STOCK SUMMARY REPORTS
for
COLUMBIA RIVER ANADROMOUS SALMONIDS

Volume III: Washington Subbasins below McNary Dam

for
THE COORDINATED INFORMATION SYSTEM

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PREFACE

An essential component of the effort to rebuild the Columbia Basin's anadromous fish resources is that available information and experience be organized and shared among numerous organizations and individuals. Past experience and knowledge must form the basis for actions into the future. Much of this knowledge exists only in unpublished form in agency and individual files. Even that information which is published in the form of technical and contract reports receives only limited distribution and is often out of print and unavailable after a few years. Only a small fraction of the basin's collective knowledge is captured in permanent and readily available databases (such as the Northwest Environmental Database) or in recognized journals.

State, tribal, and federal fishery managers have recognized these information management problems and have committed to a program, the Coordinated Information System Project, to capture and share more easily the core data and other information upon which management decisions are based. That project has completed scoping and identification of key information needs and development of a project plan. Work performed under the CIS project will be coordinated with and extend information contained in the Northwest Environmental Database. Construction of prototype systems will begin in Phase 3.

This report is one in a series of seven describing the results of the Coordinated Information System scoping and needs identification phase. A brief description of each of these reports follows.

CIS Phase II Products

Phase II Summary Report

This report (Roger 1992) summarizes and integrates the results of the next five reports and relates them to deliverables identified in the Phase II cooperative agreement. Broader issues of organization and operation which are not appropriate for the more focused reports are also discussed. This report should be viewed as an executive summary for the CIS project to date. If one wants a quick overview of the CIS project, this report and the project plan will provide that perspective.

Report on Information Needs

This report (Weber et al. 1992) identifies the core information needed to plan, implement, monitor, and evaluate projects to manage and restore anadromous fish. This information has been organized into various categories and missing items are identified. Prototype testing in Phase 3 will focus on this core information.

Data Catalog Report

This report (O'Connor et al. 1992) might be thought of as a "yellow pages" directory describing relevant numeric data available throughout the basin. An easily searched electronic version will be developed during prototype development and the catalog will be maintained and expanded.

VOLUME III

TABLE OF CONTENTS

Technical and Administrative Options Report

This report (Allen et al. 1992) describes a process for implementing the CIS and feasible hardware, software, and operational options. Recommendations are made for the prototype and implementation phases of the project.

Library Resource Options Report

This report (Roseberry 1992) describes options for the size and operational features for the non-numeric portion of the CIS. Recommendations are made for the prototype and implementation phases.

Stock Summary Reports

These reports (Olsen et al. 1992; Hymer et al. 1992; Kiefer et al. 1992) are available in five separate volumes for Oregon (2), Washington (2), and Idaho (1). The reports contain basic biologic information on anadromous fish populations in the Columbia Basin. This information will be incorporated into computerized data bases during prototyping and implementation and will be updated annually.

Project Plan

The Project Plan (Roger et al. 1992) is derived directly from recommendations from the above reports. It describes anticipated activities, staff needs, and cost of the project for the testing and implementation phases.

ACKNOWLEDGEMENTS

Many thanks are due to the numerous people who contributed to the preparation of the information contained in this report. Those from the Washington Department of Fisheries included Lisa Harlan, Bob Woodard, Steve Campbell, Bill Kinney, Ken Keller, Wolf Dammers, and Dick O'Connor. Those from the Washington Department of Wildlife included Brodie Cox and Dan Fender. Helen Morrison and AM Roseberry of the Columbia River Inter-Tribal Fish Commission worked on the draft and final documents, and Phil Roger, CIS project leader, saw it through to completion.

INTRODUCTION

Purpose of the Report.

These volumes update the Stock Assessment Report (SAR) published in 1985 (Howell et al.). They have been enlarged partially in response to Northwest Power Planning Council comments concerning the 1985 report. The volumes are new in their format and an annual updating and refining of their information is anticipated. The volumes include both genetic information such as electrophoretic profiles, and non-genetic information. Non-genetic items include the abundance of populations, number of smolts released or outmigrating, and number of adults caught in the subbasin, etc.

The reports are divided into subbasin chapters composed of sections reporting the species of salmon and steelhead present, and their production type (natural and/or hatchery). Within each subbasin, the species are listed in the following order, if present:

spring chinook
summer chinook
fall chinook
coho
chum
sockeye
summer steelhead
winter steelhead

Within each species, naturally produced fish are listed before hatchery produced fish and early run types before late run types.

It should not be presumed that the geographical scale of these units is of biological significance. The subbasins used were the same as those units defined in the Columbia Basin Subbasin Planning Process. Some agencies chose to summarize data in finer geographic sub-divisions. The use of the word "stock" in the title "Stock Summary Report" refers to these geographic subbasin units, and does not presuppose any evolutionary significance. As in the 1985 SAR, the information varies from specific conclusions based on substantial data, to general statements which have not been verified. The standards established and agreed upon by the contributors may have not yet been met in all categories by the authors.

Desired Qualities in Stock Assessment Data.

These data should be used with caution if used to compare subbasin populations. A description of how the data was collected and summarized follows in the methods section, and the reader is urged to contact the primary authors for further clarification.

The methods of comparing stock data may vary, but there are certain qualities such data should have. A calibration of the effects the environment has on the traits described would also give analyses more meaning. For example, the environmental influences of temperature, size and timing of release or outmigration, and harvest may all influence the observed age composition of a brood.

Life history differences between stocks should not be artifacts of year-to-year variations in abundance. This is one reason information was reported in the brood year format. Multiple year class data were reported so the magnitude of a trait's temporal variation might be assessed.

Brood Year Format

The brood year format was used in the majority of the standard tables as a way of tracking the progeny of a season's spawners (a cohort). For instance, 1987 brood coho salmon came from adults that spawned in the fall of 1987. As juveniles, these coho might not have migrated until the spring of 1989. The 1987 brood jacks (two year olds) returned and were accounted for in the fall of 1989. The remaining adults returned and were accounted for in 1990. Thus, a 1987 brood year entry in a coho table is in fact current through 1990 returns. Similarly, a complete accounting of a chinook salmon brood may take six years. In such a case, the 1984 brood would be the latest brood fully reportable with 1990 return year data (reporting up to the 1990 run year was mimimum goal for these reports).

Authorship

Information contained in this volume represents the work of several agencies. The Washington Department of Wildlife (WDW) compiled the steelhead reports. The Washington Department of Fisheries (WDF) compiled the chinook, coho, sockeye, and chum salmon reports for all subbasins except the Yakima, which was compiled by Columbia River Inter-Tribal Fish Commission (CRITFC) staff. The views represented in this volume are those of the agencies compiling the information, and do not necessarily represent the views of other CIS participants. Portions of the information in this report are reported in standard formats developed by the CIS participants. CRITFC provided coordinating services to provide consistency among the five Stock Summary Report volumes. This report includes all data received from the agencies by September 30, 1992.

METHODS

Following Howell et al.'s methodology (1985), published and unpublished anadromous fish data derived from both a literature review and contacts with biologists and hatchery personnel were summarized by subbasin. This report includes all of that information which could be located and fit into a set of standardized tables. The agencies were free to introduce these tables in the order they found appropriate to the following major text headings:

Geographic Location
(A brief description of the subbasin)
Origin
(Source of brooclstock or eggs for hatchery stocks, history of hatchery stock introductions)
Distribution
(The distribution of the species in the subbasin)
Production
Adult Life History
Juvenile Life History
Biochemical-Genetic Characteristics
Diseases
References

Ten categories of information based on the Northwest Power Planning Council comments on the 1985 SAR were addressed. A list of the standard tables developed to address these categories, and a key to the two letter codes used to identify them throughout the document, follows at the end of this section.

1. Species and Strain

Maps were used to depict spawning, rearing, and hatchery locations for at least one anadromous species per subbasin. A complete set of these maps may be found in the 1990 Subbasin Production Plans.

2. Timing of Runs

Charts also developed for the 1990 Subbasin Production Plans were used to depict the freshwater life history of the salmon and steelhead. Peak dates were added when available. Available information that related to adult migration timing (such as jaw tags, radio telemetry, pit tags, freeze brands) was summarized. These timing charts also addressed incubation, rearing, and emergence times.

3. Disease Status and Tolerance

Diseases with management importance, as defined by the Model Comprehensive Fish Health Protection Program for the Pacific Northwest (Wold et al. 1987), were listed in the standard table coded "TD". These diseases are generally those that restrict stock transfers. In some cases agencies reported more comprehensive lists. Any known subbasin specific information on resistance or treatment response was cited in the text.

4. Stock Size, Stock Recruitment

Accounting for the number of recruits per spawner first requires an estimate of the total number of spawners. Age-specific return data for a series of years is then needed to track the recruits. Standard age composition table code "RN" reports a breakdown of spawner escapement by total age. Age specific estimates of sport catch (code RS), hatchery rack (code RH), and subbasin totals (code RB), were also generated when possible.

In the special case of summer steelhead, the total age assigned may have been the eventual total age of the fish at maturity in the spring. Steelhead needing such a projected total age might include steelhead non-lethally sampled in August at a weir or ladder during the first calendar year of their two year run span. These fish would not be spawning until the following spring. Such data was only reported if it was considered an adequate sample for describing the age composition of the run at maturity.

Estimates of the total number of smolts were included in standard table (code JM) that reports outmigration totals by season and brood year.

5. Freshwater and Ocean Migration Characteristics

Residualism was described in tables of age composition (code AC) that included freshwater age. Anything known about non-anadromous populations existing in sympatry with anadromous forms was discussed in the text.

Ocean and river distribution data are, with few exceptions, only available from coded wire tags recovered during fisheries not designed to scientifically sample distribution. This report focused on providing a subbasin specific guide to the available coded wire tag groups, including their number and size at release (table code TR). Numerous reports available from the Pacific States Marine Fisheries Commission and the Pacific Salmon Commission detail aspects of time and place of recovery for any coded wire tag code of interest.

6. Survival and Fecundity

Actual measurements of survival by life stage are extremely rare and most subbasin specific data are described in a text format.

Fecundity data are also rare, and infrequently measured even in hatcheries. When such data was available, it was reported in standard table "AF." Fecundity data are usually a measure of total egg take divided by the number of females spawned. Sometimes the total egg take figure itself is based on old fecundity estimates multiplied by the number of females.

The proportion of females in a brood's various age classes are reported in a table coded "AS". The "Total % Female" value in this table is based on the age composition of a brood, weighted by the "% Female" in each age class (unless otherwise stated). For example, if 10% of a coho brood returned at two years of age, the rest as three year olds, all of the jacks were male, and fifty percent of the adults were female, then:

$$(.10 \times .00) + (.90 \times .50) = .45$$

Forty-five percent of the accounted for brood was female.

The "N" reported in this table is the sum of the fish belonging to the brood that were actually aged and sexed.

7. Age and Size Composition, Life Stage Timing

The timing of early life stages was reported in charts developed for the Subbasin Production Plans. These charts (coded TT) depict the freshwater life history of the salmon and steelhead.

Length was the most universally measured parameter of smolt size. Mean length, range, and sample size basis were displayed for outmigrating smolts (table code SL). Such data may reflect rearing conditions or the timing of outmigration sampling, therefore a reference was included directly in these tables.

The life history trait of freshwater/ocean age combinations was displayed in standard table "AC". In this and other tables, the number of years of freshwater residence is denoted by the number displayed before a decimal point. The balance of the total age in years (usually equivalent to the number of years of saltwater residence) follows the decimal point. Thus a coho jack salmon would be described as a "2.0", a three year adult a "2.1 ".

The "N" column in the table reports the sum of fish belonging to a brood that were aged. This was a crude measure of confidence, because each of the run years summed could have had a different sampling rate. Note the size of entire brood was reported elsewhere.

Adult length data was displayed utilizing the above freshwater-ocean age specific format. Methods, sample size and standard deviations are also included in standard table code "AL". Because the availability of weight data is rare, no standard tables were developed to report this data.

8. Current Rearing and Release Methods (Hatcheries)

Standard table code "TR", based on a Washington Department of Fisheries format reports most of the information concerning hatchery releases. The use of a uniform set of definitions for the 'Life Stage' at release column proved impossible, both between, and within some states. The states therefore defmed the terms they used for this table.

Outplanting was described in the hatchery release table. The reporting of all hatchery releases in the Columbia Basin in a common format, on 8.5 x 11 inch paper led to less detail than is available in the assorted source databases. Further CIS development will likely allow additional detail for this table. For instance in the 'Release Site' field, where presently only the common name of the creek or river of release is listed.

9. Anatomical and Biochemical Traits

A collection of electrophoretic tables from major published works in the Columbia Basin were collected and appear as appendices. These tables were reproduced verbatim, and reflect the nomenclature used by researchers to report allele frequencies at their time of publishing. Efforts have subsequently been made by the American Fisheries Society to standardize the reporting of this type of information. The availability of meristic data was noted for the applicable subbasins.

10. Genetic Variability, Straying

Emigration and immigration were described in a standard table format proposed by Idaho (standard

table codes AE and AI). These tables report the number of carcasses examined for coded wire tags at hatcheries and during spawning ground surveys, the number of tags recovered, and an expanded "total number estimated" based on the numbers reported by PSMFC. Approximately 4,600 individual coded wire tag codes have been released to date in the Columbia River Basin, the bulk of these into Washington and Oregon waters. Harvest recoveries were not listed in the standard form of the these tables.

Standard, and Non-standard Table Codes.

A collection of standardized tables conveyed the above information. An upper case, two letter code identifies the category of these tables. The standard table codes are as follows:

- **(HB)** NPPC habitat quality
- **(RN)** Returns back as Natural spawners.
- **(RH)** Returns back to a Hatchery. 99% of the time these are rack returns, but a few places with 100% marking have made splits between marked and unmarked fish.
- **(RT)** Tribal catch in the subbasin
- **(RS)** Sport catch in the subbasin.
- **(RB)** Subbasin grand total, (subbasin catches, natural and hatchery escapement).
- **(JM)** Number of juvenile migrants
- **(SL)** Length of smolts
- **(AC)** Age composition (freshwaterocean)
- **(AS)** Percent females by brood year and age class
- **(AL)** Mean fork length by brood year and age class
- **(AF)** Mean fecundity by brood year and age class
- **(TR)** Hatchery releases by brood year
- **(AE)** Emigration of tagged fish
- **(AI)** Immigration of tagged fish
- **(TD)** Parasites and diseases
- **(AD)** Distribution, present/potential and absence figure
- **(TT)** Subbasin plan bar chart of life stage timing

Deviations from the standard formats, (i.e. run years instead of brood years), are identified with a third lowercase letter such as: RS-a or RS-b.

Tables for categories of information without standardized formats also have a third lowercase letter, and were coded as follows:

TS-a, etc.	Survival tables, any life stage
ST-a, etc.	Non-standard Smolt Timing information
AT-a, etc.	Non-standard Adult Timing information
AH-a, etc.	Adult Harvest information, i.e. Ocean or mainstem
ET-a, etc.	Egg Take data
AW-a, etc.	Mean weight by brood year and age class
JC-a, etc.	Juvenile age Composition

REFERENCES

Howell, P. J., K. Jones, D. Scamecchia, L. LaVoy, W. Kendra, and D. Ortmann. 1985. Stock assessment of Columbia River anadromous salmonids, volumes I & II. Final report of Oregon Department of Fish and Wildlife, Washington Department of Fisheries, Washington Department of Game, and Idaho Department of Fish and Game (Project 83-335, Contract DE-AI79-84BP12737) to Bonneville Power Administration, Portland, Oregon.

Wold, E., J. Gearheard, and J. Warren. Model Comprehensive Fish Health Protection Program, Part I. Pacific Northwest Fish Health Protection Committee. January 1, 1987.

RESULTS

The results of this project are contained in five volumes.

Volume I includes the following Oregon subbasins below Bonneville Dam:

Lower Columbia
Mid-Willamette
Clackamas
Molalla
Tualatin
Coast Range
Santiam
Mckenzie
Coast Fork
Long Tom
Middle Fork
Sandy
Hood River

Volume II includes the following Oregon subbasins above Bonneville Dam:

15 Mile
Deschutes
John Day
Umatilla
Grande Roncle (incluclmg data for Washington)
Imnaha

Volume III includes the following Washington subbasins below McNary Dam:

Lower Columbia
Grays
Elochoman
cowlitz
Kalama
Lewis
Washogal
Wind
White Salmon
Klickitat

Volume IV includes the following Washington subbasins above McNary Dam:

Walla Walla (including data for Oregon)
Snake
Tucannon
Yakima
Upper Columbia
Wenatchee
Entiat
Wells
Methow
Okanoagan

Volume V includes the following Idaho subbasins:

Cleatwater
- **Mainstem**
- South Fork
- Mid Fork
- **Locksa**
- Selway

Salmon River
- Lower **Mainstem**
- Little **Salmon**
- Mid-Mainstem
- Upper **Mainstem**
- **Lemhi**
- Headwaters
- South Fork
- Pahsimeroi

The following Tables 1 through 6 summarize, by species, the presence or absence of the standardized (and some **non-standardized)** tabular data for the Washington subbasins below McNary Dam. Tables 7 through 12 cover the region above McNary Dam.

Table 1. Summary of tabular information on spring chinook salmon in ten Washington subbasins.

	Lower Columbia	Grays	Elochoman	Cowlitz	Kalama	Lewis	Washougal	Wind	White Salmon	Klickitat
HABITAT				✓	✓			✓		✓
SUBBASIN DISTRIBUTION								✓		✓
PRODUCTION										
HATCHERY RELEASES					✓	✓		✓	✓	✓
HATCHERY RETURNS				✓	✓	✓		✓		✓
SUBBASIN HARVEST										
SPORT				✓	✓	✓		✓		✓
TRIBAL										✓
ADULT LIFE HISTORY										
# SPAWNERS				✓	✓	✓				✓
TOTAL SUBBASIN RETURNS				✓	✓	✓		✓		✓
LENGTH					✓	✓		✓		
AGE COMP.				✓	✓	✓		✓		
SEX RATIO				✓	✓	✓		✓		
FECUNDITY										
IMMIGRATION				✓	✓	✓		✓		
EMIGRATION				✓				✓	✓	
JUVENILE LIFE HISTORY										
TIMING				✓						
SMOLT LENGTH										
# SMOLTS										
BIOCHEMICAL				✓	✓					
DISEASE				✓	✓	✓		✓		✓

Table 2. Summary of tabular information on fall chinook salmon in ten Washington subbasins.

	Lower Columbia	Grays	Elochoman	Cowlitz	Kalama	Lewis	Washougal	Wind	White Salmon	Klickitat
HABITAT		✓	✓	✓	✓		✓	✓	✓	✓
SUBBASIN DISTRIBUTION										
PRODUCTION										
HATCHERY RELEASES		✓	✓	✓	✓	✓	✓		✓	✓
HATCHERY RETURNS		✓	✓	✓	✓	✓	✓	✓	✓	✓
SUBBASIN HARVEST										
SPORT										
TRIBAL										
ADULT LIFE HISTORY										
# SPAWNERS		✓	✓	✓	✓	✓	✓	✓	✓	✓
TOTAL SUBBASIN RETURNS										
LENGTH		✓	✓	✓	✓	✓	✓	✓	✓	
AGE COMP.		✓	✓	✓	✓	✓	✓	✓	✓	
SEX RATIO		✓	✓	✓	✓	✓	✓	✓	✓	
FECUNDITY										
IMMIGRATION		✓	✓	✓	✓	✓	✓	✓	✓	
EMIGRATION		✓	✓	✓	✓	✓	✓			✓
JUVENILE LIFE HISTORY										
TIMING				✓			✓			
SMOLT LENGTH		✓			✓	✓	✓			
# SMOLTS					✓	✓	✓			
BIOCHEMICAL						✓				
DISEASE		✓	✓	✓	✓		✓		✓	✓

Table 3. Summary of tabular information on coho salmon in ten Washington subbasins.

	Lower Columbia	Grays	Elochoman	Cowlitz	Kalama	Lewis	Washougal	Wind	White Salmon	Klickitat
HABITAT		✓	✓	✓		✓	✓	✓		✓
SUBBASIN DISTRIBUTION										
PRODUCTION										
HATCHERY RELEASES		✓	✓	✓	✓	✓	✓	✓	✓	✓
HATCHERY RETURNS		✓	✓	✓	✓	✓	✓	✓		
SUBBASIN HARVEST										
SPORT	✓		✓							
TRIBAL										
ADULT LIFE HISTORY										
# SPAWNERS					✓					
TOTAL SUBBASIN RETURNS										
LENGTH									✓	
AGE COMP.		✓		✓	✓	✓			✓	
SEX RATIO		✓	✓						✓	
FECUNDITY		✓	✓							
IMMIGRATION		✓		✓	✓	✓	✓		✓	
EMIGRATION		✓		✓	✓	✓	✓		✓	
JUVENILE LIFE HISTORY										
TIMING										
SMOLT LENGTH										
# SMOLTS										
BIOCHEMICAL										
DISEASE		✓	✓	✓	✓	✓	✓			✓

Table 4. Summary of tabular information on chum salmon in ten Washington subbasins.

	Lower Columbia	Grays	Elochoman	Cowlitz	Kalama	Lewis	Washougal	Wind	White Salmon	Klickitat
HABITAT										
SUBBASIN DISTRIBUTION										
PRODUCTION										
HATCHERY RELEASES	✓	✓								
HATCHERY RETURNS										
SUBBASIN HARVEST										
SPORT	✓									
TRIBAL										
ADULT LIFE HISTORY										
# SPAWNERS	✓									
TOTAL SUBBASIN RETURNS										
LENGTH	✓	✓								
AGE COMP.	✓	✓								
SEX RATIO	✓	✓								
FECUNDITY										
IMMIGRATION										
EMIGRATION										
JUVENILE LIFE HISTORY										
TIMING										
SMOLT LENGTH	✓	✓								
# SMOLTS										
BIOCHEMICAL										
DISEASE										

Table 5. Summary of tabular information on summer steelhead in ten Washington subbasins.

	Lower Columbia	Grays	Elochoman	Cowlitz	Kalama	Lewis	Washougal	Wind	White Salmon	Klickitat
HABITAT				✓	✓	✓	✓	✓	✓	✓
SUBBASIN DISTRIBUTION										
PRODUCTION										
HATCHERY RELEASES			✓	✓	✓	✓	✓	✓	✓	✓
HATCHERY RETURNS				✓	✓		✓			
SUBBASIN HARVEST										
SPORT	✓		✓	✓		✓			✓	
TRIBAL										
ADULT LIFE HISTORY										
# SPAWNERS					✓			✓	✓	
TOTAL SUBBASIN RETURNS				✓	✓		✓	✓		✓
LENGTH				✓	✓		✓	✓	✓	✓
AGE COMP.				✓	✓		✓	✓	✓	✓
SEX RATIO				✓	✓		✓	✓	✓	✓
FECUNDITY				✓			✓			
IMMIGRATION				✓						
EMIGRATION										
JUVENILE LIFE HISTORY										
TIMING				✓	✓	✓	✓			
SMOLT LENGTH					✓					✓
# SMOLTS					✓					
BIOCHEMICAL					✓					
DISEASE			✓	✓	✓	✓	✓	✓		✓

Table 6. Summary of tabular information on winter steelhead in ten Washington subbasins.

	Lower Columbia	Grays	Elochoman	Cowlitz	Kalama	Lewis	Washougal	Wind	White Salmon	Klickitat
HABITAT	✓	✓	✓	✓	✓	✓	✓		✓	
SUBBASIN DISTRIBUTION		✓	✓		✓	✓				
PRODUCTION										
HATCHERY RELEASES	✓	✓	✓	✓	✓	✓	✓		✓	
HATCHERY RETURNS			✓	✓	✓					
SUBBASIN HARVEST		✓								
SPORT	✓	✓	✓	✓		✓	✓			
TRIBAL										
ADULT LIFE HISTORY										
# SPAWNERS				✓	✓					
TOTAL SUBBASIN RETURNS				✓	✓				✓	
LENGTH				✓	✓	✓				
AGE COMP.				✓	✓	✓				
SEX RATIO			✓	✓	✓					
FECUNDITY			✓	✓			✓			
IMMIGRATION				✓						
EMIGRATION				✓						
JUVENILE LIFE HISTORY										
TIMING	✓			✓	✓	✓	✓			
SMOLT LENGTH				✓	✓					
# SMOLTS				✓	✓					
BIOCHEMICAL										
DISEASE	✓	✓	✓	✓	✓	✓	✓		✓	

Table 7. Summary of tabular information on spring chinook salmon in ten Washington subbasins.

	Walla Walla	Snake	Tucannon	Yakima	Upper Columbia	Wenatchee	Entiat	Wells	Methow	Okanogan
HABITAT				✓		✓	✓		✓	
SUBBASIN DISTRIBUTION				✓						
PRODUCTION										
HATCHERY RELEASES				✓		✓	✓		✓	
HATCHERY RETURNS						✓	✓		✓	
SUBBASIN HARVEST										
SPORT						✓				
TRIBAL				✓		✓				
ADULT LIFE HISTORY										
# SPAWNERS				✓		✓	✓		✓	
TOTAL SUBBASIN RETURNS				✓		✓				
LENGTH				✓						
AGE COMP.				✓						
SEX RATIO				✓						
FECUNDITY				✓						
IMMIGRATION			✓			✓				
EMIGRATION										
JUVENILE LIFE HISTORY										
TIMING										
SMOLT LENGTH										
# SMOLTS				✓						
BIOCHEMICAL										
DISEASE										

Table 8. Summary of tabular information on summer chinook in ten Washington subbasins.

	Walla Walla	Snake	Tucannon	Yakima	Upper Columbia	Wenatchee	Entiat	Wells	Methow	Okanogan
HABITAT						✓			✓	✓
SUBBASIN DISTRIBUTION										
PRODUCTION										
HATCHERY RELEASES									✓	
HATCHERY RETURNS										
SUBBASIN HARVEST										
SPORT										
TRIBAL										
ADULT LIFE HISTORY										
# SPAWNERS						✓			✓	✓
TOTAL SUBBASIN RETURNS										
LENGTH										
AGE COMP.										
SEX RATIO										
FECUNDITY										
IMMIGRATION										
EMIGRATION										
JUVENILE LIFE HISTORY										
TIMING										
SMOLT LENGTH										
# SMOLTS										
BIOCHEMICAL										
DISEASE										

Table 9. Summary of tabular information on fall chinook salmon in ten Washington subbasins.

	Walla Walla	Snake	Tucannon	Yakima	Upper Columbia	Wenatchee	Entiat	Wells	Methow	Okanogan
HABITAT				✓						
SUBBASIN DISTRIBUTION										
PRODUCTION				✓						
HATCHERY RELEASES		✓		✓	✓					
HATCHERY RETURNS					✓					
SUBBASIN HARVEST										
SPORT					✓					
TRIBAL										
ADULT LIFE HISTORY										
# SPAWNERS					✓					
TOTAL SUBBASIN RETURNS				✓						
LENGTH				✓	✓					
AGE COMP.		✓			✓					
SEX RATIO		✓			✓					
FECUNDITY										
IMMIGRATION		✓		✓	✓					
EMIGRATION					✓					
JUVENILE LIFE HISTORY										
TIMING										
SMOLT LENGTH										
# SMOLTS				✓						
BIOCHEMICAL										
DISEASE		✓			✓					

Table 10. Summary of tabular information on coho salmon in ten Washington subbasins.

	Walla Walla	Snake	Tucannon	Yakima	Upper Columbia	Wenatchee	Entiat	Wells	Methow	Okanogan
HABITAT				✓						
SUBBASIN DISTRIBUTION										
PRODUCTION										
HATCHERY RELEASES				✓						
HATCHERY RETURNS										
SUBBASIN HARVEST										
SPORT										
TRIBAL										
ADULT LIFE HISTORY										
# SPAWNERS										
TOTAL SUBBASIN RETURNS										
LENGTH										
AGE COMP.										
SEX RATIO										
FECUNDITY										
IMMIGRATION										
EMIGRATION										
JUVENILE LIFE HISTORY										
TIMING										
SMOLT LENGTH										
# SMOLTS										
BIOCHEMICAL										
DISEASE										

Table 11. Summary of tabular information on sockeye salmon in ten Washington subbasins (the Okanogan subbasin still to be completed).

	Walla Walla	Snake	Tucannon	Yakima	Upper Columbia	Wenatchee	Entiat	Wells	Methow	Okanogan
HABITAT										
SUBBASIN DISTRIBUTION										
PRODUCTION										
HATCHERY RELEASES										
HATCHERY RETURNS										
SUBBASIN HARVEST										
SPORT										
TRIBAL										
ADULT LIFE HISTORY										
# SPAWNERS						✓				✓
TOTAL SUBBASIN RETURNS										
LENGTH										
AGE COMP.										
SEX RATIO										
FECUNDITY										
IMMIGRATION										
EMIGRATION										
JUVENILE LIFE HISTORY										
TIMING										
SMOLT LENGTH										
# SMOLTS										
BIOCHEMICAL										
DISEASE										

Table 12. Summary of tabular information on summer steelhead in ten Washington subbasins.

	Walla Walla	Snake	Tucannon	Yakima	Upper Columbia	Wenatchee	Entiat	Wells	Methow	Okanogan
HABITAT	✓	✓	✓	✓		✓	✓		✓	✓
SUBBASIN DISTRIBUTION	✓		✓			✓				
PRODUCTION										
HATCHERY RELEASES	✓	✓	✓	✓		✓	✓	✓	✓	✓
HATCHERY RETURNS								✓		
SUBBASIN HARVEST										
SPORT	✓						✓			
TRIBAL										
ADULT LIFE HISTORY										
# SPAWNERS										
TOTAL SUBBASIN RETURNS		✓	✓	✓		✓			✓	✓
LENGTH	✓	✓	✓	✓			✓	✓	✓	✓
AGE COMP.	✓	✓	✓	✓		✓	✓	✓	✓	✓
SEX RATIO	✓	✓		✓			✓		✓	✓
FECUNDITY	✓	✓	✓	✓					✓	
IMMIGRATION	✓		✓							
EMIGRATION	✓	✓	✓							
JUVENILE LIFE HISTORY										
TIMING	✓		✓							
SMOLT LENGTH		✓	✓	✓					✓	✓
# SMOLTS			✓	✓					✓	
BIOCHEMICAL										
DISEASE	✓	✓	✓	✓		✓	✓	✓		✓

LOWER COLUMBIA SUBBASIN

Chum Salmon

GEOGRAPHIC LOCATION

The Lower Columbia River Subbasin encompasses the Columbia River from its mouth to Bonneville Dam at RM 146, including tributaries that are not covered by individual subbasins of their own. Tributaries not covered in other subbasins that historically contributed significantly to the total production of chum from the Columbia River include the Chinook and Deep Rivers, Crooked, Jim Crow, Skamokawa, Mill, Abernathy, Germany, Coal, Salmon, Duncan, Hardy and Hamilton creeks.

The Chinook River enters the Columbia River at River Mile (RM) 4, three miles east of the town of Chinook. Deep River enters the Columbia at RM 20 on Grays Bay. Smaller tributaries that enter the Columbia and supported chum runs include Crooked Creek (RM 21 one mile east of the Grays River), and Jim Crow Creek (RM 29 at the town of Brookfield, Washington). The headwaters of both Crooked and Jim Crow Creeks originate on Elk Mountain. Skamokawa Creek enters the Columbia at RM 33, Mill Creek at RM 54 just east of Oak Point, Abernathy Creek at RM 54, Germany Creek at RM 56 near the town of Stella, Coal Creek at RM 60, Salmon Creek at RM 87 about 10 miles west of Vancouver, Hardy and Hamilton creeks both at RM 142. A former production area in lower Duncan Creek was reduced to minor importance by a dam built in 1964 (WDF, 1973). Tributaries lumped into this subbasin vary widely in size and character. Most of these streams are relatively short in length with Jim Crow the shortest at 5 miles and Salmon Creek the longest at 26 miles in length. Most of these areas except Hardy and Hamilton Creeks have only small runs, if any, at present (WDF, 1973).

Sea Resources and the Abernathy Hatchery have both developed runs of chum. Sea Resources Hatchery is located on the Chinook River.

ORIGIN

Chum are native to the lower Columbia River tributaries. However, due to low numbers of native chum, Hood Canal and Willipa Bay stocks have been used for supplementation including fry releases from egg boxes on Abernathy, Germany, and Skamokawa Creeks and eyed egg plants into Hamilton Springs, a tributary of Hamilton Creek (Allen, 1983). Hood Canal stock eggs were used because native Columbia River stock eggs were hard to find in significant numbers. Based on subsequent spawning ground surveys, success of these programs seems to be minor. Howell et al. (1985) report a run of chum developed from Willapa Bay stock (Nemah River) at the private Sea Resources Hatchery. The first chum egg collection at Chinook River was in 1918 (WDF, 1951). Sea Resources Hatchery began operation in 1895. The 1986 brood egg box program at Abernathy Hatchery utilized Willapa Bay chum (Fiscus, 1991).

DISTRIBUTION

Chum salmon are found in the lower sections of tributaries flowing into the Columbia River below Bonneville Dam. Primary wild production areas where annual stream surveys are conducted include the Grays River subbasin and Hardy and Hamilton Creeks.

PRODUCTION

Chum runs throughout the Columbia River drainage have declined drastically from their former abundance. Washington Department of Fisheries estimated escapement of chum in some lower Columbia River tributaries in 1951. Those estimates include Abernathy (300), Coal (400), Mill and Germany (both 1,000), Crooked and Jim Crow (1,200), Skamokawa (3,000) and Salmon Creek to Bonneville (4,000). Today the composite Columbia River run is reduced to less than 0.5 percent of historic levels with returns averaging in the neighborhood of 2,000 fish (NPPC, 1986). Habitat degradation caused by forest and agricultural practices, urbanization and pollution, along with heavy fishing mortality contributed to the decline (WDF, 1990). The outlook for Columbia River chum is not good (Chaney and Perry, 1976) since the runs have not responded to reduced fishing exploitation (Fulton, 1970).

The number of chum spawning annually in the area near Bonneville Dam, chiefly in Hardy and Hamilton Creeks, averaged about 1,000 fish from 1967 - 1971 (WDF, 1973). Hardy Creek chum natural spawn escapement from 1979 - 1985 brood years averaged 205 ranging from a low of 10 for the 1979 brood to a peak of 802 for the 1984 brood. Hardy Creek chum natural spawn escapements by age and brood year are listed in Table 1.

Hamilton Creek natural spawn escapement from 1979 - 1985 brood years averaged 111 ranging from a low of 15 for the 1979 brood and a peak of 359 for the 1982 brood. Hamilton Creek chum natural spawn escapements by age and brood year are listed in Table 2.

Sea Resources Hatchery chum returns from 1986 - 1990 return years were 74, 92, 345, 247, and 1,055 fish, respectively. However, Sea Resources chum returns by age and brood year are unavailable.

Abernathy Hatchery chum returns in 1990 were 142 fish. In addition, an estimated 100 fish spawned naturally in Abernathy Creek in 1990. Two complete surveys were made in 1990 to document the natural spawning from 1986 brood Willapa Ray stock chum released from the Abernathy egg box program. The 1990 natural spawn counts were well above the recent years background levels. These levels for 9 of the 10 years between 1980 and 1989, averaged less than one chum during single spawning ground surveys on the lowermost 0.4 miles of Abernathy Creek (Fiscus, 1991).

No sport harvest of chum occurs in the smaller Lower Columbia River tributaries.

ADULT LIFE HISTORY

Run size, catch and escapement

Chum salmon are not generally harvested in the ocean commercial and recreational fisheries. A few fish have been caught off of central Alaska (Johnson et al. 1976).

Maximum historical chum landings for the Columbia River have been estimated as high as 697,000 fish in 1928 (Northwest Power Planning Council, 1986). In 1942, landings were 425,000 fish but by 1955 they had diminished to 10,000 fish. Since 1965, commercial landings have been less than 2,000 fish annually (Columbia Fish Runs and Fisheries, 1988). There is no data with which to determine what portion of these catches were from specific tributaries. Historically chum were harvested in the mainstem by a variety of methods. Today chum are harvested in mainstem gill net fisheries as incidental catch during late fall seasons targeting on late coho. Local biologists familiar

with the fisheries and spawning ground assessments in Washington suggest the harvest rate may approximate 35 to 50 percent (WDF, 1990). No freshwater recreational harvest occurs in the lower Columbia River tributaries.

Lower Columbia River chum have not been coded wire tagged and there have been no stray tag recoveries in the Lower Columbia River subbasin.

Time of Migration

Adults migrate into the Columbia River from mid-October through November (WDF, 1990).

Spawning Period

Peak spawner counts generally occur in mid-December in Hardy and Hamilton Creeks (Howell et al. 1985).

Spawning Areas

Chum salmon are found in the lower sections of tributaries flowing into the Columbia River below Bonneville Dam. Wild production areas where annual stream surveys are conducted include the lower 0.7 miles of Hardy Creek and the lower 1.0 miles of Hamilton Creeks.

Age composition

Chum return as three-year-old to six-year-old adults with three-year-old and four-year-olds usually the dominant age classes. Columbia River chum do not return as two-year-old jacks (Howell et al. 1985). Tables 3 and 4 list the age composition percentages by brood year and freshwater.ocean rearing for chum returning to Hardy and Hamilton Creek spawning grounds, respectively.

Sex ratio

Females comprised 47 - 67 percent of the chum returning to Hardy Creek spawning grounds between 1979 - 1985 brood years. The percent females by brood year and freshwater.ocean rearing ages for Hardy Creek natural spawners are presented in Table 5.

Females comprised 27 - 67 percent of the chum returning to Hamilton Creek spawning grounds between 1979 - 1985 brood years. The percent females by brood year and freshwaterocean rearing ages for Hamilton Creek natural spawners are presented in Table 6.

The mean fork length by brood year, sex, and freshwaterocean rearing ages of Hardy and Hamilton Creek natural spawners for 1977 - 1987 brood years are available in Tables 7 and 8.

Fecundity

Fecundity averaged 2,241 eggs per female at Sea Resources Hatchery on the Chinook River between 1984 - 1987 (Howell et al. 1985). Other fecundity data is not available.

JUVENILE LIFE HISTORY

Time of Emergence

Time of emergence is estimated to be early spring; mid March to early April.

Time. age and size at migration

Juvenile chum migrate to sea as zero-age smolts (Hart, 1973). Skamokawa Creek 1978 brood chum averaged 38 mm and ranged from 36 - 40 mm. Table 9 lists the lengths of juvenile chum from stick seining Skamokawa Creek between March 16 - May 18, 1979. Length data of other natural chum smolts is unavailable. The number of natural juvenile chum salmon that migrate from the Lower Columbia River tributaries is also unavailable. Hatchery release information is available in Table 10.

Survival Rate

Survival rate information is unavailable.

BIOCHEMICAL-GENETIC CHARACTERISTICS

Data has not been compiled.

DISEASE

Bacteria and parasitic diseases found in the Lower Columbia River tributaries are unavailable.

Table 1 (RN-l). Total natural escapement of chum in Hardy Creek by brood year.

Brood Year	Total Age 3	4	5	Total	Adult Total
1976					
1977			0		
1978		311	20		
1979	10	0	0	10	10
1980	151	95	3	249	249
1981	21	14	0	35	35
1982	86	89	18	193	200
1983	0	115	12	127	193
1984	162	640	0	802	802
1985	15	7	0	22	22
1986	7	164			
1987	13				
1988					

Age based on scale reading analysis.

Table 2 **(RN-2).** Total natural escapement of chum returning to Hamilton Creek by brood year.

Total Age

Brood Year	3	4	5	Total	Adult Total
1976					
1977			0		
1978		239	16		
1979	7	8	0	15	15
1980	33	41	0	74	74
1981	31	14	5	50	50
1982	105	231	23	359	359
1983	9	42	4	55	55
1984	34	157	5	196	196
1985	6	24	0	30	30
1986	9	65			
1987	2				
1988					

Age by scale reading analysis.

Table 3 (AC-l). Age composition percentage (freshwater.ocean) by brood year for chum spawning naturally in Hardy Creek.

Brood Year	N	Age Composition (%) 0.3	0.4	0.5
1978				
1979	3	1.00	0	0
1980	47	60.64	38.15	1.20
1981	10	60.00	40.00	0
1982	44	44.56	46.11	9.33
1983	62	0	90.55	9.45
1984	247	20.20	79.80	0
1985	6	68.18	31.82	0
1986				
1987				
1987				
1988				

Age based on scale reading analysis.

Table 4 (AC-2). Age composition percentage (freshwater. ocean) by brood year for chum spawning naturally in Hamilton Creek.

Brood Year	N	Age Composition (%) 3	4	5
1978				
1979	5	46.67	53.33	0
1980	21	44.59	55.41	0
1981	16	62.00	28.00	10.00
1982	140	29.25	64.35	6.41
1983	26	16.36	76.36	7.27
1984	92	17.35	80.10	2.55
1985	8	20.00	80.00	0
1986				
1987				
1988				

Age based on scale reading analysis.

Table 5 (AS-l). Percent females by brood year and age class **(freshwater.ocean)** for chum spawning naturally in Hardy Creek.

% Females

Brood Year	N	0.3	0.4	0.5	Total % Females
1978					
1979	3	66.67	0	0	66.67
1980	27	47.83	65.22	1.00	57.45
1981	5	60.00	40.00	0	50.00
1982	23	40.00	55.50	66.67	52.27
1983	29	0.00	47.46	33.33	46.77
1984	130	56.63	50.61	0	52.63
1985	4	1.00	0	0	66.67
1986		1.00	35.29		
1987		1.00			
1988					

Age based on scale reading analysis.

Table 6 (AS-2). Percent females by brood year and age class (freshwater.ocean) for chum spawning naturally in Hamilton Creek.

% Females

Brood Year	N	0.3	0.4	0.5	Total % Females
1978					
1979	3	66.67	50.00	0	60.00
1980	14	87.50	53.85	0	66.67
1981	7	50.00	50.00	0	43.75
1982	79	60.00	56.57	45.45	56.43
1983	7	25.00	30.00	0	26.92
1984	55	68.75	58.67	0	59.78
1985	5	33.33	80.00	0	62.50
1986		50.00	64.52		
1987		1.00			
1988					

Age based on scale readiig analysis.

Table 7 (AL-a). Mean fork length by brood year and age class (freshwater.ocean) for female chum spawning naturally in Hamilton and Hardy Creeks.

Mean Fork Length (cm)

Brood Year	0.3	0.4	0.5
1978		71	74
N		57	5
St. Dev.		4.00	1.50
1979	63	75	
N	1	1	
St. Dev.	---	---	
1980	67	73	74
N	18	20	1
St. Dev.	3.90	3.30	---
1981	62	73	
N	1	4	
St. Dev.	---	2.60	
1982	66	73	75
N	30	20	10
St. Dev.	7.00	3.30	5.00
1983	62	69	75
N	1	75	1
St. Dev.	---	4.40	---
1984	65	69	
N	59	129	
St. Dev.	4.90	3.90	

Table 7 (cont.) Mean fork length by brood year and age class (freshwater.ocean) for female chum spawning naturally in Hamilton and Hardy Creeks.

Mean Fork Length (cm)

Brood Year	0.3	0.4	0.5
1985	64	72	
N	5	4	
St. Dev.	2.70	4.60	
1986	68	70	
N	3	38	
St. Dev.	7.80	3.80	
1987	63		
N	5		
St. Dev.	3.10		

Age based on scale reading analysis.

Table 8 (AL-b). Mean fork length by brood year and age class (freshwater.ocean) for male chum spawning naturally in Hamilton and Hardy Creeks.

Mean Fork Length (cm)

Brood Year	0.3	0.4	0.5
1978		82	84
N		43	2
St. Dev.		3.60	1.40
1979	70	89	82
N	2	1	1
St. Dev.	9.20	---	
1980	78	80	
N	13	17	
St. Dev.	4.20	2.90	
1981	76	78	82
N	1	5	1
St. Dev.	---	4.10	---
1982	72	80	84
N	30	17	10
St. Dev.	3.00	2.90	5.20
1983	76	78	86
N	1	75	4
St. Dev.	---	4.70	5.60
1984	72	78	79
N	43	111	1
St. Dev.	5.80	5.00	---

Table 8 (cont.). Mean fork length by brood year and age class (freshwater.ocean) for male chum spawning naturally in Hamilton and Hardy Creeks.

Mean Fork Length (cm)

Brood Year	0.3	0.4	0.5
1985	77	80	
N	2	3	
St. Dev.	3.50	1.20	
1986	70	80	
N	1	44	
St. Dev.	---	4.40	
1987			
N			
St. Dev.			

Age based on scale reading analysis.

Table 9 (SL). Lengths of juvenile chum salmon from Skamokawa Creek, 1979.

Location and year	No. Fish	Length ave. (mm)	Length range (mm)	Reference
Standardand McDonald Creek to mouth, 1979	10	38.0	36-40	"Spring seining of 1978 brood wild fall chinook juveniles on the Kalama River, Grays River, and Skamakawa Creek. WDF memorandum from Nancy Bluestein to Don McIsaac, December 11, 1979.

Six stick seining trips were made on Skamokawa Creek between March 16-May 18, 1979. Though the seining trips were primarily to evaluate fall chinook natural production, chum were also enumerated and a subsample was measured. Average length and range may reflect rearing and/or outmigration size patterns.

Table 10 (TR). Hatchery releases of Chum salmon into the Lower Columbia mainstem sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1969	NEMAH RIVER	CHINOOK RIVER	FeFry	03/10/70	03/10/70	744	50265	CHINOOK R (25.1001)	UNTAGGED
1971	UNKNOWN STOCK	SEA RESOURC NET PENS	FeFry	04/05/72	04/05/72	613	24538	CHINOOK R (25.1001)	UNTAGGED
1971	UNKNOWN STOCK	SEA RESOURC NET PENS	FeFry	04/05/72	04/05/72	567	17469	CHINOOK R (25.1001)	UNTAGGED
1972	BEAR RIVER	SEA RESOURC NET PENS	FeFry	04/12/73	04/12/73	331	74910	CHINOOK R (25.1001)	UNTAGGED
1972	CHINOOK RIVER	SEA RESOURC NET PENS	FeFry	04/24/73	04/24/73	375	14250	CHINOOK R (25.1001)	UNTAGGED
1973	UNKNOWN STOCK	SEA RESOURC NET PENS	FeFry	04/19/74	04/19/74	210	66423	CHINOOK R (25.1001)	UNTAGGED
1973	UNKNOWN STOCK	SEA RESOURC NET PENS	FeFry	04/22/74	04/22/74	207	3927	CHINOOK R (25.1001)	UNTAGGED
1977	UNKNOWN STOCK	LOWER COL R GILLNETT	EmFry	04/01/78	04/01/78	1260	40000	CRIPPEN CREEK (25)	UNTAGGED
1977	UNKNOWN STOCK	SEA RESOURC NET PENS	FeFry	04/07/78	04/07/78	352	53000	CHINOOK R (25.1001)	UNTAGGED
1978	UNKNOWN STOCK	LOWER COL R GILLNETT	EmFry	04/01/79	04/01/79	1031	72000	CRIPPEN CREEK (25)	UNTAGGED
1978	UNKNOWN STOCK	SEA RESOURC NET PENS	FeFry	04/17/79	04/17/79	346	13125	CHINOOK R (25.1001)	UNTAGGED
1979	FINCH CREEK (16)	LOWER COL R GILLNETT	EmFry	04/01/80	04/01/80	1194	90000	CRIPPEN CREEK (25)	UNTAGGED
1979	CHINOOK RIVER	SEA RESOURC NET PENS	FeFry	04/08/80	04/08/80	324	6464	CHINOOK R (25.1001)	UNTAGGED
1980	FINCH CREEK (16)	LOWER COL R GILLNETT	EmFry	04/01/81	04/01/81	1055	38304	SKAMOKAWA CR 25.0194	UNTAGGED
1980	CHINOOK RIVER	SEA RESOURC NET PENS	FeFry	03/12/81	03/12/81	597	23213	CHINOOK R (25.1001)	UNTAGGED
1980	CHINOOK RIVER	SEA RESOURC NET PENS	FeFry	03/12/81	03/12/81	405	21000	CHINOOK R (25.1001)	UNTAGGED
1981	HOOD CANAL X ELLSWOR	GERMANY CREEK	EmFry	04/01/82	04/01/82	1008	60000	GERMANY CR (25.0313)	UNTAGGED
1981	HOOD CANAL X ELLSWOR	LOWER COL R GILLNETT	EmFry	04/01/82	04/01/82	1008	80000	SKAMOKAWA CR 25.0194	UNTAGGED
1981	CHINOOK RIVER	SEA RESOURC NET PENS	FeFry	02/26/82	02/26/82	657	56100	CHINOOK R (25.1001)	UNTAGGED
1981	HOOD CANAL X ELLSWOR	UNSPECIFIED EGG BOX	EmFry	04/01/82	04/01/82	1008	625000	ABERNATHY CR 25.0297	UNTAGGED
1982	FINCH X FORKS	LOWER COL R GILLNETT	EmFry	03/30/83	03/30/83	401	100000	CRIPPEN CREEK (25)	UNTAGGED
1982	CHINOOK RIVER	SEA RESOURC NET PENS	FeFry	02/26/83	02/26/83	677	160317	CHINOOK R (25.1001)	UNTAGGED
1982	ELLSWORTH CREEK	UNSPECIFIED EGG BOX	EmFry	02/15/83	02/15/83	1008	65000	GERMANY CR (25.0313)	UNTAGGED
1982	ELLSWORTH CREEK	UNSPECIFIED EGG BOX	EmFry	02/15/83	02/15/83	1008	60000	SKAMOKAWA CR 25.0194	UNTAGGED
1983	CHINOOK RIVER	SEA RESOURC NET PENS	FeFry	03/02/84	03/02/84	639	30875	CHINOOK R (25.1001)	UNTAGGED
1984	CHINOOK RIVER	SEA RESOURC NET PENS	EmFry	03/01/85	03/01/85	1031	10322	CHINOOK R (25.1001)	UNTAGGED
1984	CHINOOK RIVER	SEA RESOURC NET PENS	FeFry	02/19/85	02/19/85	1008	52200	CHINOOK R (25.1001)	UNTAGGED
1984	CHINOOK RIVER	SEA RESOURC NET PENS	FeFry	03/24/85	03/24/85	605	44630	CHINOOK R (25.1001)	UNTAGGED
1984	FINCH CREEK (16)	UNSPECIFIED EGG BOX	EmFry	03/01/85	03/01/85	1512	90500	ABERNATHY CR 25.0297	UNTAGGED
1985	CHINOOK RIVER	SEA RESOURC NET PENS	FeFry	04/01/86	04/01/86	498	48400	CHINOOK R (25.1001)	UNTAGGED
1985	NASELLE RIVER	SEA RESOURC NET PENS	FeFry	04/02/86	04/02/86	498	291780	CHINOOK R (25.1001)	UNTAGGED
1985	NASELLE RIVER	SEA RESOURC NET PENS	FeFry	04/03/86	04/03/86	498	113369	CHINOOK R (25.1001)	UNTAGGED
1986	NEMAH RIVER	SEA RESOURC NET PENS	FeFry	02/25/87	02/25/87	597	130000	CHINOOK R (25.1001)	UNTAGGED
1986	NEMAH RIVER	SEA RESOURC NET PENS	FeFry	03/14/87	03/14/87	574	115000	CHINOOK R (25.1001)	UNTAGGED
1987	CHINOOK RIVER	SEA RESOURC NET PENS	FeFry	04/12/88	04/12/88	300	50000	CHINOOK R (25.1001)	UNTAGGED
1987	CHINOOK RIVER	SEA RESOURC NET PENS	FeFry	04/12/88	04/12/88	300	50000	CHINOOK R (25.1001)	UNTAGGED
1988	CHINOOK RIVER	SEA RESOURC NET PENS	FeFry	03/31/89	03/31/89	401	161000	CHINOOK R (25.1001)	UNTAGGED
1989	CHINOOK RIVER	SEA RESOURC NET PENS	FeFry	03/15/90	03/15/90	449	363000	CHINOOK R (25.1001)	UNTAGGED

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LOWER COLUMBIA RIVER

Naturally Produced Winter Steelhead

GEOGRAPHIC LOCATION

The Lower Columbia River forms the border between Oregon and Washington and although the drainage of this subbasin includes tributaries within both Oregon and Washington, this report will focus only on Lower Columbia tributaries within Washington. The Lower Columbia is defined as the Columbia River from its mouth to the Bonneville Dam at river mile (RM) 146. Combined in this report are many tributaries not covered by their own individual subbasin report including: Coal Creek (RM 56.4, drainage of 26.9 Square miles), Abernathy Creek (RM 54.3, drainage of 28.7 square miles), Germany Creek (RM 56.2, drainage of 22.5 square miles), Mill Creek (RM 53.9, drainage of 29.1 square miles), Skamokawa Creek (RM 33.3, drainage of 50.6 square miles), and Hamilton and Salmon creeks. Each of these tributaries is generally small in terms of length and drainage area although they each differ widely in size and character. The lower reaches of these tributaries are usually tidally influenced with most emptying into broad sloughs. This tidal action can be detected throughout the entire length of the Lower Columbia due to its flat gradient.

ORIGIN

Most of the tributaries of the Lower Columbia River have a natural stock, although one or more of the Chambers Creek, Cowlitz and Beaver Creek hatchery-stocks have been introduced into most of the tributaries so some genetic influence has probably been exerted on the wild stocks.

DISTRIBUTION

Table 1 lists spawning and rearing habitat, by quality, for Lower Columbia River steelhead based on estimates from the Northwest Power Planning Council.

Winter steelhead are distributed throughout the tributaries of the Lower Columbia Subbasin. Distribution on many streams is concentrated in the lower reaches.

PRODUCTION

Production Facilities

No steelhead hatcheries exist on any of the streams covered by this report. Steelhead hatcheries which operate on major tributaries to the Lower Columbia and release fish into this subbasin would include the Skamania Hatchery on the Washougal River, Beaver Creek Hatchery on the Elochoman River, and the Cowlitz Hatchery on the Cowlitz River, all of which are covered in other subbasin reports.

Production Summary

No data are available on wild smolt production although winter steelhead production is considered low. The subbasin covers a large geographic area and most of the lands contained within the subbasin have been used for forestry, agriculture and urban development which have all impacted production within subbasin streams.

Problems which have both eliminated anadromous fish in some streams and reduced production in others would include the indiscriminate logging, destruction of riparian habitat by agricultural and urban development, and non-point source pollution from agricultural and industrial development

(Subbasin Plan 1990).

ADULT LIFE HISTORY

Run Size and Escapement

No data are available on lower Columbia steelhead.

Time of migration

Wild winter steelhead migration is generally from January through May, peaking in March although migration varies on each individual stream. Figure 1 illustrates a generalized freshwater life history for winter steelhead.

Harvest

Ocean catch of Lower Columbia River winter steelhead are unknown.

Sport harvest on the Lower Columbia will be divided into two categories: 1) sport catch within the mainstem Lower Columbia and, 2) sport catch within individual tributaries of the subbasin.

1) Sport harvest on the mainstem Lower Columbia River accounts for a large number of steelhead caught (winter and summer) although the vast majority are not from the Lower Columbia Subbasin but are fish migrating upstream to other subbasins. Based on WDW permit-card harvest estimates, harvest of winter steelhead in the mainstem lower river from 1980 through 1990 ranged from 423 steelhead in 1983-1984 to 1,473 fish in 1980-1981 (Table 2). Harvest of summer steelhead within the mainstem Lower Columbia for the same ten year period ranged from 751 steelhead in 1980-1981 to 4,683 fish in 1988-1989 (Table 3).

2) Based on permit-card harvest estimates, sport catch of winter steelhead for all subbasin tributaries combined, averaged 453 fish annually from 1977 through 1986. Annual average sport catch within individual subbasin streams ranged from a low catch of 2 steelhead from the Chinook River to a high of 196 fish from Germany Creek (Table 4).

There are no Indian fishing rights exercised in the small tributaries of this subbasin.

Spawning Period

Spawning is believed to occur from March through June with some variation among the individual tributaries.

Spawning area

Wild winter steelhead are known to spawn in the following areas: Mainstem Skamokawa Creek and it's tributaries, Mill Creek including the lower section of Little Mill Creek, mainstem Abernathy Creek and it's tributaries, throughout Germany Creek and, the lower reaches of Coal Creek.

Fecundity

No data are available for steelhead.

Age Composition

No data are available for steelhead.

Size

No data are available for steelhead.

Sex ratio

No data are available for steelhead.

Survival rate

No data are available for steelhead.

JUVENILE LIFE HISTORY

Egg

No data are available on egg production or egg to smolt survival.

Emergence

No data are available for steelhead.

Juvenile rearing

Juvenile rearing lasts approximately two years prior to ocean emigration. Juvenile steelhead outmigration generally occurs from April through May at an average size of 160 mm.

Hatchery Releases

The streams and creeks of the Lower Columbia Subbasin has received hatchery smolts from the Skamania, Beaver Creek, Chambers Creek and Cowlitz hatcheries. Hatchery releases within individual streams is outlined in Tables 4-l 1.

Straying

No data are available for steelhead.

BIOCHEMICAL-GENETIC CHARACTERISTICS

No data are available for steelhead.

DISEASES

Disease history for smolts planted in the Lower Columbia Subbasin is presented in Table 12.

Figure 1 (TT). Generalized freshwater life history of winter steelhead.

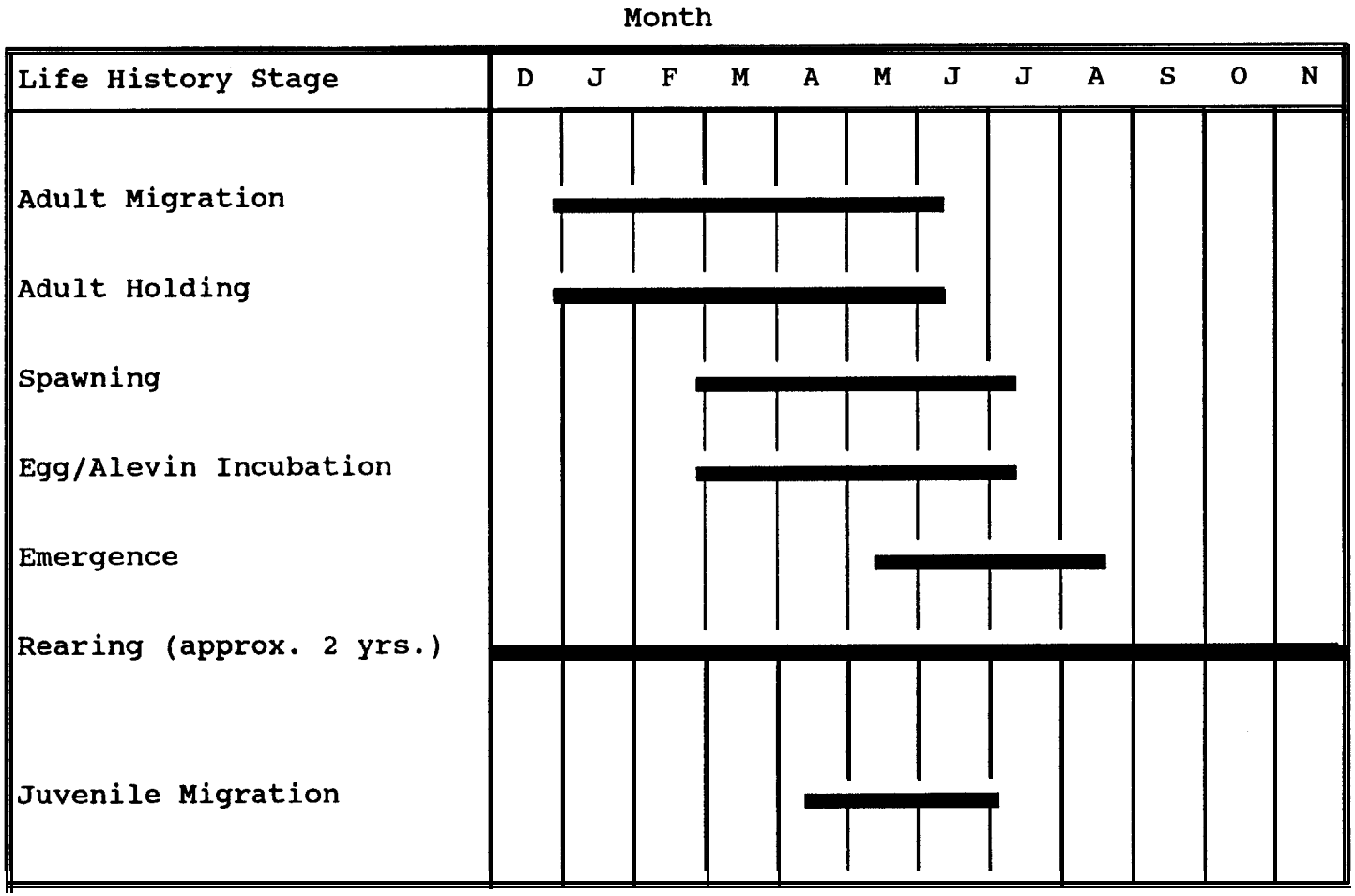

Table 1 (HB-1). Estimated* amount of rearing and spawning habitat, by quality, of Lower Columbia Subbasin winter steelhead.

Area	Excellent	Good	Fair[B]	Poor[B]	Unknown	Total	Confidence
Miles	14.2%	40.9%	37.0%	7.9%		240.3	Unknown
Acres	13.7%	48.0%	32.7%	5.7%		336.5	Unknown

*Northwest Power Planning Council estimates based on limited observations.
[B]Ratings of fair and poor may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/absence database, NPPC 1991.

Table 2 (RS-a). Returns (sport catch/escapement) of winter steelhead to the Lower Columbia Subbasin.

Return Year	Sport Catch[A B C]	Escapement	Adult Total
1980-81	1527	No data	Unknown
1981-82	1711	No data	Unknown
1982-83	1135	No data	Unknown
1983-84	677	No data	Unknown
1984-85	913	No data	Unknown
1985-86	718	No data	Unknown
1986-87	1202	No data	Unknown
1987-88	1148	No data	Unknown
1988-89	775	No data	Unknown
1989-90	1104	No data	Unknown

[A]Sport catch includes mainstem Lower Columbia and its tributaries.

[B]Sport catch on mainstem river comprised mainly of steelhead migrating to other subbasins.

[C]Sport catch only within tributaries of the Lower Columbia presented in Table 4.

Source: Sport Catch, Washington Department of Wildlife permit-cards.
Sport catch includes: Main Stem Lower Columbia, Germany Creek, Coal Creek, Abernathy Creek, Salmon Creek, Skamokawa Creek.

Table 3 (RS-b). Sport catch of summer steelhead in the mainstem Lower Columbia River.

Return Year	Sport Catch^
1980	751
1981	1,225
1982	2,090
1983	1,694
1984	1,624
1985	2,728
1986	2,965
1987	4,821
1988	2,612
1989	4,683
1990	3,894

^Summer steelhead are not indigenous to this subbasin although some summer fish were introduced into the subbasin, no further planting occurs and it is assumed very little if any natural production occurs, thus the summer steelhead sport catch is from fish migrating upstream to other subbasins.

Source: Sport catch from permit-card harvest estimates.

Table 4 (RS-c). Average estimates of annual winter steelhead catch in subbasin tributary streams, 1977-1986.

Stream (Washington State)	Estimated Sport Catch
Mill Creek	18
Hamilton Creek	21
Salmon Creek	89
Chinook River	2
Deep River	4
Skamokawa Creek	23
Abernathy Creek	85
Germany Creek	196
Coal Creek	15
Total	453

Source: Lower Columbia Subbasin Plan, 1990.

Table 5 (TR-1). Hatchery releases of winter steelhead into Salmon Creek by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1981	Bogachiel R	Skamania	Smolt	04/21/83	5.1	3,917	Salmon Cr	
1981	Bogachiel R	Skamania	Smolt	04/21/83	5.1	3,417	Salmon Cr	
1981	Bogachiel R	Skamania	Smolt	04/22/83	5.1	688	Salmon Cr	
1981	Chambers Cr	Beaver Cr.	Smolt	05/03/82	6.2	8,959	Salmon Cr	
1981	Chambers Cr	Beaver Cr.	Smolt	05/04/82	5.8	4,524	Salmon Cr	
1981	Chambers Cr	Beaver Cr.	Smolt	05/04/82	5.8	2,900	Salmon Cr	
1981	Chambers Cr	Beaver Cr.	Smolt	05/05/82	6.0	8,610	Salmon Cr	
1983	Elochoman R	Skamania	Smolt	05/02/84	5.1	3,060	Salmon Cr	AD
1983	Elochoman R	Skamania	Smolt	05/02/84	5.1	3,075	Salmon Cr	AD
1983	Elochoman R	Skamania	Smolt	05/02/84	5.1	3,947	Salmon Cr	AD
1984	Unknown	Unknown	Smolt	04-25-85	5.0	3,225	Salmon Cr	AD
1984	Elochoman R	Beaver Cr.	Smolt	05/08/85	4.9	5,047	Salmon Cr	AD
1984	Elochoman R	Beaver Cr.	Smolt	05/13/85	4.0	4,800	Salmon Cr	AD
1985	Cowlitz R	Skamania	Non-Smolt	11/14/85	18.2	11,157	Salmon Cr	
1985	Unknown	Unknown	Smolt	05-01-86	5.2	3,094	Salmon Cr	AD
1985	Elochoman R	Beaver Cr	Smolt	04/24/86	5.5	31,554	Salmon Cr	
1986	Elochoman R	Beaver Cr.	Smolt	05/12/87	4.9	7,350	Salmon Cr	
1986	Elochoman R	Beaver Cr.	Smolt	05/13/87	4.9	5,880	Salmon Cr	
1986	Elochoman R	Beaver Cr.	Smolt	05/19/87	4.5	3,375	Salmon Cr	AD
1986	Elochoman R	Beaver Cr.	Smolt	05/19/87	5.6	6,720	Salmon Cr	

Table 5 (cont.). Hatchery releases of winter steelhead into Salmon Creek by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1986	Elochoman R	Beaver Cr.	Smolt	05/19/87	5.7	7,125	Salmon Cr	
1986	Elochoman R	Beaver Cr.	Smolt	05/20/87	4.6	6,670	Salmon Cr	
1987	Elochoman R	Beaver Cr.	Smolt	05/09/88	4.8	5,040	Salmon Cr	AD
1987	Elochoman R	Beaver Cr.	Smolt	05/12/88	4.3	5,590	Salmon Cr	AD
1988	Washougal R	Skamania	Smolt	04/21/89	6.0	10,222	Salmon Cr	AD
1989	Elochoman R	Beaver Cr.	Smolt	05/10/90	6.2	9,920	Salmon Cr	AD
1990	Elochoman R	Skamania	Smolt	05/01/91	4.5	6,300	Salmon Cr	AD
1990	Elochoman R	Skamania	Smolt	05/06/91	4.5	6,750	Salmon Cr	AD
1990	Elochoman R	Skamania	Smolt	05/07/91	4.5	6,750	Salmon Cr	AD
1990	Elochoman R	Skamania	Smolt	05/08/91	4.5	1,732	Salmon Cr	AD

Table 6 (TR-2). Hatchery releases of winter steelhead into Coal Creek by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Code/ Fin Clip
1988	Elochoman R	Beaver Cr.	Smolt	5/05/89	5.0	8,000	Coal Cr	AD
1990	Elochoman R	Beaver Cr.	Smolt	5/08/91	5.2	5,200	Coal Cr	AD

Table 7 (TR-3). Hatchery releases of winter steelhead into Abernathy Creek by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1981	Bogachiel R	Beaver Cr.	Smolt	5/12/82	5.6	4,144	Abernathy CR	
1981	Bogachiel R	Beaver Cr.	Smolt	5/12/82	6.4	1,280	Abernathy CR	
1981	Chambers Cr	Beaver Cr.	Smolt	4/25/83	4.5	2,745	Abernathy CR	
1983	Elochoman R	Beaver Cr.	Smolt	5/04/84	6.0	4,980	Abernathy CR	
1984	Elochoman R	Beaver Cr.	Smolt	5/13/85	4.0	5,000	Abernathy CR	AD
1985	Elochoman R	Beaver Cr.	Smolt	4/25/86	5.0	5,050	Abernathy CR	
1986	Elochoman R	Beaver Cr.	Smolt	5/05/87	5.0	3,750	Abernathy CR	AD
1986	Elochoman R	Beaver Cr.	Smolt	5/14/87	4.9	7,718	Abernathy CR	
1987	Elochoman R	Beaver Cr.	Smolt	4/25/88	5.0	3,750	Abernathy CR	AD
1987	Elochoman R	Beaver Cr.	Smolt	5/11/88	4.3	2,150	Abernathy CR	AD
1988	Elochoman R	Beaver Cr.	Smolt	5/05/89	5.0	6,250	Abernathy CR	AD
1989	Elochoman R	Beaver Cr.	Smolt	4/27/90	4.5	4,950	Abernathy CR	AD
1990	Elochoman R	Beaver Cr.	Smolt	5/03/91	5.0	8,500	Abernathy CR	AD

Table 8 (TR-4). Hatchery releases of winter steelhead into Germany Creek by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1981	Chambers Cr	Beaver Cr.	Smolt	4/26/83	4.5	6,750	Germany Cr	
1981	Chambers Cr	Beaver Cr.	Smolt	4/27/82	5.4	7,857	Germany Cr	
1981	Chambers Cr	Beaver Cr.	Smolt	5/07/82	6.8	7,276	Germany Cr	
1983	Unknown	Beaver Cr.	Smolt	4/26/84	4.2	15,120	Germany Cr	
1984	Elochoman R	Beaver Cr.	Smolt	4/29/85	4.9	5,170	Germany Cr	
1984	Elochoman R	Beaver Cr.	Smolt	4/30/85	5.0	4,900	Germany Cr	
1985	Elochoman R	Beaver Cr.	Smolt	4/21/86	4.8	16,500	Germany Cr	
1986	Elochoman R	Beaver Cr.	Smolt	5/09/87	4.6	25,392	Germany Cr	
1986	Elochoman R	Beaver Cr.	Smolt	5/18/87	4.6	6,440	Germany Cr	
1987	Elochoman R	Beaver Cr.	Smolt	4/30/88	4.9	4,900	Germany Cr	AD
1987	Elochoman R	Beaver Cr.	Smolt	4/30/88	4.9	4,900	Germany Cr	AD
1987	Elochoman R	Beaver Cr.	Smolt	4/30/88	4.9	4,900	Germany Cr	AD
1988	Elochoman R	Beaver Cr.	Smolt	5/03/89	5.0	6,250	Germany Cr	AD
1988	Elochoman R	Beaver Cr.	Smolt	5/04/89	5.0	4,000	Germany Cr	AD
1988	Elochoman R	Beaver Cr.	Smolt	4/21/89	4.8	5,280	Germany Cr	AD
1989	Elochoman R	Beaver Cr.	Smolt	4/27/90	4.5	8,100	Germany Cr	AD
1990	Elochoman R	Beaver Cr.	Smolt	4/22/91	4.6	5,750	Germany Cr	AD
1990	Elochoman R	Beaver Cr.	Smolt	4/24/91	4.2	4,200	Germany Cr	AD

Table 9 (TR-5). Hatchery releases of winter steelhead into the Lower Columbia by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1982	Chambers Cr	Beaver Cr.	Non-Smolt	10/12/82	76.0	76,000	Columbia Lower	
1986	Elochoman R	Beaver Cr.	Non-Smolt	6/23/86	387.0	43,344	Columbia Lower	
1986	Elochoman R	Beaver Cr.	Non-Smolt	6/30/86	237.0	19,908	Columbia Lower	
1986	Elochoman R	Beaver Cr.	Non-Smolt	6/30/86	210.0	24,150	Columbia Lower	
1986	Elochoman R	Beaver Cr.	Non-Smolt	9/27/86	50.0	32,500	Columbia Lower	
1986	Elochoman R	Beaver Cr.	Non-Smolt	9/26/86	82.0	18,368	Unknown	
1986	Elochoman R	Beaver Cr.	Non-Smolt	9/26/86	75.0	4,575	Unknown	
1986	Elochoman R	Beaver Cr.	Non-Smolt	9/27/86	31.9	9,102	Unknown	
1986	Washougal R	Vancouver	Non-Smolt	6/08/87	300.0	43,500	Columbia Lower	
1987	Elochoman R	Beaver Cr.	Non-Smolt	11/30/87	16.0	52,000	Columbia Lower	AD
1987	Elochoman R	Beaver Cr.	Non-Smolt	7/02/87	131.0	90,783	Columbia Lower	

Table 10 (TR-6). Hatchery releases of winter steelhead into Hamilton Creek by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1987	Elochoman R	Beaver Creek	Smolt	5/17/88	4.5	4,950	Hamilton Cr	AD
1988	Washougal R	Skamania	Smolt	4/20/89	5.9	5,074	Unknown	AD
1989	Elochoman R	Beaver Cr.	Smolt	4/27/90	4.6	4,600	Hamilton Cr	AD
1990	Elochoman R	Skamania	Smolt	4/18/91	5.1	10,000	Hamilton Cr	AD

Table 11 (TR-7). Hatchery releases of winter steelhead into Skamokawa Creek by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1981	Chambers Cr	Beaver Cr.	Smolt	5/11/82	6.5	5,200	Skamokawa Cr	
1983	Unknown	Beaver Cr.	Smolt	4/23/84	6.0	5,400	Skamokawa Cr	
1984	Elochoman R	Beaver Cr.	Smolt	4/30/85	5.0	5,000	Skamokawa Cr	
1985	Elochoman R	Beaver Cr.	Smolt	5/21/86	4.8	9,854	Skamokawa Cr	
1986	Elochoman R	Beaver Cr.	Smolt	4/09/87	4.5	4,950	Skamokawa Cr	
1986	Elochoman R	Beaver Cr.	Smolt	5/02/87	5.0	5,250	Skamokawa Cr	
1987	Elochoman R	Beaver Cr.	Smolt	4/25/88	5.0	4,250	Skamokawa Cr	AD
1987	Elochoman R	Beaver Cr.	Smolt	5/19/88	4.5	4,500	Skamokawa Cr	AD
1988	Elochoman R	Beaver Cr.	Smolt	5/05/89	5.0	10,250	Skamokawa Cr	AD
1989	Washougal R	Beaver Cr.	Smolt	4/27/90	4.5	4,950	Skamokawa Cr	AD
1990	Elochoman R	Beaver Cr.	Non-Smolt	11/28/90	26.5	29,758	Skamokawa Cr	AD
1990	Elochoman R	Beaver Cr.	Smolt	4/24/91	4.2	5,250	Skamokawa Cr	AD

Table 12 (TD). Parasites and diseases isolated at the hatcheries which reared Lower Columbia steelhead smolts[A].

Disease Type	Hatchery	Specific Pathogen
Bacterial	Beaver Cr.[B]	*Flavobacterium sp.*
Bacterial	Beaver Cr.	*Aeromonas salmonicida* (Furunculosis)
Bacterial	Beaver Cr.	*Flexibacter columnaris* (Columnaris)
Bacterial	Beaver Cr.	*Renibacterium salmonarium* (BKD)
Bacterial	Beaver Cr.	*Flexibacter cytophaga* (Coldwater)
Parasite	Beaver Cr.	*Ichthyoboda sp.* (Costia)
Parasite	Beaver Cr.	*Ichthyophthirius multiflis* (Ich)
Parasite	Beaver Cr.	*Nanophetyus sp.*
Parasite	Beaver Cr.	*Trichodina sp.*
Parasite	Beaver Cr.	*Hexamita sp.*
Viral	Beaver Cr.	*Infectious Hematopoietic Necrosis* (IHN)
Viral	Beaver Cr.	*EIBS*

[A]Smolts released into the Lower Columbia were also reared at the Skamania Hatchery located on the Washougal River.

'Beaver Creek Hatchery is located on Beaver Creek, a tributary of the Elochoman River.

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

Source: WDW pathologist, Steve Roberts, 1991.

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GRAYS SUBBASIN

Fall Chinook

GEOGRAPHIC LOCATION

The Grays River originates in the southeast Pacific County and flows southwest through Wahkiakum County to its confluence with the Columbia River at River Mile (RM) 21. The lower six miles of the river are a slough subject to tidal influence. The next six miles flow through a wide, flat valley before entering the steep foothills. Most of the upper watershed flows through steep narrow canyons in the rugged Willapa Hills. The entire basin encompasses 124 square miles.
Grays River Salmon Hatchery is located on the West Fork of the Grays.

ORIGIN

A native population of fall chinook was in existence on the Grays River prior to construction of the Grays River Salmon Hatchery in 1960. Mixing of stocks very likely began to occur when hatchery supplementation was initiated in 1947 with the release of 100,090 tule fall chinook fingerlings (WDF, 1990). This supplementation and hatchery brood stock were a mix of local stock and transfers from other hatcheries, primarily Spring Creek Hatchery. Brood stock for the Grays Hatchery are collected at a rack and the remaining adults are passed upstream to spawn naturally. In recent years, broodstock for Grays River Hatchery also has been collected from Grays River spawning grounds and at other lower river spawning grounds and hatcheries. It is presumed there are no differences between hatchery stock and naturally spawning populations, as no effort was, nor is, being made to keep them separate.

DISTRIBUTION

Grays River mainstem natural production extends from the head of tidewater upstream to above the West Fork. Some spawning also occurs in the West Fork Grays River below the hatchery rack.

PRODUCTION

Hatchery production is the dominant component in the Grays River although some natural production also occurs.

Tables 1 and 2 describe the amount of spawning and rearing habitat by quality, available in the Grays River. This data was derived from the Presence/Absence database of Northwest Power Planning Council, 199 1.

The Grays River fall chinook natural spawn escapement from 1978 - 1984 brood years averaged 869 with a low return of 411 for the 1978 brood and a peak of 2,079 for the 1984 brood. Natural spawn escapements by age and brood year are presented in Table 3.

Grays River Hatchery fall chinook returns from 1976 - 1984 brood years averaged 619 with a low return of 45 for the 1977 brood and a peak of 2,080 for the 1984 brood. Hatchery returns by age and brood year are presented in Table 4.

Grays River tributary sport catch estimates between 1981 - 1988 return years averaged 156 adult fall chinook, ranging from a low of 17 in 1983 to a high of 342 in 1987 based on punchcard and limited actual sampling data. However, specific age and brood year analysis for Grays River sport catch is

unavailable.

ADULT LIFE HISTORY

Run size, catch and escapement

Ocean commercial and recreational fisheries from Alaska to Washington, in addition to Columbia River gill net and sport fisheries all harvest a portion of the Grays River origin fall chinook. Columbia River sport and commercial fisheries are managed to ensure attainment of hatchery egg-take requirements.

Strays from other lower river hatcheries are not unusual. Table 5 lists Grays Hatchery origin fall chinook stray coded wire tag recoveries beginning with the 1978 brood through to the 1988 brood, and Table 6 lists the coded wire tags recovered within the Grays subbasin which originated outside the Grays subbasin.

Time of Migration

Upstream migration begins from early August to early September depending partly on early fall rains.

Spawning Period

Natural spawning occurs between late September and mid-November, usually peaking in mid-October.

Spawning Areas

Grays River mainstem natural production extends from the head of tidewater upstream to above the West Fork. Some spawning also takes place in the West Fork Grays River below the hatchery rack.

Age Composition

Age ranges from two-year-old jacks to six-year-old adults with three-year-olds or four-year-olds usually the dominant age class. Total age composition data is summarized in Tables 3 and 4. Table 7 lists the age composition percentages by brood year and freshwater.ocean rearing for fall chinook returning to the Grays River spawning grounds. Table 8 lists the age composition percentages by brood year and freshwater.ocean rearing for fall chinook returning to the Grays River Hatchery.

Ratio

Female fall chinook comprised 36 - 63 percent of the natural spawners in the Grays River between 1981 - 1984 brood years. The percent females by brood year and freshwater.ocean rearing ages for Grays River natural spawners are presented in Table 9.

Female fall chinook comprised 31 - 43 percent of the fall chinook returning to the Grays Hatchery etween 1981 - 1984 brood years. The percent females by brood year and freshwater.ocean rearing ages for Grays Hatchery returns are presented in Table 10.

The mean fork length by brood year, sex, and freshwaterocean rearing ages of Grays River natural

spawners for 1979 - 1983 brood years are available in Tables 11 and 12. The mean fork length by brood year, sex, and freshwaterocean rearing ages for Grays Hatchery returns from 1978 - 1984 brood years are available in Tables 13 and 14.

Fecundity

Fecundity at the Grays Hatchery between 1983 - 1990 return years averaged 4,312 and ranged from a low of 4,148 in 1983 to a high of 4,720 in 1990. Grays River natural spawn and Grays Hatchery fecundity data by age and brood year is unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

Emergence times were estimated to be early April for naturally spawning fry, depending on time of egg deposition and water temperatures (Howell et. al., 1985).

Time, age and size at migration

Hatchery release information for the Grays subbasin by brood year is presented in Table 15. Length data of 1978 brood natural fall chinook smolts from the Grays River is available in Table 16. The number of natural juvenile fall chinook salmon that migrate from the Grays River is unavailable.

Survival Rate

Data not available.

BIOCHEMICAL-GENETIC CHARACTERISTICS

Schreck et al. (1986) determined from electrophoresis that Bonneville Hatchery fall chinook and Spring Creek Hatchery (BPH) had 11 similar isozyme gene frequencies and none dissimilar. They did not, however, analyze fall chinook from the Grays Hatchery.

DISEASE

Bacteria and parasitic diseases found in the Grays Hatchery are listed in Table 16. (WDF Salmon Culture, Olympia)

Table 1 (HB-1). Estimated amount of rearing and spawning habitat, by quality, of the Grays River fall chinook production area.

Distance/Area	Excellent	Good	Fair[a]	Poor[a]	Unknown	Total	Confidence
Miles (%)	31	69	00	00		31.9	
Acres (%)	27	73	00	00		117.2	

"Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 1991.

Table 2 (HB-2). Estimated amount of rearing habitat, by quality, of the Grays River fall chinook production area.

Distance/Area	Excellent	Good	Fair[a]	Poor[a]	Unknown	Total	Confidence
Miles (%)	100	00	00	00		6.5	
Acres (%)	100	00	00	00		11.8	

"Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC , 199 1.

Table 3 (RN). Total natural spawner escapement of fall chinook to the Grays River subbasin by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974					0		
1975				17	0		
1976			144	7	0		
1977		24	91	11	0		126
1978	12	148	251	0	0	411	399
1979	105	160	515	10	0	790	685
1980	0	412	215	0	0	627	627
1981	0	17	406	0	0	423	423
1982	98	406	338	20	0	862	764
1983	**26**	**563**	**258**	**43**	**0**	**890**	**864**
1984	**173**	**815**	**785**	**281**	**25**	**2,079**	**1,906**
1985	**20**	**175**	**421**	**41**			
1986	**7**	**103**	**180**				
1987	**8**	**41**					
1988	0						

Age based on scale reading analysis except:

1991 return year excludes 160 fish trapped and taken to Grays River Hatchery for broodstock.

1981 and 1984 return years used Grays River Hatchery age composition.

1980 return year - adult proportion based on hatchery sampling.

Table 4 (RH). Total hatchery returns of fall chinook to the Grays River subbasin by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1972					0		
1973				49	0		
1974			2,085	0	0		
1975		286	461	8	0		755
1976	111	227	70	2	0	410	299
1977	4	13	22	6	0	45	41
1978	6	35	178	12	0	231	225
1979	26	494	170	7	0	697	671
1980	23	91	150	25	0	289	266
1981	1	12	72	33	0	118	117
1982	68	148	254	8	0	478	410
1983	112	941	154	20	0	1,227	1,115
1984	240	206	1,240	347	47	2,080	1,840
1985	14	97	180	170			
1986	90	160	381				
1987	11	37					
1988	22						

Age based on scale reading analysis.

1987 return year includes only Grays River Hatchery stock.

Table 5 (AE). Emigration of coded wire tagged fall chinook from the Grays subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Grays Hatchery	Skamokawa Creek, 1982	Spawning Ground	448	1	2
Grays Hatchery	Elochoman, 1982	Hatchery	2,062	1	1
Weyco Pond	Elochoman, 1982	Hatchery	2,062	3	3
Weyco Pond	Grays, 1982	Hatchery	701	12	13
Weyco Pond	Elochoman, 1982	Hatchery	2,062	3	3
Weyco Pond	Skamokawa Creek, 1982	Spawning Ground	448	1	2
Weyco Pond	Grays, 1982	Hatchery	701	1	1
Grays Hatchery	W.F. Grays River, 1983	Spawning Ground	7	1	11
Grays Hatchery	Elochoman, 1983	Hatchery	2,690	1	1
Grays Hatchery	Grays River, 1988	Spawning Ground	129	1	9
Grays Hatchery	Grays River, 1989	Spawning Ground	388	2	5
Grays Hatchery	Grays River, 1988	Spawning Ground	129	2	17
Grays Hatchery	Grays River, 1989	Spawning Ground	388	3	7
Grays Hatchery	Grays River, 1989	Spawning Ground	388	3	7
Grays Hatchery	Grays River, 1989	Spawning Ground	388	5	12
Grays Hatchery	Grays River, 1988	Spawning Ground	129	1	9
Grays Hatchery	Grays River, 1989	Spawning Ground	388	10	24
Grays Hatchery	Grays River, 1988	Spawning Ground	129	1	9
Grays Hatchery	Grays River, 1989	Spawning Ground	388	2	5

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Grays Hatchery	Grays River, 1989	Spawning Ground	388	4	9
Grays Hatchery	Grays River, 1989	Spawning Ground	388	1	2
Grays Hatchery	Grays River, 1989	Spawning Ground	388	1	2
Grays Hatchery	Grays River, 1989	Spawning Ground	388	4	9
Grays Hatchery	W.F. Grays River, 1989	Spawning Ground	37	2	0
Grays Hatchery	W.F. Grays River, 1986	Spawning Ground	42	1	26
Grays Hatchery	W.F. Grays River, 1989	Spawning Ground	37	4	0
Grays Hatchery	W.F. Grays River, 1989	Spawning Ground	37	4	0
Grays Hatchery	W.F. Grays River, 1989	Spawning Ground	37	2	0
Grays Hatchery	W.F. Grays River, 1989	Spawning Ground	37	1	0
Grays Hatchery	W.F. Grays River, 1989	Spawning Ground	37	1	0
Grays Hatchery	W.F. Grays River, 1989	Spawning Ground	37	3	0
Grays Hatchery	W.F. Grays River, 1989	Spawning Ground	37	2	0
Grays Hatchery	Skamokawa Creek, 1985	Spawning Ground	3,555	1	2
Grays Hatchery	Skamokawa Creek, 1988	Spawning Ground	315	2	7
Grays Hatchery	Skamokawa Creek, 1989	Spawning Ground	851	9	11
Grays Hatchery	Skamokawa Creek, 1988	Spawning Ground	315	1	3
Grays Hatchery	Skamokawa Creek, 1989	Spawning Ground	851	7	9
Grays Hatchery	Skamokawa Creek, 1989	Spawning Ground	851	4	5
Grays Hatchery	Skamokawa Creek, 1989	Spawning Ground	851	11	14

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Grays Hatchery	Skamokawa Creek, 1989	Spawning Ground	851	8	10
Grays Hatchery	Skamokawa Creek, 1988	Spawning Ground	315	2	7
Grays Hatchery	Skamokawa Creek, 1989	Spawning Ground	851	4	5
Grays Hatchery	Skamokawa Creek, 1988	Spawning Ground	315	1	3
Grays Hatchery	Skamokawa Creek, 1989	Spawning Ground	851	6	7
Grays Hatchery	Skamokawa Creek, 1988	Spawning Ground	315	1	3
Grays Hatchery	Skamokawa Creek, 1989	Spawning Ground	851	3	4
Grays Hatchery	Skamokawa Creek, 1989	Spawning Ground	851	2	2
Grays Hatchery	Skamokawa Creek, 1989	Spawning Ground	851	18	22
Grays Hatchery	Skamokawa Creek, 1989	Spawning Ground	851	23	28
Grays Hatchery	Elochoman, 1985	Hatchery	1,809	1	1
Grays Hatchery	Elochoman, 1986	Hatchery	1,514	11	11
Grays Hatchery	Elochoman, 1987	Hatchery	4,811	2	2
Grays Hatchery	Elochoman, 1985	Hatchery	1,809	1	1
Grays Hatchery	Elochoman, 1986	Hatchery	139	3	3
Grays Hatchery	Elochoman, 1988	Hatchery	4,705	9	9
Grays Hatchery	Elochoman, 1989	Hatchery	3,677	26	26
Grays Hatchery	Elochoman, 1986	Hatchery	139	3	3
Grays Hatchery	Elochoman, 1988	Hatchery	4,705	14	15
Grays Hatchery	Elochoman, 1989	Hatchery	3,677	16	16

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Grays Hatchery	Elochoman, 1988	Hatchery	4,705	2	2
Grays Hatchery	Elochoman, 1989	Hatchery	3,677	24	24
Grays Hatchery	Elochoman, 1986	Hatchery	139	1	1
Grays Hatchery	Elochoman, 1988	Hatchery	4,705	8	8
Grays Hatchery	Elochoman, 1989	Hatchery	3,677	30	30
Grays Hatchery	Elochoman, 1986	Hatchery	139	1	1
Grays Hatchery	Elochoman, 1988	Hatchery	4,705	11	11
Grays Hatchery	Elochoman, 1989	Hatchery	3,677	30	30
Grays Hatchery	Elochoman, 1988	Hatchery	4,705	2	2
Grays Hatchery	Elochoman, 1989	Hatchery	3,677	10	10
Grays Hatchery	Elochoman, 1988	Hatchery	4,705	3	3
Grays Hatchery	Elochoman, 1989	Hatchery	3,677	12	12
Grays Hatchery	Elochoman, 1988	Hatchery	4,705	1	1
Grays Hatchery	Elochoman, 1989	Hatchery	3,677	9	9
Grays Hatchery	Elochoman, 1989	Hatchery	3,677	5	5
Grays Hatchery	Elochoman, 1988	Hatchery	4,705	2	2
Grays Hatchery	Elochoman, 1989	Hatchery	3,677	62	63
Grays Hatchery	Elochoman, 1989	Hatchery	3,677	53	54
Grays Hatchery	Elochoman River, 1988	Spawning Ground	553	1	2
Grays Hatchery	Elochoman River, 1989	Spawning Ground	31	1	4

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Grays Hatchery	Elochoman River, 1988	Spawning Ground	553	2	5
Grays Hatchery	Elochoman River, 1989	Spawning Ground	31	1	4
Grays Hatchery	Elochoman River, 1988	Spawning Ground	553	2	5
Grays Hatchery	Elochoman River, 1988	Spawning Ground	553	2	5
Grays Hatchery	Elochoman River, 1988	Spawning Ground	553	1	2
Grays Hatchery	Elochoman River, 1988	Spawning Ground	553	1	2
Grays Hatchery	Abernathy Creek, 1989	Spawning Ground	445	1	2
Grays Hatchery	Cowlitz, 1989	Hatchery	11,376	1	1
Grays Hatchery	Kalama River, 1989	Spawning Ground	3,957	1	5
Grays Hatchery	Kalama River, 1989	Spawning Ground	3,957	1	5
Grays Hatchery	Abernathy, 1989	Hatchery	1,522	1	1
Grays Hatchery	Lewis River & Cedar Creek, 1989	Spawning Ground	5,808	1	4

*Based on the following tag codes: 63-16-46, 63-19-37, 63-19-39, H1-02-03, H1-03-01, 63-20-43, 63-16-46, 63-32-42, 63-32-43, 63-33-21, 63-33-26, 63-33-27, 63-36-31, 63-36-32, 63-37-60, 63-37-61, 63-37-62, 63-22-63, 63-37-59, 63-22-37, and 63-23-40.

Beginning with the 1978 brood.

Table 6 (AI). Immigration of coded wire tagged fall chinook into the Grays River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Big Creek Hatchery	Grays, 1982	Hatchery	701	1	1
Weyco Pond	Grays, 1982	Hatchery	701	12	13
Weyco Pond	Grays, 1982	Hatchery	701	1	1
Cowlitz Hatchery, released Lower Columbia Streams	Grays, 1981	Hatchery	85	2	2
Cowlitz Hatchery, released Lower Columbia Streams	Grays, 1982	Hatchery	701	1	1
Elochoman Hatchery	Grays River, 1988	Spawning Ground	129	1	9
Elochoman Hatchery	Grays River, 1989	Spawning Ground	388	1	2
Grays Hatchery	Grays River, 1988	Spawning Ground	129	1	9
Grays Hatchery	Grays River, 1989	Spawning Ground	388	2	5
Grays Hatchery	Grays River, 1988	Spawning Ground	129	2	17
Grays Hatchery	Grays River, 1989	Spawning Ground	388	3	7
Grays Hatchery	Grays River, 1989	Spawning Ground	388	3	7
Grays Hatchery	Grays River, 1989	Spawning Ground	388	5	12
Grays Hatchery	Grays River, 1988	Spawning Ground	129	1	9
Grays Hatchery	Grays River, 1989	Spawning Ground	388	10	24
Grays Hatchery	Grays River, 1988	Spawning Ground	129	1	9

Table 6 (cont.) Immigration of coded wire tagged fall chinook into the Grays River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Grays Hatchery	Grays River, 1989	Spawning Ground	388	2	5
Grays Hatchery	Grays River, 1989	Spawning Ground	388	4	9
Grays Hatchery	Grays River, 1989	Spawning Ground	388	1	2
Grays Hatchery	Grays River, 1989	Spawning Ground	388	1	2
Grays Hatchery	Grays River, 1989	Spawning Ground	388	4	9
Grays Hatchery	W.F. Grays River, 1989	Spawning Ground	37	2	---
Grays Hatchery	W.F. Grays River, 1986	Spawning Ground	42	1	26
Grays Hatchery	W.F. Grays River, 1989	Spawning Ground	37	4	---
Grays Hatchery	W.F. Grays River, 1989	Spawning Ground	37	4	---
Grays Hatchery	W.F. Grays River, 1989	Spawning Ground	37	2	---
Grays Hatchery	W.F. Grays River, 1989	Spawning Ground	37	1	---
Grays Hatchery	W.F. Grays River, 1989	Spawning Ground	37	1	---
Grays Hatchery	W.F. Grays River, 1989	Spawning Ground	37	3	---
Grays Hatchery	W.F. Grays River, 1989	Spawning Ground	37	2	---
Grays Hatchery	W.F. Grays River, 1983	Spawning Ground	---	1	11

*Based on the following tag codes: 03-42-02, H1-02-03, H1-03-01, 63-21-54, 63-34-59, 63-32-42, 63-32-43, 63-33-21, 63-33-26, 63-33-27, 63-36-31, 63-36-32, 63-37-60, 63-37-61, 63-37-62, and 63-20-43.

Beginning with the 1978 brood.

Table 7 (AC-l). Age composition percentage (freshwater.ocean) by brood year for fall chinook spawning naturally in the Grays River.

Age Composition (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5
1978						
1979						
1980						
1981	19	0.00	21.05	78.95	0	0
1982	14	0.00	71.43	21.43	7.14	0
1983	19	5.26	26.32	63.16	5.26	0
1984	163	0.00	25.15	11.04	61.97	1.84
1985						
1986						
1987						
1988						

Age based on scale reading analysis.

Table 8 (AC-2). Age composition percentage (freshwater.ocean) by brood year for fall chinook returning to the Grays River Hatchery.

		Age Composition							
Brood Year	N	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3
1978									
1979									
1980									
1981	60	1.67	20.00	61.67	16.66	0	0	0	0
1982	331	20.54	29.01	48.64	1.81	0	0	0	0
1983	771	14.00	67.32	16.86	1.69	0	0	0	0.13
1984	1,263	10.29	13.13	54.48	19.56	2.30	0	0.16	0.08
1985									
1986									
1987									
1988									

Age based on scale reading analysis.

Table 9 (AS-1). Percent females by brood year and age class (freshwater.ocean) for fall chinook spawning naturally in the Grays River.

Females (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	Total % Female
1976							
1977							
1978							
1979				58.33	100.00		
1980			34.67	83.33			
1981	12	0	50.00	66.67	0	0	63.16
1982	5	0	40.00	33.33	0	0	35.71
1983	8	0	40.00	41.67	100.00	0	42.11
1984	8	0	14.63	61.11	60.40	66.67	49.08
1985							
1986							
1987							
1988							

Age based on scale reading analysis.

Table 10 (AS-2). Percent females by brood year and age class (freshwater.ocean) for fall chinook returning to the Grays River Hatchery.

Females (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	2.1	2.2	Total % Female
1976									
1977									
1978					50.00				
1979				61.54	100.00				
1980			23.38	63.43	72.73				
1981	24	0	16.67	40.54	70.00	0	0	0	40.00
1982	120	0	11.46	65.84	50.00	0	0	0	36.25
1983	242	0	29.29	63.08	61.54	0	0	0	31.39
1984	538	0	7.83	48.98	67.21	72.41	0	50.00	42.60
1985									
1986									
1987									
1988									

Age based on scale reading analysis.

Table 11 (AL-a). Mean fork length by brood year and **age** class (freshwater. ocean) for female fall chinook spawning naturally in the Grays River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5
1979			91	94	
N			21	1	
St. Dev.			4.8	---	
1980		79	89		
N		11	10		
St. Dev.		3.96	4.65		
1981		76	89		
N		2	10		
St. Dev.		11.31	5.23		
1982		82	89		
N		4	1		
St. Dev.		1.26	---		
1983		74			
N		2			
St. Dev.		7.07			

Age based on scale reading analysis.

Table 12 (AL-b), Mean fork length by brood year and age class **(freshwater.ocean)** for male fall chinook spawning naturally in the Grays River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5
1979			96		
N			15		
St. Dev.			6.74		
1980		86	102		
N		19	2		
St. Dev.		7.29	12.73		
1981		82	100		
N		2	5		
St. Dev.		0	6.73		
1982		84	91		
N		6	2		
St. Dev.		6.11	4.24		
1983	54	85			
N	1	3			
St. Dev.	---	4.51			

Age based on scale reading analysis.

Table 13 (AL-c). Mean fork length by brood year and age class (freshwater.ocean) for female fall chinook returning to the Grays River Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5
1978				90	
N				5	
St. Dev.				5.22	
1979			89	92	
N			88	7	
St. Dev.			6.65	3.13	
1980		74	83	91	
N		18	85	16	
St. Dev.		5.55	6.38	6.51	
1981		67	88	94	
N		2	15	7	
St. Dev.		2.12	5.67	5.69	
1982		76	86		
N		11	106		
St. Dev.		4.87	6.07		
1983		75			
N		152			
St. Dev.		5.66			
1984					
N					
St. Dev.					

Age based on scale reading analysis.

Table 14 (AL-d). Mean fork length by brood year and age class (freshwater.ocean) for male fall chinook returning to the Grays River Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5
1978				91	
N				5	
St. Dev.				4.85	
1979			91		
N			55		
St. Dev.			9.45		
1980		72	85	97	
N		59	49	6	
St. Dev.		8.13	7.34	8.31	
1981	54	75	89	97	
N	1	10	22	3	
St. Dev.	0	5.28	8.59	14.19	
1982	42	70	89		
N	68	85	55		
St. Dev.	3.04	8.26	8.51		
1983	50	76			
N	108	367			
St. Dev.	4.26	6.41			
1984	45				
N	131				
St. Dev.	5.25				

Age based on scale reading analysis.

Table 15 (TR). Hatchery releases of fall chinook salmon into the Grays River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site		CWT Code
1966	ELOCHOMAN RIVER	GRAYS R HATCHERY -WF	Fingr	05/26/67	05/26/67	74	620955	GRAYS R -WF	25.0131	UNTAGGED
1966	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	05/26/67	05/26/67	70	162190	GRAYS R -WF	25.0131	UNTAGGED
1967	ABERNATHY CREEK	GRAYS R HATCHERY -WF	Fingr	06/03/68	06/03/68	38	479408	GRAYS R -WF	25.0131	UNTAGGED
1967	KALAMA RIVER	GRAYS R HATCHERY -WF	Fingr	06/20/68	06/20/68	99	448592	GRAYS R -WF	25.0131	UNTAGGED
1968	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	05/08/69	05/08/69	164	820492	GRAYS R -WF	25.0131	UNTAGGED
1968	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	05/22/69	05/22/69	80	632720	GRAYS R -WF	25.0131	UNTAGGED
1968	ABERNATHY CREEK	GRAYS R HATCHERY -WF	Fingr	06/16/69	06/16/69	66	447810	GRAYS R -WF	25.0131	UNTAGGED
1969	ABERNATHY CREEK	GRAYS R HATCHERY -WF	Fingr	05/25/70	05/25/70	101	447127	GRAYS R -WF	25.0131	UNTAGGED
1969	ABERNATHY CREEK	GRAYS R HATCHERY -WF	Fingr	05/25/70	05/25/70	90	465300	GRAYS R -WF	25.0131	UNTAGGED
1969	ABERNATHY CREEK	GRAYS R HATCHERY -WF	Fingr	06/10/70	06/10/70	31	373271	GRAYS R -WF	25.0131	UNTAGGED
1969	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/22/70	06/22/70	115	489785	GRAYS R -WF	25.0131	UNTAGGED
1970	ABERNATHY CREEK	GRAYS R HATCHERY -WF	Fingr	05/11/71	05/11/71	64	1262131	GRAYS R -WF	25.0131	UNTAGGED
1970	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	05/24/71	05/24/71	137	391272	GRAYS R -WF	25.0131	UNTAGGED
1970	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/15/71	06/15/71	133	440762	GRAYS R -WF	25.0131	UNTAGGED
1971	GRAYS RIVER	GRAYS R HATCHERY -WF	EmFry	02/18/72	02/18/72	1008	175000	GRAYS R -WF	25.0131	UNTAGGED
1971	ABERNATHY CREEK	GRAYS R HATCHERY -WF	Fingr	05/26/72	05/26/72	52	634084	GRAYS R -WF	25.0131	UNTAGGED
1971	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/14/72	06/14/72	153	510255	GRAYS R -WF	25.0131	UNTAGGED
1971	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/14/72	06/14/72	138	407100	GRAYS R -WF	25.0131	UNTAGGED
1971	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/14/72	06/14/72	95	572470	GRAYS R -WF	25.0131	UNTAGGED
1971	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/14/72	06/14/72	83	188742	GRAYS R -WF	25.0131	UNTAGGED
1972	ABERNATHY CREEK	GRAYS R HATCHERY -WF	EmFry	12/12/72	12/12/72	1463	308444	GRAYS R -WF	25.0131	UNTAGGED
1972	ABERNATHY CREEK	GRAYS R HATCHERY -WF	Fingr	04/30/73	04/30/73	468	123755	GRAYS R -WF	25.0131	UNTAGGED
1972	ABERNATHY CREEK	GRAYS R HATCHERY -WF	Fingr	06/13/73	06/13/73	102	589152	GRAYS R -WF	25.0131	UNTAGGED
1972	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/13/73	06/13/73	90	635480	GRAYS R -WF	25.0131	UNTAGGED
1973	ABERNATHY CREEK	GRAYS R HATCHERY -WF	Fingr	03/20/74	03/20/74	258	681184	GRAYS R -WF	25.0131	UNTAGGED
1973	ABERNATHY CREEK	GRAYS R HATCHERY -WF	Fingr	05/18/74	05/18/74	97	681464	GRAYS R -WF	25.0131	UNTAGGED
1973	ABERNATHY CREEK	GRAYS R HATCHERY -WF	Fingr	06/04/74	06/04/74	49	679540	GRAYS R -WF	25.0131	UNTAGGED
1973	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/16/74	06/16/74	96	571008	GRAYS R -WF	25.0131	UNTAGGED
1973	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/30/74	06/30/74	25	530575	GRAYS R -WF	25.0131	UNTAGGED
1974	ABERNATHY CREEK	GRAYS R HATCHERY -WF	EmFry	01/07/75	01/07/75	1163	996080	GRAYS R -WF	25.0131	UNTAGGED
1974	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/04/75	06/04/75	88	490952	GRAYS R -WF	25.0131	UNTAGGED
1974	ABERNATHY CREEK	GRAYS R HATCHERY -WF	Fingr	06/09/75	06/09/75	60	576300	GRAYS R -WF	25.0131	UNTAGGED
1974	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/10/75	06/10/75	145	705713	GRAYS R -WF	25.0131	UNTAGGED
1974	GRAYS RIVER	GRAYS R HATCHERY -WF	PreSm	10/05/75	10/05/75	11	113697	GRAYS R -WF	25.0131	UNTAGGED
1974	GRAYS RIVER	GRAYS R HATCHERY -WF	PreSm	10/11/75	10/11/75	11	5367	GRAYS R -WF	25.0131	130402
1974	GRAYS RIVER	GRAYS R HATCHERY -WF	PreSm	10/11/75	10/11/75	11	113697	GRAYS R -WF	25.0131	UNTAGGED
1975	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/11/76	06/11/76	67	855120	GRAYS R -WF	25.0131	UNTAGGED
1975	GRAYS RIVER	GRAYS R HATCHERY -WF	PreSm	10/11/76	10/11/76	15	36855	GRAYS R -WF	25.0131	130807
1975	GRAYS RIVER	GRAYS R HATCHERY -WF	PreSm	10/11/76	10/11/76	15	77025	GRAYS R -WF	25.0131	UNTAGGED
1975	GRAYS RIVER	GRAYS R HATCHERY -WF	PreSm	10/11/76	10/11/76	15	77025	GRAYS R -WF	25.0131	UNTAGGED
1975	GRAYS RIVER	WEYCO POND	Fingr	06/24/76	06/24/76	28	997261	ALDER CREEK		UNTAGGED
1976	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/01/77	06/01/77	74	135781	GRAYS R -WF	25.0131	631603
1976	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/01/77	06/01/77	74	638611	GRAYS R -WF	25.0131	UNTAGGED
1976	OREGON - BIG CREEK	GRAYS R HATCHERY -WF	Fingr	06/01/77	06/01/77	90	162540	GRAYS R -WF	25.0131	UNTAGGED
1976	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/01/77	06/01/77	74	615639	GRAYS R -WF	25.0131	UNTAGGED
1976	OREGON - BIG CREEK	GRAYS R HATCHERY -WF	Fingr	06/21/77	06/21/77	74	638392	GRAYS R -WF	25.0131	UNTAGGED
1976	GRAYS RIVER	GRAYS R HATCHERY -WF	PreSm	08/16/77	08/16/77	24	15197	GRAYS R -WF	25.0131	131615
1976	GRAYS RIVER	GRAYS R HATCHERY -WF	PreSm	08/16/77	08/16/77	24	30291	GRAYS R -WF	25.0131	UNTAGGED
1976	GRAYS RIVER	GRAYS R HATCHERY -WF	PreSm	08/16/77	08/16/77	23	25549	GRAYS R -WF	25.0131	UNTAGGED
1976	SPRING CREEK	WEYCO POND	Fingr	06/20/77	06/20/77	40	1759414	ALDER CREEK		UNTAGGED
1977	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	04/12/78	04/12/78	122	238388	GRAYS R -WF	25.0131	UNTAGGED
1977	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	05/26/78	05/26/78	73	143182	GRAYS R -WF	25.0131	631743
1977	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	05/26/78	05/26/78	73	820666	GRAYS R -WF	25.0131	UNTAGGED
1977	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	05/26/78	05/26/78	70	820287	GRAYS R -WF	25.0131	UNTAGGED
1977	SPRING CREEK	WEYCO POND	Fingr	06/06/78	06/06/78	53	1880000	ALDER CREEK		UNTAGGED

Table 5 (cont.). Hatchery releases of fal chinook salmon into the Grays River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site		CWT Code
1978	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/05/79	06/05/79	58	92358	ALDER CREEK	≈5.°155	631939
1978	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/05/79	06/05/79	58	274168	ALDER CREEK	≈5.°155	UNTAGGED
1978	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/09/79	06/09/79	92	73872	GRAYS R -WF	≈5.°131	631646
1978	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/09/79	06/09/79	92	604015	GRAYS R -WF	≈5.°131	UNTAGGED
1978	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/09/79	06/09/79	92	7635	GRAYS R -WF	≈5.°131	631833
1978	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/09/79	06/09/79	92	62428	GRAYS R -WF	≈5.°131	UNTAGGED
1978	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/09/79	06/09/79	92	68115	GRAYS R -WF	≈5.°131	631937
1978	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/09/79	06/09/79	92	559499	GRAYS R -WF	≈5.°131	UNTAGGED
1978	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/09/79	06/09/79	92	1220830	GRAYS R -WF	≈5.°131	UNTAGGED
1978	GRAYS RIVER	WEYCO POND	Fingr	06/05/79	06/05/79	58	271621	ALDER CREEK		UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/11/80	06/11/80	200	421652	GRAYS R -WF	25.0131	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/13/80	06/13/80	195	373737	GRAYS R -WF	25.0131	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/01/80	07/01/80	85	195085	GRAYS R -WF	25.0131	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/02/80	07/02/80	100	534400	GRAYS R -WF	25.0131	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/02/80	07/02/80	90	678563	GRAYS R -WF	25.0131	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/03/80	07/03/80	123	1324413	GRAYS R -WF	25.0131	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/16/80	06/16/80	181	346905	HULL CR	(25.0119)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/03/80	07/11/80	200	244267	LOW COLUMBIA STREAMS		632154
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/03/80	07/11/80	200	5681689	LOW COLUMBIA STREAMS		UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/18/80	07/11/80	130	70474	LOW COLUMBIA STREAMS		632159
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/18/80	07/11/80	130	1569455	LOW COLUMBIA STREAMS		UNTAGGED
1979	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	04/01/80	04/01/80	180	223775	GRAYS R -WF	25.0131	UNTAGGED
1979	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	04/21/80	04/21/80	200	253645	GRAYS R -WF	25.0131	UNTAGGED
1979	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/01/80	06/24/80	85	37456	GRAYS R -WF	25.0131	632043
1979	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/01/80	06/24/80	85	769514	GRAYS R -WF	25.0131	UNTAGGED
1979	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/01/80	06/01/80	85	388546	GRAYS R -WF	25.0131	UNTAGGED
1979	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/03/80	06/03/80	99	133955	GRAYS R -WF	25.0131	UNTAGGED
1979	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/24/80	06/24/80	61	245533	GRAYS R -WF	25.0131	UNTAGGED
1979	TOUTLE (GREEN RIVER)	WEYCO POND	Fingr	06/10/80	06/10/80	90	1850483	ALDER CREEK		UNTAGGED
1979	TOUTLE (GREEN RIVER)	WEYCO POND	Fingr	06/10/80	06/10/80	60	97799	ALDER CREEK	≈5.°155	H10203
1979	TOUTLE (GREEN RIVER)	WEYCO POND	Fingr	06/10/80	06/10/80	60	1854072	ALDER CREEK	≈5.°155	UNTAGGED
1980	KALAMA RIVER	GRAYS R HATCHERY -WF	Fingr	06/01/81	06/08/81	93	64096	GRAYS R -WF	≈5.°131	632263
1980	KALAMA RIVER	GRAYS R HATCHERY -WF	Fingr	06/01/81	06/08/81	93	1146397	GRAYS R -WF	≈5.°131	UNTAGGED
1980	KALAMA R + GRAYS RIV	GRAYS R HATCHERY -WF	Fingr	06/01/81	06/01/81	93	10180	GRAYS R -WF	≈5.°131	632340
1980	KALAMA R + GRAYS RIV	GRAYS R HATCHERY -WF	Fingr	06/01/81	06/01/81	93	193	GRAYS R -WF	≈5.°131	UNTAGGED
1980	KALAMA RIVER	GRAYS R HATCHERY -WF	Fingr	06/01/81	06/01/81	93	322399	GRAYS R -WF	≈5.°131	UNTAGGED
1980	KALAMA RIVER	GRAYS R HATCHERY -WF	Fingr	06/05/81	06/05/81	85	211130	GRAYS R -WF	≈5.°131	UNTAGGED
1980	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/08/81	06/08/81	82	34200	GRAYS R -WF	≈5.°131	UNTAGGED
1980	KALAMA RIVER	GRAYS R HATCHERY -WF	Fingr	06/08/81	06/08/81	82	578000	GRAYS R -WF	≈5.°131	UNTAGGED
1980	GRAYS RIVER	GRAYS R HATCHERY -WF	PreSm	12/23/80	12/23/80	907	67500	GRAYS R -WF	≈5.°131	UNTAGGED
1980	GRAYS RIVER	WEYCO POND	Fingr	06/12/81	06/12/81	90	56730	ALDER CREEK		UNTAGGED
1980	KLICKITAT RIVER	WEYCO POND	Fingr	06/12/81	06/12/81	90	225134	ALDER CREEK		UNTAGGED
1980	ELOCHOMAN RIVER	WEYCO POND	Fingr	06/12/81	06/12/81	90	424903	ALDER CREEK		UNTAGGED
1980	KALAMA RIVER	WEYCO POND	Fingr	06/12/81	06/12/81	90	558080	ALDER CREEK		UNTAGGED
1980	COLUMBIA (N BONNEVL)	WEYCO POND	Fingr	06/12/81	06/12/81	90	3271327	ALDER CREEK		UNTAGGED
1980	COLUMBIA (N BONNEVL)	WEYCO POND	Fingr	05/15/81	06/12/81	90	169459	ALDER CREEK	≈5.°155	H10301
1980	COLUMBIA (N BONNEVL)	WEYCO POND	Fingr	05/15/81	06/12/81	90	3330724	ALDER CREEK	≈5.°155	UNTAGGED
1980	LOWER COLUMBIA	WEYCO POND	Fingr	05/15/81	06/12/81	90	64303	ALDER CREEK	≈5.°155	H10302
1980	LOWER COLUMBIA	WEYCO POND	Fingr	05/15/81	06/12/81	90	1208713	ALDER CREEK	≈5.°155	UNTAGGED
1981	SPRING CREEK	GRAYS R HATCHERY -WF	Fingr	06/01/82	06/01/82	87	27460	GRAYS R -WF	≈5.°131	632458
1981	SPRING CREEK	GRAYS R HATCHERY -WF	Fingr	06/01/82	06/01/82	87	280496	GRAYS R -WF	≈5.°131	UNTAGGED
1981	SPRING CREEK	GRAYS R HATCHERY -WF	Fingr	06/01/82	06/01/82	87	45361	GRAYS R -WF	≈5.°131	632459
1981	SPRING CREEK	GRAYS R HATCHERY -WF	Fingr	06/01/82	06/01/82	87	473033	GRAYS R -WF	≈5.°131	UNTAGGED
1981	LOWER COLUMBIA	WEYCO POND	Fingr	06/18/82	06/18/82	°00	217132	GRAYS R -WF	≈5.°131	H10406
1981	LOWER COLUMBIA	WEYCO POND	Fingr	06/18/82	06/18/82	₀00	4278368	GRAYS R -WF	≈5.°131	UNTAGGED

Table 15 (cont.). Hatchery releases of fall chinook salmon into the Grays River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site		CWT Code
1982	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/11/83	06/11/83	97	97135	GRAYS R -WF	25.0031	632237
1982	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/11/83	06/11/83	97	805265	GRAYS R -WF	25.0031	UNTAGGED
1982	ABERNATHY CREEK	GRAYS R HATCHERY -WF	Fingr	06/11/83	06/11/83	96	380200	GRAYS R -WF	25.0031	UNTAGGED
1982	COLUMBIA (N BONNEVL)	WEYCO POND	Fingr	06/24/83	06/24/83	100	224100	ALDER CREEK		UNTAGGED
1982	ABERNATHY CREEK	WEYCO POND	Fingr	06/24/83	06/24/83	100	975000	ALDER CREEK		UNTAGGED
1982	SPRING CREEK	WEYCO POND	Fingr	06/24/83	06/24/83	100	3246900	ALDER CREEK		UNTAGGED
1983	KALAMA RIVER	GRAYS R HATCHERY -WF	Fingr	06/21/84	06/21/84	85	1198000	GRAYS R -WF	25.0131	UNTAGGED
1983	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/21/84	06/21/84	75	423300	GRAYS R -WF	25.0131	UNTAGGED
1983	GRAYS RIVER	GRAYS R HATCHERY -WF	PreSm	10/01/84	10/01/84	29	23200	GRAYS R -WF	25.0131	UNTAGGED
1983	WASHOUGAL RIVER	WEYCO POND	Fingr	06/25/84	06/25/84	80	481700	GRAYS R -WF	25.0131	UNTAGGED
1983	OREGON - BIG CREEK	WEYCO POND	Fingr	06/25/84	06/25/84	80	605700	GRAYS R -WF	25.0131	UNTAGGED
1983	KALAMA RIVER	WEYCO POND	Fingr	06/25/84	06/25/84	80	1051700	GRAYS R -WF	25.0131	UNTAGGED
1983	ELOCHOMAN RIVER	WEYCO POND	Fingr	06/25/84	06/25/84	80	1214500	GRAYS R -WF	25.0131	UNTAGGED
1983	COLUMBIA (N BONNEVL)	WEYCO POND	Fingr	06/25/84	06/25/84	80	1246400	GRAYS R -WF	25.0131	UNTAGGED
1984	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/24/85	06/24/85	62	52090	GRAYS R -WF	25.0131	633242
1984	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/24/85	06/24/85	62	420	GRAYS R -WF	25.0131	UNTAGGED
1984	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/24/85	06/24/85	62	52368	GRAYS R -WF	25.0131	633243
1984	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/24/85	06/24/85	62	422	GRAYS R -WF	25.0131	UNTAGGED
1984	KALAMA RIVER	GRAYS R HATCHERY -WF	Fingr	06/24/85	06/24/85	87	365900	GRAYS R -WF	25.0131	UNTAGGED
1984	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/24/85	06/24/85	78	81800	GRAYS R -WF	25.0131	UNTAGGED
1984	WASHOUGAL RIVER	GRAYS R HATCHERY -WF	Fingr	06/24/85	06/24/85	74	187700	GRAYS R -WF	25.0131	UNTAGGED
1984	GRAYS RIVER	GRAYS R HATCHERY -WF	PreSm	10/03/85	10/03/85	21	50401	GRAYS R -WF	25.0131	633326
1984	GRAYS RIVER	GRAYS R HATCHERY -WF	PreSm	10/03/85	10/03/85	21	127	GRAYS R -WF	25.0131	UNTAGGED
1984	GRAYS RIVER	GRAYS R HATCHERY -WF	PreSm	10/03/85	10/03/85	21	50745	GRAYS R -WF	25.0131	633327
1984	GRAYS RIVER	GRAYS R HATCHERY -WF	PreSm	10/03/85	10/03/85	21	127	GRAYS R -WF	25.0131	UNTAGGED
1985	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	03/28/86	03/28/86	52	18300	GRAYS R -WF	25.0131	UNTAGGED
1985	ELOCHOMAN RIVER	GRAYS R HATCHERY -WF	Fingr	03/28/86	03/28/86	52	33900	GRAYS R -WF	25.0131	UNTAGGED
1985	GRAYS R +ELOCHOMAN R	GRAYS R HATCHERY -WF	Fingr	04/23/86	04/23/86	34	47548	GRAYS R -WF	25.0131	633631
1985	GRAYS R +ELOCHOMAN R	GRAYS R HATCHERY -WF	Fingr	04/23/86	04/23/86	34	8161	GRAYS R -WF	25.0131	UNTAGGED
1985	GRAYS R +ELOCHOMAN R	GRAYS R HATCHERY -WF	Fingr	04/23/86	04/23/86	34	48043	GRAYS R -WF	25.0131	633632
1985	GRAYS R +ELOCHOMAN R	GRAYS R HATCHERY -WF	Fingr	04/23/86	04/23/86	34	8248	GRAYS R -WF	25.0131	UNTAGGED
1985	WASHOUGAL RIVER	GRAYS R HATCHERY -WF	Fingr	05/28/86	05/28/86	99	72181	GRAYS R -WF	25.0131	633321
1985	WASHOUGAL RIVER	GRAYS R HATCHERY -WF	Fingr	05/28/86	05/28/86	99	614	GRAYS R -WF	25.0131	UNTAGGED
1985	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	05/28/86	05/28/86	96	49874	GRAYS R -WF	25.0131	633759
1985	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	05/28/86	05/28/86	96	453	GRAYS R -WF	25.0131	UNTAGGED
1985	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	05/28/86	05/28/86	96	50635	GRAYS R -WF	25.0131	633760
1985	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	05/28/86	05/28/86	96	460	GRAYS R -WF	25.0131	UNTAGGED
1985	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	05/28/86	05/28/86	96	22223	GRAYS R -WF	25.0131	UNTAGGED
1985	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	05/28/86	05/28/86	65	130100	GRAYS R -WF	25.0131	UNTAGGED
1985	ELOCHOMAN RIVER	GRAYS R HATCHERY -WF	Fingr	05/28/86	05/28/86	65	560000	GRAYS R -WF	25.0131	UNTAGGED
1985	KALAMA RIVER	GRAYS R HATCHERY -WF	Fingr	06/09/86	06/09/86	113	238000	GRAYS R -WF	25.0131	UNTAGGED
1985	KALAMA RIVER	GRAYS R HATCHERY -WF	PreSm	09/15/86	09/15/86	24	49144	GRAYS R -WF	25.0131	633761
1985	KALAMA RIVER	GRAYS R HATCHERY -WF	PreSm	09/15/86	09/15/86	24	496	GRAYS R -WF	25.0131	UNTAGGED
1985	KALAMA RIVER	GRAYS R HATCHERY -WF	PreSm	09/15/86	09/15/86	24	49115	GRAYS R -WF	25.0131	633762
1985	KALAMA RIVER	GRAYS R HATCHERY -WF	PreSm	09/15/86	09/15/86	24	496	GRAYS R -WF	25.0131	UNTAGGED
1985	COWLITZ RIVER	WEYCO POND	Fingr	06/11/86	06/11/86	100	144000	GRAYS R -WF	25.0131	UNTAGGED
1985	KALAMA RIVER	WEYCO POND	Fingr	06/11/86	06/11/86	100	1184000	GRAYS R -WF	25.0131	UNTAGGED
1986	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	05/21/87	05/21/87	53	208900	GRAYS R -WF	25.0131	UNTAGGED
1986	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/01/87	06/01/87	37	219300	GRAYS R -WF	25.0131	UNTAGGED
1986	WASHOUGAL RIVER	GRAYS R HATCHERY -WF	Fingr	06/04/87	06/04/87	94	430300	GRAYS R -WF	25.0131	UNTAGGED
1986	WASHOUGAL RIVER	GRAYS R HATCHERY -WF	Fingr	06/05/87	06/05/87	100	220700	GRAYS R -WF	25.0131	UNTAGGED
1986	SKAMOKAWA CREEK	GRAYS R HATCHERY -WF	Fingr	06/05/87	06/05/87	50	107000	GRAYS R -WF	25.0131	UNTAGGED
1986	WASHOUGAL RIVER	GRAYS R HATCHERY -WF	Fingr	06/22/87	06/22/87	60	179200	GRAYS R -WF	25.0131	UNTAGGED
1986	GRAYS RIVER	GRAYS R HATCHERY -WF	PreSm	08/24/87	08/24/87	26	105200	GRAYS R -WF	25.0131	UNTAGGED
1987	KALAMA RIVER	GRAYS R HATCHERY -WF	EmFry	02/20/88	02/20/88	1055	32000	GRAYS R -WF	25.0131	UNTAGGED

Table 15 (cont.). Hatchery releases of fall chinook salmon into the Grays River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1987	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	02/25/88	02/25/88	354	121400	GRAYS R -WF RM 5.0	UNTAGGED
1987	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	05/06/88	05/06/88	99	292200	GRAYS R -WF RM 5.0	UNTAGGED
1987	KALAMA RIVER	GRAYS R HATCHERY -WF	Fingr	05/06/88	05/06/88	70	105000	GRAYS R -WF RM 5.0	UNTAGGED
1987	KALAMA RIVER	GRAYS R HATCHERY -WF	Fingr	05/09/88	05/09/88	190	220900	GRAYS R -WF RM 5.0	UNTAGGED
1987	KALAMA RIVER	GRAYS R HATCHERY -WF	Fingr	05/09/88	05/09/88	160	520100	GRAYS R -WF RM 5.0	UNTAGGED
1988	ELOCHOMAN RIVER	GRAYS R HATCHERY -WF	EmFry	02/04/88	02/04/88	1106	427000	GRAYS R -WF RM 5.0	UNTAGGED
1988	ELOCHOMAN RIVER	GRAYS R HATCHERY -WF	EmFry	02/09/88	02/09/88	1031	590000	GRAYS R -WF RM 5.0	UNTAGGED
1988	ELOCHOMAN RIVER	GRAYS R HATCHERY -WF	Fingr	01/17/89	01/17/89	488	580000	GRAYS R -WF RM 5.0	UNTAGGED
1988	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	05/23/89	05/23/89	71	220600	GRAYS R -WF RM 5.0	UNTAGGED
1988	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/08/89	06/08/89	53	818900	GRAYS R -WF RM 5.0	UNTAGGED
1988	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/26/89	06/26/89	45	242000	GRAYS R -WF RM 5.0	UNTAGGED
1989	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	03/12/90	03/12/90	401	162800	GRAYS R -WF RM 5.0	UNTAGGED
1989	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	05/14/90	05/14/90	73	406700	GRAYS R -WF RM 5.0	UNTAGGED
1989	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/05/90	06/05/90	64	89758	GRAYS R -WF RM 5.0	635538
1989	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/05/90	06/05/90	64	295242	GRAYS R -WF RM 5.0	UNTAGGED
1989	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/18/90	06/18/90	46	87927	GRAYS R -WF RM 5.0	635541
1989	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/18/90	06/18/90	46	104573	GRAYS R -WF RM 5.0	UNTAGGED
1989	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/22/90	06/22/90	35	89019	GRAYS R -WF RM 5.0	635537
1989	GRAYS RIVER	GRAYS R HATCHERY -WF	Fingr	06/22/90	06/22/90	35	157581	GRAYS R -WF RM 5.0	UNTAGGED

Table 16 (SL). Lengths of fall chinook smolts from the Grays River, 1979.

Location and year	No. Fish	Length ave. (mm)	Length range (mm)	Reference
West Fork and mainstream Grays, 1979	90	40.2	33-51	"Spring seining of 1978 brood wild fall chinook juveniles on the Kalama River, Grays River and Skamokawa Creek" WDF memorandum from Nancy Bluestein to Don McIssac, December 11, 1979.

Five stick seining trips were made on the Grays River between March 22-Apri126, 1979. Chinook average length and ranges are based on those seining results and may reflect rearing and/or outmigration size patterns.

Table 17 (TD). Parasites and diseases of fall chinook at the Grays Hatchery.

Disease type	Hatchery	Specific Pathogen
Parasite	Grays	*Costia necatrix* (Costia)
Parasite	Grays	*Trichodiniosis* (Trichodina)
Parasite	Grays	*Plistophora salmonae* (Plistophora)
Parasite (commensal)	Grays	Epistylis
Parasite	Grays	*Ichthyophthirius multifilis* (Ichthyopthirius)
Bacteria	Grays	*Yersinia ruckeri* (Enteric Redmouth)
Bacteria	Grays	*Aeromonous salmonicida* (Furunculosis)

REFERENCES

Howell, P. J., K. Jones, D. Scarnecchia, L. LaVoy, W. Kendra, and D. Ortmann. 1985. Stock assessment of Columbia River anadromous salmonids, volumes I & II. Final report of Oregon Department of Fish and Wildlife, Washington Department of Fisheries, Washington Department of Game, and Idaho Department of Fish and Game (project 83-335, Contract DE-AI79-84BP12737) to Bonneville Power Administration, Portland, Oregon.

Schreck, C. B., H. W. Li, R. C. Hjort, and C. S. Sharpe. 1986. Stock Identification of Columbia River chinook salmon and steelhead trout. Final Report of Cooperative Fisheries Research Unit, Oregon State University (Project 83-451, Agreement DE-A179-83 BP 13499) to Bonneville Power Administration, Portland, Oregon.

Washington Department of Fisheries. 1990. Grays River Subbasin, Salmon and Steelhead Production Plan.

GRAYS SUBBASIN

Coho

GEOGRAPHIC LOCATION

The Grays River originates in the southeast Pacific County and flows southwest through Wahkiakum County to its confluence with the Columbia River at River Mile (RM) 21. The lower six miles of the river are a slough subject to tidal influence. The next six miles flow through a wide, flat valley before entering the steep foothills. Most of the upper watershed flows through steep narrow canyons in the rugged Willapa Hills. The entire basin encompasses 124 square miles.

A number of tributaries of the Grays River have good to excellent coho production potential. Among these are Hull, Fossil, and Mitchell Creeks, and the East, North, and South Forks of the Grays River (WDF, 1973).

Grays River Hatchery is located 2.5 miles upstream from State Highway 4 on the West, Fork of the Grays River. The hatchery is 21 miles from the mouth of the Columbia River. Grays River Hatchery is the sixth hatchery constructed under the Columbia River Fisheries Development Program and began operation in 1961.

ORIGIN

Washington Department of Fisheries (1951) reported Grays River had native late (Type-N) stocks. The current hatchery program produces early (Type-S) coho. Most existing early (Type-S) coho hatchery programs are considered linked, in varying degrees, to native Toutle River stock coho. These fish provided the basis for the who rearing program, beginning in 1952, at the Toutle Hatchery on the Green River. The hatchery program was very successful and, consequently, surplus eggs were readily available for transfer to other stations. Because of extensive transferring of eggs between most Columbia River facilities, releases considered to be of Toutle River ancestry are probably a mixture of various early coho production (Howell et al. 1985).

DISTRIBUTION

Natural spawning occurs in most areas accessible to coho.

PRODUCTION

U.S. Fish and Wildlife Service surveys in 1936 and 1937 indicated coho were present in all accessible tributaries of the Grays River, but no population estimates were made. Portions of the watershed were being logged, and splash dams, log and debris jams, and logging through the streams had probably already adversely affected fish production. Under the Columbia River Fisheries Development Program some of these problems were addressed on an ad hoc basis and production was extended by removing natural and man-made barriers. In 195 1, Washington Department of Fisheries estimated coho escapement at 2,500 fish.

Tables 1 and 2 describe the amount of spawning and rearing habitat, by quality, available in the Grays River. This data was derived from the Presence/Absence database of the Northwest Power Planning Council, 199 1.

Subbasin natural production potential was estimated to be 125,874 smolts using the Smolt Density Model. Natural spawning is presumed of early stock coho, through anecdotal information, to be quite low and subsequent juvenile production well below stream potential. Some natural production of late stock coho exists but probably does not exceed 10 - 15 percent (Howell et al. 1985).

Current production of coho at the Grays River Salmon Hatchery is limited by the need to rear fish for the Toutle River program, whose hatchery was destroyed in the Mount St. Helens eruption.

The number of Grays River coho natural spawn escapement is unavailable. Grays River Hatchery coho returns from 1978 - 1988 brood years averaged 2,684 with a low return of 468 for the 1984 brood and a peak of 5,382 for the 1979 brood. Grays River Hatchery returns by-brood year and age class are presented in Table 3.

Grays River tributary sport catch estimates between 1981 - 1988 return years averaged 68 adult coho, ranging from a low of 4 in 1981 and a high of 177 in 1984 based on catch records and limited actual sampling data. However, specific age and brood year analysis for Grays River sport catch is unavailable.

ADULT LIFE HISTORY

Run size, catch and escapement

Ocean commercial and recreational fisheries off the Oregon coast are the primary harvesters of early coho. The Oregon troll fishery accounts for the highest percentage of the overall catch. Early coho are distributed to coastal Oregon fisheries more heavily than their more northerly distributed late cohorts. Based on coded-wire tagged releases of 1976 - 1978 brood late coho, most of the harvest occurs in the Washington and Oregon ocean fisheries. This reflects the catch distribution where the Washington coastal late coho catch comprised 40 percent of the total harvest compared to 20 percent for early coho during 1979 - 1981. Late coho also contribute significantly to the lower Columbia River commercial gill net fishery. Harvest rates have averaged 79 percent and 85 percent for early and late coho stocks, respectively, between 1983 and 1987. Columbia River harvest of early coho is occasionally constrained by one or more of the fall chinook stocks. Harvest of late coho is generally not constrained by weak stocks, with hatchery escapement being the only management constraint (WDF, 1990). Most of the freshwater recreational harvest occurs in the Washington tributaries (Howell et al. 1985).

Strays from other lower river hatcheries are not unusual. Table 4 lists Grays Hatchery origin coho stray coded-wire tag recoveries beginning with the 1978 brood through to the 1988 brood. Table 5 lists the coded-wire tags recovered within the Grays subbasin which originated outside the Grays subbasin.

Time of Migration

Early coho enter the Columbia River by mid-August and begin returning to the lower Columbia hatcheries in early September. In the mainstem Columbia River early coho predominate from August to mid-September. Stock composition shifts to late coho in late September and October. Typically, the late coho run begins entering freshwater in mid to late September with mid-October considered the main migratory period in the mainstem Columbia River (Howell et al. 1985).

Spawning Period

For early coho, both hatchery and natural spawning occurs around late October, while for late coho spawning extends from late November through March, with the bulk occurring in December and early January (Howell et al. 1985)

Spawning Areas

Natural spawning occurs in most areas accessible to coho.

Age composition

Coho return as two-year-old jacks and three-year-old adults. Table 6 lists the age composition percentages by brood year and age class for coho returning to Grays River Hatchery. Age composition percentages by brood year and age class for Grays River natural spawners is unavailable.

Sex Ratio

Females comprised 4 - 51 percent of the coho returning to the Grays River Hatchery between 1978 - 1987 brood years. The percent females by brood year and age class for Grays River Hatchery returns are presented in Table 7. The percent females by brood year and age class for Grays River natural spawners are unavailable.

Early stock coho fork length measurements generally range from 30 - 45 cm. for jacks (Washington hatchery sampling) and 55 - 70 cm. for adults (commercial fishery sampling). Based on sampling of the lower Columbia River commercial fishery during 1980 - 1982, late coho adult fork length measurements ranged from about 50 - 70 cm. (Howell et al. 1985). Grays River Hatchery returns and natural spawn escapement mean fork length by brood year and age class are unavailable.

Fecundity

Coho fecundity at the Grays Hatchery for 1977 - 1987 brood years averaged 2,32 1 and with a low of 1,750 for the 1980 brood and a peak of 2,713 for the 1982 and 1985 broods. Table 8 lists the mean fecundity by brood year and age class for coho returning to the Grays River Hatchery. The mean fecundity of Grays River natural spawners brood year and age class is unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

The juvenile life history for Grays River subbasin coho is similar to that of other stocks in the region with a spring emergence (WDF, 1990).

Time. age and size at migration

Hatchery information for the Grays River subbasin by brood year is presented in Table 9. Length data of natural coho smolts from the Grays River is unavailable. The number of natural juvenile coho salmon that migrate from the Grays River is also unavailable.

Survival Rate

A generalized recent year smolt-to-adult survival for coho was estimated to be 2.5 percent (TAC, 1983).

BIOCHEMICAL-GENETIC CHARACTERISTICS

Data has not been compiled.

DISEASE

Bacteria and parasitic diseases found in the Grays Hatchery are listed in Table 10 (WDF Salmon Culture, Olympia).

Table 1 (HB-1). Estimated amount of rearing and spawning habitat, by quality, of the Grays River coho production area.

Distance/Area	Excellent	Good	Fair*	Poor*	Unknown	Total	Confidence
Miles (%)	.27	.68	.06	0.00		48.5	
Acres (%)	.33	.58	.09	0.00		44.8	

*Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC , 199 1.

Table 2 (HB-2). Estimated amount of rearing habitat, by quality, of the Grays River coho production area.

Distance/Area	Excellent	Good	Fair*	Poor*	Unknown	Total	Confidence
Miles (%)	.31	.50	.19	0.00		8	
Acres (%)	.82	.02	.17	0.00		14.1	

"Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 199 1.

Table 3 (RH). Total hatchery returns of coho to the Grays River Hatchery by brood year.

Brood Year	Total Age 2	3	Total	Adult Total
1978	1,040	530	1,570	530
1979	1,313	4,069	5,382	4,069
1980	1,744	178	1,922	178
1981	112	2,684	2,796	2,684
1982	89	828	917	828
1983	182	1,883	2,065	1,883
1984	92	376	468	376
1985	1,012	3,035	4,047	3,035
1986	1,609	3,739	5,348	3,739
1987	731	1,488	2,219	1,488
1988	1,071			

Age composition based on hatchery personnel designation of adults and jacks. Adult coho assumed to be 2.1 and jacks 2.0.

Table 4 (AE). Emigration of coded wire tagged coho from the Grays River subbasin..

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Grays River Hatchery	Grays River, 1982	Spawning Ground	36	4	139
Grays River Hatchery	Skamokawa Creek,1982	Spawning Ground	3	1	33
Grays River Hatchery	Grays River, 1988	Spawning Ground	14	1	---
Grays River Hatchery	Skamokawa Creek, 1989	Spawning Ground	8	1	---
Grays River Hatchery	Elochoman, 1986	Hatchery	5,476	1	2
Grays River Hatchery	Elochoman, 1986	Hatchery	5,476	4	8
Grays River Hatchery	Elochoman, 1986	Hatchery	5,476	2	4
Grays River Hatchery	Elochoman, 1986	Hatchery	5,476	2	4
Grays River Hatchery	Elochoman, 1986	Hatchery	5,476	1	2
Grays River Hatchery	Elochoman, 1986	Hatchery	5,476	5	10
Grays River Hatchery	Elochoman, 1988	Hatchery	3,754	1	1
Grays River Hatchery	Elochoman, 1988	Hatchery	3,754	1	1
Grays River Hatchery	Elochoman, 1988	Hatchery	3,754	2	2
Grays River Hatchery	Elochoman, 1988	Hatchery	2,766	1	1
Grays River Hatchery	Cowlitz, 1986	Hatchery	54,685	1	1

*Based on the following tag codes: 63-22-43, 63-42-47, 63-42-50, 63-32-59, 63-32-60, 63-32-61, 63-32-62, 63-32-63, 63-33-01, 63-42-49, 63-42-52, and 63-32-59.

Beginning with the 1978 brood.

Table 5 (AI). Immigration of coded wire tagged coho into the Grays River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Grays River Hatchery	Grays River, 1982	Spawning Ground	36	4	139
Willard Hatchery, released Hammond	Grays River, 1981	Hatchery	1,843	1	1
Grays River Hatchery	Grays River, 1988	Spawning Ground	14	1	---

*Based on the following tag codes: 63-22-43, 05-06-53, and 63-42-47.

Beginning with the 1978 brood.

Table 6 (AC). Age composition percentage (freshwater.ocean) by brood year for coho returning to the Grays River Hatchery.

		Age Composition (%)	
Brood Year	N	2.0	2.1
1978		66.24	33.76
1979		24.40	75.60
1980		90.74	9.26
1981		4.01	95.99
1982		9.71	90.29
1983		8.81	91.19
1984		19.66	80.34
1985		25.01	74.99
1986		30.09	69.91
1987		32.94	67.06
1988			

Age composition based on hatchery personnel designation of adults and jacks. Adult coho assumed to be 2.1 and jacks 2.0.

N (Number of scale samples) not applicable.

Table 7 (AS). Percent females by brood year and age class (freshwater.ocean) for coho returning to the Grays River Hatchery.

Females (%)

Brood Year	N	2.0	2.1	Total % Female
1978		0	49.06	16.56
1979		0	36.62	27.68
1980		0	40.45	3.75
1981		0	53.09	50.97
1982		0	54.23	48.96
1983		0	39.94	36.42
1984		0	42.29	33.97
1985		0	34.17	25.62
1986		0	43.38	30.33
1987		0	38.31	25.69
1988		0		

Age composition based on hatchery personnel designation of adults and jacks. Adults assumed to be 2.1 and jacks 2.0. Females assumed to be adults.

N (Number of scale samples) not applicable.

Table 8 (AF). Mean fecundity by brood year and age class (freshwater.ocean) for coho returning to the Grays River Hatchery.

Mean Fecundity

Brood Year	2.0	2.1
1977	0	2,623
1978	0	2,258
1979	0	1,933
1980	0	1,750
1981	0	2,600
1982	0	2,713
1983	0	2,516
1984	0	2,547
1985	0	2,713
1986	0	1,818
1987	0	2,537
1988	0	

Age composition based on hatchery personnel designation of adults and jacks. Adults assumed to be 2.1 and jacks 2.0. All females were assumed to be adults.

Table 9 (TR). tchery releases of COHO salmon into the GRAYS RIVER subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1965	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Smolt	04/23/67	04/23/67	22	35068	GRAYS R -WF 25.0131	UNTAGGED
1965	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Smolt	04/23/67	04/23/67	22	36344	GRAYS R -WF 25.0131	UNTAGGED
1965	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Smolt	04/23/67	04/23/67	20	107227	GRAYS R -WF 25.0131	UNTAGGED
1965	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Smolt	04/23/67	04/23/67	20	948153	GRAYS R -WF 25.0131	UNTAGGED
1966	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	EmFry	02/24/67	02/24/67	1226	654480	GRAYS R -WF 25.0131	UNTAGGED
1966	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Fingr	06/14/67	06/14/67	100	75000	FOSSIL CR (25.0130)	UNTAGGED
1966	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Fingr	05/27/67	05/27/67	147	3969	GRAYS R -WF 25.0131	UNTAGGED
1966	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Fingr	06/14/67	06/14/67	100	75000	HULL CR (25.0119)	UNTAGGED
1966	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Smolt	04/15/68	04/15/68	17	63150	GRAYS R -WF 25.0131	UNTAGGED
1966	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Smolt	04/15/68	04/15/68	17	549955	GRAYS R -WF 25.0131	UNTAGGED
1967	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Smolt	04/19/69	04/19/69	16	19504	FOSSIL CR (25.0130)	UNTAGGED
1967	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Smolt	04/19/69	04/19/69	16	804032	GRAYS R -WF 25.0131	UNTAGGED
1967	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Smolt	04/19/69	04/19/69	16	20000	HULL CR (25.0119)	UNTAGGED
1968	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Fingr	05/12/69	05/12/69	251	201250	GRAYS R -WF 25.0131	UNTAGGED
1968	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Fingr	05/28/69	05/28/69	156	197028	GRAYS R -WF 25.0131	UNTAGGED
1968	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Fingr	06/09/69	06/09/69	233	174396	GRAYS R -WF 25.0131	UNTAGGED
1968	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Smolt	04/02/70	04/02/70	17	28763	GRAYS R -WF 25.0131	UNTAGGED
1968	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Smolt	04/02/70	04/02/70	17	33697	GRAYS R -WF 25.0131	UNTAGGED
1968	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Smolt	04/02/70	04/02/70	17	29609	GRAYS R -WF 25.0131	UNTAGGED
1968	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Smolt	04/02/70	04/02/70	16	1015155	GRAYS R -WF 25.0131	UNTAGGED
1968	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Smolt	04/02/70	04/02/70	16	35960	GRAYS R -WF 25.0131	UNTAGGED
1968	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Smolt	04/02/70	04/02/70	16	68741	GRAYS R -WF 25.0131	UNTAGGED
1969	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Fingr	03/11/70	03/11/70	1008	75332	FOSSIL CR (25.0130)	UNTAGGED
1969	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Fingr	03/11/70	03/11/70	1008	249410	GRAYS R -WF 25.0131	UNTAGGED
1969	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Fingr	03/11/70	03/11/70	1008	75332	HULL CR (25.0119)	UNTAGGED
1969	GRAYS RIVER TYP-S	GRAYS R HATCHERY -WF	Smolt	03/29/71	03/29/71	16	1273872	GRAYS R -WF 25.0131	UNTAGGED
1970	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	06/03/71	06/03/71	207	71406	GRAYS R -WF 25.0131	UNTAGGED
1970	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	08/05/71	08/05/71	76	518612	GRAYS R -WF 25.0131	UNTAGGED
1970	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/03/72	04/03/72	14	1174362	GRAYS R -WF 25.0131	UNTAGGED
1971	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	EmFry	02/15/72	02/15/72	1163	55200	FOSSIL CR (25.0130)	UNTAGGED
1971	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	EmFry	02/15/72	02/15/72	1163	200100	GRAYS R -WF 25.0131	UNTAGGED
1971	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	EmFry	02/15/72	02/15/72	1163	149500	HULL CR (25.0119)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Smolt	03/24/73	03/24/73	18	286632	GRAYS R -WF 25.0131	UNTAGGED
1971	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Smolt	03/24/73	03/24/73	16	438976	GRAYS R -WF 25.0131	UNTAGGED
1971	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/10/73	04/10/73	16	748000	GRAYS R -WF 25.0131	UNTAGGED
1972	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	05/04/73	05/04/73	262	50112	FOSSIL CR (25.0130)	UNTAGGED
1972	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	05/01/73	05/01/73	300	278400	GRAYS R -WF 25.0131	UNTAGGED
1972	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	05/02/73	05/02/73	300	50100	GRAYS R -WF 25.0131	UNTAGGED
1972	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	05/09/73	05/09/73	282	50018	GRAYS R -WF 25.0131	UNTAGGED
1972	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	05/09/73	05/09/73	282	50018	GRAYS R -WF 25.0131	UNTAGGED
1972	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	08/02/73	08/02/73	69	918450	GRAYS R -WF 25.0131	UNTAGGED
1972	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	05/01/73	05/01/73	300	50100	HULL CR (25.0119)	UNTAGGED
1972	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	05/08/73	05/08/73	282	75027	MITCHELL CR 25.0159	UNTAGGED
1972	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	05/08/73	05/08/73	282	50018	SEAL CR (25.0104)	UNTAGGED
1972	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	05/04/73	05/04/73	261	78300	SWEIGLER CR 25.0135	UNTAGGED
1972	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Smolt	04/01/74	04/01/74	15	272790	GRAYS R -WF 25.0131	UNTAGGED
1972	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/01/74	04/01/74	15	797685	GRAYS R -WF 25.0131	UNTAGGED
1972	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/01/74	04/01/74	12	185205	GRAYS R -WF 25.0131	UNTAGGED
1973	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	06/18/74	06/18/74	95	40375	FOSSIL CR (25.0130)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Fingr	06/26/74	06/26/74	225	50175	GRAYS R -EF 25.0157	UNTAGGED
1973	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	06/11/74	06/11/74	97	34823	GRAYS R -WF 25.0131	UNTAGGED
1973	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	06/18/74	06/18/74	75	34500	GRAYS R -WF 25.0131	UNTAGGED
1973	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	06/18/74	06/18/74	75	34875	GRAYS R -WF 25.0131	UNTAGGED
1973	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Fingr	06/25/74	06/25/74	190	58900	GRAYS R -WF 25.0131	UNTAGGED
1973	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Fingr	06/25/74	06/25/74	181	55205	GRAYS R -WF 25.0131	UNTAGGED

Table 9. Hatchery releases of COHO salmon into the GRAYS RIVER subbasin sorted by brood year, hatchery and life stage ∞ NT NUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1973	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Fingr	06/25/74	6/25/74	181	61902	GRAYS R -WF 25.0131	UNTAGGED
1973	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Fingr	06/25/74	6/25/74	181	62264	GRAYS R -WF 25.0131	UNTAGGED
1973	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Fingr	06/25/74	6/25/74	181	66065	GRAYS R -WF 25.0131	UNTAGGED
1973	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Fingr	06/26/74	6/26/74	194	64420	GRAYS R -WF 25.0131	UNTAGGED
1973	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Fingr	06/26/74	6/26/74	185	59200	GRAYS R -WF 25.0131	UNTAGGED
1973	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Fingr	06/26/74	6/26/74	185	91205	GRAYS R -WF 25.0131	UNTAGGED
1973	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	06/11/74	6/11/74	97	75175	HULL CR 25-0119)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Fingr	06/20/74	6/20/74	195	65998	MITCHELL CR 25.0159	UNTAGGED
1973	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	06/18/74	6/18/74	75	31050	SEAL CR (25-0104)	UNTAGGED
1973	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	06/18/74	6/18/74	75	31350	SWEIGLER CR 25.0135	UNTAGGED
1973	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Smolt	05/01/75	5/01/75	16	757232	GRAYS R -WF 25.0131	UNTAGGED
1973	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Smolt	05/02/75	5/02/75	16	794056	GRAYS R -WF 25.0131	UNTAGGED
1973	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Smolt	05/06/75	5/06/75	15	20280	SEAL CR (25-0104)	UNTAGGED
1974	GRAYS RIVER TYPE-N	GRAYS R HATCHERY -WF	Fingr	07/11/75	7/11/75	341	49980	FOSSIL CR (25-0130)	UNTAGGED
1974	GRAYS RIVER TYPE-N	GRAYS R HATCHERY -WF	Fingr	07/08/75	7/08/75	270	50220	GRAYS R -WF 25.0131	UNTAGGED
1974	GRAYS RIVER TYPE-N	GRAYS R HATCHERY -WF	Fingr	07/08/75	7/08/75	223	169926	GRAYS R -WF 25.0131	UNTAGGED
1974	GRAYS RIVER TYPE-N	GRAYS R HATCHERY -WF	Fingr	07/10/75	7/10/75	341	82960	GRAYS R -WF 25.0131	UNTAGGED
1974	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	07/11/75	7/11/75	84	54096	GRAYS R -WF 25.0131	UNTAGGED
1974	GRAYS RIVER TYPE-N	GRAYS R HATCHERY -WF	Fingr	08/28/75	8/28/75	65	398385	GRAYS R -WF 25.0131	UNTAGGED
1974	GRAYS RIVER TYPE-N	GRAYS R HATCHERY -WF	Fingr	07/09/75	7/09/75	270	50220	HULL CR (25.0119)	UNTAGGED
1974	GRAYS RIVER TYPE-N	GRAYS R HATCHERY -WF	Fingr	07/10/75	7/10/75	341	19720	MALONE CR (25.0106)	UNTAGGED
1974	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	07/11/75	7/11/75	84	36624	MITCHELL CR 25.0159	UNTAGGED
1974	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	07/11/75	7/11/75	84	79380	SEAL CR (25-0104)	UNTAGGED
1974	GRAYS RIVER TYPE-N	GRAYS R HATCHERY -WF	Fingr	07/08/75	7/08/75	270	40500	SWEIGLER CR 25.0135	UNTAGGED
1974	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Smolt	05/03/76	5/14/76	16	51934	GRAYS R + SEAL R	130507
1974	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Smolt	05/03/76	5/14/76	16	217863	GRAYS R + SEAL R	UNTAGGED
1974	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	05/03/76	5/14/76	16	52082	GRAYS R + SEAL R	130508
1974	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	05/03/76	5/14/76	16	949349	GRAYS R + SEAL R	UNTAGGED
1974	GRAYS RIVER TYPE-N	GRAYS R HATCHERY -WF	Smolt	05/03/76	5/03/76	16	156530	GRAYS R -WF 25.0131	UNTAGGED
1974	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Smolt	05/03/76	5/03/76	16	210614	GRAYS R -WF 25.0131	UNTAGGED
1974	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Smolt	05/03/76	5/03/76	16	759136	GRAYS R -WF 25.0131	UNTAGGED
1974	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Smolt	05/14/76	5/14/76	12	7249	SEAL CR (25.0104)	UNTAGGED
1974	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Smolt	05/14/76	5/14/76	12	33683	SEAL CR (25.0104)	UNTAGGED
1974	ELOCHOMAN R TYPE-S	WEYCO POND	Smolt	03/29/76	3/29/76	12	455799	ALDER CREEK	UNTAGGED
1975	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	07/14/76	7/14/76	115	10005	MALONE CR (25.0106)	UNTAGGED
1975	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	07/14/76	7/14/76	115	62346	SEAL CR (25.0104)	UNTAGGED
1975	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/29/77	4/29/77	16	51639	GRAYS R -WF 25.0131	131307
1975	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/29/77	4/29/77	16	953089	GRAYS R -WF 25.0131	UNTAGGED
1975	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Smolt	04/29/77	4/29/77	17	41943	GRAYS R -WF 25.0131	131601
1975	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Smolt	04/29/77	4/29/77	17	350587	GRAYS R -WF 25.0131	UNTAGGED
1975	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Smolt	04/29/77	4/29/77	17	343855	GRAYS R -WF 25.0131	UNTAGGED
1975	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/29/77	4/29/77	16	186625	GRAYS R -WF 25.0131	UNTAGGED
1975	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/29/77	4/29/77	16	319179	GRAYS R -WF 25.0131	UNTAGGED
1975	WASHOUGAL R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/29/77	4/29/77	16	446031	GRAYS R -WF 25.0131	UNTAGGED
1975	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Smolt	05/05/77	5/05/77	13	25311	SEAL CR (25-0104)	UNTAGGED
1976	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	05/19/77	5/19/77	167	90514	GRAYS R -WF 25.0131	UNTAGGED
1976	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	05/19/77	5/19/77	167	90514	GRAYS R -WF 25.0131	UNTAGGED
1976	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	05/20/77	5/20/77	171	21375	GRAYS R -WF 25.0131	UNTAGGED
1976	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	05/20/77	5/20/77	171	93024	GRAYS R -WF 25.0131	UNTAGGED
1976	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	05/20/77	5/20/77	171	51471	HULL CR (25.0119)	UNTAGGED
1976	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	05/20/77	5/20/77	167	15531	MALONE CR (25.0106)	UNTAGGED
1976	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	05/19/77	5/19/77	167	90180	SEAL CR (25-0104)	UNTAGGED
1976	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Smolt	04/12/78	4/12/78	18	61020	GRAYS R -WF 25.0131	UNTAGGED
1976	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	05/01/78	5/01/78	19	47139	GRAYS R -WF 25.0131	631648
1976	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	05/01/78	5/01/78	19	803567	GRAYS R -WF 25.0131	UNTAGGED

Table 9. Hatchery releases of COHO salmon into the GRAYS RIVER subbasin sorted by brood year, hatchery and life stage - CONTINUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1976	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Smolt	05/01/78	05/01/78	19	48798	GRAYS R -WF 25.0131	631661
1976	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Smolt	05/01/78	05/01/78	19	278789	GRAYS R -WF 25.0131	UNTAGGED
1976	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Smolt	05/01/78	05/01/78	19	180229	GRAYS R -WF 25.0131	UNTAGGED
1976	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Smolt	05/01/78	05/01/78	19	277795	GRAYS R -WF 25.0131	UNTAGGED
1976	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Smolt	05/01/78	05/01/78	16	619407	GRAYS R -WF 25.0131	UNTAGGED
1977	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/18/79	04/18/79	18	50858	GRAYS R -WF 25.0131	631753
1977	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/18/79	04/18/79	18	146764	GRAYS R -WF 25.0131	UNTAGGED
1977	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/18/79	04/18/79	18	50761	GRAYS R -WF 25.0131	631805
1977	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/18/79	04/18/79	18	181027	GRAYS R -WF 25.0131	UNTAGGED
1977	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/18/79	04/18/79	18	180879	GRAYS R -WF 25.0131	UNTAGGED
1977	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/18/79	04/18/79	18	146146	GRAYS R -WF 25.0131	UNTAGGED
1977	TOUTLE RIVER TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/23/79	04/23/79	19	527209	GRAYS R -WF 25.0131	UNTAGGED
1978	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	EmFry	12/22/78	12/22/78	1512	93000	HULL CR (25.0119)	UNTAGGED
1978	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/20/79	03/20/79	510	50800	GRAYS R -EF 25.0157	UNTAGGED
1978	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/16/79	03/16/79	521	100000	HENDRICKSON CR (25)	UNTAGGED
1978	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/20/79	03/20/79	510	63500	HULL CR (25.0119)	UNTAGGED
1978	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/21/79	03/21/79	540	53700	MITCHELL CR 25.0159	UNTAGGED
1978	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/16/79	03/16/79	521	161744	SEAL CR (25.0104)	UNTAGGED
1978	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/21/79	03/21/79	540	67125	UNNAMED STREAM (25)	UNTAGGED
1978	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/09/80	04/09/80	18	104679	GRAYS R -WF 25.0131	631952
1978	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/09/80	04/09/80	18	127140	GRAYS R -WF 25.0131	UNTAGGED
1978	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/09/80	04/09/80	18	103624	GRAYS R -WF 25.0131	631953
1978	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/09/80	04/09/80	18	193145	GRAYS R -WF 25.0131	UNTAGGED
1978	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/09/80	04/09/80	18	125741	GRAYS R -WF 25.0131	UNTAGGED
1978	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/09/80	04/09/80	18	192142	GRAYS R -WF 25.0131	UNTAGGED
1978	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/09/80	04/09/80	18	547915	GRAYS R -WF 25.0131	UNTAGGED
1979	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	02/22/80	02/22/80	639	146000	FOSSIL CR (25.0130)	UNTAGGED
1979	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/10/80	04/10/80	315	160020	GRAYS R -EF 25.0157	UNTAGGED
1979	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/11/80	03/11/80	547	274870	GRAYS R -WF 25.0131	UNTAGGED
1979	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	02/22/80	02/22/80	732	300000	HULL CR (25.0119)	UNTAGGED
1979	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	06/19/80	06/19/80	130	31700	MALONE CR (25.0106)	UNTAGGED
1979	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/10/80	03/10/80	560	140750	MITCHELL CR 25.0159	UNTAGGED
1979	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	06/19/80	06/19/80	130	32700	SEAL CR (25.0104)	UNTAGGED
1979	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	06/18/80	06/18/80	142	40000	SWEIGLER CR 25.0135	UNTAGGED
1979	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	06/17/80	06/17/80	143	36600	UNNAMED STREAM (25)	UNTAGGED
1979	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/29/81	04/29/81	18	475525	GRAYS R -WF 25.0131	UNTAGGED
1979	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/30/81	04/30/81	18	97532	GRAYS R -WF 25.0131	632106
1979	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/30/81	04/30/81	18	86445	GRAYS R -WF 25.0131	UNTAGGED
1979	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/30/81	04/30/81	17	99921	GRAYS R -WF 25.0131	632243
1979	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/30/81	04/30/81	17	103734	GRAYS R -WF 25.0131	UNTAGGED
1979	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/30/81	04/30/81	18	83904	GRAYS R -WF 25.0131	UNTAGGED
1979	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/30/81	04/30/81	17	101067	GRAYS R -WF 25.0131	UNTAGGED
1980	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	EmFry	12/23/80	12/23/80	1296	59500	SWEIGLER CR 25.0135	UNTAGGED
1980	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	02/11/81	02/11/81	720	49680	BLANEY CR (25.0142)	UNTAGGED
1980	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	02/11/81	02/11/81	720	134320	BLANEY CR (25.0142)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Fingr	04/02/81	04/02/81	375	99750	GRAYS R -EF 25.0157	UNTAGGED
1980	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Fingr	09/09/81	09/09/81	52	66466	GRAYS R -EF 25.0157	UNTAGGED
1980	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	09/09/81	09/09/81	52	6334	GRAYS R -EF 25.0157	UNTAGGED
1980	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	02/11/81	02/11/81	720	214182	GRAYS R -WF 25.0131	UNTAGGED
1980	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	02/11/81	02/11/81	720	214182	GRAYS R -WF 25.0131	UNTAGGED
1980	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/05/81	03/05/81	1008	142840	GRAYS R -WF 25.0131	UNTAGGED
1980	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	07/29/81	07/29/81	63	8400	GRAYS R -WF 25.0131	UNTAGGED
1980	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Fingr	07/29/81	07/29/81	63	68179	GRAYS R -WF 25.0131	UNTAGGED
1980	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Fingr	09/10/81	09/10/81	52	71214	GRAYS R -WF 25.0131	UNTAGGED
1980	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	09/10/81	09/10/81	52	6786	GRAYS R -WF 25.0131	UNTAGGED

Table 9. Hatchery releases of COHO salmon into the GRAYS RIVER subbasin sorted by brood year, hatchery and life stage - CONTINUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1980	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	2/11/81	02/11/81	709	49140	HULL CR (25.0119)	UNTAGGED
1980	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	2/11/81	02/11/81	709	132860	HULL CR (25.0119)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Fingr	4/02/81	04/02/81	375	94125	HULL CR (25.0119)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	GRAYS R HATCHERY -WF	Fingr	4/02/81	04/02/81	375	96000	MITCHELL CR 25.0159	UNTAGGED
1980	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	4/30/82	04/30/82	16	52110	GRAYS R -WF 25.0131	632363
1980	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	4/30/82	04/30/82	16	453888	GRAYS R -WF 25.0131	UNTAGGED
1980	ELOCHOMAN RIVER	SEA RESOURC NET PENS	Fingr	4/22/81	04/22/81	151	22801	MALONE CR (25.0106)	UNTAGGED
1980	ELOCHOMAN RIVER	SEA RESOURC NET PENS	Fingr	4/22/81	04/22/81	151	22650	SEAL CR (25.0104)	UNTAGGED
1981	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	4/30/83	04/30/83	20	50086	GRAYS R -WF 25.0131	632733
1981	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	4/30/83	04/30/83	20	346114	GRAYS R -WF 25.0131	UNTAGGED
1982	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	3/01/83	03/01/83	483	50900	GRAYS R -EF 25.0157	UNTAGGED
1982	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	3/01/83	03/01/83	483	50400	HULL CR (25.0119)	UNTAGGED
1982	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	3/02/83	03/02/83	560	41400	MALONE CR (25.0106)	UNTAGGED
1982	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	3/02/83	03/02/83	560	42600	MITCHELL CR 25.0159	UNTAGGED
1982	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	3/02/83	03/02/83	534	40100	SEAL CR (25.0104)	UNTAGGED
1982	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	4/30/84	04/30/84	18	48594	GRAYS R -WF 25.0131	633011
1982	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	4/30/84	04/30/84	18	357006	GRAYS R -WF 25.0131	UNTAGGED
1983	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	4/30/85	05/13/85	16	24678	GRAYS R -WF 25.0131	633259
1983	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	4/30/85	05/13/85	16	300	GRAYS R -WF 25.0131	UNTAGGED
1983	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	4/30/85	05/13/85	16	24274	GRAYS R -WF 25.0131	633260
1983	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	4/30/85	05/13/85	16	295	GRAYS R -WF 25.0131	UNTAGGED
1983	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	4/30/85	05/13/85	16	24693	GRAYS R -WF 25.0131	633261
1983	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	4/30/85	05/13/85	16	300	GRAYS R -WF 25.0131	UNTAGGED
1983	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	4/30/85	04/30/85	16	24599	GRAYS R -WF 25.0131	633262
1983	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	4/30/85	04/30/85	16	149	GRAYS R -WF 25.0131	UNTAGGED
1983	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	4/30/85	04/30/85	16	24475	GRAYS R -WF 25.0131	633263
1983	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	4/30/85	04/30/85	16	148	GRAYS R -WF 25.0131	UNTAGGED
1983	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	4/30/85	04/30/85	16	23941	GRAYS R -WF 25.0131	633301
1983	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	4/30/85	04/30/85	16	145	GRAYS R -WF 25.0131	UNTAGGED
1983	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Smolt	4/30/85	04/30/85	16	34389	GRAYS R -WF 25.0131	UNTAGGED
1983	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Smolt	4/30/85	04/30/85	16	82411	GRAYS R -WF 25.0131	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	3/25/85	03/25/85	498	12000	ALDER CR -UPR 250155	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	4/15/85	04/15/85	424	10200	BELL CANYON CR (25)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	3/26/85	03/26/85	498	22000	CABIN CR (25.0164)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	3/25/85	03/25/85	498	54000	FALL CR (25.0122)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	3/26/85	03/26/85	498	22000	FOSSIL CR (25.0130)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	4/15/85	04/15/85	424	42400	FOSSIL CR (25.0130)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	3/26/85	03/26/85	527	56700	GRAYS R -EF 25.0157	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	4/11/85	04/11/85	449	48800	GRAYS R -EF 25.0157	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	4/08/85	04/08/85	498	44000	GRAYS R -SF 25.0141	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	4/16/85	04/16/85	424	42400	GRAYS R -SF 25.0141	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	3/26/85	03/26/85	504	36300	GRAYS R -WF 25.0131	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	4/01/85	04/01/85	424	37400	GRAYS R -WF 25.0131	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	5/24/85	05/24/85	185	28700	GRAYS R -WF 25.0131	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	4/17/85	04/17/85	498	50000	HENDRICKSON CR (25)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	3/25/85	03/25/85	498	54000	HULL CR (25.0119)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	3/25/85	03/25/85	498	60000	HULL CR (25.0119)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	3/27/85	03/27/85	527	6300	IMPIE CR (25.0114)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	3/27/85	03/27/85	527	6300	KING CR (25.0118)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	4/09/85	04/09/85	498	27000	KLINTS CR (25.0128)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	4/15/85	04/15/85	424	22900	KLINTS CR (25.0128)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	3/27/85	03/27/85	527	37800	MALONE CR (25.0106)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	3/26/85	03/26/85	504	50400	MITCHELL CR 25.0159	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	3/27/85	03/27/85	527	6300	NIKKA CR (25.0115)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	4/17/85	04/17/85	445	75000	SEAL CR (25.0104)	UNTAGGED

Table 9. Hatchery releases of COHO salmon into the GRAYS RIVER subbasin sorted by brood year, hatchery and life stage - CONTINUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/21/85	03/21/85	477	48000	SWEIGLER CR 25.0135	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/27/85	03/27/85	527	6300	THADBAR CR (25.0116)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/25/85	03/25/85	498	60000	UNNAMED STREAM (25)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/26/85	03/26/85	498	36000	UNNAMED STREAM (25)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/08/85	04/08/85	498	54000	UNNAMED STREAM (25)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/11/85	04/11/85	498	50000	UNNAMED STREAM (25)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/11/85	04/11/85	498	50000	UNNAMED STREAM (25)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/16/85	04/16/85	445	44400	UNNAMED STREAM (25)	UNTAGGED
1984	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/15/86	05/09/86	16	25851	GRAYS R -WF 25.0131	633531
1984	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/15/86	05/09/86	16	15717	GRAYS R -WF 25.0131	UNTAGGED
1984	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/15/86	05/09/86	16	26277	GRAYS R -WF 25.0131	633532
1984	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/15/86	05/09/86	16	15977	GRAYS R -WF 25.0131	UNTAGGED
1984	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/15/86	05/09/86	16	26416	GRAYS R -WF 25.0131	633533
1984	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/15/86	05/09/86	16	16062	GRAYS R -WF 25.0131	UNTAGGED
1984	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/30/86	04/30/86	16	26300	GRAYS R -WF 25.0131	633534
1984	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/30/86	04/30/86	16	7941	GRAYS R -WF 25.0131	UNTAGGED
1984	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/30/86	04/30/86	16	25853	GRAYS R -WF 25.0131	633535
1984	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/30/86	04/30/86	16	7807	GRAYS R -WF 25.0131	UNTAGGED
1984	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/30/86	04/30/86	16	26191	GRAYS R -WF 25.0131	633536
1984	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/30/86	04/30/86	16	7908	GRAYS R -WF 25.0131	UNTAGGED
1985	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/17/86	03/17/86	582	12200	ALDER CREEK	UNTAGGED
1985	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/10/86	03/10/86	567	22200	CABIN CR (25.0164)	UNTAGGED
1985	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/10/86	03/10/86	567	54000	FALL CR (25.0122)	UNTAGGED
1985	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/10/86	03/10/86	567	22200	FOSSIL CR (25.0130)	UNTAGGED
1985	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/17/86	03/17/86	582	107900	GRAYS R -EF 25.0157	UNTAGGED
1985	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/10/86	03/10/86	567	35800	GRAYS R -WF 25.0131	UNTAGGED
1985	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	05/20/86	05/20/86	180	20000	GRAYS R -WF 25.0131	UNTAGGED
1985	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/10/86	03/10/86	567	60200	HULL CR (25.0119)	UNTAGGED
1985	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/18/86	03/18/86	582	53900	HULL CR (25.0119)	UNTAGGED
1985	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/18/86	03/18/86	498	36000	MALONE CR (25.0106)	UNTAGGED
1985	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/10/86	03/10/86	567	46000	MITCHELL CR 25.0159	UNTAGGED
1985	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/17/86	03/17/86	582	26100	MITCHELL CR 25.0159	UNTAGGED
1985	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/26/86	03/26/86	560	48000	SWEIGLER CR 25.0135	UNTAGGED
1985	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/10/86	03/10/86	567	54000	UNNAMED STREAM (25)	UNTAGGED
1985	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/17/86	03/17/86	582	59700	UNNAMED STREAM (25)	UNTAGGED
1985	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/26/86	03/26/86	560	48000	UNNAMED STREAM (25)	UNTAGGED
1985	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/26/86	03/26/86	560	48000	UNNAMED STREAM (25)	UNTAGGED
1985	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/16/87	05/04/87	15	39541	GRAYS R -WF 25.0131	634247
1985	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/16/87	05/04/87	15	24264	GRAYS R -WF 25.0131	UNTAGGED
1985	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/16/87	05/04/87	15	39231	GRAYS R -WF 25.0131	634249
1985	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/16/87	05/04/87	15	24264	GRAYS R -WF 25.0131	UNTAGGED
1985	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/20/87	04/20/87	15	195700	GRAYS R -WF 25.0131	UNTAGGED
1985	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/29/87	04/29/87	14	39874	GRAYS R -WF 25.0131	634250
1985	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/29/87	04/29/87	14	14194	GRAYS R -WF 25.0131	UNTAGGED
1985	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/29/87	04/29/87	14	39142	GRAYS R -WF 25.0131	634252
1985	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04/29/87	04/29/87	14	14190	GRAYS R -WF 25.0131	UNTAGGED
1985	COLUMBIA R - TYPE-S	SEA RESOURC NET PENS	Fingr	04/23/86	04/23/86	298	7774	SEAL CR (25.0104)	UNTAGGED
1986	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/17/87	03/17/87	540	13000	ALDER CREEK	UNTAGGED
1986	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/09/87	03/09/87	574	62100	FALL CR (25.0122)	UNTAGGED
1986	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/16/87	03/16/87	477	20900	FOSSIL CR (25.0130)	UNTAGGED
1986	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/09/87	03/09/87	534	114700	GRAYS R -EF 25.0157	UNTAGGED
1986	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/11/87	03/11/87	521	45800	GRAYS R -WF 25.0131	UNTAGGED
1986	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/17/87	03/17/87	540	91000	GRAYS R -WF 25.0131	UNTAGGED
1986	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/09/87	03/09/87	574	62100	HULL CR (25.0119)	UNTAGGED
1986	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/11/87	03/11/87	521	62400	HULL CR (25.0119)	UNTAGGED

Table 9. Hatchery releases of COHO salmon into the GRAYS RIVER subbasin sorted by brood year, hatchery and life stage - CONTINUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1986	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03 23/87	03 23/87	440	2200	IMPIE CR (25.0114)	UNTAGGED
1986	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03 23/87	03 23/87	440	2200	KING CR (25.0118)	UNTAGGED
1986	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03 23/87	03 23/87	436	18700	MALONE CR (25.0106)	UNTAGGED
1986	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03 10/87	03 10/87	547	78600	MITCHELL CR 25.0159	UNTAGGED
1986	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03 23/87	03 23/87	440	2200	NIKKA CR (25.0115)	UNTAGGED
1986	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03 23/87	03 23/87	440	2200	THADBAR CR (25.0116)	UNTAGGED
1986	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03 09/87	03 09/87	574	57500	UNNAMED STREAM (25)	UNTAGGED
1986	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03 09/87	03 09/87	574	57500	UNNAMED STREAM (25)	UNTAGGED
1986	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03 10/87	03 10/87	547	65500	UNNAMED STREAM (25)	UNTAGGED
1986	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Smolt	04 22/88	04 22/88	14	329500	GRAYS R -WF 25.0131	UNTAGGED
1986	NASELLE RIVER	SEA RESOURC NET PENS	Fingr	04 21/87	04 21/87	468	6100	SEAL CR (25.0104)	UNTAGGED
1987	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Smolt	04 12/89	04 12/89	16	229000	GRAYS R -WF 25.0131	UNTAGGED
1987	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Smolt	04 26/89	04 26/89	15	128300	GRAYS R -WF 25.0131	UNTAGGED
1988	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03 28/89	03 28/89	268	140000	GRAYS R -WF 25.0131	UNTAGGED
1988	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04 25/90	04 25/90	12	16160	GRAYS R -WF 25.0131	6350=7
1988	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	04 25/90	04 25/90	12	187515	GRAYS R -WF 25.0131	UNTAGGED
1988	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	05 07/90	05 07/90	14	15995	GRAYS R -WF 25.0131	6350=4
1988	TOUTLE R TYPE-S	GRAYS R HATCHERY -WF	Smolt	05 07/90	05 07/90	14	132805	GRAYS R -WF 25.0131	UNTAGGED

Table 10 (TD). Parasites and diseases of coho at the Grays River Hatchery.

Disease type	Hatchery	Specific Pathogen
Bacteria	Grays River	*Cytophaga psychrophila* (Cold Water Disease)
Parasite	Grays River	*Costia necatrix* (Costia)
Parasite	Grays River	*Trichodiniosis* (Trichodina)
Parasite	Grays River	*Plistophora salmonae* (Plistophora)
Parasite (Commensal)	Grays River	Epistylis
Parasite	Grays River	*Ichthyophthirius multifilis* (Ichthyopthirius)
Bacteria	Grays River	*Aeromonous salmonicida* (Furunculosis)

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GRAYS SUBBASIN

Chum Salmon

GEOGRAPHIC LOCATION

The Grays River originates in the southeast Pacific County and flows southwest through Wahkiakum County to its confluence with the Columbia River at River Mile (RM) 21. The lower six miles of the river are a slough subject to tidal influence. The next six miles flow through a wide, flat valley before entering steep foothills. Most of the upper watershed flows through steep narrow canyons in the rugged Willapa Hills. The entire basin encompasses 124 square miles.

A number of tributaries of the Grays River area have historically supported chum salmon runs. Among those were Seal, Malone, Hull, Klints, and Fossil Creeks, and the West Fork of the Grays River. Most of these area have only small runs, if any, at present (WDF, 1973).

Grays River Hatchery is located 2.5 miles upstream from State Highway 4 on the West Fork of the Grays River. The hatchery is 21 miles from the mouth of the Columbia River. Grays River Hatchery is the sixth hatchery constructed under the Columbia River Fisheries Development Program and began operation in 1961. Historically the Grays River Hatchery has raised chum though it does not currently.

ORIGIN

Chum are native to the lower Columbia River tributaries including the Grays River system. However, chum runs throughout the Columbia River drainage have declined drastically from their former abundance. Managers have attempted several times to augment natural chum production by releasing fed fry or fry from egg boxes directly into the stream. The mainstem and the West Fork Grays River have both been recipients of intermittent releases since 1972. The present low numbers of chum in the Columbia River made it necessary to use stock from outside the area. In 1976 approximately 1.1 million 1975 brood chum fry from Hokkaido, Japan (Mokoto stock) were released into the West Fork Grays River. These releases apparently had little affect on adults returns. Non-Columbia River stock chum salmon released in the Grays River also included Hood Canal stocks (WDF, 1990).

DISTRIBUTION

Spawning ground surveys include the mainstem Grays from River Mile (RM) 9.5 to RM 13.0 and West Fork of the Grays including the lower 1.4 miles, and 0.5 miles of Crazy Johnson Creek. Recent stream enhancement work by the Washington Department of Fisheries Department in Gorley Springs at RM 12 has been relatively successful and may increase basin chum production by providing a stable incubation environment (WDF, 1990).

PRODUCTION

The Grays River was once noted for its large runs of chum salmon. In 1936, 6,286 spawning or spawned-out chum were counted below the falls at RM 13, and an additional 1,388 chum were counted in the West Fork of the Grays River (Bryant, 1949). In 1951, the Washington Department of Fisheries estimated 7,500 chum returned to the Grays River. Logging of the watershed and the resulting landslides, erosion and channel changes caused serious damage to salmon spawning habitat. Today the Grays River chum run is a fraction of its historic run size.

The Grays River chum natural spawn escapement from 1977 - 1988 return years is measured as peak fish counts rather than natural spawn escapement estimates. The Grays River chum natural escapement (except Gorley Creek) has not been calculated. Peak fish counts for Grays River chum (including Gorley Creek) for 1977 through 1988 averaged 515 fish and ranged from 107 fish in 1980 to a high of 1,370 in 1988 (WDF, 1990). Gorley Creek chum natural spawn escapement from 1983 - 1984 brood years were 27 and 720 fish, respectively. Gorley Creek natural spawn escapements by age and brood year are presented in Table 1.

Few chum are harvested in the tributary recreational fishery.

ADULT LIFE HISTORY

Run size, catch and escapement

Chum salmon are not generally harvested in the ocean commercial and recreational fisheries. A few fish have been caught off of central Alaska (Johnson et al. 1976).

Maximum historical chum landings for the Columbia River have been estimated as high as 697,000 fish in 1928 (Northwest Power Planning Council, 1986). In 1942, landings were 425,000 fish but by 1955 they had diminished to 10,000 fish. Since 1965, commercial landings have been less than 2,000 fish annually (Columbia Fish Runs and Fisheries, 1988). It is impossible, however, to determine what portion of these catches might have been of Grays River origin. Historically chum were harvested in the mainstem by a variety of methods. Today chum are harvested in mainstem gill net fisheries as incidental catch during late fall seasons targeting on late coho. Local biologists familiar with the fisheries and spawning ground assessments in Washington suggest the harvest rate may approximate 35 to 50 percent (WDF, 1990). Little or no freshwater recreational harvest occurs in the Grays River.

Grays River chum have not been coded wire tagged and there have been no stray tag recoveries within the Grays River subbasin.

Time of Migration

Chum enter the Columbia River in mid October through November (Chaney and Perry, 1976). Adults migrate into the river from mid-October through November with peak spawner abundance occurring in late November (WDF, 1990).

Spawning Period

Peak spawner counts generally occur in late November in the Grays River (Howell et al. 1985).

Spawning Areas

Spawning ground surveys include the mainstem Grays from RM 9.5 to Rm 13.0 and the lower 1.4 miles of West Forks of the Grays River. Spawning also occurs in Crazy Johnson Creek and Gorley Springs at RM 12. Seasonal low flows sometimes restrict access of chum to preferred off-channel spawning area confining them to less stable mainstem reaches. Some mainstem reaches were chum spawn are subject to frequent channel shifts and bedload deposition or scour, all of which reduce intragravel survival.

Age composition

Chum return as three-year-old to six-year-old adults with three-year-old and four-year-olds normally the dominant age classes. Columbia River chum do not return as two-year-old jacks (Howell et al. 1985). Table 2 lists the age composition percentages by brood year and freshwaterocean rearing ages for chum returning to the Grays River spawning grounds.

Sex Ratio

Females comprised 42 - 67 percent of the chum returning to the Grays River spawning grounds between 1979 - 1984 brood years. The percent females by brood year and freshwater.ocean rearing ages for Grays River natural spawners are presented in Table 3.

The mean fork length by brood year, sex, and freshwater.ocean rearing ages of Grays River natural spawners for 1977 - 1987 brood years are available in Tables 4 and 5.

Fecundity

Fecundity data on Grays River chum are not available.

JUVENILE LIFE HISTORY

Time of Emergence

Time of emergence is estimated to be early spring.

Time. age and size at migration

The peak chum catch during seining of juvenile salmon in the Grays River from March 16 to May 18, 1979 occurred on April 5th (Bluestein, 1979). The fry averaged 41 mm and ranged from 35 - 45 mm in length. Table 6 lists the lengths of juvenile chum from the Grays River in 1979. Juvenile chum migrate to sea as zero-age smolts (Hart, 1973). The number of natural juvenile chum salmon that migrate from the Grays River is unavailable. Hatchery release information is available in Table 7.

Survival Rate

Survival rate information is unavailable.

BIOCHEMICAL-GENETIC CHARACTERISTICS

Data has not been compiled.

DISEASE

Bacteria and parasitic diseases found in the Grays River are unavailable.

Table 1 (RN). Total natural spawner escapement of chum returning to Gorley Creek by brood year.

Total Age

Brood Year	3	4	5	6	Total	Adult Total
1974						
1975						
1976						
1977						
1978						
1979						
1980				0		
1981			14	0		
1982		425	0	0		
1983	0	3	24	0	27	27
1984	0	716	4	0	720	720
1985	36	11	6			
1986	8	429	55			
1987	6					
1988						

Age based on scale reading analysis.

Table 2 (AC). Age composition percentage (freshwater.ocean) by brood year of chum spawning naturally in the Grays River subbasin.

Brood Year	N	Age Composition (%) 0.3	0.4	0.5	0.6
1978					
1979	12	83.33	16.67	0	0
1980	9	22.22	44.44	33.33	0
1981	35	25.71	71.43	2.96	0
1982	167	17.37	74.85	7.78	0
1983	45	0	82.22	15.56	2.22
1984	245	5.71	84.49	8.98	0.82
1985					
1986					
1987					
1988					

Age based on scale reading analysis.

Table 3 (AS). Percent females by brood year and age class (freshwater.ocean) for chum spawning naturally in the Grays River subbasin.

Females (%)

Brood Year	N	0.3	0.4	0.5	0.6	Total % Female
1976					0	
1977				33.33	0	
1978			54.35	33.33	0	
1979	8	70.00	50.00	0	0	66.67
1980	4	50.00	50.00	33.33	0	44.44
1981	15	33.33	48.00	0	0	42.86
1982	95	48.28	58.40	61.54	0	56.89
1983	19	0	48.65	14.26	0	42.22
1984	129	50.00	53.62	50.00	0	52.65
1985		60.00	45.83	50.00		
1986		57.14	40.00			
1987		100.00				
1988						

Age based on scale reading analysis.

Table 4 (AL-a). Mean fork length by brood year and age class (freshwater.ocean) for female chum spawning naturally in the Grays River.

Mean Fork Length (cm)

Brood Year	0.3	0.4	0.5	0.6
1977			72	
N			1	
St. Dev.				
1978		73	75	
N		25	1	
St. Dev.				
1979	70	77		
N	7	1		
St. Dev.				
1980	66	72	79	
N	1	2	1	
St. Dev.				
1981	71	71		
N	3	12		
St. Dev.				
1982	65	70	75	
N	15	74	8	
St. Dev.				
1983		72	64	
N		18	1	
St. Dev.				

Table 4 (cont.) Mean fork length, by brood year and age class, (freshwater.ocean) of female chum salmon originating in the Grays River.

Mean Fork Length (cm)

Brood Year	0.3	0.4	0.5	0.6
1984	65	70	76	
N	7	138	11	
St. Dev.				
1985	63	73	73	
N	7	11	1	
St. Dev.				
1986	67	69		
N	4	51		
St. Dev.				
1987	66			
N	2			
St. Dev.				

Age based on scale reading analysis.

Standard deviation not calculated.

Table 5 (AL-b). Mean fork length by brood year and age class (freshwater.ocean) of male chum spawning naturally in the Grays River:

Mean Fork Length (cm)

Brood Year	0.3	0.4	0.5	0.6
1977			89	
N			3	
St. Dev.				
1978		83	86	
N		22	2	
St. Dev.				
1979	79	79		
N	4	1		
St. Dev.				
1980	75	81	85	
N	1	2	2	
St. Dev.				
1981	75	82	76	
N	6	13	1	
St. Dev.				
1982	75	78	82	
N	15	53	5	
St. Dev.				
1983		79	84	79
N		19	14	1
St. Dev.				

Table 5 (cont.) Mean fork length, by brood year and age class, (freshwater.ocean) of male chum salmon originating in the Grays River.

Mean Fork Length (cm)

Brood Year	0.3	0.4	0.5	0.6
1984	74	78	85	84
N	7	134	11	2
St. Dev.				
1985	75	82	80	
N	9	13	1	
St. Dev.				
1986	74	80		
N	3	79		
St. Dev.				
1987				
N				
St. Dev.				

Age based on scale reading analysis.

Standard deviation not calculated.

Table 6 (SL). Lengths of juvenile chum salmon from the Grays River, 1979.

Location and year	No. Fish	Length ave. (mm)	Length range (mm)	Reference
West Fork & Mainstem, 1979	29	41.0	35-45	"Spring seining of 1978 brood wild fall chinook juveniles on the Kalama River, Grays River, and Skamokawa Creek." WDF memorandum from Nancy Bluestein to Don McIsaac. December 11, 1979

Five stick seining trips were made on the Grays River between March 22-Apri126, 1979. Though the seining trips were primarily to evaluate fall chinook natural production, chum were also enumerated and a subsample was measured. Average length and range may reflect rearing and/or outmigration size patterns.

Table 7 (TR). Hatchery releases of CHUM salmon into the GRAYS RIVER subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1966	GRAYS RIVER	GRAYS R HATCHERY -WF	FeFry	3/15/67	3/15/67	782	152100	GRAYS R -WF 25.0131	UNTA
1967	GRAYS RIVER	GRAYS R HATCHERY -WF	FeFry	3/09/68	3/09/68	769	38650	GRAYS R -WF 25.0131	UNTA
1968	GRAYS RIVER	GRAYS R HATCHERY -WF	FeFry	3/10/69	3/10/69	769	1539	GRAYS R -WF 25.0131	UNTA
1968	GRAYS RIVER	GRAYS R HATCHERY -WF	FeFry	4/13/69	4/13/69	825	2482	GRAYS R -WF 25.0131	UNTA
1969	GRAYS RIVER	GRAYS R HATCHERY -WF	FeFry	3/15/70	3/15/70	889	29601	GRAYS R -WF 25.0131	UNTA
1969	GRAYS RIVER	GRAYS R HATCHERY -WF	FeFry	3/29/70	3/29/70	720	32890	GRAYS R -WF 25.0131	UNTA
1971	FINCH CREEK (16)	GRAYS R HATCHERY -WF	FeFry	4/26/72	4/26/72	540	638493	GRAYS R -WF 25.0131	UNTA
1972	BIG QUILCENE RIVER	GRAYS R HATCHERY -WF	FeFry	5/31/73	5/31/73	401	563604	GRAYS R -WF 25.0131	UNTA
1973	GRAYS RIVER	GRAYS R HATCHERY -WF	FeFry	4/30/74	4/30/74	127	14947	GRAYS R -WF 25.0131	UNTA
1973	BIG QUILCENE RIVER	GRAYS R HATCHERY -WF	FeFry	6/10/74	6/10/74	186	612312	GRAYS R -WF 25.0131	UNTA
1975	JAPAN - HOKKAIDO	GRAYS R HATCHERY -WF	FeFry	5/24/76	5/24/76	243	1126752	GRAYS R -WF 25.0131	UNTA
1977	UNKNOWN STOCK	LOWER COL R GILLNETT	EmFry	4/01/78	4/01/78	1260	30000	HULL CR (25.0119)	UNTA
1978	UNKNOWN STOCK	LOWER COL R GILLNETT	EmFry	4/01/79	4/01/79	1031	72000	HULL CR (25.0119)	UNTA
1979	FINCH CREEK (16)	LOWER COL R GILLNETT	EmFry	4/01/80	4/01/80	1194	90000	HULL CR (25.0119)	UNTA
1980	FINCH CREEK (16)	GERMANY CREEK	EmFry	4/01/81	4/01/81	1080	69691	LITTLE CREEK (25)	UNTA

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GRAYS RIVER SUBBASIN

Naturally Produced Winter Steelhead

GEOGRAPHIC LOCATION

The Grays River Subbasin is located in southwest Washington within Pacific County. Originating in the Willapa Hills the river drops through numerous steep, narrow canyons which comprise the upper watershed before entering a wide flat valley. The last six miles of the river are a slough subject to tidal influence. Dikes have been constructed in this area to protect the residents of this low-lying land. The Grays River joins the Columbia River at river mile (RM) 21 and the entire watershed encompasses 124 square miles.

ORIGIN

The wild winter steelhead stock in the Grays River is native, although interbreeding with introduced Cowlitz, Chambers Creek and Elochoman hatchery stocks has probably occurred.

DISTRIBUTION

Table 1 lists rearing and spawning habitat, by quality, for Grays River steelhead based on estimates from the Northwest Power Planning Council. Washington Department of Wildlife planners using the Smolt Density Model, estimate the watershed can produce 45,300 smolts. Figure 1 illustrates the probable spawning areas of wild steelhead in the Grays River (Howell et al. 1985).

Distribution of winter steelhead occurs throughout the mainstem river above tidal reaches, and also within the East, South and West Forks. In the mid-1940's there were reports of several hundred steelhead congregating in the pool below Grays River falls. These steelhead were believed to ascend the falls in high water. Once they ascended the falls there were numerous obstacles, natural and man-made which blocked fish migration into the upper reaches of the mainstem and many tributaries. During the 1950's explosives were used to lower Grays Falls, in addition other barriers above the falls were cleared to improve steelhead access to the river's upper reaches.

PRODUCTION

Production Facilities

The Grays River Salmon Hatchery is located on the West Fork Grays River. Production is primarily fall chinook and coho salmon. No steelhead rearing occurs at the Grays River Hatchery.

Production Summary

No data are available on natural smolt production. Natural production continues in both the mainstem Grays and the lower sections of most tributaries. Smolt production throughout the drainage is severely reduced from logging related problems in the watershed.

ADULT LIFE HISTORY

Run Size and Escapement

No estimates of wild run size or escapement exist. Steelhead abundance during the 1920's and 1930's was estimated at 2,000 fish annually (WDW 1936). This number has declined due to habitat degradation in the Grays River watershed. Currently, local biologists estimate steelhead escapement

to be between 400 and 600 fish annually. Lucas (1992) estimates spawning escapement for 1991 at 716 fish.

Time of migration

Adult time of entry for wild winter steelhead is generally from January through May with peak returns occurring in March and April.

Harvest

Ocean harvest of Grays River steelhead is unknown. The lower Columbia River supports a popular sport fishery with harvest of some Grays River steelhead contributing to the lower Columbia catch.

Sport fishing occurs throughout the Grays River. Based on punchcard returns, the average annual steelhead sport catch (wild and hatchery) from 1980 through 1990 was 533 fish (Table 2). In 1986, wild release regulations were imposed on the Grays River limiting legal harvest to hatchery fish only. To promote maximum returns on wild fish while providing sport fishing opportunity the state currently emphasizes separation of hatchery and wild stocks. The use of early returning Beaver Creek fish were chosen as the hatchery stock for release into the Grays River thus creating a early returning hatchery stock with a later returning native stock.

Indian fishing rights are not exercised on the Grays River.

Spawning period

Wild steelhead spawning occurs from March through mid-June.

Spawning area

Wild steelhead spawn throughout the Grays River, and in the lower reaches of the East, South and West forks and in other tributaries.

Fecundity

No data are available on wild steelhead fecundity.

Age Composition

No data are available on steelhead age structure.

Size

No data are available on wild steelhead.

Sex ratio

No data on Grays River steelhead.

Survival rate

No data available on Grays River steelhead.

JUVENILE LIFE HISTORY

Egg

No data are available on egg production, egg to smolt survival, or emergence timing.

Juvenile rearing

Juvenile rearing for the majority of wild smolts lasts approximately two years prior to ocean emigration. Wild steelhead smolts emigrate in April and May, peaking in early May.

Hatchery releases

Smolts were originally released into the Grays River in 1957 from Chambers Creek stock and although Cowlitz River fish were released for several years in the 1960's, Chambers Creek and Beaver Creek stocks have been the hatchery-stocks released into the Grays River for the past ten years 1981-1990 (Table 3).

Straying

No data on Grays River.

BIOCHEMICAL-GENETIC CHARACTERISTICS

No data are available on Grays River steelhead.

DISEASES

Disease history for hatchery smolts planted in the Grays River is presented in Table 4.

Figure 1 (AD). Probable spawning areas of wild steelhead trout in Grays River, Washington (B. Lucas, WDG, personal communication., (Howell et al. 1985).

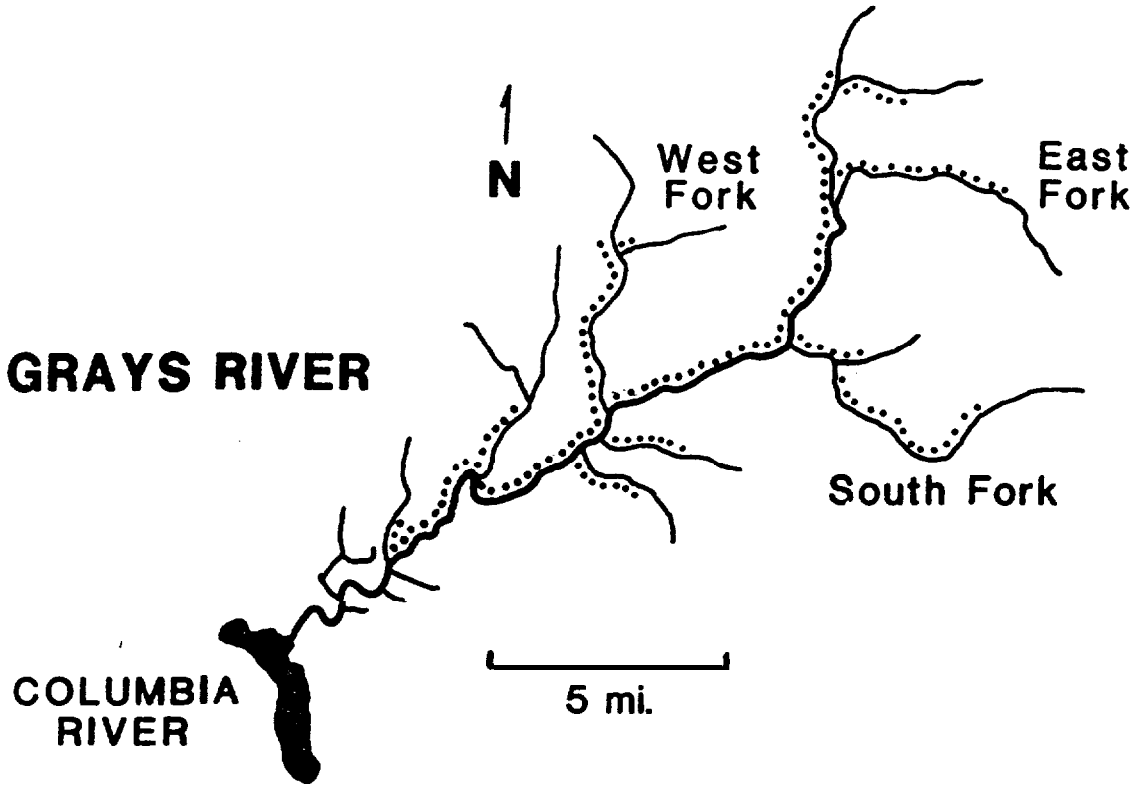

Table 1 (HB-1). Estimated' amount of rearing and spawning habitat, by quality, of Grays River subbasin winter steelhead.

Area	Excellent	Good	Fair[b]	Poor[A]	Unknown	Total	Confidence
Miles	22.3	73.1%	4.7%	0.0%		57.9	Unknown
Acres	10.0%	87.2%	2.9%	0.0%		48.4	Unknown

*Northwest Power Planning Council estimates based on limited observations.

[b]Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by man.

Source: Presence/absence database, NPPC , 199 1.

Table 2 (RS-a). Returns (sport catch/escapement) winter steelhead to the Grays River subbasin.

Return Year	Escapement	Sport Catch[A]	Adult Total
1980-81		678	Unknown
1981-82		588	Unknown
1982-83		565	Unknown
1983-84		478	Unknown
1984-85		1031	Unknown
1985-86		407	Unknown
1986-87		409	Unknown
1987-88		418	Unknown
1988-89		354	Unknown
1989-90		402	Unknown

Catch within subbasin only.

Source: Sport Catch based on permit-card harvest estimates.

Table 3 (TR). Hatchery releases of winter steelhead into the Grays River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release site	CWT Code/ Fin Clip
1981	Chambers Cr	Beaver Cr.	Smolt	04/04/82		5.4	7,074	Grays R (+West Fk.)	
1981	Chambers Cr	Beaver Cr.	Smolt	04/06/82		5.4	4,563	Grays R (+West Fk.)	
1981	Chambers Cr	Beaver Cr.	Smolt	04/25/83		4.5	7,290	Grays R (+West Fk.)	
1981	Chambers Cr	Beaver Cr.	Smolt	05/03/82		5.8	7,656	Grays R (+West Fk.)	
1981	Chambers Cr	Beaver Cr.	Smolt	05/03/83		4.6	22,603	Grays R (+West Fk.)	
1981	Chambers Cr	Beaver Cr.	Smolt	05/05/82		6.4	9,152	Grays R (+West Fk.)	
1981	Chambers Cr	Beaver Cr.	Smolt	05/06/82		5.9	3,038	Grays R (+West Fk.)	
1981	Chambers Cr	Beaver Cr.	Smolt	05/06/82		6.4	5,792	Grays R (+West Fk.)	
1981	Chambers Cr	Beaver Cr.	Smolt	05/11/82		6.5	12,968	Grays R (+West Fk.)	
1983	Elochoman R	Beaver Cr.	Smolt	05/01/84		6.2	8,680	Grays R (+West Fk.)	
1983	Elochoman R	Beaver Cr.	Smolt	05/01/84		6.2	7,595	Grays R (+West Fk.)	
1983	Unknown	Beaver Cr.	Smolt	04/20/84		6.0	7,800	Grays R (+West Fk.)	
1983	Unknown	Beaver Cr.	Smolt	04/23/84		4.5	6,300	Grays R (+West Fk.)	
1983	Unknown	Beaver Cr.	Smolt	04/24/84		4.5	5,174	Grays R (+West Fk.)	
1983	Unknown	Beaver Cr.	Smolt	04/26/84		4.2	5,670	Grays R (+West Fk.)	
1983	Unknown	Beaver Cr.	Smolt	04/26/84		4.2	5,880	Grays R (+West Fk.)	
1984	Elochoman R	Beaver Cr.	Smolt	04/23/85		5.2	7,280	Grays R (+West Fk.)	AD
1984	Elochoman R	Beaver Cr.	Smolt	04/25/85		5.0	7,500	Grays R (+West Fk.)	AD
1984	Elochoman R	Beaver Cr.	Smolt	05/01/85		5.0	7,900	Grays R (+West Fk.)	AD
1984	Elochoman R	Beaver Cr.	Smolt	05/06/85		6.0	4,650	Grays R (+West Fk.)	AD

Table 3 (cont.). Hatchery releases of winter steelhead into the Grays River by brood year and, if marked, the coded wire tag codes.

1984	Elochoman R	Beaver Cr.	Smolt	05/09/85		4.9	2,695	Grays R (+West Fk.)	AD
1984	Elochoman R	Beaver Cr.	Smolt	05/09/85		4.2	2,310	Grays R (+West Fk.)	AD
1984	Elochoman R	Beaver Cr.	Smolt	05/17/85		6.9	5,175	Grays R (+West Fk.)	AD
1985	Elochoman R	Beaver Cr.	Smolt	04/21/86		5.2	22,050	Grays R (+West Fk.)	AD
1985	Elochoman R	Beaver Cr.	Smolt	05/08/86		4.8	35,952	Grays R (+West Fk.)	AD
1986	Elochoman R	Beaver Cr.	Smolt	04/09/87		4.5	6,525	Grays R (+West Fk.)	AD
1986	Elochoman R	Beaver Cr.	Smolt	04/09/87		4.5	6,525	Grays R (+West Fk.)	AD
1986	Elochoman R	Beaver Cr.	Smolt	04/16/87		4.5	6,750	Grays R (+West Fk.)	AD
1986	Elochoman R	Beaver Cr.	Smolt	04/17/87		5.5	7,975	Grays R (+West Fk.)	AD
1986	Elochoman R	Beaver Cr.	Smolt	04/20/87		5.5	8,525	Grays R (+West Fk.)	AD
1986	Elochoman R	Beaver Cr.	Smolt	04/24/87		5.5	6,600	Grays R (+West Fk.)	AD
1986	Elochoman R	Beaver Cr.	Smolt	04/28/87		4.4	5,280	Grays R (+West Fk.)	AD
1986	Elochoman R	Beaver Cr.	Smolt	04/30/87		4.4	5,280	Grays R (+West Fk.)	AD
1986	Elochoman R	Beaver Cr.	Smolt	04/30/87		4.4	5,280	Grays R (+West Fk.)	AD
1986	Elochoman R	Beaver Cr.	Smolt	05/02/87		5.0	6,500	Grays R (+West Fk.)	AD
1987	Elochoman R	Beaver Cr.	Smolt	04/21/88		4.6	7,360	Grays R (+West Fk.)	AD
1987	Elochoman R	Beaver Cr.	Smolt	04/21/88		4.6	4,600	Grays R (+West Fk.)	AD
1987	Elochoman R	Beaver Cr.	Smolt	04/21/88		4.6	5,520	Grays R (+West Fk.)	AD
1987	Elochoman R	Beaver Cr.	Smolt	04/21/88		5.0	5,000	Grays R (+West Fk.)	AD
1987	Elochoman R	Beaver Cr.	Smolt	04/21/88		5.0	7,500	Grays R (+West Fk.)	AD
1987	Elochoman R	Beaver Cr.	Smolt	04/21/88		5.0	8,000	Grays R (+West Fk.)	AD
1987	Elochoman R	Beaver Cr.	Smolt	05/12/88		4.3	6,450	Grays R (+West Fk.)	AD

Table 3 (cont.). Hatchery releases of winter steelhead into the Grays River by brood year and, if marked, the coded wire tag codes.

1988	Elochoman R	Beaver Cr.	Smolt	05/05/89		5.0	8,000	Grays R (+West Fk.)	AD
1988	Elochoman R	Beaver Cr.	Smolt	05/05/89		5.0	14,250	Grays R (+West Fk.)	AD
1988	Elochoman R	Beaver Cr.	Smolt	04/21/89		4.8	6,000	Grays R (+West Fk.)	AD
1988	Elochoman R	Beaver Cr.	Smolt	04/24/89		4.4	5,500	Grays R (+West Fk.)	AD
1988	Elochoman R	Beaver Cr.	Smolt	04/24/89		4.4	6,600	Grays R (+West Fk.)	AD
1988	Elochoman R	Beaver Cr.	Smolt	04/27/89		5.5	4,675	Grays R (+West Fk.)	AD
1989	Elochoman R	Beaver Cr.	Smolt	04/30/90		4.5	11,250	Grays R (+West Fk.)	AD
1989	Elochoman R	Beaver Cr.	Smolt	05/02/90		4.9	6,125	Grays R (+West Fk.)	AD
1989	Elochoman R	Beaver Cr.	Smolt	05/02/90		4.9	6,125	Grays R (+West Fk.)	AD
1989	Elochoman R	Beaver Cr.	Smolt	05/02/90		4.9	6,370	Grays R (+West Fk.)	AD
1990	Elochoman R	Beaver Cr.	Smolt	04/25/91		6.0	7,500	Grays R (+West Fk.)	AD
1990	Elochoman R	Beaver Cr.	Smolt	04/25/91		6.0	4,800	Grays R (+West Fk.)	AD
1990	Elochoman R	Beaver Cr.	Smolt	04/25/91		5.6	7,700	Grays R (+West Fk.)	AD
1990	Elochoman R	Beaver Cr.	Smolt	04/25/91		5.6	8,960	Grays R (+West Fk.)	AD
1990	Elochoman R	Beaver Cr.	Smolt	04/25/91		4.2	3,255	Grays R (+West Fk.)	AD
1990	Elochoman R	Beaver Cr.	Smolt	05/01/91		5.2	7,956	Grays R (+West Fk.)	AD

Source: Terry Lovgren, WDW, Hatchery Stocking Database, 1991.

Table 4 ('ID). Parasites and diseases isolated at the hatchery which reared Grays River steelhead smolts.

Disease Type	Hatchery[A]	Specific Pathogen
Bacterial	Beaver Creek	*Aeromonas salmonicida* (Furunculosis)
Bacterial	Beaver Creek	*Flavobacterium sp.*
Bacterial	Beaver Creek	*Flexibacter cytophaga* (Coldwater)
Bacterial	Beaver Creek	*Renibacterium salmonarium* (BKD)
Bacterial	Beaver Creek	*Flexibacter columnaris* (Columnaris)
Parasite	Beaver Creek	*Hexamita sp.*
Parasite	Beaver Creek	*Ichthyoboda sp.* (Costia)
Parasite	Beaver Creek	*Ichthyophthirius multiflis* (Ich)
Parasite	Beaver Creek	*Nanophetyus sp.*
Parasite	Beaver Creek	*Trichodina sp.*
Viral	Beaver Creek	*EZBS*
Viral	Beaver Creek	*Infectious Hematopoietic Necrosis* (IHN)

*Beaver Creek Hatchery is located on the Elochoman River.

Disease history only represents pathogens isolated at this hatchery and not necessarily a disease outbreak.

Source: Steve Roberts, Washington Department of Wildlife, 1991.

REFERENCES

Howell, P. J., K. Jones, D. Scarnecchia, L. LaVoy, W. Kendra, and D. Ortmann. 1985. Stock assessment of Columbia River anadromous salmonids, volumes I & II. Final report of Oregon Department of Fish and Wildlife, Washington Department of Fisheries, Washington Department of Game, and Idaho Department of Fish and Game (Project 83-335, Contract DE-AI79-84BP12737) to Bonneville Power Administration, Portland, Oregon.

Lucas B., WDW unpublished data 1991.

WDW Columbia Basin System Planning Grays River Production Plan, 1990.

ELOCHOMAN SUBBASIN

Fall Chinook

GEOGRAPHIC LOCATION

The Elochoman River originates in the Willapa Hills (southwest Lewis County and northeast Cowlitz County), and flows in a generally southwest direction into Wahkiakum County meeting the Columbia River at River Mile (RM) 38. Elochoman (also commonly spelled Elokomin) Hatchery is located at RM 9, approximately seven miles northwest of Cathlamet.

ORIGIN

A native population of fall chinook was in existence on the Elochoman River prior to construction of the Elochoman River Salmon Hatchery in 1953. Mixing of stocks very likely began to occur when hatchery supplementation was initiated in 1950 with the release of 70,000 tule fall chinook fingerlings (WDF, 1990). This supplementation and hatchery brood stock were a mix of local stock and transfers from other hatcheries, primarily Spring Creek Hatchery. Brood stock for the Elochoman Hatchery are collected at a weir located near tidewater and the remaining adults are passed upstream to spawn naturally. It is presumed there are no differences between hatchery stock and naturally spawning populations, as no effort was, nor is, being made to keep them separate.

DISTRIBUTION

Natural production occurs mainly in the lower river above tidewater, but will also occur throughout the river up to the hatchery dam at RM 9.2, depending on water flows.

PRODUCTION

Hatchery production is the dominant component in the Elochoman River although some natural production also occurs. In recent years, surplus fall chinook returning to Elochoman Hatchery have been collected for other lower river hatcheries.

Tables 1 and 2 describe the amount of spawning and rearing habitat, by quality, available in the Elochoman River. This data was derived from the Presence/Absence database of Northwest Power Planning Council, 1991.

The Elochoman River adult fall chinook natural spawn escapement from 1977 - 1984 brood years averaged 806 with a low return of 104 for the 1977 brood and a peak of 3,557 for the 1984 brood. Natural spawn escapements by age and brood year are presented in Table 3.

Elochoman Hatchery adult fall chinook returns from 1978 - 1984 brood years averaged 2,907 with a low return of 796 for the 1978 brood and a peak of 9,476 for the 1984 brood. Hatchery returns by age and brood year are presented in Table 4.

Elochoman River tributary sport catch estimates between 1981 - 1988 return years averaged 95 adult fall chinook, ranging from a low of 41 in 1988 to a high of 236 in 1985, based on punchcard and limited actual sampling data. However, specific age and brood year analysis for Elochoman River sport catch is unavailable.

ADULT LIFE HISTORY

Run size. catch and escapement

Ocean commercial and recreational fisheries from Alaska to Washington, in addition to Columbia River gill net and sport fisheries all harvest a portion of the Elochoman River origin fall chinook. Columbia River sport and commercial fisheries are managed to ensure attainment of hatchery egg-take requirements.

Strays from other lower river hatcheries are not unusual. Table 5 lists Elochoman Hatchery origin fall chinook stray coded wire tag recoveries beginning with the 1978 brood through to the 1988 brood, and Table 6 lists the coded wire tags recovered within the Elochoman subbasin which originated outside the Elochoman subbasin.

Time of Migration

Adults enter the Elochoman River between September and November.

Spawning Period

Natural spawning occurs between late September and mid-November, usually peaking in mid-October.

Soawnine Areas

Natural production occurs mainly in the lower river above tidewater, but will also occur throughout the river up to the hatchery dam at RM 9.2, depending on water flows.

Age composition

Age ranges from two-year-old jacks to six-year-old adults with three-year-olds or four-year-olds usually the dominant age class. Total age composition data is summarized in Tables 3 and 4. Table 7 lists the age composition percentages by brood year and freshwaterocean rearing for fall chinook returning to the Elochoman River spawning grounds. Table 8 lists the age composition percentages by brood year and freshwater.ocean rearing for fall chinook returning to the Elochoman Hatchery.

Sex Ratio

Female fall chinook comprised 34 - 59 percent of the natural spawners in the Elochoman River between 1981 - 1984 brood years. The percent females by brood year and freshwaterocean rearing ages for Elochoman River natural spawners are presented in Table 9.

Female fall chinook comprised 44 - 48 percent of the fall chinook returning to the Elochoman Hatchery between 1981 - 1984 brood years. The percent females by brood year and freshwater.ocean rearing ages for Elochoman Hatchery returns are presented in Table 10.

The mean fork length by brood year, sex, and freshwater.ocean rearing ages of Elochoman River natural spawners for 1979 - 1984 brood years are available in Table 11 and 12. The mean fork length by brood year, sex, and freshwater.ocean rearing ages for Elochoman Hatchery returns from 1978 - 1988 brood years are available in Table 13 and 14.

Fecundity

Fecundity at the Elochoman Hatchery between 1983 - 1990 return years averaged 4,204 and ranged from a low of 3,504 in 1987 to a high of 4,395 in 1989. Elochoman River natural spawn and Elochoman Hatchery fecundity data by age and brood year is unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

Emergence times were estimated to be early April for naturally spawning fry, depending on time of egg deposition and water temperatures (Howell et. al., 1985).

Time. age and size at migration

Hatchery release information for the Elochoman subbasin by brood year is presented in Table 15. Length data of natural fall chinook smolts from the Elochoman River is unavailable. The number of natural juvenile fall chinook salmon that migrate from the Elochoman River is also unavailable.

Survival Rate

Data not available.

BIOCHEMICAL-GENETIC CHARACTERISTICS

Schreck et al. (1986) determined from electrophoresis that Bonneville Hatchery fall chinook and Spring Creek Hatchery (BPH) had 11 similar isozyme gene frequencies and none dissimilar. They did not, however, analyze fall chinook from the Elochoman Hatchery.

DISEASE

Bacteria and parasitic diseases found in the Elochoman Hatchery are listed in Table 16. (WDF Salmon Culture, Olympia).

REFERENCES

The references for this section appear at the end of the following coho section.

Table 1 **(HB-1).** Estimated amount of rearing and spawning habitat, by quality, of the Elochoman River fall chinook production area.

Distance/Area	Excellent	Good	Fair[a]	Poor[a]	unknown	Total	Confidence
Miles (%)	100	00	00	00		6.1	
Acres (%)	100	00	00	00		22.2	

• Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 1991.

Table 2 **(HB-2).** Estimated amount of rearing habitat, by quality, of the Elochoman River fall chinook production area.

Distance/Area	Excellent	Good	Fair[a]	Poor[a]	Unknown	Total	Confidence
Miles (%)	00	loo	00	00		2.6	
Acres (%)	00	loo	00	00		10.9	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 199 1.

Table 3 (RN). Total natural spawner escapement of fall chinook to the Elochoman River subbasin, by brood year.

Brood Year	Total Age 2	3	4	5	6	Total	Adult Total
1974					0		
1975				3	0		
1976			56	17	0		
1977		5	83	16	0		104
1978	0	38	205	0	0	243	243
1979	0	96	627	5	0	728	728
1980	23	389	163	0	0	575	552
1981	0	124	57	0	0	181	181
1982	2	350	234	0	0	586	584
1983	57	324	133	43	0	557	500
1984	360	2,259	1,286	12	0	3,917	3,557
1985	66	27	50	22			
1986	14	58	54				
1987	2	60					
1988	38						

Age based on scale reading analysis except: hatchery age composition used for 1980, 1981, and 1984 return years.

Table 4 (RH). Total hatchery returns of fall chinook to the Elochoman River subbasin, by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1975					0		
1976				79	0		
1977			382	16	0		
1978		172	583	41	0		796
1979	1	1,457	1,724	32	0	3,214	3,213
1980	6	925	952	64	0	1,947	1,941
1981	1	720	866	58	0	1,645	1,644
1982	10	880	609	22	0	1,521	1,511
1983	22	832	912	62	5	1,833	1,811
1984	155	3,882	4,423	1,116	15	9,591	9,436
1985	14	220	2,012	270			
1986	42	543	939				
1987	10	266					
1988	21						

Age based on scale reading analysis.

1990 return year excludes 30 adults that were trapped in Mill Creek and spawned at the Elochoman Hatchery.

1987 return year includes 879 adults that returned to the Elochoman Hatchery and were spawned at the Grays River Hatchery.

1985 return year includes 350 fish that returned to Elochoman Hatchery and were spawned at the Grays River Hatchery.

1983 return year includes 746 fish that returned to Elochoman Hatchery and were spawned at the Grays River Hatchery.

1980 return year age composition unavailable.

Table 5 (AE). Emigration of coded wire tagged fall chinook from the Elochoman subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Elochoman H	Kalama, 1982	Hatchery	1,711	1	1
Elochoman H	Elochoman River, 1983	Spawning Ground	405	1	3
Elochoman H	Abernathy, 1983	Hatchery	2,142	1	1
Elochoman H	Abernathy, 1983	Hatchery	2,142	1	1
Elochoman H	Abernathy, 1984	Hatchery	742	2	2
Elochoman H	Abernathy, 1985	Hatchery	2,217	1	1
Elochoman H	Abernathy, 1986	Hatchery	2,258	1	1
Elochoman H	Abernathy, 1988	Hatchery	1,736	3	3
Elochoman H	Abernathy, 1988	Hatchery	1,736	3	3
Elochoman H	Abernathy, 1989	Hatchery	1,522	5	5
Elochoman H	Abernathy, 1989	Hatchery	1,522	1	1
Elochoman H	Grays River, 1988	Spawning Ground	129	1	9
Elochoman H	Grays River, 1989	Spawning Ground	388	1	2
Elochoman H	Skamokawa Creek, 1985	Spawning Ground	3,555	1	2
Elochoman H	Skamokawa Creek, 1988	Spawning Ground	315	2	7
Elochoman H	Skamokawa Creek, 1989	Spawning Ground	851	5	6
Elochoman H	Skamokawa Creek, 1988.	Spawning Ground	315	1	3
Elochoman H	Skamokawa Creek, 1989	Spawning Ground	851	2	2
Elochoman H	Skamokawa Creek, 1989	Spawning Ground	851	2	2

Table 5 (cont.) Emigration of coded wire tagged fall chinook from the Elochoman subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Elochoman H	Skamokawa Creek, 1989	Spawning Ground	851	2	2
Elochoman H	Skamokawa Creek, 1989	Spawning Ground	851	1	1
Elochoman H	Elochoman River, 1988	Spawning Ground	553	1	2
Elochoman H	Mill Creek (Cowlitz Co.), 1989	Spawning Ground	863	3	5
Elochoman H	Mill Creek (Cowlitz Co.), 1989	Spawning Ground	863	5	9
Elochoman H	Mill Creek (Cowlitz Co.), 1989	Spawning Ground	863	1	2
Elochoman H	Mill Creek (Cowlitz Co.), 1989	Spawning Ground	863	2	4
Elochoman H	Abernathy Creek, 1985	Spawning Ground	318	1	5
Elochoman H	Abernathy Creek, 1988	Spawning Ground	471	2	4
Elochoman H	Abernathy Creek, 1989	Spawning Ground	445	3	6
Elochoman H	Germany Creek, 1988	Spawning Ground	467	1	3
Elochoman H	Germany Creek, 1988	Spawning Ground	467	1	3
Elochoman H	Cowlitz River, 1985	Spawning Ground	1,061	1	4
Elochoman H	Kalama Falls Hatchery, 1985	Hatchery	3,445	2	2
Elochoman H	Kalama Falls Hatchery, 1988	Hatchery	3,438	1	1
Elochoman H	Kalama Falls Hatchery, 1989	Hatchery	2,432	1	1
Elochoman H	Kalama River, 1989	Spawning Ground	3,957	1	5

Table 5 (cont.) Emigration of coded wire tagged fall chinook from the Elochoman subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Elochoman H	Kalama River, 1989	Spawning Ground	3,957	2	11
Elochoman H	Lower Kalama Hatchery, 1989	Hatchery	1,307	1	1
Elochoman H	Lewis River (incl. Cedar Creek), 1988	Spawning Ground	509	1	10
Elochoman H	Abernathy, 1990	Hatchery	56	1	1

*Based on the following tag codes: 63-22-34, 63-34-59, 63-22-60, 63-34-58, 63-38-19, 63-38-20, and 63-18-56.

Beginning with 1978 brood.

Table 6 (AI). Immigration of coded wire tagged fall chinook into the Elochoman subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Big Creek H	Elochoman, 1981	Hatchery	634	3	3
Big Creek H	Elochoman, 1982	Hatchery	2,062	4	4
Big Creek H	Elochoman, 1982	Hatchery	2,062	17	17
Big Creek H	Elochoman, 1982	Hatchery	2,062	18	18
Big Creek H	Elochoman River, 1982	Spawning Ground	134	1	3
Klaskanine H	Elochoman, 1982	Hatchery	2,062	1	1
Grays H	Elochoman, 1982	Hatchery	2,062	1	1
Weyco Pond	Elochoman, 1982	Hatchery	2,062	3	3
Weyco Pond	Elochoman, 1982	Hatchery	2,062	3	3
Cowlitz H, released Lower Columbia Streams	Elochoman, 1982	Hatchery	2,062	1	1
Spring Creek, released Hammond	Elochoman River, 1981	Spawning Ground	22	1	6
Elochoman H	Elochoman River, 1988	Spawning Ground	553	1	2
Grays H	Elochoman, 1985	Hatchery	1,809	1	1
Grays H	Elochoman, 1986	Hatchery	1,514	11	11
Grays H	Elochoman, 1987	Hatchery	4,811	2	2
Grays H	Elochoman, 1985	Hatchery	1,809	1	1
Grays H	Elochoman, 1986	Hatchery	139	3	3

Table 6 (cont.) Immigration of coded wire tagged fall chinook into the Elochoman subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Grays H	Elochoman, 1988	Hatchery	4,705	9	9
Grays H	Elochoman, 1989	Hatchery	3,677	26	26
Grays H	Elochoman, 1986	Hatchery	139	3	3
Grays H	Elochoman, 1988	Hatchery	4,705	14	15
Grays H	Elochoman, 1989	Hatchery	3,677	16	16
Grays H	Elochoman, 1988	Hatchery	4,705	2	2
Grays H	Elochoman, 1989	Hatchery	3,677	24	24
Grays H	Elochoman, 1986	Hatchery	139	1	1
Grays H	Elochoman, 1988	Hatchery	4,705	8	8
Grays H	Elochoman, 1989	Hatchery	3,677	30	30
Grays H	Elochoman, 1986	Hatchery	139	1	1
Grays H	Elochoman, 1988	Hatchery	4,705	11	11
Grays H	Elochoman, 1989	Hatchery	3,677	30	30
Grays H	Elochoman, 1988	Hatchery	4,705	2	2
Grays H	Elochoman, 1989	Hatchery	3,677	10	10
Grays H	Elochoman, 1988	Hatchery	4,705	3	3
Grays H	Elochoman, 1989	Hatchery	3,677	12	12
Grays H	Elochoman, 1988	Hatchery	4,705	1	1
Grays H	Elochoman, 1989	Hatchery	3,677	9	9

Table 6 (cont.) Immigration of coded wire tagged fall chinook into the Elochoman subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Grays H	Elochoman, 1989	Hatchery	3,677	5	5
Grays H	Elochoman, 1988	Hatchery	4,705	2	2
Grays H	Elochoman, 1989	Hatchery	3,677	62	63
Grays H	Elochoman, 1989	Hatchery	3,677	53	54
Grays H	Elochoman River, 1988	Spawning Ground	553	1	2
Grays H	Elochoman River, 1989	Spawning Ground	31	1	4
Grays H	Elochoman River, 1988	Spawning Ground	553	2	5
Grays H	Elochoman River, 1989	Spawning Ground	31	1	4
Grays H	Elochoman River, 1988	Spawning Ground	553	2	5
Grays H	Elochoman River, 1988	Spawning Ground	553	2	5
Grays H	Elochoman River, 1988	Spawning Ground	553	1	2
Grays H	Elochoman River, 1988	Spawning Ground	553	1	2
Elochoman H	Elochoman River, 1983	Spawning Ground	405	1	3
Grays H	Elochoman, 1983	Hatchery	2,690	1	1

*Based on the following tag codes: 07-18-44, 03-42-02, 07-21-60, 07-23-31, 07-21-61, 63-19-37, 63-19-39, H1-02-03, 63-21-59, 03-48-01, 63-34-59, 63-22-37, 63-23-40, 63-32-42, 63-32-43, 63-33-21, 63-33-26, 63-33-27, 63-36-31, 63-36-32, 63-37-59, 63-37-60, 63-37-61, 63-37-62, 63-20-05, and 63-16-46.

Beginning with the 1978 brood.

Table 7 (AC-l). Age composition percentage **(freshwater.ocean)** by brood year for **fall** chinook spawning naturally in the Elochoman River.

Age Composition **(%)**

Brood Year	N	1.1	1.2	1.3	1.4	1.5
1978						
1979						
1980						
1981	13	0	53.85	46.15	0	0
1982	46	2.17	50.00	47.83	0	0
1983	37	18.92	62.16	10.81	8.11	0
1984	176	18.18	37.50	42.61	1.71	0
1985						
1986						
1987						
1988						

Age based on scale reading analysis.

Table 8 (AC-2). Age composition percentage (freshwater.ocean) by brood year for fall chinook returning to the Elochoman Hatchery.

Age Composition (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	2.1	2.2
1978								
1979								
1980								
1981	514	0	43.58	51.56	4.67	0	0	0.19
1982	510	0.59	53.72	44.71	0.98	0	0	0
1983	640	3.28	49.84	44.69	1.57	0.31	0	0.31
1984	2,082	2.64	45.34	35.73	15.95	0.19	0.05	0.10
1985								
1986								
1987								
1988								

Age based on scale reading analysis.

Table 9 (AS-l). Percent females by brood year and age class **(freshwater.ocean)** for fall chinook spawning naturally in the Elochoman River.

Females **(%)**

Brood Year	N	1.1	1.2	1.3	1.4	1.5	Total % Female
1976							
1977							
1978							
1979				65.38			
1980			61.29	28.57			
1981	13	0	28.57	83.33	0	0	53.84
1982	46	0	47.83	72.73	0	0	58.70
1983	37	0	26.09	100.00	100.00	0	35.14
1984	176	0	25.76	54.67	66.67	0	34.09
1985							
1986							
1987							
1988							

Age based on scale reading analysis.

Table 10 (AS-2). Percent females by brood year and age class (freshwater.ocean) for fall chinook returning to the Elochoman Hatchery.

Females (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	2.1	2.2	Total % Female
1976									
1977									
1978					50.00				
1979				60.36	70.00				
1980			34.22	55.80	51.35				
1981	238	0	27.23	60.75	66.67	0	0	0	46.30
1982	240	0	29.20	68.86	60.00	0	0	0	47.06
1983	283	0	32.92	58.04	90.00	50.00	0	100.00	44.22
1984	990	0	30.51	64.25	67.17	25.00	0	0	47.55
1985		0	27.03	53.39	67.44			0	
1986		0	28.25	62.34			0	100.00	
1987		0	32.00						
1988		0							

Age based on scale reading analysis.

Table 11 (AL-a). Mean fork length by brood year and age class **(freshwater.ocean)** for female fall chinook spawning naturally in the Elochoman River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5
1979			88		
N			34		
St. Dev.			6.49		
1980		78	90		
N		19	2		
St. Dev.		4.95	6.36		
1981		70	80		
N		2	5		
St. Dev.		2.12	5.5		
1982		79	92		
N		11	16		
St. Dev.		4.16	4		
1983		79			
N		6			
St. Dev.		1.97			
1984					
N					
St. Dev.					

Age based on **scale** reading analysis.

Table 12 (AL-b). Mean fork length by brood year and age class (freshwater.ocean) for male fall chinook spawning naturally in the Elochoman River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5
1979			96		
N			18		
St. Dev.			9.53		
1980		81	88		
N		12	5		
St. Dev.		6.96	12.36		
1981		74	85		
N		5	1		
St. Dev.		5.55	- -		
1982	56	80	96		
N	1	12	6		
St. Dev.	---	7.66	6.83		
1983	56	82			
N	6	17			
St. Dev.	4.37	9.46			
1984	59				
N	32				
St. Dev.	4.88				

Age based on scale reading analysis.

Table 13 (AL-c). Mean fork length by brood year and age class **(freshwater.ocean)** for female fall chinook returning to the Elochoman Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2
1978				93			
N				7			
St. Dev.				7.72			
1979			89	92			
N			364	7			
St. Dev.			6.76	4.83			
1980		79	87	93			
N		116	202	19			
St. Dev.		4.99	5.8	6.36			
1981		78	90	93			
N		61	161	16			
St. Dev.		3.87	4.77	5.71			
1982		81	90	97			
N		80	157	3			
St. Dev.		4.51	5.75	3.21			
1983		76	87	98	110		81
N		105	166	9	1		2
St. Dev.		5.09	4.9	5.25	---		3.54
1984		78	91	94	95		
N		288	478	223	1		
St. Dev.		4.3	5.41	6.11	---		

Table 13 (cont.) Mean fork length by brood year and age class (freshwater.ocean) for female fall chinook returning to the Elochoman Hatchery.

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2
1985		82	87	93			
N		10	323	58			
St. Dev.		4.79	6.24	6.13			
1986		77	87				75
N		50	197				2
St. Dev.		6.13	6.12				4.24
1987		78					
N		24					
St. Dev.		5.63					
1988							
N							
St. Dev.							

Age based on scale reading analysis.

Table 14 (AL-d). Mean fork length by brood year and age class (freshwater.ocean) for male fall chinook returning to the Elochoman Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2
1978				98			
N				7			
St. Dev.				5.16			
1979			94	99			
N			239	3			
St. Dev.			8.57	8.02			
1980		81	90	101			
N		223	160	18			
St. Dev.		7.99	7.66	8.19			
1981		81	95	102			94
N		163	104	9			1
St. Dev.		5.13	7	10.8			---
1982	51	82	95	94			
N	3	194	71	2			
St. Dev.	13.45	6.59	9.37	8.49			
1983	47	77	92	104	111		
N	21	214	120	1	1		
St. Dev.	3.05	6.96	7.74	---	---		
1984	53	81	96	101	100	67	79
N	55	656	266	109	3	1	2
St. Dev.	5.49	6.33	7.16	8.98	7.07	---	1.41

Table 14 (cont.) Mean fork length by brood year and age class (freshwater.ocean) for male fall chinook returning to the Elochoman Hatchery.

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2
1985	42	82	90	98			86
N	4	27	282	28			1
St. Dev.	6.56	7.14	6.81	8.97			---
1986	46	78	90			66	
N	10	127	119			1	
St. Dev.	8.6	7.67	7.99			---	
1987	50	79					
N	4	51					
St. Dev.	7.76	7.3					
1988	58						
N	6						
St. Dev.	9.58						

Age based on scale reading analysis.

Table 15 (TR). Hatchery releases of fall chinook salmon into the Elochoman River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1966	SPRING CREEK	ELOKOMIN HATCHERY	EmFry	01/24/67	01/24/67	1296	1545855	ELOCHOMAN R(25.0236)	UNTAGGED
1966	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	01/25/67	01/25/67	1106	345240	ELOCHOMAN R(25.0236)	UNTAGGED
1966	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/23/67	05/23/67	100	1935700	ELOCHOMAN R(25.0236)	UNTAGGED
1966	SPRING CREEK	ELOKOMIN HATCHERY	Fingr	06/01/67	06/01/67	112	317072	ELOCHOMAN R(25.0236)	UNTAGGED
1967	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/10/68	05/10/68	122	1535370	ELOCHOMAN R(25.0236)	UNTAGGED
1967	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/31/68	05/31/68	91	119483	ELOCHOMAN R(25.0236)	UNTAGGED
1967	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/31/68	05/31/68	75	152325	ELOCHOMAN R(25.0236)	UNTAGGED
1967	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/03/68	06/03/68	91	273091	ELOCHOMAN R(25.0236)	UNTAGGED
1968	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/28/69	05/28/69	98	238042	ELOCHOMAN R(25.0236)	UNTAGGED
1968	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/28/69	05/28/69	83	126409	ELOCHOMAN R(25.0236)	UNTAGGED
1968	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/29/69	05/29/69	110	307221	ELOCHOMAN R(25.0236)	UNTAGGED
1968	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/02/69	06/02/69	110	1200320	ELOCHOMAN R(25.0236)	UNTAGGED
1968	ABERNATHY CREEK	ELOKOMIN HATCHERY	Fingr	06/04/69	06/04/69	98	389060	ELOCHOMAN R(25.0236)	UNTAGGED
1969	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/25/70	05/25/70	91	1663207	ELOCHOMAN R(25.0236)	UNTAGGED
1969	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/28/70	05/28/70	94	256902	ELOCHOMAN R(25.0236)	UNTAGGED
1970	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	04/30/71	04/30/71	210	1409520	ELOCHOMAN R(25.0236)	UNTAGGED
1970	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/21/71	05/21/71	130	1812330	ELOCHOMAN R(25.0236)	UNTAGGED
1970	NEMAH RIVER	NEMAH HATCHERY	Fingr	04/28/71	04/28/71	251	132750	ELOCHOMAN R(25.0236)	UNTAGGED
1971	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	03/09/72	03/09/72	553	238095	ELOCHOMAN R(25.0236)	UNTAGGED
1971	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	04/14/72	04/14/72	236	469168	ELOCHOMAN R(25.0236)	UNTAGGED
1971	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/25/72	05/25/72	95	2568800	ELOCHOMAN R(25.0236)	UNTAGGED
1971	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/31/72	05/31/72	91	38766	ELOCHOMAN R(25.0236)	UNTAGGED
1971	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	PreSm	08/29/72	08/29/72	15	101175	ELOCHOMAN R(25.0236)	UNTAGGED
1972	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/04/73	06/04/73	98	1119846	ELOCHOMAN R(25.0236)	UNTAGGED
1972	KALAMA RIVER	ELOKOMIN HATCHERY	Fingr	06/06/73	06/06/73	98	2435594	ELOCHOMAN R(25.0236)	UNTAGGED
1972	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	PreSm	08/27/73	08/27/73	9	94088	ELOCHOMAN R(25.0236)	UNTAGGED
1973	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	03/20/74	03/20/74	445	210456	ELOCHOMAN R(25.0236)	UNTAGGED
1973	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	04/15/74	04/15/74	285	627000	ELOCHOMAN R(25.0236)	UNTAGGED
1973	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/04/74	06/04/74	87	1259261	ELOCHOMAN R(25.0236)	UNTAGGED
1973	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/13/74	06/13/74	79	971305	ELOCHOMAN R(25.0236)	UNTAGGED
1973	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	PreSm	08/30/74	08/30/74	12	121326	ELOCHOMAN R(25.0236)	UNTAGGED
1973	OREGON- ELK RIVER	ELOKOMIN HATCHERY	PreSm	11/19/74	11/19/74	15	29502	ELOCHOMAN R(25.0236)	011107
1973	OREGON- ELK RIVER	ELOKOMIN HATCHERY	PreSm	11/19/74	11/19/74	15	9568	ELOCHOMAN R(25.0236)	UNTAGGED
1973	OR-TRASK RIVER	ELOKOMIN HATCHERY	PreSm	11/19/74	11/19/74	15	27440	ELOCHOMAN R(25.0236)	011108
1973	OR-TRASK RIVER	ELOKOMIN HATCHERY	PreSm	11/19/74	11/19/74	15	11534	ELOCHOMAN R(25.0236)	UNTAGGED
1973	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	PreSm	11/19/74	11/19/74	7	27130	ELOCHOMAN R(25.0236)	011202
1973	OREGON- ELK RIVER	ELOKOMIN HATCHERY	PreSm	11/19/74	11/19/74	15	9568	ELOCHOMAN R(25.0236)	UNTAGGED
1973	OR-TRASK RIVER	ELOKOMIN HATCHERY	PreSm	11/19/74	11/19/74	14	11534	ELOCHOMAN R(25.0236)	UNTAGGED
1974	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/02/75	06/02/75	95	1357305	ELOCHOMAN R(25.0236)	UNTAGGED
1974	TOUTLE (GREEN RIVER)	ELOKOMIN HATCHERY	Fingr	06/17/75	06/17/75	88	1361726	ELOCHOMAN R(25.0236)	UNTAGGED
1974	TOUTLE (GREEN RIVER)	ELOKOMIN HATCHERY	Fingr	07/24/75	07/24/75	38	44764	ELOCHOMAN R(25.0236)	UNTAGGED
1974	TOUTLE (GREEN RIVER)	ELOKOMIN HATCHERY	PreSm	08/28/75	08/28/75	16	134841	ELOCHOMAN R(25.0236)	UNTAGGED
1975	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/14/76	05/14/76	185	1082808	ELOCHOMAN R(25.0236)	UNTAGGED
1975	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/16/76	06/16/76	100	1685247	ELOCHOMAN R(25.0236)	UNTAGGED
1976	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/09/77	06/09/77	77	659114	ELOCHOMAN R(25.0236)	UNTAGGED
1976	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/16/77	06/16/77	103	145044	ELOCHOMAN R(25.0236)	631604
1976	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/16/77	06/16/77	103	2238455	ELOCHOMAN R(25.0236)	UNTAGGED
1976	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/16/77	06/16/77	94	1587455	ELOCHOMAN R(25.0236)	UNTAGGED
1976	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	PreSm	08/16/77	08/16/77	27	138024	ELOCHOMAN R(25.0236)	UNTAGGED
1977	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	EmFry	01/12/78	01/12/78	1163	194000	DUCK CR (25.0251)	UNTAGGED
1977	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	EmFry	01/12/78	01/12/78	1163	339500	ELOCHOMAN -W 250259	UNTAGGED
1977	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	EmFry	12/28/77	12/28/77	1194	169750	ELOCHOMAN R(5.0236)	UNTAGGED
1977	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	EmFry	01/04/78	01/04/78	1163	533500	ELOCHOMAN R(5.0236)	UNTAGGED
1977	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/14/78	06/14/78	98	690850	ELOCHOMAN R(5.0236)	UNTAGGED
1977	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/16/78	06/16/78	115	147978	ELOCHOMAN R(5.0236)	631744

Table 15 (cont.). Hatchery releases of fall chinook salmon into the Elochoman River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1977	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/16/78	06/16/78	115	1343966	ELOCHOMAN R(25.0236)	UNTAGGED
1977	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/16/78	06/16/78	98	1335519	ELOCHOMAN R(25.0236)	UNTAGGED
1977	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/23/78	06/23/78	95	146737	ELOCHOMAN R(25.0236)	UNTAGGED
1977	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/05/78	04/05/78	100	16340	CLEAR CR (25.0253)	UNTAGGED
1977	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	06/15/78	06/15/78	40	13002	CLEAR CR (25.0253)	UNTAGGED
1977	UNKNOWN STOCK	SPRING CR NF HATCHRY	PreSm	08/13/78	08/13/78	17	19782	CLEAR CR (25.0253)	UNTAGGED
1978	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	EmFry	03/29/79	03/29/79	1134	74515	ELOCHOMAN -NF 250264	UNTAGGED
1978	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	EmFry	03/20/79	03/20/79	1163	147000	ELOCHOMAN -WF 250259	UNTAGGED
1978	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	EmFry	03/05/79	03/05/79	1163	343000	ELOCHOMAN R(25.0236)	UNTAGGED
1978	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/15/79	06/15/79	99	21122	ELOCHOMAN R(25.0236)	631856
1978	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/15/79	06/15/79	99	416825	ELOCHOMAN R(25.0236)	UNTAGGED
1978	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/15/79	06/15/79	99	117837	ELOCHOMAN R(25.0236)	631956
1978	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/15/79	06/15/79	99	2321382	ELOCHOMAN R(25.0236)	UNTAGGED
1978	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/15/79	06/15/79	99	2730657	ELOCHOMAN R(25.0236)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/28/80	05/28/80	206	1040300	ELOCHOMAN R(25.0236)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/06/80	06/06/80	177	405599	ELOCHOMAN R(25.0236)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/09/80	06/09/80	150	345240	ELOCHOMAN R(25.0236)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/18/80	06/18/80	190	182096	ELOCHOMAN R(25.0236)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/18/80	06/18/80	130	124384	ELOCHOMAN R(25.0236)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/19/80	06/19/80	165	212801	ELOCHOMAN R(25.0236)	UNTAGGED
1979	ELOKOMIN + TOUTLE R	ELOKOMIN HATCHERY	Fingr	06/19/80	06/19/80	89	98412	ELOCHOMAN R(25.0236)	632005
1979	ELOKOMIN + TOUTLE R	ELOKOMIN HATCHERY	Fingr	06/19/80	06/19/80	89	2312719	ELOCHOMAN R(25.0236)	UNTAGGED
1979	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/19/80	06/19/80	89	1513979	ELOCHOMAN R(25.0236)	UNTAGGED
1979	TOUTLE (GREEN RIVER)	ELOKOMIN HATCHERY	Fingr	06/19/80	06/19/80	70	796600	ELOCHOMAN R(25.0236)	UNTAGGED
1980	BASIN 27 STOCKS	ELOKOMIN HATCHERY	Fingr	06/01/81	06/01/81	97	156201	ELOCHOMAN R(25.0236)	632234
1980	BASIN 27 STOCKS	ELOKOMIN HATCHERY	Fingr	06/01/81	06/01/81	97	2759359	ELOCHOMAN R(25.0236)	UNTAGGED
1980	BASIN 27 STOCKS	ELOKOMIN HATCHERY	Fingr	06/01/81	06/01/81	97	9446	ELOCHOMAN R(25.0236)	632317
1980	BASIN 27 STOCKS	ELOKOMIN HATCHERY	Fingr	06/01/81	06/01/81	97	3951	ELOCHOMAN R(25.0236)	UNTAGGED
1980	KALAMA RIVER	ELOKOMIN HATCHERY	Fingr	06/01/81	06/01/81	115	845595	ELOCHOMAN R(25.0236)	UNTAGGED
1980	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/01/81	06/01/81	97	286471	ELOCHOMAN R(25.0236)	UNTAGGED
1980	COLUMBIA (N BONNEVL)	ELOKOMIN HATCHERY	Fingr	06/01/81	06/01/81	97	668435	ELOCHOMAN R(25.0236)	UNTAGGED
1980	KLICKITAT RIVER	ELOKOMIN HATCHERY	Fingr	06/01/81	06/01/81	97	954907	ELOCHOMAN R(25.0236)	UNTAGGED
1981	KLICKITAT BASIN	ELOKOMIN HATCHERY	Fingr	06/15/82	06/15/82	80	52162	ELOCHOMAN R(25.0236)	632242
1981	KLICKITAT BASIN	ELOKOMIN HATCHERY	Fingr	06/15/82	06/15/82	80	1266162	ELOCHOMAN R(25.0236)	UNTAGGED
1981	LOWER COLUMBIA	ELOKOMIN HATCHERY	Fingr	06/15/82	06/15/82	80	50632	ELOCHOMAN R(25.0236)	632260
1981	LOWER COLUMBIA	ELOKOMIN HATCHERY	Fingr	06/15/82	06/15/82	80	1249440	ELOCHOMAN R(25.0236)	UNTAGGED
1982	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/17/83	05/17/83	95	2558000	ELOCHOMAN R(25.0236)	UNTAGGED
1983	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/08/84	06/08/84	90	2769000	ELOCHOMAN R(25.0236)	UNTAGGED
1984	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/28/85	05/28/85	95	1582000	ELOCHOMAN R(25.0236)	UNTAGGED
1984	KALAMA RIVER	ELOKOMIN HATCHERY	Fingr	05/31/85	05/31/85	120	980000	ELOCHOMAN R(25.0236)	UNTAGGED
1985	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	04/25/86	04/25/86	37	48836	ELOCHOMAN R(25.0236)	633458
1985	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	04/25/86	04/25/86	37	8424	ELOCHOMAN R(25.0236)	UNTAGGED
1985	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	04/25/86	04/25/86	37	48882	ELOCHOMAN R(25.0236)	633459
1985	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	04/25/86	04/25/86	37	8378	ELOCHOMAN R(25.0236)	UNTAGGED
1985	ELOKOMIN + KALAMA R	ELOKOMIN HATCHERY	Fingr	06/04/86	06/04/86	77	49121	ELOCHOMAN R(25.0236)	633819
1985	ELOKOMIN + KALAMA R	ELOKOMIN HATCHERY	Fingr	06/04/86	06/04/86	77	1145055	ELOCHOMAN R(25.0236)	UNTAGGED
1985	ELOKOMIN + KALAMA R	ELOKOMIN HATCHERY	Fingr	06/04/86	06/04/86	68	49121	ELOCHOMAN R(25.0236)	633820
1985	ELOKOMIN + KALAMA R	ELOKOMIN HATCHERY	Fingr	06/04/86	06/04/86	68	1145056	ELOCHOMAN R(25.0236)	UNTAGGED
1986	KALAMA RIVER	ELOKOMIN HATCHERY	Fingr	05/09/87	05/09/87	95	38300	ELOCHOMAN R(25.0236)	UNTAGGED
1986	SKAMOKAWA CREEK	ELOKOMIN HATCHERY	Fingr	05/09/87	05/09/87	95	50200	ELOCHOMAN R(25.0236)	UNTAGGED
1986	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/09/87	05/09/87	95	311500	ELOCHOMAN R(25.0236)	UNTAGGED
1986	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/09/87	05/09/87	95	223000	ELOCHOMAN R(25.0236)	UNTAGGED
1986	KALAMA RIVER	ELOKOMIN HATCHERY	Fingr	06/04/87	06/04/87	65	352200	ELOCHOMAN R(25.0236)	UNTAGGED
1986	SKAMOKAWA CREEK	ELOKOMIN HATCHERY	Fingr	06/04/87	06/04/87	65	461100	ELOCHOMAN R(25.0236)	UNTAGGED
1986	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/04/87	06/04/87	65	2050300	ELOCHOMAN R(25.0236)	UNTAGGED

Table 15 (cont.). Hatchery releases of fall chinook salmon into the Elochoman River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1987	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	04/05/88	04/05/88	458	415000	ELOCHOMAN R(=5.=z36)	UNTAGGED
1987	WASHOUGAL RIVER	ELOKOMIN HATCHERY	Fingr	04/08/88	04/08/88	498	418000	ELOCHOMAN R(=5.=z36)	UNTAGGED
1987	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/09/88	06/09/88	71	4105200	ELOCHOMAN R(=5.=z36)	UNTAGGED
1988	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	EmFry	01/23/89	01/23/89	1008	146000	ELOCHOMAN R(=5.=z36)	UNTAGGED
1988	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	EmFry	02/01/89	02/01/89	1008	160000	ELOCHOMAN R(=5.=z36)	UNTAGGED
1988	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	EmFry	02/08/89	02/08/89	1008	186000	ELOCHOMAN R(=5.=z36)	UNTAGGED
1988	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	01/23/89	01/23/89	889	918000	ELOCHOMAN R(=5.=z36)	UNTAGGED
1988	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	01/24/89	01/24/89	872	772000	ELOCHOMAN R(=5.=z36)	UNTAGGED
1988	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/04/89	05/04/89	84	493200	ELOCHOMAN R(=5.=z36)	UNTAGGED
1988	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/05/89	05/05/89	78	77510	ELOCHOMAN R(=5.=z36)	630738
1988	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/05/89	05/05/89	78	41390	ELOCHOMAN R(=5.=z36)	UNTAGGED
1988	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/16/89	05/16/89	77	76973	ELOCHOMAN R(=5.=z36)	630737
1988	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/16/89	05/16/89	77	52027	ELOCHOMAN R(=5.=z36)	UNTAGGED
1988	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/05/89	06/05/89	60	3531600	ELOCHOMAN R(=5.=z36)	UNTAGGED
1988	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/15/89	06/15/89	75	74975	ELOCHOMAN R(=5.=z36)	630735
1988	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/15/89	06/15/89	75	23325	ELOCHOMAN R(=5.=z36)	UNTAGGED
1989	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	05/24/90	05/24/90	72	248100	ELOCHOMAN R(=5.=z36)	UNTAGGED
1989	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/11/90	06/11/90	74	1021567	ELOCHOMAN R(=5.=z36)	UNTAGGED
1989	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/11/90	06/11/90	47	3317725	ELOCHOMAN R(=5.=z36)	UNTAGGED
1989	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Fingr	06/17/90	06/17/90	88	125327	ELOCHOMAN R(=5.=z36)	UNTAGGED

Table 16 (TD). Parasites and diseases of fall chinook at the Elochoman Hatchery.

Disease type	Hatchery	Specific Pathogen
Parasite	Elochoman	*Costia necatrix* (Costia)
Parasite	Elochoman	*Trichodiniosis* (Trichodina)
Parasite (commensal)	Elochoman	Epistylis
Bacteria	Elochoman	*Yersinia ruckeri* (Enteric Redmouth

ELOCHOMAN SUBBASIN

Coho Salmon

GEOGRAPHIC LOCATION

The Elochoman River originates in the Willapa Hills (southwest Lewis County and northeast Cowlitz County), and flows in a generally southwest direction into Wahkiakum County meeting the Columbia River at River Mile (RM) 38. Elochoman (also commonly spelled Elokomin) Hatchery is located at RM 9, approximately seven miles northwest of Cathlamet.

ORIGIN

A native population of coho was noted to be in existence in the Elochoman River prior to construction of the Elochoman Salmon Hatchery in 1953. Most existing early coho (Type-S) hatchery programs are considered to be linked to native Toutle River stock coho. Washington stations either received Toutle stock eggs or utilized local native early run coho. Late stock coho (Type-N) are informally considered synonymous with Cowlitz River stock coho. Late stock hatchery programs were developed utilizing Cowlitz River stock, their derivatives, or native late runs. Late coho used in most of the current programs are presumably a blend of all of these, although egg transfers from Cowlitz Hatchery occur most frequently (Howell et al. 1985). The current method for obtaining brood stock is to divert all coho in the main river into a hatchery holding pond until management goals are met.

DISTRIBUTION

Natural spawning occurs in most areas accessible to coho. When hatchery escapement goals are met the ladder at the barrier dam is opened and all remaining fish are able to pass through and spawn naturally.

PRODUCTION

In Washington and Oregon adult production of early and late coho from natural spawners is unknown except for a few instances. A factor of 10 - 15 percent might be considered reasonable for the percent of the total Columbia River coho production originating from naturally spawning fish (Howell et al. 1985). Hatchery production is the dominant component in the Elochoman River although some natural production also occurs.

Tables 1 and 2 describe the amount of spawning and rearing habitat, by quality, available in the Elochoman River. This data was derived from the Presence/Absence database of the Northwest Power Planning Council, 1991.

The number of Elochoman River coho natural spawn escapement is unavailable. Elochoman Hatchery coho returns from 1978 - 1988 brood years averaged 7,144 with a low return of 1,094 for the 1980 brood and a peak of 14,000 for the 1979 brood. Hatchery returns by age and brood year are presented in Table 3.

Elochoman River tributary sport catch estimates between 1981 - 1988 return years averaged 1,183 adult coho, ranging from a low of 94 in 1987 and a high of 2,626 in 1982 based on punch card records and limited sampling data. However, specific age and brood year analysis for Elochoman River sport catch is unavailable.

ADULT LIFE HISTORY

Run size. catch and escapement

Ocean commercial and recreational fisheries off the Oregon coast are the primary harvesters of early coho. The Oregon troll fishery accounts for the highest percentage of the overall catch. Most of the freshwater recreational harvest occurs in the Washington tributaries (Howell et al. 1985).

Based on coded-wire tagged releases of 1976 - 1978 brood late coho, most of the harvest occurs in the Washington and Oregon ocean fisheries. Late coho have a more northerly migration pattern than early coho (WDF, 1990). This is reflected in the catch distribution where the Washington coastal catch comprised 40 percent of the total harvest compared to 20 percent for early coho during 1979 - 1981. Late coho also contribute significantly to the lower Columbia River commercial gill net fishery (Howell et al. 1985).

Strays from other lower river hatcheries are not unusual. Table 4 lists Elochoman Hatchery origin coho stray coded-wire tag recoveries beginning with the 1978 brood through to the 1988 brood. Table 5 lists the coded-wire tags recovered within the Elochoman subbasin which originated outside the Elochoman subbasin.

Harvest rates have averaged 79 percent and 85 percent for Type-S and N stocks, respectively, between 1983 and 1987. Harvest of Type-S coho is occasionally constrained by one or more of the fall chinook stocks. Harvest of Type-N coho is generally not constrained by weak stocks, with hatchery escapement being the only management constraint (WDF, 1990).

Time of Migration

Early coho enter the Columbia River by mid-August and begin returning to the lower Columbia hatcheries in early September. In the mainstem Columbia River early coho predominate from August to mid-September. Stock composition shifts to late coho in late September and October. Typically, the late coho run begins entering freshwater in mid to late September with mid-October considered the main migratory period in the mainstem Columbia River (Howell et al. 1985).

Spawning Period

For Type-S coho, both hatchery and natural spawning occurs around late October, while for Type-N coho spawning will extend from late November through March, with the bulk being in December and early January (Howell et al. 1985)

Spawning Areas

Natural spawning occurs in most areas accessible to coho (Howell et al. 1985).

Age composition

Coho return as two-year-old jacks and three-year-old adults. Specific age composition percentage (freshwaterocean) by brood year for coho spawning naturally and hatchery returns are unavailable.

Sex Ratio

Accounting for the differential harvest of adult males and females in the gill net fishery, the adult

run entering the Columbia River was estimated to be 46 percent females in 1982 and 30 percent females in 1983. Hatchery adult returns were 33 percent females in 1982 and 34 percent females in 1983 (Howell et al. 1985). Specific percent females by brood year and age class (freshwater.ocean) for coho spawning naturally and hatchery returns are unavailable.

Fecundity

Type-S stock coho fecundity at the Elochoman Hatchery for 1980, 1981, and 1988 return years averaged 2,558 and with a low of 1,966 in 1988, 2,508 in 1981 and a high of 2,853 in 1980.

Type-N stock coho fecundity at the Elochoman Hatchery for 1980 - 1990 return years, excluding 1981, averaged 2,460 and ranged from a low of 2,070 in 1989 to a high of 2,810 in 1980.

Elochoman River natural spawn and Elochoman Hatchery fecundity by age class and brood year is unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

The juvenile life history for Elochoman subbasin coho is similar to that of other stocks in the region with a spring emergence (WDF, 1990).

Time, age and size at migration

Freshwater rearing generally lasts for about 14 months. Hatchery release information for the Elochoman subbasin by brood year is presented in Table 6. Based on coded-wire tag recovery studies by Dawley et al. (1982), arrival in the Columbia River estuary occurs soon after hatchery release (Howell et al. 1985). Length data of natural coho smolts from the Elochoman River is unavailable. The number of natural juvenile coho salmon that migrate from the Elochoman River is also unavailable.

Survival Rate

A generalized recent year smolt to adult survival rate for coho was estimated to be 2.5 percent (TAC 1983, Howell et al. 1985).

BIOCHEMICAL-GENETIC CHARACTERISTICS

Data has not been compiled.

DISEASE

Bacteria and parasitic diseases found in the Elochoman Hatchery are listed in Table 7. (WDF Salmon Culture, Olympia).

Table 1 (HB-1). Estimated amount of rearing and spawning habitat, by quality, of the Elochoman River coho production area.

Distance/Area	Excellent	Good	Fair[a]	Poor[a]	Unknown	Total	Confidence
Miles (%)	52	00	48	00		14.7	
Acres (%)	62	00	38	00		37.0	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 1991.

Table 2 (HB-2). Estimated amount of rearing habitat, by quality, of the Elochoman River coho production area.

Distance/Area	Excellent	Good	Fair[a]	Poor[a]	Unknown	Total	Confidence
Miles (%)	00	100	00	00		2.6	
Acres (%)	00	100	00	00		10.9	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 199 1.

Table 3 (RH). Total coho returns to the Elochoman Hatchery, by brood year.

Total Age

Brood Year	2	3	Total	Adult Total
1978	1,033	4,898	5,931	4,898
1979	241	13,759	14,000	13,759
1980	599	495	1,094	495
1981	609	3,094	3,703	3,094
1982	1,234	5,563	6,797	5,563
1983	892	5,458	6,350	5,458
1984	682	1,267	1,949	1,267
1985	3,477	6,520	9,997	6,520
1986	2,891	6,203	9,094	6,203
1987	4,560	7,963	12,523	7,963
1988	2,413			
1989				

Age composition based on hatchery personnel designation of adults and jacks.

Jacks are assumed to be two-year-olds, and adults are assumed to be three-year-olds.

Table 4 (AE). Emigration of coded wire tagged coho from the Elochoman Hatchery.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Elochoman Hatchery	Elochoman River, 1988	Spawning Ground	64	1	[a]

Based on the following tag code: 63-36-58.

Beginning with the 1978 brood.

[a] No population estimates of naturally spawning coho are made, therefore total number of estimated tags cannot be generated.

Table 5 (AI). Immigration of coded wire tagged coho into the Elochoman subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Cascade, released Tanner Creek	Elochoman, 1982	Spawning Ground	326	1	21
Elochoman	Elochoman, 1988	Spawning Ground	64	1	[a]
Grays	Elochoman, 1986	Hatchery	5,476	1	2
Grays	Elochoman, 1986	Hatchery	5,476	4	8
Grays	Elochoman, 1986	Hatchery	5,476	2	4
Grays	Elochoman, 1986	Hatchery	5,476	2	4
Grays	Elochoman, 1986	Hatchery	5,476	1	2
Grays	Elochoman, 1986	Hatchery	5,476	5	10
Grays	Elochoman, 1988	Hatchery	3,754	1	1
Grays	Elochoman, 1988	Hatchery	3,754	1	1
Grays	Elochoman, 1988	Hatchery	3,754	2	2
Grays	Elochoman, 1988	Hatchery	2,766	1	1

Based on the following tag codes: 07-21-29, 63-36-58, 63-32-59, 63-32-60, 63-32-61, 63-32-62, 63-32-63, 63-33-01, 63-42-47, 63-42-49, 63-42-50, and 63-42-52.

Beginning with the 1978 brood.

[a] No population estimates of naturally spawning coho are made, therefore total number of estimated tags cannot be generated.

Table 6. (TR) Hatchery releases of coho salmon into the Elochoman River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1965	ELOCHOMAN RIVERTYP-S	ELOCHOMIN HATCHERY	Fingr	01/01/67	01/01/67	35	118365	ELOCHOMAN R(25.0236)	UNTAGGED
1965	ELOCHOMAN RIVERTYP-S	ELOCHOMIN HATCHERY	Fingr	01/01/67	01/01/67	31	1172840	ELOCHOMAN R(25.0236)	UNTAGGED
1966	ELOCHOMAN RIVERTYP-S	ELOCHOMIN HATCHERY	Smolt	04/16/68	04/16/68	16	88515	ELOCHOMAN R(25.0236)	UNTAGGED
1966	ELOCHOMAN RIVERTYP-S	ELOCHOMIN HATCHERY	Smolt	04/16/68	04/16/68	16	789613	ELOCHOMAN R(25.0236)	UNTAGGED
1967	ELOCHOMAN RIVERTYP-S	ELOCHOMIN HATCHERY	Smolt	04/17/69	04/17/69	16	970560	ELOCHOMAN R(25.0236)	UNTAGGED
1968	ELOCHOMAN RIVERTYP-S	ELOCHOMIN HATCHERY	Smolt	04/10/70	04/10/70	15	463365	ELOCHOMAN R(25.0236)	UNTAGGED
1968	ELOCHOMAN RIVERTYP-S	ELOCHOMIN HATCHERY	Smolt	04/13/70	04/13/70	16	1393440	ELOCHOMAN R(25.0236)	UNTAGGED
1969	ELOCHOMAN RIVERTYP-S	ELOCHOMIN HATCHERY	EmFry	01/30/70	01/30/70	1163	49014	DUCK CR (25.0251)	UNTAGGED
1969	ELOCHOMAN RIVERTYP-S	ELOCHOMIN HATCHERY	EmFry	01/30/70	01/30/70	1163	49014	NELSON CR (25.0241)	UNTAGGED
1969	ELOCHOMAN RIVERTYP-S	ELOCHOMIN HATCHERY	Fingr	02/26/70	02/26/70	639	140598	ELOCHOMAN R(25.0236)	UNTAGGED
1969	ELOCHOMAN RIVERTYP-S	ELOCHOMIN HATCHERY	Smolt	04/02/71	04/02/71	17	499222	ELOCHOMAN R(25.0236)	UNTAGGED
1969	ELOCHOMAN RIVERTYP-S	ELOCHOMIN HATCHERY	Smolt	04/06/71	04/06/71	15	1000005	ELOCHOMAN R(25.0236)	UNTAGGED
1969	ELOCHOMAN RIVERTYP-S	ELOCHOMIN HATCHERY	Smolt	04/20/71	04/20/71	15	435615	ELOCHOMAN R(25.0236)	UNTAGGED
1970	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	EmFry	02/05/71	02/05/71	1031	595260	ELOCHOMAN -NF 250264	UNTAGGED
1970	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	EmFry	02/05/71	02/05/71	1031	326280	ELOCHOMAN -WF 250259	UNTAGGED
1970	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	EmFry	02/09/71	02/09/71	1031	213200	ELOCHOMAN -WF 250259	UNTAGGED
1970	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	EmFry	02/09/71	02/09/71	1031	104000	ELOCHOMAN R(25.0236)	UNTAGGED
1970	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Fingr	04/09/71	04/09/71	375	54750	DUCK CR (25.0251)	UNTAGGED
1970	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Fingr	04/09/71	04/09/71	375	54750	NELSON CR (25.0241)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/17/72	04/17/72	18	89645	ELOCHOMAN R(25.0236)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/17/72	04/17/72	18	230611	ELOCHOMAN R(25.0236)	UNTAGGED
1970	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Smolt	04/18/72	04/18/72	16	1529315	ELOCHOMAN R(25.0236)	UNTAGGED
1970	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Smolt	04/18/72	04/18/72	16	95333	ELOCHOMAN R(25.0236)	UNTAGGED
1971	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	EmFry	03/07/72	03/07/72	986	49450	DUCK CR (25.0251)	UNTAGGED
1971	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	EmFry	03/07/72	03/07/72	986	49450	NELSON CR (25.0241)	UNTAGGED
1971	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Fingr	04/03/72	04/03/72	621	197835	ELOCHOMAN R(25.0236)	UNTAGGED
1971	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Smolt	04/18/73	04/18/73	15	42915	ELOCHOMAN R(25.0236)	UNTAGGED
1971	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Smolt	04/18/73	04/18/73	15	1035585	ELOCHOMAN R(25.0236)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/25/73	04/25/73	16	45552	ELOCHOMAN R(25.0236)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/25/73	04/25/73	16	333968	ELOCHOMAN R(25.0236)	UNTAGGED
1972	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Fingr	03/13/73	03/13/73	825	200030	ELOCHOMAN -NF 250264	UNTAGGED
1972	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/02/74	05/02/74	16	20386	ELOCHOMAN R(25.0236)	010103
1972	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/02/74	05/02/74	16	206	ELOCHOMAN R(25.0236)	UNTAGGED
1972	TOUTLE (GREEN) TYP-S	ELOCHOMIN HATCHERY	Smolt	05/02/74	05/02/74	15	19905	ELOCHOMAN R(25.0236)	010104
1972	TOUTLE (GREEN) TYP-S	ELOCHOMIN HATCHERY	Smolt	05/02/74	05/02/74	15	291	ELOCHOMAN R(25.0236)	UNTAGGED
1972	TOUTLE (GREEN) TYP-S	ELOCHOMIN HATCHERY	Smolt	05/02/74	05/02/74	15	20675	ELOCHOMAN R(25.0236)	010207
1972	TOUTLE (GREEN) TYP-S	ELOCHOMIN HATCHERY	Smolt	05/02/74	05/02/74	15	1251	ELOCHOMAN R(25.0236)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/02/74	05/02/74	15	20640	ELOCHOMAN R(25.0236)	151515
1972	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/02/74	05/02/74	16	341307	ELOCHOMAN R(25.0236)	UNTAGGED
1972	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Smolt	05/02/74	05/02/74	15	879544	ELOCHOMAN R(25.0236)	UNTAGGED
1972	TOUTLE (GREEN) TYP-S	ELOCHOMIN HATCHERY	Smolt	05/03/74	05/03/74	15	40347	ELOCHOMAN R(25.0236)	010213
1972	TOUTLE (GREEN) TYP-S	ELOCHOMIN HATCHERY	Smolt	05/03/74	05/03/74	15	1251	ELOCHOMAN R(25.0236)	UNTAGGED
1972	TOUTLE (GREEN) TYP-S	ELOCHOMIN HATCHERY	Smolt	05/03/74	05/03/74	15	42405	ELOCHOMAN R(25.0236)	010314
1972	TOUTLE (GREEN) TYP-S	ELOCHOMIN HATCHERY	Smolt	05/03/74	05/03/74	15	40808	ELOCHOMAN R(25.0236)	010401
1972	TOUTLE (GREEN) TYP-S	ELOCHOMIN HATCHERY	Smolt	05/03/74	05/03/74	15	412	ELOCHOMAN R(25.0236)	UNTAGGED
1973	ELOCHOMAN RIVERTYP-S	ELOCHOMIN HATCHERY	Fingr	02/11/74	02/11/74	796	149910	ELOCHOMAN -WF 250259	UNTAGGED
1973	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/30/75	04/30/75	15	472986	ELOCHOMAN R(25.0236)	UNTAGGED
1973	ELOCHOMAN R TYPE-N	ELOCHOMIN HATCHERY	Smolt	04/30/75	04/30/75	14	370147	ELOCHOMAN R(25.0236)	UNTAGGED
1973	ELOCHOMAN RIVERTYP-S	ELOCHOMIN HATCHERY	Smolt	04/30/75	04/30/75	14	439740	ELOCHOMAN R(25.0236)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/06/75	05/06/75	15	499310	ELOCHOMAN R(25.0236)	UNTAGGED
1974	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Fingr	03/18/75	03/18/75	597	180000	DUCK CR (25.0251)	UNTAGGED
1974	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Fingr	03/18/75	03/18/75	597	180000	ELOCHOMAN -NF 250264	UNTAGGED
1974	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Fingr	03/18/75	03/18/75	597	142039	ELOCHOMAN R(25.0236)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	11/06/75	11/06/75	43	43055	ELOCHOMAN R(25.0236)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	11/07/75	11/07/75	32	31926	ELOCHOMAN R(25.0236)	UNTAGGED

Table 6 (cont.). Hatchery releases of coho salmon into the Elochoman River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1974	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Fingr	03/18/75	03/18/75	597	90000	NELSON CR (25.0241)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/10/76	05/10/76	15	51129	ELOCHOMAN R(25.0236)	130606
1974	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/10/76	05/10/76	15	928782	ELOCHOMAN R(25.0236)	UNTAGGED
1974	TOUTLE (GREEN) TYP-S	ELOCHOMIN HATCHERY	Smolt	05/10/76	05/10/76	14	49874	ELOCHOMAN R(25.0236)	130607
1974	TOUTLE (GREEN) TYP-S	ELOCHOMIN HATCHERY	Smolt	05/10/76	05/10/76	14	403474	ELOCHOMAN R(25.0236)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/10/76	05/10/76	15	928782	ELOCHOMAN R(25.0236)	UNTAGGED
1974	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Smolt	05/10/76	05/10/76	14	403474	ELOCHOMAN R(25.0236)	UNTAGGED
1975	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Smolt	05/03/77	05/03/77	14	950950	ELOCHOMAN R(25.0236)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/11/77	05/11/77	16	1344067	ELOCHOMAN R(25.0236)	UNTAGGED
1976	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Smolt	05/02/78	05/02/78	15	2697541	ELOCHOMAN R(25.0236)	UNTAGGED
1976	ELOCHOMAN R TYPE-N	ELOCHOMIN HATCHERY	Smolt	05/30/78	05/30/78	15	1000000	ELOCHOMAN R(25.0236)	UNTAGGED
1977	ELOCHOMAN R TYPE-N	ELOCHOMIN HATCHERY	Smolt	04/25/79	04/25/79	16	786296	ELOCHOMAN R(25.0236)	UNTAGGED
1977	TYPE-N (TOUTLE)	ELOCHOMIN HATCHERY	Smolt	04/30/79	04/30/79	16	699104	ELOCHOMAN R(25.0236)	UNTAGGED
1977	TOUTLE RIVER TYPE-S	ELOCHOMIN HATCHERY	Smolt	04/30/79	04/30/79	16	1248051	ELOCHOMAN R(25.0236)	UNTAGGED
1977	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/25/79	05/25/79	17	387067	ELOCHOMAN R(25.0236)	UNTAGGED
1977	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Smolt	05/25/79	05/25/79	17	512076	ELOCHOMAN R(25.0236)	UNTAGGED
1978	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	EmFry	03/08/79	03/08/79	1055	122500	DUCK CR (25.0251)	UNTAGGED
1978	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	EmFry	03/08/79	03/08/79	1055	122500	NELSON CR (25.0241)	UNTAGGED
1978	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Smolt	04/07/80	04/07/80	23	483941	ELOCHOMAN R(25.0236)	UNTAGGED
1978	GRAYS RIVER TYPE-S	ELOCHOMIN HATCHERY	Smolt	04/07/80	04/07/80	18	112041	ELOCHOMAN R(25.0236)	UNTAGGED
1978	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/07/80	04/07/80	18	278952	ELOCHOMAN R(25.0236)	UNTAGGED
1978	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Smolt	04/07/80	04/07/80	18	1068726	ELOCHOMAN R(25.0236)	UNTAGGED
1978	LTL WHITE SALM TYP-S	ELOCHOMIN HATCHERY	Smolt	05/01/80	05/01/80	23	946128	ELOCHOMAN R(25.0236)	UNTAGGED
1978	ELOCHOMAN R TYPE-N	ELOCHOMIN HATCHERY	Smolt	05/01/80	05/01/80	23	964988	ELOCHOMAN R(25.0236)	UNTAGGED
1979	ELOCHOMAN R TYPE-N	ELOCHOMIN HATCHERY	EmFry	02/27/80	02/27/80	1080	97000	DUCK CR (25.0251)	UNTAGGED
1979	ELOCHOMAN R TYPE-N	ELOCHOMIN HATCHERY	EmFry	02/27/80	02/27/80	1080	64660	NELSON CR (25.0241)	UNTAGGED
1979	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Fingr	05/28/80	05/28/80	236	148680	ELOCHOMAN R(25.0236)	UNTAGGED
1979	ELOCHOMAN R TYPE-S	ELOCHOMIN HATCHERY	Fingr	06/10/80	06/10/80	472	35076	ELOCHOMAN R(25.0236)	UNTAGGED
1979	COLUMBIA R - TYPE-S	ELOCHOMIN HATCHERY	Smolt	03/25/81	03/25/81	20	840000	ELOCHOMAN R(25.0236)	UNTAGGED
1979	COLUMBIA R - TYPE-S	ELOCHOMIN HATCHERY	Smolt	04/17/81	04/17/81	20	15000	ELOCHOMAN R(25.0236)	UNTAGGED
1979	COLUMBIA R - TYPE-S	ELOCHOMIN HATCHERY	Smolt	04/17/81	04/17/81	20	138000	ELOCHOMAN R(25.0236)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/17/81	04/17/81	20	147000	ELOCHOMAN R(25.0236)	UNTAGGED
1979	COLUMBIA R - TYPE-S	ELOCHOMIN HATCHERY	Smolt	05/01/81	05/01/81	18	25000	ELOCHOMAN R(25.0236)	UNTAGGED
1979	COLUMBIA R - TYPE-S	ELOCHOMIN HATCHERY	Smolt	05/01/81	05/01/81	18	230000	ELOCHOMAN R(25.0236)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/01/81	05/01/81	18	245000	ELOCHOMAN R(25.0236)	UNTAGGED
1979	COLUMBIA R - TYPE-S	ELOCHOMIN HATCHERY	Smolt	06/09/81	06/09/81	17	51150	ELOCHOMAN R(25.0236)	UNTAGGED
1979	COLUMBIA R - TYPE-S	ELOCHOMIN HATCHERY	Smolt	06/09/81	06/09/81	17	470580	ELOCHOMAN R(25.0236)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	06/09/81	06/09/81	17	501270	ELOCHOMAN R(25.0236)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	01/16/81	01/16/81	1296	580000	ELOCHOMAN -NF 25.0264	UNTAGGED
1980	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	05/01/81	05/01/81	756	979188	ELOCHOMAN R(25.0236)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	05/07/81	05/07/81	648	74635	ELOCHOMAN R(25.0236)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	03/19/82	03/19/82	24	794000	ELOCHOMAN R(25.0236)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/22/82	04/22/82	20	800000	ELOCHOMAN R(25.0236)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/05/82	05/05/82	18	600000	ELOCHOMAN R(25.0236)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/26/82	05/26/82	17	525000	ELOCHOMAN R(25.0236)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	03/31/82	03/31/82	840	145256	ELOCHOMAN R(25.0236)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	03/04/83	03/04/83	20	830000	ELOCHOMAN R(25.0236)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/30/83	04/30/83	18	1200000	ELOCHOMAN R(25.0236)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/19/83	05/19/83	17	625000	ELOCHOMAN R(25.0236)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	03/15/83	03/15/83	744	110000	DUCK CR (25.0251)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	03/15/83	03/15/83	687	35000	ELOCHOMAN R(25.0236)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	03/09/83	03/09/83	667	66500	NELSON CR (25.0241)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	03/20/84	03/20/84	21	787000	ELOCHOMAN R(25.0236)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/05/84	04/05/84	19	50000	ELOCHOMAN R(25.0236)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/14/84	04/14/84	18	100000	ELOCHOMAN R(25.0236)	UNTAGGED

Table 6 (cont.). Hatchery releases of coho salmon into the Elochoman River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1982	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/26/84	04/26/84	17	200000	ELOCHOMAN R(25.0236)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/13/84	05/13/84	16	575000	ELOCHOMAN R(25.0236)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/24/84	05/24/84	15	795000	ELOCHOMAN R(25.0236)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	04/25/84	04/25/84	667	10000	DUCK CR (25.0251)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	04/25/84	04/25/84	648	122200	ELOCHOMAN -NF 250264	UNTAGGED
1983	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	05/08/84	05/08/84	582	106300	ELOCHOMAN -NF 250264	UNTAGGED
1983	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	04/25/84	04/25/84	648	112000	ELOCHOMAN -WF 250259	UNTAGGED
1983	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	05/08/84	05/08/84	582	106300	ELOCHOMAN -WF 250259	UNTAGGED
1983	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	04/25/84	04/25/84	65	75000	NELSON CR (25.0241)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/15/85	05/27/85	19	25618	ELOCHOMAN R(25.0236)	633253
1983	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/15/85	05/27/85	19	815708	ELOCHOMAN R(25.0236)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/15/85	05/27/85	19	26149	ELOCHOMAN R(25.0236)	633254
1983	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/15/85	05/27/85	19	835525	ELOCHOMAN R(25.0236)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	04/09/85	04/09/85	540	29100	ELOCHOMAN R(25.0236)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	04/09/85	04/09/85	540	29100	ELOCHOMAN R(25.0236)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	05/01/85	05/01/85	574	207000	ELOCHOMAN R(25.0236)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	04/08/85	04/08/85	540	38800	NELSON CR (25.0241)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/15/86	05/22/86	16	26188	ELOCHOMAN R(25.0236)	633527
1984	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/15/86	05/22/86	16	823812	ELOCHOMAN R(25.0236)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/15/86	05/22/86	16	26309	ELOCHOMAN R(25.0236)	633528
1984	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/15/86	05/22/86	16	823691	ELOCHOMAN R(25.0236)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	04/21/86	04/21/86	432	5200	DUCK CR (25.0251)	UNTAGGED
1985	COLUMBIA R - TYPE-S	ELOCHOMIN HATCHERY	Fingr	04/02/86	04/02/86	488	48800	ELOCHOMAN R(25.0236)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	04/21/86	04/21/86	428	16300	ELOCHOMAN R(25.0236)	UNTAGGED
1985	COLUMBIA R - TYPE-S	ELOCHOMIN HATCHERY	Fingr	04/02/86	04/02/86	488	16100	NELSON CR (25.0241)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	04/21/86	04/21/86	428	7300	NELSON CR (25.0241)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/14/87	04/14/87	18	305950	ELOCHOMAN R(25.0236)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/15/87	06/03/87	16	26085	ELOCHOMAN R(25.0236)	633658
1985	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/15/87	06/03/87	16	349519	ELOCHOMAN R(25.0236)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/15/87	06/03/87	16	26081	ELOCHOMAN R(25.0236)	633659
1985	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/15/87	06/03/87	16	349512	ELOCHOMAN R(25.0236)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/24/87	04/24/87	13	281050	ELOCHOMAN R(25.0236)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	05/11/87	05/11/87	483	24200	DUCK CR (25.0251)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	05/11/87	05/11/87	488	133900	ELOCHOMAN R(25.0236)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	05/13/87	05/13/87	458	36500	NELSON CR (25.0241)	UNTAGGED
1986	ELOCHOMAN RIVER	ELOCHOMIN HATCHERY	Smolt	04/27/88	04/27/88	20	1720600	ELOCHOMAN R(25.0236)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/24/89	04/24/89	15	515800	ELOCHOMAN R(25.0236)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/01/89	05/01/89	17	524900	ELOCHOMAN R(25.0236)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/10/89	05/10/89	17	345200	ELOCHOMAN R(25.0236)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/19/89	05/19/89	17	428300	ELOCHOMAN R(25.0236)	UNTAGGED
1988	TOUTLE R TYPE-S	ELOCHOMIN HATCHERY	Smolt	04/17/90	04/17/90	18	31260	ELOCHOMAN R(25.0236)	631128
1988	TOUTLE R TYPE-S	ELOCHOMIN HATCHERY	Smolt	04/17/90	04/17/90	18	444440	ELOCHOMAN R(25.0236)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	04/26/90	04/26/90	16	274700	ELOCHOMAN R(25.0236)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/10/90	05/10/90	16	293931	ELOCHOMAN R(25.0236)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/31/90	05/31/90	12	30767	ELOCHOMAN R(25.0236)	630750
1988	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Smolt	05/31/90	05/31/90	12	545083	ELOCHOMAN R(25.0236)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	06/26/90	06/26/90	215	159100	ELOCHOMAN R(25.0236)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	07/06/90	07/06/90	210	107182	ELOCHOMAN R(25.0236)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	ELOCHOMIN HATCHERY	Fingr	11/16/90	11/16/90	40	150000	ELOCHOMAN R(25.0236)	UNTAGGED

Table 7 (TD). Parasites and diseases of coho at the Elochoman Hatchery located in the Elochoman River.

Disease type	Hatchery	Specific Pathogen
Bacteria	Elochoman	*Cytophaga psychrophila* (Cold Water Disease
Bacteria	Elochoman	*Aeronmonous salmonicida* (Furunculosis)
Parasite	Elochoman	*Costia* necatrix (Costia)
Parasite	Elochoman	*Trichodiniosis* (Trichodina)
Parasite (commensal)	Elochoman	Epistylis
Bacteria	Elochoman	*Clostridium botulinum* (Botulism)

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ELOCHOMAN RIVER SUBBASIN

Hatchery Produced Beaver Creek Summer Steelhead

GEOGRAPHIC LOCATION

Beaver Creek Hatchery is located several hundred yards upstream on Beaver Creek, a tributary of the Elochoman which is located approximately four miles from the mouth of the Elochoman River.

ORIGIN

The Beaver Creek Hatchery steelhead originated from Skamania hatchery stock. Hatchery releases of summer steelhead began in the Elochoman in 1982. Summer steelhead are not indigenous to the Elochoman River, no historical evidence of natural production exists for this stock.

PRODUCTION

Production Facilities

Beaver Creek Hatchery contains 10 raceways measuring 4 ft x 30 ft and 20 raceways measuring 10 ft x 80 ft plus a one acre smolt rearing pond and two adult holding ponds. Well water is used for incubation and fry rearing with Beaver Creek and Elochoman River water used for grow-out.

Production Summary

Beaver Creek steelhead are artificially reared in a hatchery environment. Egg capacity currently stands at approximately 1 million eggs (steelhead and trout). Summer steelhead production averaged releases of approximately 39,514 smolts annually from 1982 through 1989.

ADULT LIFE HISTORY

Run size and escapement

No data are available on Beaver Creek steelhead.

Time of migration

Peak returns occur in June and July.

Harvest

Ocean harvest of Beaver Creek steelhead is unknown. A popular fishery exists on the lower Columbia River and although the number of Beaver Creek steelhead caught is not known, some Beaver Creek steelhead are part of the lower Columbia harvest.

Prior to 1983, sport catch of summer steelhead consisted of steelhead strays with catch averaging under 30 fish annually (Table 1). Releases of hatchery steelhead into the Elochoman River in 1982 have provided anglers with higher returns of summer steelhead with an average sport catch since 1983 of 573 fish annually (Table 1).

Spawning period

No data are available on Beaver Creek steelhead.

Fecundity

No data are available on summer steelhead.

Age composition

No data are available on summer steelhead.

Size

No data are available on summer steelhead.

Sex ratio

No data are available on summer steelhead.

JUVENILE LIFE HISTORY

Egg

No data are available on egg to smolt survival.

Juvenile

Hatchery smolts are reared in the hatchery environment for one year after which they are planted in April and May at a size of 65 to 115 grams each (4-7 fish per pound).

Straying

No data are available on Beaver Creek steelhead.

Hatcher-y releases

Table 2 outlines hatchery releases of summer steelhead into the Elochoman River.

BIOCHEMICAL-GENETIC CHARACTERISTICS

No data are available on Beaver Creek steelhead.

DISEASES

Disease history for Beaver Creek Hatchery is presented in Table 3.

REFERENCES

The references for this section appear at the end of the winter steelhead section.

Table 1 (RS-a). Sport catch of hatchery summer steelhead in the Elochoman River.

Return Year	Sport Catch[A]
1977-78	18
1978-79	25
1979-80	27
1980-81	24
1981-82	17
1982-83	28
1983-84	306
1984-85	600
1985-86	1,280
1986-87	1,141
1987-88	176
1988-89	327
1989-90	183

'Hatchery releases began in 1982 with first returns in 1983-84.

Source: WDW permit-card harvest estimates.

Table 2 (TR). Hatchery releases of summer steelhead into the Elochoman River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release site	CWT Code /Fin Clip
1981	Kalama R	Beaver Creek	Smolt	04/18/83		5.0	10,750	Elochoman R	
1981	Washougal R	Beaver Creek	Smolt	04/12/83		6.1	17,751	Elochoman R	
1981	Washougal R	Beaver Creek	Smolt	04/13/83		6.1	4,941	Elochoman R	
1981	Washougal R	Beaver Creek	Smolt	04/15/83		6.0	15,690	Elochoman R	
1981	Washougal R	Beaver Creek	Smolt	04/21/83		6.5	20,670	Elochoman R	
1981	Washougal R	Beaver Creek	Smolt	04/26/82		4.8	14,160	Elochoman R	
1981	Washougal R	Beaver Creek	Smolt	04/26/82		5.3	15,687	Elochoman R	
1981	Washougal R	Beaver Creek	Smolt	04/29/83		6.6	14,190	Elochoman R	
1981	Washougal R	Beaver Creek	Smolt	05/03/82		6.0	9,000	Elochoman R	
1981	Washougal R	Beaver Creek	Smolt	05/14/82		7.0	15,269	Elochoman R	
1983	Washougal R	Beaver Creek	Smolt	05/11/84		8.2	8,610	Elochoman R	
1983	Washougal R	Beaver Creek	Smolt	05/11/84		6.5	4,225	Elochoman R	
1983	Washougal R	Beaver Creek	Smolt	05/11/84		8.2	4,592	Elochoman R	
1983	Washougal R	Beaver Creek	Smolt	05/11/84		6.2	4,650	Elochoman R	
1983	Washougal R - WF/NF	Beaver Creek	Smolt	04/27/84		5.3	15,370	Elochoman R	AD
1983	Washougal R - WF/NF	Beaver Creek	Smolt	04/30/84		5.4	16,470	Elochoman R	AD
1984	Washougal R - WF/NF	Beaver Creek	Smolt	05/17/85		6.9	10,005	Elochoman R	AD

Table 2 (cont.). Hatchery releases of summer steelhead into the Elochoman River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release site	CWT Code /Fin Clip
1985	Elochoman R	Beaver Creek	Smolt	04/22/86		5.5	34,304	Elochoman R	AD
1986	Elochoman R	Beaver Creek	Smolt	05/04/87		5.7	2,850	Elochoman R	AD
1986	Washougal R	Beaver Creek	Smolt	04/27/87		5.6	7,000	Elochoman R	AD
1986	Washougal R	Beaver Creek	Smolt	04/27/87		5.6	7,000	Elochoman R	AD
1987	Washougal R	Beaver Creek	Smolt	04/26/88		5.6	8,400	Elochoman R	AD
1987	Washougal R	Beaver Creek	Smolt	04/26/88		5.6	8,400	Elochoman R	AD
1987	Washougal R	Beaver Creek	Smolt	04/26/88		5.6	5,040	Elochoman R	AD
1987	Washougal R	Beaver Creek	Smolt	05/20/88		6.4	3,840	Elochoman R	AD
1988	Washougal R	Beaver Creek	Smolt	04/27/89		5.2	3,120	Elochoman R	AD
1988	Washougal R	Beaver Creek	Smolt	04/27/89		4.2	6,300	Elochoman R	AD
1988	Washougal R	Beaver Creek	Smolt	04/27/89		4.2	5,250	Elochoman R	AD
1988	Washougal R	Beaver Creek	Smolt	04/27/89		4.2	2,100	Elochoman R	AD
1988	Washougal R	Beaver Creek	Smolt	05/12/89		5.6	3,360	Elochoman R	AD
1988	Washougal R	Beaver Creek	Smolt	05/15/89		5.6	2,940	Elochoman R	AD
1989	Washougal R	Beaver Creek	Smolt	05/11/90		6.4	8,000	Elochoman R	AD
1989	Washougal R	Beaver Creek	Smolt	05/18/90		6.6	1,881	Elochoman R	AD
1990	Washougal R - WF/NF	Beaver Creek	Smolt	04/23/91		7.5	20,250	Elochoman R	AD

Table 2 (cont.). Hatchery releases of summer steelhead into the Elochoman River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release site	CWT Code /Fin Clip
1990	Washougal R - WF/NF	Beaver Creek	Smolt	05/09/91		5.7	912	Elochoman R	AD
1990	Washougal R - WF/NF	Beaver Creek	Smolt	05/16/91		5.4	1,312	Elochoman R	AD

Source: Terry Lovgren, WDW Hatchery Stocking Database, 1991.

Table 3 (TD). Parasites and diseases isolated at Beaver Creek Hatchery located on the Elochoman River.

Disease Type	Hatchery	Specific Pathogen
Bacterial	Beaver Creek	*Flavobacterium sp.*
Bacterial	Beaver Creek	*Aeromonas salmonicida* (Furunculosis)
Bacterial	Beaver Creek	*Flexibacter columnaris* (Columnaris)
Bacterial	Beaver Creek	*Renibacterium salmonarium* (BKD)
Bacterial	Beaver Creek	*Flexibacter cytophaga* (Coldwater)
Parasite	Beaver Creek	*Ichthyoboda sp.* (Costia)
Parasite	Beaver Creek	*Ichthyophthirius multiflis* (Ich)
Parasite	Beaver Creek	*Nanophetyus sp.*
Parasite	Beaver Creek	*Trichodina sp.*
Parasite	Beaver Creek	*Hexamita sp.*
Viral	Beaver Creek	*Infectious Hematopoietic Necrosis* (IHN)
Viral	Beaver Creek	*EIBS*

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

Source: WDW pathologist, Steve Roberts, 1991

ELOCHOMAN RIVER SUBBASIN

Naturally Produced Winter Steelhead

GEOGRAPHIC LOCATION

The Elochoman River begins in the Willapa Hills area of southwest Lewis County and northeast Cowlitz County. From its source the river flows southwest joining the Columbia River at river mile (RM) 38, just downstream of the town of Cathlamet, Washington. Total drainage area of Elochoman basin is 73.3 square miles.

ORIGIN

The wild winter steelhead stock in the Elochoman River is native, although interbreeding with introduced Cowlitz, Chambers Creek and Elochoman hatchery stocks has likely occurred.

DISTRIBUTION

Table 1 lists rearing and spawning habitat, by quality, for Elochoman River steelhead based on estimates from the Northwest Power Planning Council.

Distribution of winter steelhead occurs throughout the mainstem including the West, North and East forks and also within tributary streams. Figure 1 illustrates this distribution.

PRODUCTION

Production Facilities

There are two hatcheries located on the Elochoman River, the Elochoman River Hatchery operated by Washington Department of Fisheries which rears fall chinook and coho salmon and the Beaver Creek Hatchery operated by Washington Department of Wildlife which rears steelhead and cutthroat trout.

Production Summary

No data are available on natural smolt production.

ADULT LIFE HISTORY

Run Size and Escapement

No data are available on wild run size or escapement, however, creel and trapping operations in the early 1960's provide some information. Watson (1963) estimated run size (wild and hatchery fish) at 2,947 in 1962-63 and 2,537 in 196364. A slightly higher count was made by Lavier (1970) who estimated total returns (wild and hatchery) of 3,410 and 3,588 fish for the same run years as Watson. Lucas (1992) estimated wild steelhead escapement in 1991 at 166 fish.

Time of migration

Adult time of entry for wild winter steelhead is generally from January through May with peak returns occurring in March and April.

Harvest

Ocean harvest of Elochoman steelhead is unknown. A popular fishery exists on the lower Columbia River which harvests a large number of steelhead including some Elochoman River steelhead.

Based on permit-card harvest estimates, sport catch from 1980 through 1990 averaged 3,046 fish (wild and hatchery; Table 2). "Wild Release" regulations were imposed on the Elochoman River in 1986, limiting legal harvest to hatchery fish only. .

There are no Indian fishing rights exercised in the Elochoman River subbasin.

Spawning period

Wild steelhead spawning occurs from March through mid-June.

Spawning area

Wild steelhead spawn throughout the Elochoman River and in the North, East and West forks. Spawning areas are considered fair for the first five kilometers of the mainstem and the lower sections of most tributaries. Spawning and rearing habitat improve in the upper reaches of the river with spawning surveys conducted in 1991 finding more spawning occurring in the upper portion of the basin.

Fecundity

No data are available on wild steelhead fecundity.

Aee composition

No data are available on Elochoman wild steelhead.

Size

Size data on wild fish is lacking, Watson (1964) separated wild versus hatchery fish on dorsal fin condition and determined the average length of wild winter steelhead to be 27 inches (68.6 cm).

Sex ratio

No current data on wild steelhead. Watson (1964) listed females at 84 percent of a 35 fish sample in 1962-63 and in 1963-64 listed females at 52 percent of a 39 fish sample.

Survival rate

No data are available on Elochoman steelhead.

JUVENILE LIFE HISTORY

Egg

No data are available on wild egg to smolt survival.

Emergence

No data are available on Elochoman steelhead.

Juvenile rearing

Juvenile rearing for the majority of wild smolts lasts approximately two years prior to ocean emigration.
Wild steelhead smolts emigrate in April and May, peaking in early May.

Hatcher-v releases

Smolts released into the Elochoman River are provided by Beaver Creek Hatchery which is located on the Elochoman River. Numbers of fish released into the Elochoman River and data concerning the Beaver Creek Hatchery stock is presented in the adjoining Elochoman River hatchery steelhead report.

Straying

No data are available on Elochoman steelhead.

BIOCHEMICAL-GENETIC CHARACTERISTICS

No data are available on Elochoman steelhead.

DISEASES

No data are available on Elochoman steelhead.

REFERENCES

The references for this section appear at the end of the following steelhead section.

Figure 1 (AD). Probable spawning locations of wild winter steelhead in the Elochoman River, Washington (B. Lucas Washington Department of Game, personal communication). , in Howell et al. 1985.

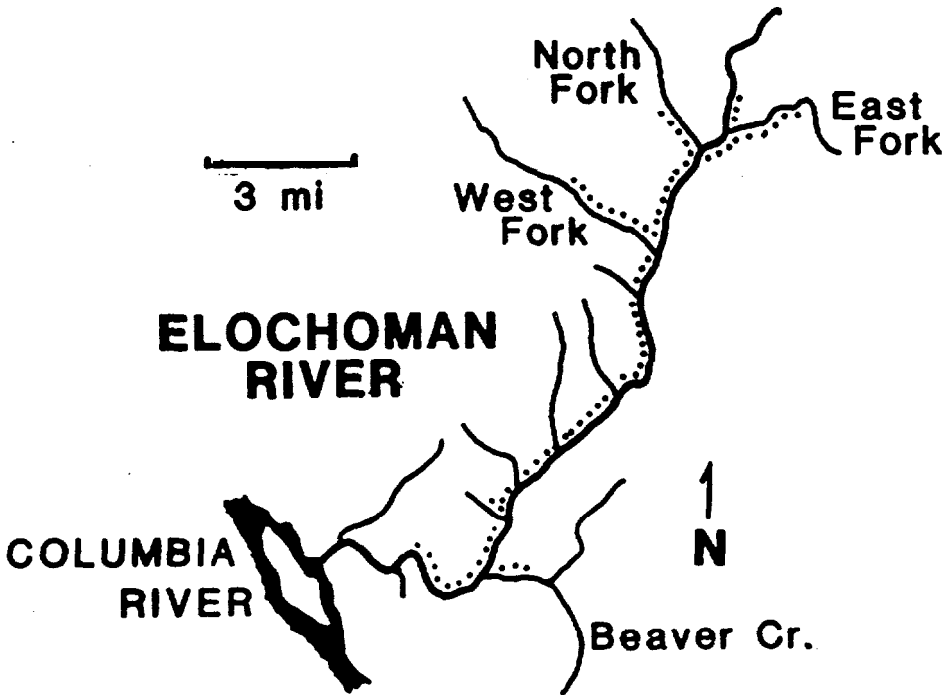

Table 1 (HB-1). Estimated* amount of rearing and spawning habitat, by quality, of Elochoman River subbasin winter steelhead.

Area	Excellent	Good	Fair[B]	Poor[B]	Unknown	Total	Confidence
Miles	44.4 %	55.6%	0.0%	0.0%		17.1	Unknown
Acres	57.4%	42.6%	0.0%	0.0%		40.2	Unknown

*Northwest Power Planning Council estimates based on limited observations.

[B]Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/absence database, NPPC , 199 1.

Table 2. Sport catch of winter steelhead (hatchery and wild) by catch year for the Elochoman River.

Catch Year	Sport Catch[A B]
1980-81	3,816
1981-82	2,004
1982-83	2,951
1983-84	4,318
1984-85	6,056
1985-86	2,858
1986-87	3,377
1987-88	1,389
1988-89	1,711
1989-90	1,985

[A]Sport catch limited to hatchery fish only in 1986.

[B]Catch within subbasin only.

ELOCHOMAN RIVER SUBBASIN

Hatchery Produced Winter Steelhead

GEOGRAPHIC LOCATION

Beaver Creek Hatchery is located several hundred yards upstream on Beaver Creek, a tributary of the Elochoman which is located approximately four miles from the mouth of the Elochoman River.

ORIGIN

The Beaver Creek Hatchery winter steelhead originated from native Chambers Creek steelhead in the 1940's. In the late 1950's native Elochoman steelhead were predominantly used as brood stock although some native steelhead were used from Chambers Creek and to a lesser degree, Cowlitz River steelhead.

PRODUCTION

Production Facilities

Beaver Creek Hatchery contains 10 raceways measuring 4 ft x 30 ft and 20 raceways measuring 10 ft x 80 ft, plus a one acre smolt rearing pond and two adult holding ponds. Well water is used for incubation and fry rearing with Beaver Creek and Elochoman River water used for grow-out.

Production Summary

Beaver Creek winter steelhead are artificially reared in a hatchery environment. Egg capacity currently stands at approximately 1 million eggs (steelhead and trout). Steelhead production averages approximately 150,000 lbs which results in releases of 400,000 to 500,000 smolts annually.

ADULT LIFE HISTORY

Run size and escapement

Hatchery returns and escapement data are limited. For the period 1977 to 1984 the number of steelhead returning to Beaver Creek Hatchery as measured by fish collected in the hatchery fish trap ranged from 537 fish in 1977-78 to 2,148 fish in 1983-84 (Table 1).

Time of migration

Adult time of entry for hatchery steelhead is mid November through February, peaking in December and January.

Harvest

Ocean harvest of Beaver Creek steelhead is unknown.

A popular fishery exists on the lower Columbia River and although the number of Beaver Creek steelhead caught is not known, some Beaver Creek steelhead are part of the lower Columbia harvest.

Sport harvest of hatchery steelhead is primarily a December and January fishery. Prior to the operation of the hatchery, sport harvest occurred throughout the Elochoman River from December through March, with peak harvest occurring in March. With current steelhead returns being predominately hatchery fish and with Beaver Creek Hatchery being only a short distance from the mouth of the Elochoman River, returning hatchery steelhead only travel through the lower river which has resulted in a highly concentrated fishery in the four miles of river between Beaver Creek Hatchery and the mouth of the river. With the vast majority of the river being upstream of the hatchery an attempt to stock fish upstream of the hatchery, to spread out the fishing pressure, has met with little success.

No record of treaty fishing on the Elochoman River.

Spawning period

Hatchery steelhead are spawned at Beaver Creek Hatchery starting in mid-December, peaking in January and tapering off by mid-February.

Spawning area

Hatchery steelhead are spawned within the hatchery complex.

Fecundity

Hatchery steelhead spawned from 1980 through 1990 averaged 2,717 eggs per female (Table 3).

Age composition

Length-frequency data indicates that approximately 70 to 90 percent of hatchery winter steelhead return to Beaver Creek Hatchery as 1. 1 + age class. Based on a modified notation of Narver and Whithler age 1.1+ represents a fish with 1 year of freshwater growth and 1-1/2 years of marine growth.

Size

Hatchery size data from 1983-84 showed returning adults averaged 65.1 cm length with a range from 55.4 cm to 80.0 cm.

Sex ratio

Data on hatchery steelhead trapped at Beaver Creek showed 60 percent female fish returning in 1982-83 while fish returning in 1983-84 were 50.5 percent female (Table 2).

Survival rate

Smolt to adult survival rates, based on hatchery rack returns and sport catch, for Beaver Creek hatchery-stock steelhead planted in the Elochoman River between 1976 to 1984 ranged from 2.06 percent in 1981-82 to 4.46 percent in 1983-84 and averaging 3.15 for the eight year period (Table 4).

JUVENILE LIFE HISTORY

Egg

No data are available on egg to smolt survival.

Juvenile rearing

Hatchery smolts are reared in the hatchery environment for one year after which they are planted in April and May at a size of 65 to 115 grams each (4-7 fish per pound).

Straying

No data are available on hatchery steelhead.

Hatchery releases

Hatchery production at Beaver Creek Hatchery averages approximately 400,000 to 500,000 smolts annually. Beaver Creek hatchery-stock steelhead are released into numerous Washington streams, including Grays River, Skamokawa Creek, Elochoman River, Abernathy Creek, Germany Creek, Coal Creek, Coweeman River, Kalama River, Lewis River, Salmon Creek, Washougal River and Big White Salmon River, all are tributaries to the Columbia River.

BIOCHEMICAL-GENETIC CHARACTERISTICS

No data are available on hatchery steelhead.

DISEASES

Disease history for hatchery smolts planted in the Elochoman River is presented in Table 6.

Table 1 (RH-a). Total returns (sport catch and hatchery return) of hatchery winter steelhead to the Beaver Creek Hatchery.

Return Year	Sport CatchA	Adults Trapped at Hatchery[B]	Hatchery Run Size[C]
1977-78	2,288	537	2,825
1978-79	1,804	744	2,548
1979-80	3,491	675	4,166
1980-81	2,862	1,111	3,973
1981-82	1,503	557	2,060
1982-83	2,211	649	2,860
1983-84	3.238	2.148	5.386

[A]Sport catch represents hatchery portion of catch (75% of total catch).
Sport catch within subbasin only.
[B]All adults returning to hatchery fish trap are assumed hatchery fish since all adults examined in 1981-82 and 1982-83 had stubbed dorsal tins.
[C]Run size equal to hatchery sport catch and hatchery returns combined although three bias exist: 1) some trapped fish are released and may return to be counted again; 2) some hatchery-stock fish spawn in the river never returning to the hatchery; 3) some hatchery fish are harvested in the Columbia River.

Sources: Elochoman Subbasin Production Plan 1990.
Woody, S. Hatchery Manager, Beaver Creek Hatchery.

Table 2 (AS-a). Percent females by return year for adult hatchery winter steelhead returning to Beaver Creek Hatchery located on the Elochoman River.

% Females

Return Year	Percent*
1980-81	52.2
1981-82	47.7
1982-83	55.4
1983-84	49.4
1984-85	41.5
1985-86	51.3
1986-87	44.6
1987-88	42.4
1988-89	41.8
1989-90	52.9

*Data obtained from adults returning to Beaver Creek Hatchery.
Source: Washington Department of Wildlife Annual Production Report 1988-89.

Table 3 **(AF-a).** Mean fecundity by return year for hatchery winter steelhead returning to Beaver Creek Hatchery.

Return Year	Number Fish*	Eggs per Female[B]
1979-80		3,361
1980-81	323	3,563
1981-82	430	1,985
1982-83	360	2,383
1987-88	218	2,610
1988-89	266	3,142
1989-90	521	2,572
1990-91	146	2,762

*Data based on fish returning to Beaver Creek Hatchery.
[B]Fecundity determined by dividing total egg take by total females spawned.
Source: Stock Assessment of Columbia River Anadromous Salmonids, Vol. II, 1985
Stan Woody, Beaver Creek Hatchery Manager, 1991.

Table 4 **(TS-a).** Smolt to adult survival rates for Elochoman hatchery winter steelhead.

Return Year	Smolts Planted	s *	Percent Return[B C]
1977-78	96,857	2,825	2.92
1978-79	93,988	2,548	2.71
1979-80	107,416	4,166	3.88
1980-81	115,894	3,973	3.43
1981-82	99,964	2,060	2.06
1982-83	109,175	2,860	2.62
1983-84	120,870	5,386	4.46

*Returns include sport catch plus hatchery rack returns.
*Percentages based on hatchery smolts released compared to number of returning adults.
[C]Smolt return percentages are not exact due to the following;
1). Fish may spawn in the river and not return to the hatchery.
2). Fish may be harvested in the Lower Columbia fishery.
3). Some fish trapped at the hatchery are released and may be counted twice if they return to the hatchery.
Source: Stock Assessment of Columbia River Anadromous Salmonids, Vol.II, 1985

Table 5 (TR). Hatchery releases of winter steelhead into the Elochoman River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code/ Fin Clip
1981	Bogachiel R	Beaver Creek	Smolt	04/21/83		4.7	15,322	Elochoman R	
1981	Bogachiel R	Beaver Creek	Smolt	04/25/83		6.4	10,656	Elochoman R	
1981	Bogachiel R	Beaver Creek	Smolt	04/27/83		6.6	16,404	Elochoman R	
1981	Bogachiel R	Beaver Creek	Smolt	04/27/83		6.8	21,670	Elochoman R	
1981	Bogachiel R	Beaver Creek	Smolt	04/25/83		6.4	12,224	Unknown	
1981	Elochoman R	Beaver Creek	Smolt	04/09/83		4.2	6,573	Elochoman R	
1981	Elochoman R	Beaver Creek	Smolt	04/12/83		6.4	19,392	Elochoman R	
1981	Elochoman R	Beaver Creek	Smolt	04/13/83		4.2	7,266	Elochoman R	
1981	Elochoman R	Beaver Creek	Smolt	04/14/83		4.3	31,901	Elochoman R	
1981	Elochoman R	Beaver Creek	Smolt	04/15/83		7.0	20,440	Elochoman R	
1981	Elochoman R	Beaver Creek	Smolt	04/20/83		6.4	14,208	Elochoman R	
1981	Elochoman R	Beaver Creek	Smolt	04/21/83		5.5	13,613	Elochoman R	
1981	Elochoman R	Beaver Creek	Smolt	04/21/83		5.7	15,305	Elochoman R	
1981	Elochoman R	Beaver Creek	Smolt	04/27/83		6.8	18,156	Elochoman R	
1981	Elochoman R	Beaver Creek	Smolt	04/29/83		6.1	15,769	Elochoman R	
1981	Elochoman R	Beaver Creek	Smolt	05/05/83		6.9	33,460	Elochoman R	
1981	Elochoman R	Beaver Creek	Smolt	05/14/82		6.2	61,070	Elochoman R	
1981	Elochoman R	Beaver Creek	Smolt	05/14/82		5.2	59,800	Elochoman R	
1983	Elochoman R	Beaver Creek	Non Smolt	05/18/84		300.0	117,000	Elochoman R	
1983	Elochoman R	Beaver Creek	Smolt	05/01/84		4.6	9,315	Elochoman R	

Table 5 (cont.). Hatchery releases of winter steelhead into the Elochoman River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code/ Fin Clip
1983	Elochoman R	Beaver Creek	Smolt	05/09/84		6.2	5,890	Elochoman R	
1983	Unknown	Beaver Creek	Smolt	04/16/84		4.8	15,840	Elochoman R	
1983	Unknown	Beaver Creek	Smolt	04/16/84		4.6	15,640	Elochoman R	
1983	Unknown	Beaver Creek	Smolt	04/17/84		5.1	15,810	Elochoman R	
1983	Unknown	Beaver Creek	Smolt	04/17/84		5.6	16,240	Elochoman R	
1983	Unknown	Beaver Creek	Smolt	04/30/84		4.6	27,485	Elochoman R	
1984	Elochoman R	Beaver Creek	Smolt	04/23/85		5.2	6,240	Elochoman R	AD
1984	Elochoman R	Beaver Creek	Smolt	04/23/85		5.2	5,200	Elochoman R	AD
1984	Elochoman R	Beaver Creek	Smolt	04/24/85		5.2	7,618	Elochoman R	AD
1984	Elochoman R	Beaver Creek	Smolt	04/24/85		5.2	7,410	Elochoman R	AD
1984	Elochoman R	Beaver Creek	Smolt	04/24/85		5.2	8,580	Elochoman R	AD
1984	Elochoman R	Beaver Creek	Smolt	04/25/85		5.2	14,560	Elochoman R	AD
1984	Elochoman R	Beaver Creek	Smolt	04/26/85		5.2	17,160	Elochoman R	AD
1984	Elochoman R	Beaver Creek	Smolt	04/27/85		5.2	15,704	Elochoman R	AD
1984	Elochoman R	Beaver Creek	Smolt	04/29/85		5.0	5,650	Elochoman R	AD
1984	Elochoman R	Beaver Creek	Smolt	04/29/85		5.0	5,925	Elochoman R	AD
1985	Elochoman R	Beaver Creek	Smolt	04/23/86		4.9	10,567	Elochoman R	633562 LV AD
1985	Elochoman R	Beaver Creek	Smolt	04/23/86		6.7	10,826	Elochoman R	633563 LV AD

Table 5 (cont.). Hatchery releases of winter steelhead into the Elochoman River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code/ Fin Clip
1985	Elochoman R	Beaver Creek	Smolt	04/23/86		5.5	11,071	Elochoman R	633601 LV AD
1985	Elochoman R	Beaver Creek	Smolt	04/23/86		4.9	10,761	Elochoman R	633602 LV AD
1985	Elochoman R	Beaver Creek	Smolt	04/23/86		4.9	3,713	Elochoman R	AD
1985	Elochoman R	Beaver Creek	Smolt	04/23/86		6.7	16,715	Elochoman R	AD
1985	Elochoman R	Beaver Creek	Smolt	04/23/86		5.5	9,996	Elochoman R	AD
1985	Elochoman R	Beaver Creek	Smolt	04/23/86		4.9	3,422	Elochoman R	AD
1985	Elochoman R	Beaver Creek	Smolt	05/05/86		4.9	4,110	Elochoman R	633562 LV AD
1985	Elochoman R	Beaver Creek	Smolt	05/05/86		6.7	4,216	Elochoman R	633563 LV AD
1985	Elochoman R	Beaver Creek	Smolt	05/05/86		5.5	4,304	Elochoman R	633601 LV AD
1985	Elochoman R	Beaver Creek	Smolt	05/05/86		4.9	4,184	Elochoman R	633602 LV AD
1985	Elochoman R	Beaver Creek	Smolt	05/05/86		4.9	1,444	Elochoman R	AD
1985	Elochoman R	Beaver Creek	Smolt	05/05/86		6.7	6,504	Elochoman R	AD
1985	Elochoman R	Beaver Creek	Smolt	05/05/86		5.5	3,889	Elochoman R	AD
1985	Elochoman R	Beaver Creek	Smolt	05/05/86		4.9	1,331	Elochoman R	AD
1985	Elochoman R	Beaver Creek	Smolt	05/10/85		6.0	2,400	Elochoman R	AD
1986	Elochoman R	Beaver Creek	Smolt	04/07/87		4.6	74	Elochoman R	AD

Table 5 (cont.). Hatchery releases of winter steelhead into the Elochoman River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code/ Fin Clip
1986	Elochoman R	Beaver Creek	Smolt	04/07/87		4.6	3,491	Elochoman R	633737 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/07/87		4.6	3,364	Elochoman R	633738 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/07/87		4.6	201	Elochoman R	AD
1986	Elochoman R	Beaver Creek	Smolt	04/07/87		4.0	3,193	Elochoman R	633739 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/07/87		4.0	2,991	Elochoman R	633740 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/07/87		3.9	9	Elochoman R	AD
1986	Elochoman R	Beaver Creek	Smolt	04/07/87		5.2	3,770	Elochoman R	AD
1986	Elochoman R	Beaver Creek	Smolt	04/07/87		5.2	3,770	Elochoman R	AD
1986	Elochoman R	Beaver Creek	Smolt	04/07/87		4.8	2,006	Elochoman R	AD
1986	Elochoman R	Beaver Creek	Smolt	04/07/87		4.8	1,474	Elochoman R	633743 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/07/87		4.8	2,106	Elochoman R	AD
1986	Elochoman R	Beaver Creek	Smolt	04/07/87		4.8	1,374	Elochoman R	633744 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/08/87		4.0	1,500	Elochoman R	633739 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/08/87		4.0	1,500	Elochoman R	633740 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/08/87		5.4	7,830	Elochoman R	RV AD

Table 5 (cont.). Hatchery releases of winter steelhead into the Elochoman River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code/ Fin Clip
1986	Elochoman R	Beaver Creek	Smolt	04/09/87		5.4	7,830	Elochoman R	RV AD
1986	Elochoman R	Beaver Creek	Smolt	04/13/87		4.0	2,750	Elochoman R	633739 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/13/87		4.0	2,750	Elochoman R	633740 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/13/87		4.0	2,800	Elochoman R	633739 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/13/87		4.0	2,800	Elochoman R	633740 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/13/87		5.4	1,350	Elochoman R	RV AD
1986	Elochoman R	Beaver Creek	Smolt	04/16/87		4.6	3,335	Elochoman R	633737 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/16/87		4.6	3,335	Elochoman R	633738 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/16/87		4.6	3,335	Elochoman R	633737 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/16/87		4.6	3,335	Elochoman R	633738 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/16/87		5.0	71	Elochoman R	AD
1986	Elochoman R	Beaver Creek	Smolt	04/16/87		5.0	3,929	Elochoman R	633742 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/16/87		5.0	63	Elochoman R	AD
1986	Elochoman R	Beaver Creek	Smolt	04/16/87		5.0	3,937	Elochoman R	633741 LV AD

Table 5 (cont.). Hatchery releases of winter steelhead into the Elochoman River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code/ Fin Clip
1986	Elochoman R	Beaver Creek	Smolt	04/17/87		5.0	3,750	Elochoman R	633741 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/17/87		5.0	3,750	Elochoman R	633742 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/17/87		5.0	2,375	Elochoman R	633741 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/17/87		5.0	2,375	Elochoman R	633742 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/17/87		5.0	3,750	Elochoman R	633743 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/17/87		5.0	3,750	Elochoman R	633744 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/17/87		5.0	3,750	Elochoman R	633743 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/17/87		5.0	3,750	Elochoman R	633744 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/17/87		5.0	1,250	Elochoman R	633743 LV AD
1986	Elochoman R	Beaver Creek	Smolt	04/17/87		5.0	1,250	Elochoman R	633744 LV AD
1987	Elochoman R	Beaver Creek	Smolt	04/13/88		4.7	6,001	Elochoman R	634242 AD RV
1987	Elochoman R	Beaver Creek	Smolt	04/13/88		4.7	814	Elochoman R	AD
1987	Elochoman R	Beaver Creek	Smolt	04/13/88		4.7	6,001	Elochoman R	634242 AD RV

Table 5 (cont.). Hatchery releases of winter steelhead into the Elochoman River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code/ Fin Clip
1987	Elochoman R	Beaver Creek	Smolt	04/13/88		4.7	814	Elochoman R	AD
1987	Elochoman R	Beaver Creek	Smolt	04/14/88		4.7	1,033	Elochoman R	634242 AD RV
1987	Elochoman R	Beaver Creek	Smolt	04/14/88		4.7	142	Elochoman R	AD
1987	Elochoman R	Beaver Creek	Smolt	04/15/88		4.8	6,967	Elochoman R	634242 AD RV
1987	Elochoman R	Beaver Creek	Smolt	04/15/88		4.8	953	Elochoman R	AD
1987	Elochoman R	Beaver Creek	Smolt	04/15/88		5.0	6,636	Elochoman R	634435 AD RV
1987	Elochoman R	Beaver Creek	Smolt	04/15/88		5.0	1,114	Elochoman R	AD
1987	Elochoman R	Beaver Creek	Smolt	04/15/88		5.0	6,636	Elochoman R	634435 AD RV
1987	Elochoman R	Beaver Creek	Smolt	04/15/88		5.0	1,114	Elochoman R	AD
1987	Elochoman R	Beaver Creek	Smolt	04/15/88		4.8	6,722	Elochoman R	634435 AD RV
1987	Elochoman R	Beaver Creek	Smolt	04/15/88		4.8	1,198	Elochoman R	AD
1987	Elochoman R	Beaver Creek	Smolt	04/15/88		4.5	5,543	Elochoman R	634437 AD RV
1987	Elochoman R	Beaver Creek	Smolt	04/15/88		4.5	1,657	Elochoman R	AD
1987	Elochoman R	Beaver Creek	Smolt	04/15/88		4.5	5,543	Elochoman R	634437 AD RV
1987	Elochoman R	Beaver Creek	Smolt	04/15/88		4.5	1,657	Elochoman R	AD

Table 5 (cont.). Hatchery releases of winter steelhead into the Elochoman River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code/ Fin Clip
1987	Elochoman R	Beaver Creek	Smolt	04/18/88		4.5	5,543	Elochoman R	634437 AD RV
1987	Elochoman R	Beaver Creek	Smolt	04/18/88		4.5	1,657	Elochoman R	AD
1987	Elochoman R	Beaver Creek	Smolt	04/18/88		4.5	3,465	Elochoman R	634437 AD RV
1987	Elochoman R	Beaver Creek	Smolt	04/18/88		4.5	1,035	Elochoman R	AD
1987	Elochoman R	Beaver Creek	Smolt	04/18/88		5.0	5,434	Elochoman R	634714 AD RV
1987	Elochoman R	Beaver Creek	Smolt	04/18/88		5.0	1,566	Elochoman R	AD
1987	Elochoman R	Beaver Creek	Smolt	04/18/88		5.0	6,229	Elochoman R	634714 AD RV
1987	Elochoman R	Beaver Creek	Smolt	04/18/88		5.0	1,771	Elochoman R	AD
1987	Elochoman R	Beaver Creek	Smolt	04/18/88		5.0	6,424	Elochoman R	634714 AD RV
1987	Elochoman R	Beaver Creek	Smolt	04/18/88		5.0	1,826	Elochoman R	AD
1987	Elochoman R	Beaver Creek	Smolt	04/18/88		5.0	1,939	Elochoman R	634714 AD RV
1987	Elochoman R	Beaver Creek	Smolt	04/18/88		5.0	561	Elochoman R	AD
1988	Elochoman R	Beaver Creek	Smolt	04/13/89		4.8	6,000	Elochoman R	AD RV
1988	Elochoman R	Beaver Creek	Smolt	04/13/89		4.8	6,000	Elochoman R	AD RV
1988	Elochoman R	Beaver Creek	Smolt	04/13/89		4.8	2,880	Elochoman R	AD RV
1988	Elochoman R	Beaver Creek	Smolt	05/05/89		5.0	8,000	Elochoman R	AD
1988	Elochoman R	Beaver Creek	Smolt	05/05/89		5.0	8,000	Elochoman R	AD

Table 5 (cont.). Hatchery releases of winter steelhead into the Elochoman River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code/ Fin Clip
1988	Elochoman R	Beaver Creek	Smolt	05/11/89		4.7	22,560	Elochoman R	AD
1988	Elochoman R	Beaver Creek	Smolt	04/20/89		4.5	5,625	Elochoman R	AD
1988	Elochoman R	Beaver Creek	Smolt	04/20/89		4.5	5,850	Elochoman R	AD
1988	Elochoman R	Beaver Creek	Smolt	04/20/89		4.4	5,500	Elochoman R	AD
1988	Elochoman R	Beaver Creek	Smolt	04/20/89		4.4	3,300	Elochoman R	AD
1988	Elochoman R	Beaver Creek	Smolt	04/20/89		4.8	6,000	Elochoman R	AD
1988	Elochoman R	Beaver Creek	Smolt	04/20/89		4.8	6,000	Elochoman R	AD
1988	Elochoman R	Beaver Creek	Smolt	04/20/89		4.8	2,160	Elochoman R	AD
1988	Elochoman R	Beaver Creek	Smolt	04/21/89		4.8	2,698	Elochoman R	AD
1988	Elochoman R	Beaver Creek	Smolt	04/25/89		4.4	5,500	Elochoman R	AD
1988	Elochoman R	Beaver Creek	Smolt	04/25/89		4.4	5,500	Elochoman R	AD
1988	Elochoman R	Beaver Creek	Smolt	04/25/89		4.4	3,520	Elochoman R	AD
1989	Elochoman R	Beaver Creek	Smolt	04/13/90		5.4	42,930	Elochoman R	AD RV
1989	Elochoman R	Beaver Creek	Smolt	04/13/90		5.3	23,320	Elochoman R	AD RV
1989	Elochoman R	Beaver Creek	Smolt	05/05/90		5.2	8,060	Elochoman R	AD
1989	Elochoman R	Beaver Creek	Smolt	05/08/90		5.2	9,100	Elochoman R	AD
1989	Elochoman R	Beaver Creek	Smolt	05/08/90		5.2	6,760	Elochoman R	AD
1989	Elochoman R	Beaver Creek	Smolt	05/18/90		4.8	1,224	Elochoman R	AD
1990	Elochoman R	Beaver Creek	Smolt	04/16/91		3.8	4,750	Elochoman R	AD
1990	Elochoman R	Beaver Creek	Smolt	04/16/91		3.8	4,750	Elochoman R	AD

Table 5 (cont.). Hatchery releases of winter steelhead into the Elochoman River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code/ Fin Clip
1990	Elochoman R	Beaver Creek	Smolt	04/16/91		3.8	4,750	Elochoman R	AD
1990	Elochoman R	Beaver Creek	Smolt	04/16/91		4.0	5,200	Elochoman R	AD
1990	Elochoman R	Beaver Creek	Smolt	04/16/91		4.0	5,200	Elochoman R	AD
1990	Elochoman R	Beaver Creek	Smolt	04/30/91		4.5	20,628	Elochoman R	AD
1990	Elochoman R	Beaver Creek	Smolt	04/30/91		4.5	26,163	Elochoman R	RV
1990	Elochoman R	Beaver Creek	Smolt	04/30/91		4.5	28,638	Elochoman R	AD
1990	Elochoman R	Beaver Creek	Smolt	05/09/91		5.6	3,920	Elochoman R	AD
1990	Elochoman R	Beaver Creek	Smolt	05/10/91		5.2	10,920	Elochoman R	AD

Source: Terry Lovgren, WDW Hatchery Stocking Database, 1991.

Table 6 (TD). Parasites and diseases isolated at Beaver Creek Hatchery located on the Elochoman River.

Disease Type	Hatchery	Specific Pathogen
Bacterial	Beaver Creek	*Flavobacterium sp.*
Bacterial	Beaver Creek	*Aeromonas salmonicida* (Furunculosis)
Bacterial	Beaver Creek	*Flexibacter columnaris* (Columnaris)
Bacterial	Beaver Creek	*Renibacterium salmonarium* (BKD)
Bacterial	Beaver Creek	*Flexibacter cytophaga* (Coldwater)
Parasite	Beaver Creek	*Ichthyoboda* sp. (Costia)
Parasite	Beaver Creek	*Ichthyophthirius multiflis* (Ich)
Parasite	Beaver Creek	*Nanophetyus* sp.
Parasite	Beaver Creek	*Trichodina sp.*
Parasite	Beaver Creek	*Hexamita sp.*
Viral	Beaver Creek	*Infectious Hematopoietic Necrosis* (IHN)
Viral	Beaver Creek	*EIBS*

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbre

Source: WDW pathologist, Steve Roberts, 1991.

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COWLITZ SUBBASIN

Spring Chinook

GEOGRAPHIC LOCATION

The Cowlitz River originates from the slopes and foothills of Mt. Rainier and Mt. Adams and drainage encompasses 2,480 square miles. Upper Cowlitz River major tributaries include the Clear Fork, Muddy Fork, Tilton, and Cispus Rivers. Fish migration was blocked from these streams following the construction of Mayfield Dam in 1963 at River Mile (RM) 52. In 1968, Mossyrock, another hydroelectric dam, was constructed at RM 66. The Toutle River is the major lower river tributary accessible to spring chinook. Major Toutle River tributaries include the North and South Fork Toutle and Green Rivers. Spring chinook are not found in the Coweeman River, another major lower river tributary. The Toutle River enters the Cowlitz at RM 20. The Cowlitz River enters the Columbia River at RM 68 near Longview. The Cowlitz Salmon Hatchery is located 2 miles downstream from Mayfield Dam. The Toutle Hatchery is located near the mouth of the Green River.

ORIGIN

Native populations of spring chinook were historically present in the Cowlitz River. Cowlitz River escapement in the early 1950's was estimated to be about 10,400 with the Cispus River (8,100), upper reaches of the Toutle River (400), Tilton River (200), and upper Cowlitz (1,700) the major spawning populations (WDF, 1951). On the Cowlitz River between 1962 through 1966, an average of 8,720 adult and 1,208 jack spring chinook were counted at Mayfield Dam (Thompson and Rothfus, 1969). Spring chinook in the Cowlitz River are currently hatchery stock. Although some spring chinook spawn naturally in the river, few returning adults originate from natural spawning.

DISTRIBUTION

Historically, spawning surveys indicated all spawning in the Cowlitz occurred above Mayfield. (WDW, 1990). Washington Department of Fisheries (1951) indicated spawning in the Cowlitz occurred above Packwood and in the Cispus River between Iron and East Canyon Creeks. In the Tilton River, Thompson and Rothfus (1969) indicated spring chinook were reported in 1945, but subsequent spawning in the Tilton River has not been observed for years. From 1974 through 1980, an average of 2,838 spring chinook adults were trucked above Mayfield into the Tilton and upper Cowlitz Rivers to provide sport fishing opportunity and natural production (Stober, 1986). An average of 260 adult spring chinook were planted in the Tilton river from 1975 through 1978 and none thereafter. Since 1981, no spring chinook have been planted above Mayfield because of possible risk of IHN virus contamination of water supply at the Cowlitz Salmon Hatchery (WDW, 1990).

Currently, heaviest natural spawning occurs in the eight mile stretch between the Cowlitz Salmon and Trout Hatcheries. Minor numbers of naturally spawning chinook are observed below Blue Creek.

PRODUCTION

The Northwest Planning Council's model estimated a smolt capacity of 329,400 smolts for the Cowlitz below Mayfield and 788,400 smolts in the Toutle River. Above Mayfield, the Northwest Power Planning Council's model estimated 1600,000 smolts could be produced. Easterbrooks (1980) estimated a maximum of 1,157,400 spring chinook smolts could be produced above Cowlitz Falls.

Production from naturally spawning adult chinook and juvenile plants in the Tilton River was observed at the Mayfield Dam migrant facility. An average of 3,894 spring chinook smolts were counted at Mayfield Dam migrant facility between 1978 through 1983 and 1985 (WDW, 1990).

A salmon hatchery was present in the upper Cowlitz River near the Clear Fork, but was abandoned in 1949 as a rearing station because water temperatures were too low. The station continued to take spring chinook eggs through 1950 for transfer to the Green River Hatchery on the Toutle system. Spring chinook reared at Green River Hatchery were planted in the upper Cowlitz River (Howell et al., 1985). Spring chinook juveniles were planted in the Tilton River until 1978 while the upper Cowlitz received plants through 1981. Tilton River juvenile plants for 1974 through 1978 averaged 739,200 fish while 1979 through 1981 upper Cowlitz plants averaged 1,375,200 fish (Stober, 1986).

Currently, hatchery production is the dominant component in the Cowlitz River although some natural production also occurs. The Cowlitz Salmon Hatchery was completed in 1967 to maintain the spring chinook run at a rack return of 17,300 adults. original hatchery design called for 4 million spring chinook juveniles (fingerlings and yearlings) amounting to 196,590 pounds. Recent production of spring chinook has been 600,000 yearlings and 2.5 million fingerlings amounting to 170,000 pounds. Production has increased for 1990 to 1,056,000 smolts. Brood stock for the subbasin has been Cowlitz stock collected via hatchery rack returns except for two 1967 brood Willamette stock releases of 331,200 fingerlings in 1968 and 668,100 yearlings in 1969. The Willamette stock juveniles were in questionable health throughout the rearing period and survived poorly based on returns of a yearling fm-clip group (Howell et al., 1985).

Toutle Hatchery was destroyed by the Mt. St. Helens eruption in 1980. Most Toutle River spring chinook were reared in Dear Springs Pond, which was later destroyed when a temporary flood control dam was breached in the winter of 1981 - 1982. Production in 1967 through 1980 averaged 33,800 fmgerlings and there was one release of yearlings (WDW, 1990). In the Toutle River, most plants were unfed fry and fingerling releases using Cowlitz stock from the Cowlitz Hatchery.

Tables 1 and 2 describe the amount of spawning and rearing habitat by quality, available in the Cowlitz River. This data was derived from the Presence/Absence database of Northwest Power Planning Council, 199 1.

The Cowlitz River spring chinook natural spawn escapement from 1978 - 1984 brood years averaged 340 with a low return of 153 for the 1978 brood and a peak of 641 for the 1984 brood. Cowlitz River natural spawn escapements by age and brood year are presented in Table 3.

Cowlitz Salmon Hatchery spring chinook returns from 1978 - 1984 brood years averaged 13,581 with a low return of 5,323 for the 1982 brood and a peak of 23,045 for the 1984 brood. Cowlitz Salmon Hatchery returns by age and brood year are presented in Table 4.

Cowlitz River tributary sport catch estimates between 1978 - 1984 brood years averaged 6,410 spring chinook, ranging from a low catch of 1,669 for the 1982 brood to a peak of 12,362 for the 1979 brood. Cowlitz River tributary sport catch by age and brood year are presented in Table 5.

The total returns of spring chinook to the Cowlitz River between 1978 - 1984 brood years averaged 20,183, ranging from a low return of 7,331 for the 1982 brood and a high of 31,398 for the 1979 brood. Total returns of spring chinook to the Cowlitz River by age and brood year are presented in Table 6.

No data is available for Toutle River spring chinook natural spawn escapements or hatchery returns since the eruption of Mt. St. Helens. The Toutle River has been closed to salmon angling since the eruption.

ADULT LIFE HISTORY

Run size, catch and escapement

Ocean commercial and recreational fisheries from Alaska to Washington, in addition to Columbia River gill net and sport fisheries all harvest a portion of the Cowlitz River origin spring chinook. Ocean and Columbia river fisheries account for 43 percent of production based on the System Planning Model. Relatively little harvest occurs in the ocean while Columbia river commercial and sport fisheries comprise most of the harvest. However, Howell et al.(1985) notes most of the harvest of two 1976 brood tag groups occurred in the coastal fisheries in Washington (32 percent) and British Columbia (30 percent). In the Cowlitz River from 1975 - 1987, the tributary sport catch averaged 32 percent of the total return. Pre-eruption (1977 - 1979) harvest was distributed as 99 percent Cowlitz and 1 percent Toutle (WDW, 1990). Columbia River sport and commercial fisheries are managed to ensure attainment of hatchery egg-take requirements while minimizing any upper Columbia spring chinook impacts. Toutle Hatchery production was to provide for sport and commercial fisheries.

Strays from lower river hatcheries are not unusual. Table 7 lists Cowlitz Hatchery origin spring chinook stray coded wire tag recoveries beginning with the 1978 brood through the 1988 brood, and Table 8 lists the coded wire tags recovered within the Cowlitz subbasin which originated outside the Cowlitz subbasin.

Time of Migration

The majority of the run migrates through the lower Columbia River from mid-March to mid-May. Arrival at the Cowlitz Salmon Hatchery trap peaks in late May and early June. Figure 1 illustrates the freshwater life history of spring chinook in the Cowlitz River.

Spawning Period

Spawning extends from late August to early October with peak activity in September.

Spawning Areas

The primary spawning area in the Cowlitz River is the four mile reach downstream of the Cowlitz Salmon Hatchery.

Aee Corn-position

Age ranges from two-year-old mini-jacks to six-year-old adults. In the mid - 1970's, two-year-old spring chinook, informally called mini-jacks comprised a substantial portion of the Cowlitz River run. Modifications in the rearing strategy at Cowlitz Hatchery beginning with the 1977 brood substantially reduced the number of mini-jacks (Howell et al., 1985). Total age composition data is summarized in Tables 3 through 5. Table 9 lists the age composition percentages by brood year and freshwaterocean rearing for spring chinook returning to the Cowlitz Salmon Hatchery. Table 9 lists the age composition percentages by brood year and freshwaterocean rearing for spring chinook returning to the Cowlitz River spawning grounds. Table 10 lists the age composition percentages by brood year and freshwater-ocean rearing for spring chinook returning to the Cowlitz Salmon Hatchery. Table 11 lists the age composition percentage by brood year and freshwaterocean rearing for spring chinook caught in the Cowlitz River sport fishery.

Sex Ratio

Female fall chinook comprised 31 - 45 percent of the spring chinook returning to the Cowlitz

Salmon Hatchery between 1980 - 1984 brood years. The percent females by brood year and freshwaterocean rearing ages for Cowlitz Salmon Hatchery spring chinook returns are presented in Table 12. Cowlitz River natural spawn escapement percent females by brood year and freshwater.ocean rearing ages is currently unavailable.

The mean fork length by brood year, sex, and freshwater.ocean rearing ages of Cowlitz River natural spawn escapement and hatchery returns are currently unavailable.

Fecundity

Cowlitz River natural spawn and Cowlitz Salmon Hatchery fecundity data by age and brood year are unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

No information is available on emergence on naturally produced fry. At Cowlitz Salmon Hatchery emergence occurs primarily in mid to late November.

Time. age and size at migration

Based on scale readings and coded-wire tag recoveries, most of the spring chinook spend over a year in freshwater and migrate downstream in their second spring (Howell et al., 1985). Yearlings begin their downstream smolt migration immediately after release in March and April based on tag recoveries in the Columbia estuary (Dawley et al. 1979). Fall release tagged juveniles , based on one 1976 brood coded wire tag group, were not recovered in the estuary until the following spring (Howell et al., 1985).

Hatchery release information for the Cowlitz subbasin by brood year is presented in Table 13. Length data of natural spring chinook smolts from the Cowlitz River is unavailable. The number of natural juvenile spring chinook salmon that migrate from the Cowlitz River is also unavailable.

Survival Rate

Cowlitz Salmon Hatchery egg to fry survival was 92.9 percent for 1982 through 1986. Fry to smolt survival was 85.8 percent resulting in an egg to smolt survival of 79.7 percent. Smolt to adult survival of marked yearlings for 1980 through 1983 brood years averaged 2.74 percent and ranged from 0.46 percent to 6.97 percent. However, 1982 - 1983 releases averaged 1.21 percent (WDW, 1990). Survival to all catch was estimated to be 5.5 percent for Cowlitz spring chinook (Howell et al., 1985). Cowlitz River subbasin natural spawn and Toutle Hatchery survival data are not available.

BIOCHEMICAL-GENETIC CHARACTERISTICS

Milner et al. (1983) measured the genetic distances between Cowlitz and Kalama Falls spring chinook. The within group variation was one of the lowest for 17 different stock group comparisons, indicating a relatively high degree of genetic homogeneity. Shreck et al. (1986) compared their samples to those of Milner et al.(1983) in order to determine if there were any genetic changes in stock between sampling dates. The results indicated a statistically significant difference in isozyme gene frequencies for one enzyme system between the current and historical profiles for both the Cowlitz and Kalama Falls samples. However, the statistical difference in the Cowlitz hatchery comparison may be due to the normal difficulty in interpreting the characteristics of that particular stock enzyme system (isocitrate dehydrogenase) and not due to any stock changes

over time.

DISEASE

Bacteria and parasitic diseases found in the Cowlitz Salmon Hatchery are listed in Table 14. (WDF Salmon Culture, Olympia).

REFERENCES

The references for this section appear at the end of the following chinook section.

Figure 1. Freshwater life history of spring chinook in the Cowlitz River. The developmental stage timing represents basinwide averages, local conditions may cause some variability.

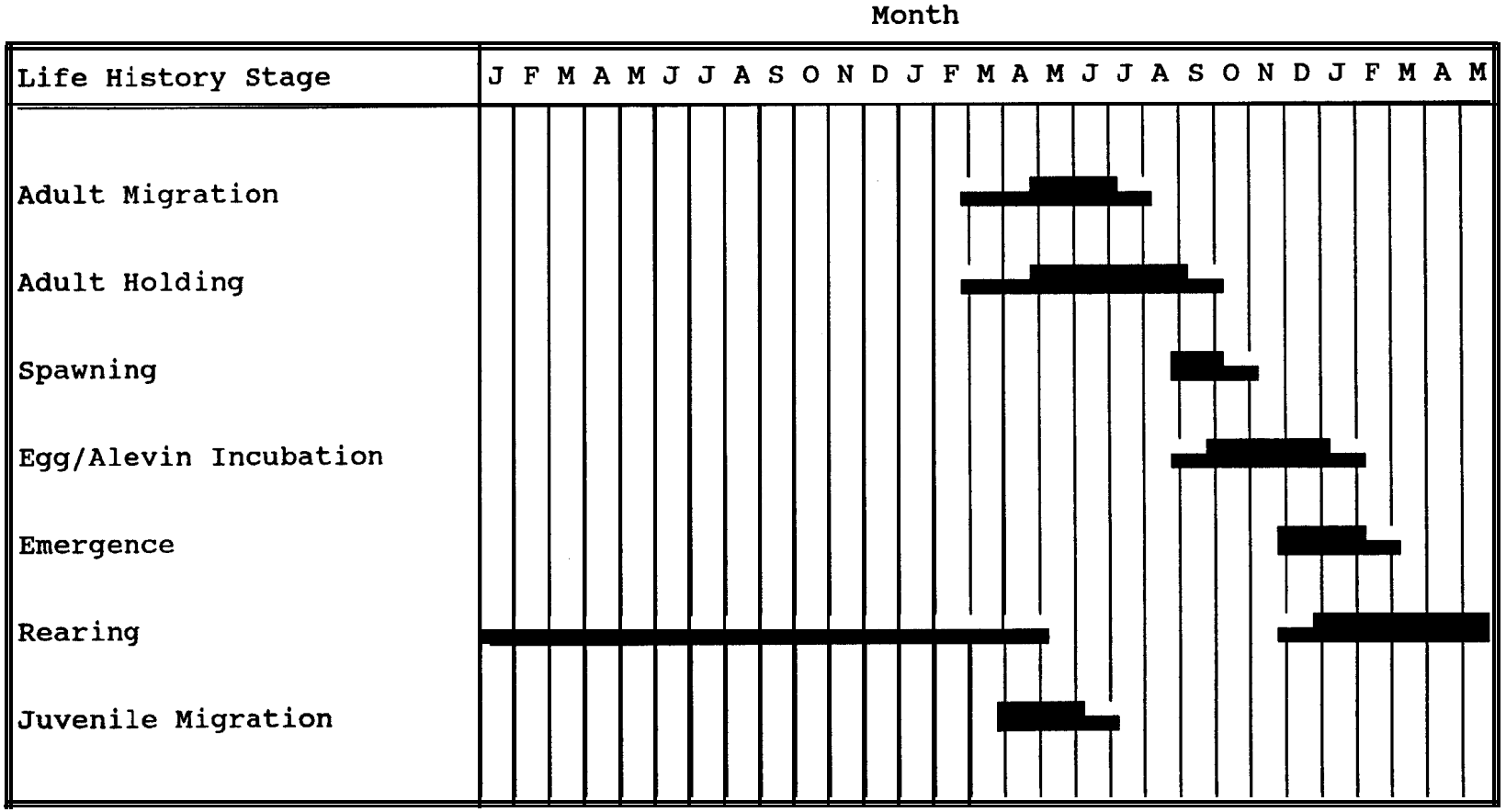

Table 1 (HB-1). Estimated amount of rearing and spawning habitat, by quality, of the Cowlitz River spring chinook production area.

Distance/Area	Excellent	Good	Fair"	Poor[a]	Unknown	Total	Confidence
Miles (%)	0.00	0.53	0.31	0.16		78.4	
Acres (%)	0.00	0.53	0.32	0.15		517.7	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database of Northwest Power Planning Council, 1991.

Table 2 (HB-2). Estimated amount of rearing habitat, by quality, of the Cowlitz River spring chinook production area.

Distance/Area	Excellent	Good	Fair[a]	Poor[a]	Unknown	Total	Confidence
Miles (%)	0.00	0.00	0.36	0.64		59	
Acres (%)	0.00	0.00	0.38	0.62		406.7	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database of Northwest Power Planning Council, 1991.

Table 3 (RN). Total natural spawner escapement of spring chinook to the Cowlitz River by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974					1		
1975				68	10		
1976			97	318	2		
1977		27	630	121	0		778
1978	4	51	86	12	0	153	98
1979	106	54	58	29	0	247	87
1980	16	11	118	40	4	189	162
1981	14	9	116	144	0	283	260
1982	5	9	319	6	0	339	325
1983	96	289	65	65	10	525	140
1984	203	8	107	314	9	641	430
1985	11	8	239	88			
1986	41	51	181				
1987	70	14					
1988	28						

Age composition based on scale reading analysis.

Table 4 (RH). Total hatchery returns of spring chinook to the Cowlitz River by brood year.

	Total Age							
Brood Year	2	3	4	5	6	7	Total	Adult Total
1974					94	0		
1975				6,483	215	0		
1976			9,283	7,172	114	0		
1977		2,615	14,219	7,076	81	0		23,991
1978	426	1,139	5,046	2,246	24	0	8,881	7,316
1979	2,364	2,744	10,991	2,690	0	0	18,789	13,681
1980	742	2,015	10,931	1,743	62	0	15,493	12,736
1981	2,565	832	5,090	1,431	38	0	9,956	6,559
1982	502	407	3,225	1,160	29	0	5,323	4,414
1983	4,210	2,920	12,481	3,336	92	6	23,045	15,915
1984	2,054	1,433	5,715	3,207	154			
1985	2,058	301	2,404	1,505				
1986	2,178	569	3,020					
1987	959	713						
1988	11,939							

Age composition based on scale reading analysis.

Table 5 **(RS).** Total sport catches of spring chinook in the Cowlitz River by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974					53		
1975				1,646	23		
1976			6,024	675	62		
1977		5,068	4,658	2,706	0		12,432
1978	618	1,087	4,124	726	0	6,555	4,850
1979	630	2,764	7,236	1,721	11	12,362	8,968
1980	157	3,102	5,814	778	0	9,851	6,592
1981	559	540	2,133	723	0	3,955	2,856
1982	59	35	1,417	158	0	1,669	1,575
1983	340	768	4,075	1,123	38	6,344	5,236
1984	283	790	1,962	821	275	4,131	3,058
1985	518	132	1,230	633			
1986	54	189	1,492				
1987	27	1,020					
1988	180						

Age based on scale reading analysis.

Table 6 **(RB).** Total returns of spring chinook to the Cowlitz River by brood year.

Brood Year	Total Age 2	3	4	5	6	Total	Adult Total
1974					148		
1975				8,197	248		
1976			15,404	8,166	178		
1977		7,710	19,507	9,903	81		37,201
1978	1,048	2,277	9,256	2,984	24	15,589	12,264
1979	3,100	5,562	18,285	4,440	11	31,398	22,736
1980	915	5,128	16,863	2,561	66	25,533	19,490
1981	3,138	1,381	7,339	2,298	38	14,194	9,675
1982	566	451	4,961	1,324	29	7,331	6,314
1983	4,646	3,977	16,621	4,524	140	29,908	21,285
1984	2,540	2,231	7,784	4,342	434	17,331	12,560
1985	2,587	441	3,873	2,226			
1986	2,273	809	4,693				
1987	1,056	1,747					
1988	12,147						

Age based on scale reading analysis.

Table 7 (AE). Emigration of coded wire tagged spring chinook from the Cowlitz River.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Cowlitz H	Cowlitz River, 1985	Spawning Ground	1,061	1	4
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	1	2
Cowlitz H	Cowlitz River, 1987	Spawning Ground	2,556	1	3
Cowlitz H	Cowlitz River, 1987	Spawning Ground	2,556	1	3
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	3	7
Cowlitz H	Cowlitz River, 1987	Spawning Ground	2,556	1	3
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Cowlitz H	Cowlitz River, 1989	Spawning Ground	159	1	---
Cowlitz H	Cowlitz River, 1989	Spawning Ground	159	1	---
Cowlitz H	Cowlitz River, 1989	Spawning Ground	159	2	---
Cowlitz H	Cowlitz River, 1989	Spawning Ground	159	2	---
Cowlitz H	Cowlitz River, 1989	Spawning Ground	159	1	---
Cowlitz H	Kalama Falls Hatchery, 1989	Hatchery	701	1	1
Cowlitz H	Lower Kalama Hatchery, 1987	Hatchery	2,407	1	1
Cowlitz H	Lewis River Hatchery, 1989	Hatchery	855	1	1
Cowlitz H	Lewis River 1989	Spawning Ground	1,085	1	---

Based on the following tag codes: 63-21-34, 63-25-06, 63-27-48, 63-28-34, 63-35-08, 63-35-09, 63-35-11, 63-35-12, 63-38-34, 63-38-33, 63-27-47, 63-35-08, and 63-35-10.

Table 8 (AI). Immigration of coded wire tagged spring chinook into the Cowlitz subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Cowlitz H	Cowlitz River, 1989	Spawning Ground	159	1	---
Cowlitz H	Cowlitz River, 1989	Spawning Ground	159	1	---
Cowlitz H	Cowlitz River, 1989	Spawning Ground	159	2	---
Cowlitz H	Cowlitz River, 1989	Spawning Ground	159	2	---
Cowlitz H	Cowlitz River, 1989	Spawning Ground	159	1	---
Cowlitz H	Cowlitz River, 1985	Spawning Ground	1,061	1	4
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	1	2
Cowlitz H	Cowlitz River, 1987	Spawning Ground	2,556	1	3
Cowlitz H	Cowlitz River, 1987	Spawning Ground	2,556	1	3
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	3	7
Cowlitz H	Cowlitz River, 1987	Spawning Ground	2,556	1	3
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	1	3

Based on the following tag codes: 63-35-08, 63-35-09, 63-35-11, 63-35-12, 63-38-34, 63-21-34, 63-25-06, 63-27-48, and 63-28-34.

Beginning with the 1978 brood.

Table 9 (AC-l). Age composition percentage (freshwater-ocean) by brood year for spring chinook spawning naturally in the Cowlitz River.

Age Composition (%)

Brood Year	N	2.0	2.1	2.2	2.3	2.4
1978		2.60	33.30	56.20	7.90	0
1979		42.90	21.90	23.50	11.70	0
1980		8.50	5.80	62.40	21.20	2.10
1981		4.90	3.20	41.00	50.90	0
1982		1.50	2.60	94.10	1.80	0
1983		18.30	55.00	12.40	12.40	1.90
1984		31.70	1.20	16.70	49.00	1.40
1985						
1986						
1987						
1988						

Age based on scale reading analysis.

Table 10 (AC-2). Age composition percentage (freshwaterocean) by brood year for spring chinook returning to the Cowlitz Salmon Hatchery.

		Age Composition (%)				
Brood Year	N	2.0	2.1	2.2	2.3	2.4
1978	509[a]	4.80	12.80	56.80	25.3	0.30
1979	325[b]	12.60	14.60	58.50	14.30	0
1980	584	4.80	13.00	70.60	11.20	0.40
1981	312	25.80	8.30	51.10	14.40	0.40
1982	345	9.40	7.70	60.60	21.80	0.50
1983	964	18.30	12.70	54.10	14.50	0.40
1984	1,060	16.40	11.40	45.50	25.50	1.20
1985						
1986						
1987						
1988						

[a] N excludes age 2.0 fish.

[b] N excludes age 2.0 and 2.1 fish.

Age based on scale reading analysis.

Table 11 (AC-3). Age composition percentage (freshwater.ocean) by brood year for spring chinook caught in the Cowlitz River sport fishery.

Brood Year	N	Age Composition (%) 2.0	2.1	2.2	2.3	2.4
1978	272'	9.40	16.60	62.90	11.10	0
1979	833	5.10	22.40	58.50	13.90	0.10
1980	889	1.60	31.50	59.00	7.90	0
1981	263	14.10	13.70	53.90	18.30	0
1982	55	3.50	2.10	84.90	9.50	0
1983	281	5.40	12.10	64.20	17.70	0.60
1984	114	6.80	19.10	47.50	19.90	6.70
1985						
1986						
1987						
1988						

* N excludes age 2.0 fish.

Age based on scale reading analysis.

Table 12 (AS). Percent females by brood year and age class (freshwater.ocean) for spring chinook returning to the Cowlitz Salmon Hatchery.

Females (%)

Brood Year	N	2.0	2.1	2.2	2.3	2.4	Total % Female
1976	1					100.00	
1977	249				58.40	0	
1978	509			45.70	57.10	100.00	
1979	325		2.00	54.10	65.80	0	
1980	584	0	0	50.70	69.60	76.70	43.90
1981	312	0	0	41.50	68.60	83.30	31.42
1982	345	0	5.40	47.90	58.60	36.70	44.99
1983	964	0	1.50	39.80	66.30	67.00	31.60
1984	1,060	0	8.80	46.10	66.50	50.00	39.54
1985	412	0	0	38.10	54.40		
1986	412	0	0	35.30			
1987	56	0	0.30				
1988	60	0					

Age based on scale reading analysis.

Table 13 (TR). Hatchery releases of spring chinook salmon into the Cowlitz River basin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1967	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/22/68	07/22/68	35	54355	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1967	WILLIAMETTE	COWLITZ HATCHERY	Fingr	07/22/68	07/22/68	35	54985	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1967	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/22/68	07/22/68	35	245700	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1967	WILLIAMETTE	COWLITZ HATCHERY	Fingr	07/22/68	07/22/68	35	276255	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1967	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	01/02/69	01/02/69	9	155664	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1967	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	01/02/69	01/02/69	9	167067	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1967	WILLIAMETTE	COWLITZ HATCHERY	Smolt	01/02/69	01/02/69	8	201498	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1967	WILLIAMETTE	COWLITZ HATCHERY	Smolt	01/07/69	01/07/69	8	116000	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1967	WILLIAMETTE	COWLITZ HATCHERY	Smolt	01/07/69	01/07/69	8	85995	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1967	WILLIAMETTE	COWLITZ HATCHERY	Smolt	04/04/69	04/04/69	6	34528	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1967	WILLIAMETTE	COWLITZ HATCHERY	Smolt	04/04/69	04/04/69	6	150626	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1967	WILLIAMETTE	COWLITZ HATCHERY	Smolt	04/14/69	04/14/69	6	79408	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1968	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/02/69	10/02/69	10	113682	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1968	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/28/69	10/28/69	10	101930	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1968	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/28/69	10/28/69	9	102394	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1968	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/28/69	10/28/69	8	171000	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1968	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/28/69	10/28/69	8	115596	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1968	UNKNOWN	COWLITZ HATCHERY	Smolt	01/19/70	01/19/70	13	182560	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1968	UNKNOWN	COWLITZ HATCHERY	Smolt	01/19/70	01/19/70	12	172000	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1968	UNKNOWN	COWLITZ HATCHERY	Smolt	01/19/70	01/19/70	12	175500	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1968	UNKNOWN	COWLITZ HATCHERY	Smolt	01/19/70	01/19/70	12	190210	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1968	UNKNOWN	COWLITZ HATCHERY	Smolt	01/19/70	01/19/70	10	163997	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1968	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	01/21/70	01/21/70	5	16190	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1968	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/09/70	02/09/70	5	56190	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1968	UNKNOWN	COWLITZ HATCHERY	Smolt	03/02/70	03/02/70	9	84798	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1968	UNKNOWN	COWLITZ HATCHERY	Smolt	03/02/70	03/02/70	9	94698	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1968	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/02/70	03/02/70	5	198100	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/14/70	07/14/70	22	223982	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/14/70	07/14/70	21	262080	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/14/70	07/14/70	19	68761	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/14/70	07/14/70	19	137541	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/17/70	07/17/70	22	93588	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/17/70	07/17/70	20	101000	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/21/70	07/21/70	19	85483	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/21/70	07/21/70	19	85483	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/11/70	09/11/70	10	274792	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/15/70	09/15/70	9	89496	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/20/70	11/20/70	6	82225	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/20/70	11/20/70	5	74606	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/20/70	11/20/70	5	85000	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/20/70	11/20/70	5	104540	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/20/70	11/20/70	4	65547	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/25/70	11/25/70	7	79296	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/25/70	11/25/70	7	120295	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/25/70	11/25/70	6	84108	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/25/70	11/25/70	6	94218	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/25/70	11/25/70	6	105300	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/25/70	11/25/70	4	89939	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/01/71	03/01/71	4	462972	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	08/02/71	08/02/71	21	104013	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	08/02/71	08/02/71	21	172011	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	08/03/71	08/03/71	20	146000	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	08/03/71	08/03/71	19	81833	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	08/04/71	08/04/71	22	264990	COWLITZ R (≥6.0≥0≥)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	08/04/71	08/04/71	19	196992	COWLITZ R (≥6.0≥0≥)	UNTAGGED

Table 13 (cont.). Hatchery releases of spring chinook salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	08/05/71	08/05/71	22	196413	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	08/06/71	08/06/71	25	118900	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	08/06/71	08/06/71	19	26600	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	08/09/71	08/09/71	25	207725	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	08/09/71	08/09/71	24	254280	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	08/10/71	08/10/71	26	82550	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	08/10/71	08/10/71	25	319125	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/10/71	11/10/71	8	80240	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/10/71	11/10/71	8	88536	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/11/71	11/11/71	9	86400	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/11/71	11/11/71	8	89400	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/12/71	11/12/71	9	86328	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/12/71	11/12/71	8	86960	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/15/71	11/15/71	9	95310	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/16/71	11/16/71	9	86670	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/16/71	11/16/71	9	88524	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/17/71	11/17/71	11	86636	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/17/71	11/17/71	10	86400	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/22/72	02/22/72	6	89448	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/22/72	02/22/72	6	88736	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/22/72	02/22/72	6	87395	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/22/72	02/22/72	5	92799	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/22/72	02/22/72	5	86037	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/22/72	02/22/72	5	88500	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/22/72	02/22/72	5	96138	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/22/72	02/22/72	5	89160	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/22/72	02/22/72	5	85836	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/22/72	02/22/72	5	78950	COWLITZ R (≥6.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/22/72	02/22/72	4	89182	COWLITZ R (≥6.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/03/72	01/03/72	1106	272800	TOUTLE R (≥6.0227)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/04/72	01/04/72	1106	144100	TOUTLE R (≥6.0227)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/05/72	01/05/72	1106	304700	TOUTLE R (≥6.0227)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/06/72	01/06/72	1106	304700	TOUTLE R (≥6.0227)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/13/72	01/13/72	1106	320100	TOUTLE R (≥6.0227)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/17/72	01/17/72	1106	123200	TOUTLE R (≥6.0227)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/17/72	01/17/72	1106	125400	TOUTLE R (6.0227)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/07/72	01/07/72	1106	312400	TOUTLE R -SF 26.0248	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/10/72	01/10/72	1106	304700	TOUTLE R -SF 26.0248	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/03/72	09/03/72	17	68000	COWLITZ R (≥6.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/72	09/18/72	17	61050	COWLITZ R (≥6.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/19/72	09/19/72	17	150195	COWLITZ R (≥6.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/20/72	09/20/72	14	35417	COWLITZ R (≥6.0002)	150534
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/20/72	09/20/72	14	993767	COWLITZ R (≥6.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/20/72	09/20/72	15	373305	COWLITZ R (≥6.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/20/72	09/20/72	14	158999	COWLITZ R (≥6.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/22/72	09/22/72	13	98550	COWLITZ R (≥6.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/26/72	09/26/72	11	117700	COWLITZ R (≥6.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/26/72	09/26/72	10	28000	COWLITZ R (≥6.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/10/72	11/10/72	10	114610	COWLITZ R (≥6.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/10/72	11/10/72	9	103509	COWLITZ R (≥6.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/10/72	11/10/72	9	132784	COWLITZ R (≥6.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/10/72	11/10/72	8	79195	COWLITZ R (≥6.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/10/72	11/10/72	8	180515	COWLITZ R (≥6.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/10/72	11/10/72	7	85594	COWLITZ R (≥6.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/10/72	11/10/72	7	154020	COWLITZ R (≥6.0002)	UNTAGGED

Table 13 (cont.). Hatchery releases of spring chinook salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/10/72	11/10/72	6	124704	COWLITZ R	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/14/72	11/14/72	11	28400	COWLITZ R	150609
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/14/72	11/14/72	11	1113283	COWLITZ R	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/14/72	11/14/72	11	134470	COWLITZ R	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/15/72	11/15/72	8	16811	COWLITZ R	150706
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/15/72	11/15/72	8	102462	COWLITZ R	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/15/72	11/15/72	8	100542	COWLITZ R	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/16/72	11/16/72	8	15625	COWLITZ R	150703
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/16/72	11/16/72	8	117917	COWLITZ R	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/16/72	11/16/72	8	115885	COWLITZ R	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/21/72	11/21/72	9	24097	COWLITZ R	150610
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/21/72	11/21/72	9	150294	COWLITZ R	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/21/72	11/21/72	9	145752	COWLITZ R	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/28/73	02/28/73	5	26496	COWLITZ R	150613
1971	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/28/73	02/28/73	5	164813	COWLITZ R	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/28/73	02/28/73	5	22379	COWLITZ R	150615
1971	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/28/73	02/28/73	5	136722	COWLITZ R	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/28/73	02/28/73	5	134516	COWLITZ R	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/28/73	02/28/73	5	162201	COWLITZ R	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/11/73	04/11/73	4	16080	COWLITZ R	150704
1971	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/11/73	04/11/73	4	112595	COWLITZ R	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/11/73	04/11/73	4	14451	COWLITZ R	150705
1971	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/11/73	04/11/73	4	102820	COWLITZ R	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/11/73	04/11/73	4	212151	COWLITZ R	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	05/03/73	05/03/73	3	23258	COWLITZ R	150701
1971	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	05/03/73	05/03/73	3	1224	COWLITZ R	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	05/03/73	05/03/73	3	79618	COWLITZ R	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/01/73	10/01/73	9	48659	COWLITZ R	151307
1972	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/01/73	10/01/73	9	75743	COWLITZ R	151408
1972	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/01/73	10/01/73	10	100147	COWLITZ R	151409
1972	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/06/73	11/06/73	10	52992	COWLITZ R	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/09/73	11/09/73	9	10340	COWLITZ R	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/09/73	11/09/73	9	59013	COWLITZ R	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/09/73	11/09/73	8	37800	COWLITZ R	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/13/73	11/13/73	9	38862	COWLITZ R	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/13/73	11/13/73	8	45552	COWLITZ R	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/14/73	11/14/73	9	30870	COWLITZ R	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/14/73	11/14/73	8	41600	COWLITZ R	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	12/26/73	12/26/73	6	31635	COWLITZ R	010111
1972	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	12/26/73	12/26/73	6	31314	COWLITZ R	010112
1972	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	12/26/73	12/26/73	6	24054	COWLITZ R	010113
1972	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	12/26/73	12/26/73	6	10784	COWLITZ R	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	12/26/73	12/26/73	6	14413	COWLITZ R	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	01/18/74	01/18/74	5	72500	COWLITZ R	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/04/74	03/04/74	4	68500	COWLITZ R	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/12/74	03/12/74	5	88700	COWLITZ R	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/14/74	03/14/74	5	19029	COWLITZ R	010208
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/14/74	03/14/74	5	1301	COWLITZ R	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/14/74	03/14/74	5	18132	COWLITZ R	010209
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/14/74	03/14/74	5	1136	COWLITZ R	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/14/74	03/14/74	5	18517	COWLITZ R	010210
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/14/74	03/14/74	5	1720	COWLITZ R	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/14/74	03/14/74	7	13636	COWLITZ R	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/14/74	03/14/74	6	87544	COWLITZ R	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/14/74	03/14/74	5	85400	COWLITZ R	UNTAGGED

Table 13 (cont.). Hatchery releases of spring chinook salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/14/74	03/14/74	5	2663	COWLITZ R (26.0002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/14/74	03/14/74	5	79050	COWLITZ R (26.0002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/14/74	03/14/74	5	88400	COWLITZ R (26.0002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/14/74	03/14/74	5	15862	COWLITZ R (26.0002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/14/74	03/14/74	5	19981	COWLITZ R (26.0002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/14/74	03/14/74	5	81098	COWLITZ R (26.0002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/14/74	03/14/74	5	85698	COWLITZ R (26.0002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/14/74	03/14/74	4	84996	COWLITZ R (26.0002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/14/74	03/14/74	4	77900	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/20/73	11/20/73	1194	225600	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/07/73	12/07/73	1194	252000	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/18/73	12/18/73	1194	249600	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/16/73	11/16/73	1194	223200	TILTON R (26.0560)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/28/73	11/28/73	1194	150000	TILTON R (26.0560)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/20/73	11/20/73	1194	192000	UPPER COWLITZ RIVER	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/31/74	07/31/74	30	26190	CISPUS R (26.0668)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/23/74	07/23/74	65	57600	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/29/74	07/29/74	34	23392	TILTON R (26.0560)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/30/74	07/30/74	30	24750	TILTON R (26.0560)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/31/74	07/31/74	42	26082	TILTON R (26.0560)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/31/74	07/31/74	37	27010	TILTON R (26.0560)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/29/74	07/29/74	35	38290	TOUTLE R (26.0227)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/29/74	07/29/74	34	14824	TOUTLE R (26.0227)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/29/74	07/29/74	34	19040	TOUTLE R (26.0227)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/29/74	07/29/74	33	25278	TOUTLE R (26.0227)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/30/74	07/30/74	37	16650	TOUTLE R (26.0227)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/30/74	07/30/74	34	32300	TOUTLE R (26.0227)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/30/74	07/30/74	32	10240	TOUTLE R (26.0227)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/30/74	07/30/74	32	34080	TOUTLE R (26.0227)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/30/74	07/30/74	29	8004	TOUTLE R (26.0227)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/29/74	07/29/74	40	24000	UPPER COWLITZ RIVER	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/30/74	07/30/74	32	5024	UPPER COWLITZ RIVER	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/30/74	07/30/74	29	23780	UPPER COWLITZ RIVER	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/31/74	07/31/74	35	26005	UPPER COWLITZ RIVER	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/31/74	07/31/74	26	24700	UPPER COWLITZ RIVER	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/08/74	10/08/74	11	150040	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/08/74	10/08/74	10	75733	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/08/74	10/08/74	10	75240	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/10/74	10/10/74	11	112698	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/10/74	10/10/74	10	75030	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/10/74	10/10/74	10	38926	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/10/74	10/10/74	9	75924	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	12/04/74	12/04/74	5	143208	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/11/75	02/11/75	4	73400	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/18/75	02/18/75	5	70330	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/10/75	03/10/75	4	61944	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/17/75	03/17/75	4	72492	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/17/75	03/17/75	4	68360	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/75	04/01/75	4	150150	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/75	04/01/75	4	154280	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/75	04/01/75	3	346800	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/04/74	12/04/74	1106	319000	CISPUS R (26.0668)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/22/74	11/22/74	1106	60500	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/11/74	12/11/74	1106	77000	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/14/74	11/14/74	1194	360000	TILTON R (26.0560)	UNTAGGED

Table 13 (cont.). Hatchery releases of spring chinook salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1974	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/05/74	12/05/74	1106	360800	TILTON R (26.0560)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/04/74	12/04/74	1106	800800	TOUTLE R (26.0227)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/14/74	11/14/74	1194	360000	UPPER COWLITZ RIVER	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/04/74	12/04/74	1106	480700	UPPER COWLITZ RIVER	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/16/75	05/16/75	64	52800	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/26/75	06/26/75	38	43320	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/30/75	06/30/75	33	24981	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/12/75	06/12/75	40	20320	TILTON R (26.0560)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/23/75	06/23/75	40	35600	TILTON R (26.0560)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/24/75	06/24/75	37	67340	TILTON R (26.0560)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/12/75	06/12/75	40	36000	TOUTLE R (26.0227)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/23/75	06/23/75	38	94240	TOUTLE R (26.0227)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/25/75	06/25/75	35	60200	TOUTLE R (26.0227)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	03/29/76	9	17643	COWLITZ R (26.0002)	130403
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	03/29/76	9	70775	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	03/29/76	8	15382	COWLITZ R (26.0002)	130404
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	03/29/76	8	66592	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	03/29/76	7	18070	COWLITZ R (26.0002)	130405
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	03/29/76	7	65724	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	03/29/76	8	17540	COWLITZ R (26.0002)	130406
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	03/29/76	8	67973	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	03/29/76	9	17185	COWLITZ R (26.0002)	130407
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	03/29/76	9	72985	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	03/29/76	8	15903	COWLITZ R (26.0002)	130408
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	03/29/76	8	67612	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	03/29/76	7	21110	COWLITZ R (26.0002)	130409
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	03/29/76	7	64210	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	03/29/76	7	18149	COWLITZ R (26.0002)	130410
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	03/29/76	7	68156	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	09/18/75	15	67808	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	09/18/75	15	70067	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	09/18/75	15	65464	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	09/18/75	15	70882	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	09/18/75	14	66426	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	09/18/75	14	65556	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	09/18/75	14	65490	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/18/75	09/18/75	12	63824	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/02/75	10/02/75	17	85680	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/02/75	10/02/75	14	78638	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/02/75	10/02/75	13	76102	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/03/75	10/03/75	13	144693	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/23/75	10/23/75	14	77994	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/23/75	10/23/75	12	73008	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/23/75	10/23/75	11	77995	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/23/75	10/23/75	10	84000	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	12/23/75	12/23/75	8	57893	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	12/23/75	12/23/75	8	65725	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	12/23/75	12/23/75	7	65734	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	01/05/76	01/05/76	7	62125	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	01/05/76	01/05/76	7	64260	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/01/76	03/01/76	5	135268	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/29/76	03/29/76	5	56206	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/29/76	03/29/76	5	54950	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/29/76	03/29/76	5	58243	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/29/76	03/29/76	5	54907	COWLITZ R (26.0002)	UNTAGGED

Table 13 (cont.). Hatchery releases of spring chinook salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1974	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/29/76	03/29/76	5	59281	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/29/76	03/29/76	5	61600	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/29/76	03/29/76	5	62475	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/29/76	03/29/76	5	59365	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/29/76	03/29/76	5	57023	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/29/76	03/29/76	5	57871	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ RIVER	TOUTLE HATCHERY	Fingr	07/09/75	07/09/75	70	24500	GREEN R (26.0323)	UNTAGGED
1974	COWLITZ RIVER	TOUTLE HATCHERY	Fingr	07/23/75	07/23/75	54	20520	GREEN R (26.0323)	UNTAGGED
1974	COWLITZ RIVER	TOUTLE HATCHERY	PreSm	09/26/75	09/26/75	25	10045	GREEN R (26.0323)	UNTAGGED
1974	COWLITZ RIVER	TOUTLE HATCHERY	Smolt	03/17/76	03/17/76	8	26809	GREEN R (26.0323)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/23/75	12/23/75	1106	521400	CISPUS R (26.0668)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/29/75	11/29/75	1080	203500	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/05/75	12/05/75	1106	1158300	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/04/75	12/04/75	1106	172700	MILL CREEK (LACAMAS	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/23/75	12/23/75	1106	1221000	SPIRIT LAKE (26)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/04/75	12/04/75	1106	233200	TILTON R (26.0560)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/23/75	12/23/75	1106	345400	TILTON R (26.0560)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/04/75	12/04/75	1106	174900	WINSTON CR (26.0541)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/25/76	05/25/76	50	171000	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/14/76	06/14/76	52	33800	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/14/76	06/14/76	39	150150	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/29/76	06/29/76	35	182070	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/29/76	06/29/76	33	178200	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/09/76	07/09/76	26	12506	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/26/76	07/26/76	24	42000	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/12/76	05/12/76	67	145457	TILTON R (26.0560)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/11/76	05/11/76	69	244684	UPPER COWLITZ RIVER	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	08/19/76	08/19/76	20	54000	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/03/76	09/03/76	19	367061	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	12/09/76	12/09/76	8	245864	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/01/77	02/01/77	5	104880	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/16/77	02/16/77	5	65465	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/77	03/08/77	4	88051	COWLITZ R (26.0002)	130911
1975	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/77	03/08/77	4	1705	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/77	03/08/77	4	88691	COWLITZ R (26.0002)	130912
1975	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/77	03/08/77	4	1717	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/77	03/08/77	4	61782	COWLITZ R (26.0002)	130914
1975	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/77	03/08/77	4	1196	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/77	03/08/77	4	61658	COWLITZ R (26.0002)	131104
1975	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/77	03/08/77	4	1194	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/77	03/08/77	3	28746	COWLITZ R (26.0002)	131301
1975	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/77	03/08/77	3	557	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/77	03/08/77	3	27967	COWLITZ R (26.0002)	131304
1975	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/77	03/08/77	3	541	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/77	03/08/77	4	206000	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	05/04/77	05/04/77	58	159964	COWLITZ R (26.0002)	UNTAGGED
1976	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/26/77	05/26/77	37	175010	COWLITZ R (26.0002)	UNTAGGED
1976	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/13/77	06/13/77	34	500548	COWLITZ R (26.0002)	UNTAGGED
1976	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/19/77	07/19/77	21	127155	COWLITZ R (26.0002)	UNTAGGED
1976	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/20/77	07/20/77	20	71000	COWLITZ R (26.0002)	UNTAGGED
1976	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	08/03/77	08/03/77	15	6000	COWLITZ R (26.0002)	UNTAGGED
1976	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/28/77	09/28/77	12	84376	COWLITZ R (26.0002)	631715
1976	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/28/77	09/28/77	12	2610	COWLITZ R (26.0002)	UNTAGGED
1976	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/05/77	10/05/77	11	84034	COWLITZ R (26.0002)	631716
1976	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/05/77	10/05/77	11	849	COWLITZ R (26.0002)	UNTAGGED

Table 13 (cont.). Hatchery releases of spring chinook salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1976	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/20/77	10/20/77	7	689715	COWLITZ R (26.0002)	UNTAGGED
1976	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/78	03/08/78	4	28227	COWLITZ R (26.0002)	631612
1976	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/78	03/08/78	4	27776	COWLITZ R (26.0002)	631613
1976	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/78	03/08/78	4	331	COWLITZ R (26.0002)	UNTAGGED
1976	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/78	03/08/78	5	89433	COWLITZ R (26.0002)	631709
1976	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/78	03/08/78	5	1013	COWLITZ R (26.0002)	UNTAGGED
1976	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/78	03/08/78	5	87966	COWLITZ R (26.0002)	631710
1976	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/78	03/08/78	5	3021	COWLITZ R (26.0002)	UNTAGGED
1976	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/78	03/08/78	5	58262	COWLITZ R (26.0002)	631711
1976	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/78	03/08/78	5	1617	COWLITZ R (26.0002)	UNTAGGED
1976	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/78	03/08/78	4	56964	COWLITZ R (26.0002)	631712
1976	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/78	03/08/78	4	1593	COWLITZ R (26.0002)	UNTAGGED
1976	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/78	03/08/78	6	71304	COWLITZ R (26.0002)	631717
1976	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/78	03/08/78	6	1679	COWLITZ R (26.0002)	UNTAGGED
1976	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/78	03/08/78	5	69433	COWLITZ R (26.0002)	631718
1976	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/08/78	03/08/78	5	1788	COWLITZ R (26.0002)	UNTAGGED
1976	COWLITZ RIVER	TOUTLE HATCHERY	Fingr	04/19/77	04/19/77	468	418002	SPIRIT LAKE (26)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/27/77	12/27/77	1080	297500	CISPUS R (26.0668)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/28/77	12/28/77	1080	297500	CISPUS R (26.0668)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/14/77	12/14/77	1055	42500	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/28/77	12/28/77	1080	297500	IRON CR (26.0697)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/21/77	12/21/77	1080	297500	JOHNSON CR (26.1142)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/21/77	12/21/77	1080	297500	LAKE CR (26.1231)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/29/77	12/29/77	1080	272000	OHANAPECOSH R 261304	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/06/77	12/06/77	1194	459000	SMITH CR (26.1127)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/20/77	12/20/77	1080	297500	TILTON R (26.0560)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/27/77	12/27/77	1080	297500	YELLOWJACKET CR (26)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/08/78	05/08/78	105	209114	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/11/78	05/11/78	93	54000	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/21/78	09/21/78	14	875803	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/23/79	04/23/79	5	22968	COWLITZ R (26.0002)	631815
1977	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/23/79	04/23/79	5	43536	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/23/79	04/23/79	7	24496	COWLITZ R (26.0002)	631816
1977	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/23/79	04/23/79	7	49504	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/23/79	04/23/79	5	24079	COWLITZ R (26.0002)	631817
1977	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/23/79	04/23/79	5	45910	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/23/79	04/23/79	7	24341	COWLITZ R (26.0002)	631818
1977	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/23/79	04/23/79	7	41050	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/23/79	04/23/79	10	82961	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/23/79	04/23/79	7	49257	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/23/79	04/23/79	7	40804	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/23/79	04/23/79	5	45667	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/23/79	04/23/79	5	43304	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/23/79	04/23/79	5	276506	COWLITZ R (26.0002)	UNTAGGED
1977	LTL WHITE SALMON-NFH	DEER SPRINGS REARING	Smolt	04/03/79	04/03/79	14	224590	DEER CR (26.0404)	UNTAGGED
1978	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/15/78	11/15/78	1106	348700	CISPUS R -NF 26.0866	UNTAGGED
1978	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/20/78	11/20/78	1106	425700	COWLITZ R (26.0002)	UNTAGGED
1978	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/22/78	11/22/78	1106	499400	COWLITZ R (26.0002)	UNTAGGED
1978	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/14/78	11/14/78	1106	327800	IRON CR (26.0697)	UNTAGGED
1978	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/28/78	11/28/78	1106	432300	LAKE CR (26.1231)	UNTAGGED
1978	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/13/78	11/13/78	1106	239200	MILL CREEK (LACAMAS	UNTAGGED
1978	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/13/78	11/13/78	1106	456500	OHANAPECOSH R 261304	UNTAGGED
1978	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/16/78	11/16/78	1106	599500	SPIRIT LAKE (26)	UNTAGGED
1978	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/21/78	11/21/78	1106	650100	SPIRIT LAKE (26)	UNTAGGED
1978	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/15/78	11/15/78	1106	215600	UPPER COWLITZ RIVER	UNTAGGED

Table 13 (cont.). Hatchery releases of spring chinook salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1978	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/14/78	11/14/78	1106	312400	WINSTON CR (26.0541)	UNTAGGED
1978	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/12/78	12/12/78	1106	545600	YELLOWJACKET CR (26)	UNTAGGED
1978	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/12/79	07/12/79	33	537709	UPPER COWLITZ RIVER	UNTAGGED
1978	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/15/79	09/15/79	10	991700	COWLITZ R (26.0002)	UNTAGGED
1978	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/03/80	04/03/80	9	119501	COWLITZ R (26.0002)	UNTAGGED
1978	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/03/80	04/03/80	6	515885	COWLITZ R (26.0002)	UNTAGGED
1978	COWLITZ RIVER	DEER SPRINGS REARING	PreSm	09/05/79	09/05/79	28	151918	DEER CR (26.0404)	UNTAGGED
1978	COWLITZ RIVER	DEER SPRINGS REARING	Smolt	04/02/80	04/02/80	11	148100	DEER CR (26.0404)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/20/79	12/20/79	1106	1734000	COWLITZ R (26.0002)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/30/79	12/30/79	1106	1424000	COWLITZ R (26.0002)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/14/80	05/14/80	99	109805	BUTTER CR (26.1205)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/12/80	05/12/80	100	60000	CISPUS R (26.0668)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/15/80	05/15/80	95	105260	CISPUS R -NF 26.0866	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/15/80	05/15/80	90	91107	IRON CR (26.0697)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/15/80	05/15/80	90	311580	MILL CREEK (LACAMAS	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/13/80	05/13/80	103	114433	SKATE CR (26.1182)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/14/80	05/14/80	116	120393	UPPER COWLITZ RIVER	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/14/80	05/14/80	102	112917	YELLOWJACKET CR (26)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/08/80	09/08/80	14	1136600	COWLITZ R (26.0002)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/81	04/01/81	8	123188	COWLITZ R (26.0002)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/81	04/01/81	6	619449	COWLITZ R (26.0002)	UNTAGGED
1979	COWLITZ RIVER	SEA RESOURC NET PENS	Fingr	03/26/80	03/26/80	295	536900	TOUTLE R -SF 26.0248	UNTAGGED
1979	COWLITZ RIVER	SEA RESOURC NET PENS	Fingr	04/08/80	04/08/80	196	57964	TOUTLE R -SF 26.0248	UNTAGGED
1979	COWLITZ RIVER	SEA RESOURC NET PENS	Fingr	04/09/80	04/09/80	195	59085	TOUTLE R -SF 26.0248	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/04/80	12/04/80	1106	1480000	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/10/80	12/10/80	1194	2072000	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/11/80	12/11/80	1194	1736000	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/19/80	12/19/80	1194	560000	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/19/80	12/19/80	1194	1272000	UPPER COWLITZ RIVER	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/11/81	05/11/81	77	154000	BUTTER CR (26.1205)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/12/81	05/12/81	73	84050	BUTTER CR (26.1205)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/13/81	05/13/81	86	189200	CISPUS R (26.0668)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/24/81	04/24/81	110	110660	CISPUS R -NF 26.0866	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/15/81	05/15/81	86	51600	CISPUS R -NF 26.0866	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/19/81	06/19/81	65	68138	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/23/81	06/23/81	68	29580	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/24/81	06/24/81	59	26727	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/22/81	07/22/81	38	74746	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/22/81	07/22/81	33	21483	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/29/81	04/29/81	98	112798	IRON CR (26.0697)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/14/81	05/14/81	72	64800	IRON CR (26.0697)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/11/81	05/11/81	77	69300	JOHNSON CR (26.1142)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/12/81	05/12/81	74	254050	SKATE CR (26.1182)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/12/81	05/12/81	76	360950	TILTON R (26.0560)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/13/81	05/13/81	86	86000	UPPER COWLITZ RIVER	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/14/81	05/14/81	72	86400	UPPER COWLITZ RIVER	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/29/81	04/29/81	98	87416	WINSTON CR (26.0541)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/29/81	04/29/81	98	111230	YELLOWJACKET CR (26)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/10/81	09/10/81	15	806700	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/10/81	09/10/81	12	248300	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/82	04/01/82	8	24014	COWLITZ R (26.0002)	632134
1980	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/82	04/01/82	8	12506	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/82	04/01/82	8	23917	COWLITZ R (26.0002)	632309
1980	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/82	04/01/82	8	12545	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/82	04/01/82	8	23298	COWLITZ R (26.0002)	632310

Table 13 (cont.). Hatchery releases of spring chinook salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1980	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/82	04/01/82	8	12998	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/82	04/01/82	8	24391	COWLITZ R (26.0002)	632311
1980	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/82	04/01/82	8	13507	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/05/82	04/05/82	12	132646	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/05/82	04/05/82	7	442687	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	10/27/81	10/27/81	1106	64000	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/15/81	12/15/81	1134	240000	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/22/81	12/22/81	1134	246000	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/21/82	04/21/82	116	232000	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/22/82	04/22/82	100	164400	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/23/82	04/23/82	105	249000	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/26/82	04/26/82	100	202500	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/26/82	04/26/82	93	222000	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/12/82	05/12/82	78	15000	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/18/82	06/18/82	39	201084	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/04/83	04/04/83	7	73000	COWLITZ R (26.0002)	632505
1981	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/04/83	04/04/83	7	77454	COWLITZ R (26.0002)	632506
1981	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/04/83	04/04/83	7	546	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/04/83	04/04/83	6	58292	COWLITZ R (26.0002)	632609
1981	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/04/83	04/04/83	6	708	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/04/83	04/04/83	7	71000	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/04/83	04/04/83	7	70000	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/11/83	04/11/83	8	70000	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/11/83	04/11/83	7	70000	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/11/83	04/11/83	7	70000	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/11/83	04/11/83	6	70000	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/07/82	11/07/82	1334	432000	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/19/82	11/19/82	1334	359000	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/22/82	11/22/82	1334	64000	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/29/82	11/29/82	1055	117000	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/13/82	12/13/82	1055	81000	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/18/82	12/18/82	1055	48000	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	03/23/83	03/23/83	120	216200	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/27/83	06/27/83	36	386000	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/27/83	06/27/83	35	394200	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/28/83	06/28/83	39	370000	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/30/83	06/30/83	36	5700	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/04/83	07/04/83	31	297400	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/14/83	07/14/83	28	316000	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/14/83	07/14/83	25	254000	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/16/83	05/16/83	46	46000	GREEN R (26.0323)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/16/83	05/16/83	46	46000	GREEN R (26.0323)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/17/83	05/17/83	43	43000	GREEN R (26.0323)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/17/83	05/17/83	43	43000	GREEN R (26.0323)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/19/83	05/19/83	43	51600	GREEN R (26.0323)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/19/83	05/19/83	43	51600	GREEN R (26.0323)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/19/83	05/19/83	43	27900	GREEN R (26.0323)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/16/83	05/16/83	46	46000	TOUTLE R -SF 26.0248	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/17/83	05/17/83	43	47300	TOUTLE R -SF 26.0248	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/18/83	05/18/83	43	47300	TOUTLE R -SF 26.0248	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/18/83	05/18/83	43	47300	TOUTLE R -SF 26.0248	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/19/83	05/19/83	43	21500	TOUTLE R -SF 26.0248	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/03/84	04/03/84	7	73205	COWLITZ R (26.0002)	632834
1982	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/03/84	04/03/84	7	695	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/03/84	04/03/84	8	73878	COWLITZ R (26.0002)	632835

Table 13 (cont.). Hatchery releases of spring chinook salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1982	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/03/84	04/03/84	8	222	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/03/84	04/03/84	8	72124	COWLITZ R (26.0002)	632836
1982	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/03/84	04/03/84	8	876	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/03/84	04/03/84	8	62300	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/03/84	04/03/84	6	62200	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/03/84	04/03/84	6	62800	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/04/84	04/04/84	8	73300	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/04/84	04/04/84	8	70800	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/04/84	04/04/84	7	67000	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/28/84	06/28/84	53	531300	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/28/84	06/28/84	51	456100	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/28/84	06/28/84	49	488300	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/28/84	06/28/84	43	514200	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/28/84	06/28/84	41	424000	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/11/84	07/11/84	49	79000	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/11/84	07/11/84	44	75000	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/11/84	07/11/84	41	79000	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/11/84	07/11/84	41	80000	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/11/84	07/11/84	39	79000	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/09/84	04/09/84	118	59000	GREEN R (26.0323)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/09/84	04/09/84	118	59000	GREEN R (26.0323)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/09/84	04/09/84	118	59000	GREEN R (26.0323)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/09/84	04/09/84	118	59000	GREEN R (26.0323)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/10/84	04/10/84	118	30700	GREEN R (26.0323)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/10/84	04/10/84	118	70800	GREEN R (26.0323)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/09/84	04/09/84	118	59000	TOUTLE R -NF 26.0314	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/09/84	04/09/84	118	59000	TOUTLE R -NF 26.0314	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/10/84	04/10/84	118	70800	TOUTLE R -NF 26.0314	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/10/84	04/10/84	118	73700	TOUTLE R -NF 26.0314	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/09/85	04/09/85	7	57959	COWLITZ R (26.0002)	632747
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/09/85	04/09/85	7	58	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/09/85	04/09/85	7	53949	COWLITZ R (26.0002)	632748
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/09/85	04/09/85	7	54	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/09/85	04/09/85	7	11871	COWLITZ R (26.0002)	633054
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/09/85	04/09/85	7	12	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/09/85	04/09/85	7	11286	COWLITZ R (26.0002)	633055
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/09/85	04/09/85	7	11	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/09/85	04/09/85	7	11127	COWLITZ R (26.0002)	633056
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/09/85	04/09/85	7	45	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/09/85	04/09/85	7	55903	COWLITZ R (26.0002)	633122
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/09/85	04/09/85	7	225	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/09/85	04/09/85	8	66000	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/09/85	04/09/85	7	68600	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/09/85	04/09/85	7	65600	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/09/85	04/09/85	7	68100	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/09/85	04/09/85	7	69200	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/09/85	04/09/85	6	63100	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/15/84	11/15/84	1296	953000	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/18/84	11/18/84	1296	212000	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/28/84	11/28/84	1296	446000	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/15/84	12/15/84	1296	119000	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/21/85	05/21/85	58	266800	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/21/85	05/21/85	42	523900	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/29/85	05/29/85	49	137200	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/29/85	05/29/85	46	161000	COWLITZ R (26.0002)	UNTAGGED

Table 13 (cont.). Hatchery releases of spring chinook salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/24/85	06/24/85	36	1832600	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/26/85	06/26/85	41	51200	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/26/85	07/26/85	32	12100	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/10/85	10/10/85	15	24000	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/86	04/01/86	7	22913	COWLITZ R (26.0002)	633437
1984	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/86	04/01/86	7	757	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/86	04/01/86	7	22875	COWLITZ R (26.0002)	633505
1984	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/86	04/01/86	7	756	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/86	04/01/86	7	23134	COWLITZ R (26.0002)	633506
1984	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/86	04/01/86	7	765	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/86	04/01/86	7	23473	COWLITZ R (26.0002)	633507
1984	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/86	04/01/86	7	1055	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/86	04/01/86	7	23273	COWLITZ R (26.0002)	633508
1984	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/86	04/01/86	7	1046	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/86	04/01/86	7	23019	COWLITZ R (26.0002)	633509
1984	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/86	04/01/86	7	1034	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/86	04/01/86	8	22950	COWLITZ R (26.0002)	633510
1984	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/86	04/01/86	8	981	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/86	04/01/86	8	22736	COWLITZ R (26.0002)	633511
1984	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/86	04/01/86	8	972	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/86	04/01/86	8	23074	COWLITZ R (26.0002)	633512
1984	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/86	04/01/86	8	987	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/86	04/01/86	8	425600	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/14/86	05/14/86	52	405600	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/21/86	05/21/86	64	379000	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/13/86	06/13/86	54	138400	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/25/86	06/25/86	34	1378800	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/30/86	06/30/86	43	22800	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/17/86	07/17/86	42	8200	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/87	04/01/87	9	47607	COWLITZ R (26.0002)	633833
1985	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/87	04/01/87	9	164362	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/87	04/01/87	9	47748	COWLITZ R (26.0002)	633834
1985	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/87	04/01/87	9	164830	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/87	04/01/87	8	48034	COWLITZ R (26.0002)	633835
1985	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/87	04/01/87	8	165819	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	03/23/87	03/23/87	75	239000	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/20/87	04/20/87	84	420000	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/12/87	05/12/87	60	389700	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/18/87	04/18/88	6	142047	COWLITZ R (26.0002)	634161
1986	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/18/87	04/18/88	6	456653	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/26/87	06/26/87	46	352100	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/26/87	06/26/87	46	376300	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/26/87	06/26/87	40	397100	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/26/87	06/26/87	36	387500	COWLITZ R (26.0002)	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/01/87	12/01/87	1134	256000	COWLITZ RIVER -LOWER	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/10/87	12/10/87	1163	192000	COWLITZ RIVER -LOWER	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/09/88	05/09/88	63	453800	COWLITZ RIVER -LOWER	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/10/88	05/10/88	77	415200	COWLITZ RIVER -LOWER	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/10/88	05/10/88	74	641300	COWLITZ RIVER -LOWER	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/10/88	05/10/88	65	352000	COWLITZ RIVER -LOWER	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/11/88	05/11/88	64	80000	COWLITZ RIVER -LOWER	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/11/88	05/11/88	63	38000	COWLITZ RIVER -LOWER	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/17/88	05/17/88	74	43400	COWLITZ RIVER -LOWER	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/19/88	05/19/88	64	691100	COWLITZ RIVER -LOWER	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/03/89	04/26/89	7	147638	COWLITZ RIVER -LOWER	634204

Table 13 (cont.). Hatchery releases of spring chinook salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1987	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/03/89	04/26/89	7	496162	COWLITZ RIVER -LOWER	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/21/88	11/21/88	1163	439000	COWLITZ RIVER -LOWER	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/30/88	11/30/88	1163	636000	COWLITZ RIVER -LOWER	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/01/88	12/01/88	1163	326000	COWLITZ RIVER -LOWER	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/11/89	05/11/89	77	274400	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/13/89	05/13/89	82	271500	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/15/89	05/15/89	76	259900	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/18/89	05/18/89	97	389000	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/18/89	05/18/89	92	645800	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/18/89	05/18/89	78	542000	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/19/89	09/19/89	24	7200	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/19/89	09/19/89	23	6900	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/19/89	09/19/89	23	5100	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/19/89	09/19/89	21	6600	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/19/89	09/19/89	19	6900	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/19/89	09/19/89	19	7200	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/19/89	09/19/89	18	7700	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/02/90	04/02/90	8	96000	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/02/90	04/02/90	8	101400	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/02/90	04/02/90	8	100600	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/02/90	04/02/90	7	101000	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/02/90	04/02/90	7	96300	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/02/90	04/02/90	7	95700	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/02/90	04/02/90	7	95600	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/02/90	04/02/90	7	96100	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/02/90	04/02/90	6	99700	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/03/90	04/03/90	7	96400	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/03/90	04/03/90	6	95700	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/21/89	11/21/89	1080	970000	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/22/89	11/22/89	1080	513000	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/30/89	11/30/89	1080	678000	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/08/89	12/08/89	1080	550000	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/16/90	05/16/90	37	63978	COWLITZ R (26.0002)	630819
1989	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/16/90	05/16/90	37	144322	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/18/90	06/18/90	28	70479	COWLITZ R (26.0002)	631132
1989	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/18/90	06/18/90	28	161720	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/05/90	07/05/90	24	70505	COWLITZ R (26.0002)	631135
1989	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/05/90	07/05/90	24	160388	COWLITZ R (26.0002)	UNTAGG
1990	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/27/90	11/27/90	1080	609000	COWLITZ R (26.0002)	UNTAGG
1990	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	11/29/90	11/29/90	1080	63000	COWLITZ R (26.0002)	UNTAGG
1990	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/16/90	12/16/90	1080	192000	COWLITZ R (26.0002)	UNTAGG

Table 14 (TD). Parasites and diseases of spring chinook at the Cowlitz Hatchery.

Disease type	Hatchery	Specific Pathogen
Virus	Cowlitz	IHNV: Infectious Hematopoietic Necrosis
virus	Cowlitz	EIBS: Erythrocytic Inclusion Body Syndrome
Bacteria	Cowlitz	*Renibacterium salmoninarum* (Bacterial Kidney Disease)
Bacteria	Cowlitz	*Yersinia ruckeri* (Enteric Redmouth)
Bacteria	Cowlitz	*Cytophaga psychrophila* (Cold Water Disease)
Bacteria	Cowlitz	*Aeromonas Salmonicida* (Furunculosis)
Parasite	Cowlitz	Various Ectoparasites, Endoparasistes and Myxosporidians
Parasite	Cowlitz	Ceratomyxa shasta

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

COWLITZ SUBBASIN

Fall Chinook

GEOGRAPHIC LOCATION

The Cowlitz River originates from the slopes and foothills of Mt. Rainier and Mt. Adams. The drainage encompasses 2,480 square miles. Upper Cowlitz River major tributaries include the Clear Fork, Muddy Fork, Tilton, and Cispus Rivers. Fish migration was blocked to these streams following the construction of Mayfield Dam in 1963 at River Mile (RM) 52. In 1968, Mossyrock, another hydroelectric dam, was constructed at RM 66. The Toutle and Coweeman Rivers are the major lower river tributaries accessible to fall chinook. The Toutle River enters the Cowlitz at RM 20 and the Coweeman River enters the Cowlitz at RM 2. Major Toutle River tributaries include the North and South Fork Toutle and Green Rivers. The Cowlitz River enters the Columbia River at RM 68 near Longview. The Cowlitz Salmon Hatchery is located 2 miles downstream from Mayfield Dam. The Toutle Hatchery is located near the mouth of the Green River.

ORIGIN

The Cowlitz River received only one plant of fall chinook between 1951 and 1967 when 203,769 Toutle River origin fingerlings were released into the Tilton River in 1952 (WDW, 1990). The Cowlitz Salmon Hatchery was completed in 1967 to mitigate for upstream habitat losses. Fall chinook broodstock are collected from the Cowlitz Salmon Hatchery barrier dam except for some of the fish planted in 1968 (Toutle), 1971 (Kalama), and 1981 (Big Creek, Kalama, Bonneville). It is presumed there are no differences between hatchery stock and naturally spawning populations, as no effort was, nor is, being made to keep them separate.

Washington Department of Wildlife (1990) reports the Toutle River has been stocked since at least 1951. After 1967, the stock used was primarily Toutle although some other stocks were used in 1967 (Spring Creek and Big Creek), 1979 (Kalama), and after 1987 (Grays River, Big Creek, Kalama and Washougal).

The Coweeman River received plants of fall chinook from at least 1951 to 1979. Since 1967, stocks included Spring Creek, Washougal, and Toutle (WDW, 1990).

DISTRIBUTION

Historically, Cowlitz River fall chinook distribution was from near the mouth to upper tributaries such as the Ohanapecosh and Tilton Rivers (Thompson and Rothfus 1969). Fall chinook redd counts from 1961 through 1966 indicated 37 percent were found above Mayfield (WDW, 1990). Currently, heaviest spawning occurs between the Cowlitz Salmon and Trout Hatcheries. This river section contained about 82 percent of the redds counted in 1984, but included Cowlitz Hatchery production fish that spawned naturally (Devore, 1987). Redd counts generally decrease downstream to the Kelso Bridge at RM 5. The Mt. St. Helens eruption in 1980 severely impacted any fall chinook spawning areas below the mouth of the Toutle River.

In 195 1, the Washington Department of Fisheries estimated 80 percent of the Toutle River fall chinook natural spawning occurred in the lower five miles of the river. Toutle River fall chinook natural spawn distribution for 1964 through 1979 was 4.8 percent Toutle River, 3.8 percent South Fork Toutle, 49.4 percent North Fork Toutle, and 42 percent Green River (WDW, 1990). In recent years, Toutle River fall chinook spawning ground index counts have been focused in the Toutle Hatchery area.

Coweeman River fall chinook spawning ground index counts are conducted annually between Mulholland Creek and the Jeep Club Bridge.

PRODUCTION

Hatchery production is currently the dominant component in the Cowlitz River although some natural production also occurs. Cowlitz Salmon Hatchery mitigation goals include 8,300 fall chinook. Original hatchery designs called for 10 million fall chinook juveniles amounting to 66,400 pounds (WDW, 1990).

Toutle River fall chinook are anticipated to be managed as a hatchery stock following the eruption of Mt. St. Helens. The Toutle River has been stocked since at least 1951 with 1 million to 6 million fingerlings released annually until 1980. Toutle production is presently being supplemented with annual production from Beaver Slough on the Green River. In 1987 Toutle Hatchery production was 902,400 fall chinook fingerlings. In 1988, Toutle Hatchery production increased to 2,419,000 fall chinook (WDW, 1990).

The Coweeman River has received plants of fall chinook from at least 1951 to 1979 (WDW, 1990).

Table 1 describes the amount of spawning and rearing habitat by quality, available in the Cowlitz River. This data was derived from the Presence/Absence database of Northwest Power Planning Council, 199 1.

The Northwest Power Planning Council's model showed natural production capacity was 2,183,000 smolts for the Cowlitz River below Mayfield. Above Mayfield, the Northwest Power Planning Model estimated 357,000 smolts could be produced from the Tilton River and 4,028,000 above Cowlitz Falls. Easterbrooks (1980) estimated a maximum of 4,254,000 fall chinook smolts could be produced upstream from Cowlitz Falls. The Northwest Power Planning Council's model also showed production capacity was 2,799,000 smolts in the Toutle River and 602,000 smolts in the Coweeman River.

Fall chinook in the Cowlitz River were historically abundant. In 1951, the Washington Department of Fisheries estimated 10,900 fall chinook returned to the Cowlitz and 500 fall chinook in the Tilton Rivers. In 1961 through 1966, an average of 5,992 adult and 2,543 jack fall chinook were counted at Mayfield Dam (Thompson and Rothfus 1969). From 1983 - 1985, an estimated average of 1,661 natural fall chinook returned to the Cowlitz River (Devore, 1987). The Cowlitz River fall chinook natural spawn escapement from 1978 - 1984 brood years averaged 5,194 with a low return of 2,574 for the 1982 brood and a peak of 11,660 for the 1984 brood. Cowlitz River fall chinook natural spawn escapements by age and brood year are presented in Table 2.

In 1951, the Washington Department of Fisheries estimated escapement of fall chinook in the Toutle River at 6,500 fish. Toutle River fall chinook natural spawning escapement for 1964 through 1979 averaged 6,573 fish (WDW, 1990). The Toutle River, including the mainstem Toutle and South Fork Toutle plus Green River fall chinook spawning ground data following Mt. St. Helens eruption is very limited. Toutle River subbasin fall chinook natural spawn recent escapements by age and brood year are presented in Tables 3, 4, and 5, respectively.

The Washington Department of Fisheries (1951) estimated escapement of fall chinook in the Coweeman River at 5,000 fish. The Coweeman River fall chinook natural spawn escapement from 1978 - 1984 brood years averaged 279 with a low return of 49 for the 1979 brood and a peak of 1,308 for the 1984 brood. Coweeman River fall chinook natural spawn escapements by age and brood year are presented in Table 6.

Cowlitz River Hatchery fall chinook returns from 1978 - 1984 brood years averaged 9,988 with a low return of 4,405 for the 1978 brood and a peak of 21,589 for the 1984 brood. Cowlitz Hatchery fall chinook returns by age and brood year are presented in Table 7.

Toutle Hatchery fall chinook returns from 1972 through 1979 averaged 4,183 fish (WDW, 1990). The Toutle Hatchery (Beaver Slough Pond) was reopened in 1986 after several years of being closed. The Toutle Hatchery new adult rack, trapping and holding facility became operational in the fall of 1990. The opening of the Toutle Hatchery marked the first hatchery collection and spawning since the Mt. St. Helens eruption in 1980. The recent Toutle Hatchery fall chinook return by age and brood year is presented in Table 8.

Cowlitz River tributary sport catch estimates between 1977 - 1986 return years averaged 2,672 fall chinook, ranging from a low of 407 in 1983 to a high of 4,922 in 1978 based on punchcard data. However, specific age and brood year analysis for Cowlitz River sport catch is unavailable.

The Toutle River has been closed to salmon angling since the Mt. St. Helens eruption.

Coweeman River tributary sport catch is limited to jacks (chinook <24") only. Coweeman River tributary sport catch estimates, though minor, are currently unavailable.

ADULT LIFE HISTORY

Run size, catch and escapement

Ocean commercial and recreational fisheries from Alaska to Washington, in addition to Columbia River gill net and sport fisheries all harvest a portion of the Cowlitz River origin fall chinook. The System Planning Model used a combined ocean and Columbia River harvest rate of 87.1 percent (WDW, 1990). In 1980 and 1981, a terminal commercial gillnet fishery in the lower Cowlitz River targeted primarily Toutle River fall chinook. Overall, Columbia River sport and commercial fisheries are managed to ensure attainment of hatchery egg-take requirements.

Strays from other lower river hatcheries and natural production are not unusual. Cowlitz and Toutle Hatchery origin fall chinook coded wire tag recoveries beginning with the 1978 brood through to the 1988 brood are listed in Tables 9 and 10, respectively. Table 11 lists the coded wire tags recovered within the Cowlitz subbasin which originated outside the Cowlitz subbasin.

Time of Migration

Upstream migration begins from early August to early September. Depending partly on early fall rains and tributary migration distances, recruitment to most hatchery collection sites is usually greatest during the middle of September. The Cowlitz Hatchery substock arrives at the collection site slightly later and over a broader time period than other Lower River Hatchery stocks. Figure 1 illustrates the freshwater life history of fall chinook in the Cowlitz.

Spawning Period

Cowlitz Hatchery fall chinook are spawned primarily in late October to early November. Natural spawning generally occurs concurrently with the spawning of the hatchery run.

Spawning Areas

Currently, most Cowlitz River fall chinook natural spawning occurs between the Trout Hatchery (RM 41.3) and the Salmon Hatchery (RM 52.0) with fewer numbers found downstream to the Kelso Bridge. In recent years, Toutle River spawning ground counts have been focused in the area near

the Toutle Hatchery, on the Green River.

Coweeman River fall chinook spawning ground index counts are conducted annually between Mulholland Creek and the Jeep Club Bridge, a distance of about 6.0 miles.

Age Composition

Age ranges from two-year-old jacks to six-year-old adults with three-year-olds or four-year-olds usually the dominant age class. Total age composition data is summarized in Tables 2 through 8. Tables 12 and 13 list the age composition percentages by brood year and freshwaterocean rearing for fall chinook returning to the Cowlitz and Coweeman Rivers spawning grounds, respectively. Table 14 lists the age composition percentages by brood year and freshwater.ocean rearing for fall chinook returning to the Cowlitz Salmon Hatchery.

Sex Ratio

Female fall chinook comprised 50 - 60 percent of the natural spawners in the Cowlitz River between 1981 and 1984 brood years. Female fall chinook comprised 29 - 75 percent of the natural spawners in the Coweeman River between 1981 and 1984 brood years. The percent females by brood year and freshwater.ocean rearing ages for Cowlitz and Coweeman Rivers fall chinook are presented in Tables 15 and 16, respectively.

Female fall chinook comprised 34 - 49 percent of the fall chinook returning to the Cowlitz Hatchery between 1981 - 1984 brood years. The percent females by brood year and freshwaterocean rearing ages for Cowlitz Hatchery returns are presented in Table 17.

The mean fork length by brood year, sex, and freshwater.ocean rearing ages of Cowlitz River natural spawners for 1977 - 1985 brood years are available in Table 18 and 19.

The mean fork length by brood year, sex, and freshwaterocean rearing ages of Coweeman River natural spawners for 1979 - 1984 brood years are listed in Tables 20 and 21.

The mean fork length by brood year, sex, and freshwater.ocean rearing ages for Cowlitz Hatchery returns from 1977 - 1984 brood years are available in Tables 22 and 23.

Fecundity

Fecundity at the Cowlitz Hatchery between 1983 - 1990 return years averaged 4,109 and ranged from a low of 3,898 in 1983 to a high of 4,505 in 1990. Cowlitz, Toutle, and Coweeman Rivers natural spawn and Cowlitz and Toutle Hatcheries fecundity data by age and brood year is unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

Emergence times were estimated to be early May for naturally spawning fry, depending on time of egg deposition and water temperatures (Howell et. al., 1985).

Time. age and size at migration

Hatchery release information for the Cowlitz subbasin by brood year is presented in Table 24. Length data of natural fall chinook smolts from the Cowlitz River subbasin is unavailable. The number of natural juvenile fall chinook salmon that migrate from the Cowlitz River subbasin is also unavailable.

Survival Rate

Egg-to-fry survival at Cowlitz Salmon Hatchery was 92.9 percent for 1982 - 1986. Fry-to-smolt survival was 94 percent resulting in an egg-to-smolt survival of 87.3 percent. Smolt-to-adult survival of hatchery fish for 1980 - 1983 brood years averaged 0.29 percent with a range of 0.05 percent to 0.56 percent (WDW, 1990). Cowlitz River natural spawn survival data is unavailable.

Prior to 1980, Toutle Hatchery fingerling survival was estimated at 0.57 percent. Fry-to-fingerling survival at Toutle Hatchery was 99.6 percent and 98.4 percent for the 1987 and 1988 releases, respectively. Smolt-to-adult survival for Toutle River fall chinook averaged 0.57 percent (WDW, 1990). Toutle River natural spawn survival data is unavailable.

Coweeman River fall chinook smolt-to-adult survival was estimated to be 0.25 percent (WDW, 1990).

BIOCHEMICAL-GENETIC CHARACTERISTICS

Data not available.

DISEASE

Bacteria and parasitic diseases found in the Cowlitz Hatchery are listed in Table 25. (WDF Salmon Culture, Olympia)

Figure 1 (TT). Freshwater life history of fall chinook in the Cowlitz River. The developmental stage timing represents basinwide averages, local conditions may cause some variability.

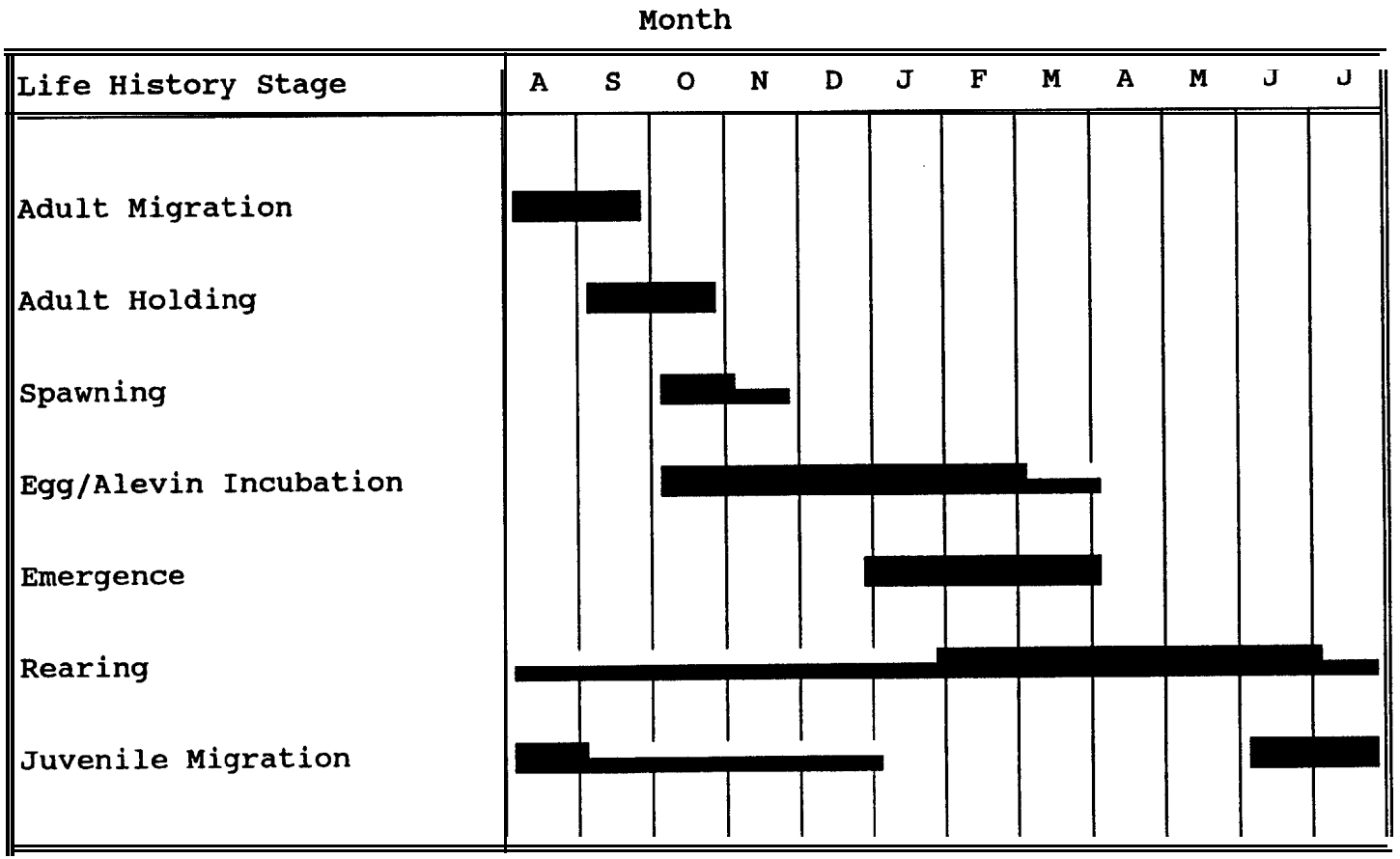

Table 1 (FIB-l). Estimated amount of rearing and spawning habitat, by quality, of the Cowlitz River fall chinook production area.

Distance/Area	Excellent	Good	Fair[a]	Poor[a]	Unknown	Total	Confidence
Miles (%)	0.02	0.40	0.40	0.18		208.8	
Acres (%)	0.02	0.42	0.35	0.21		1186.c	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database of Northwest Power Planning Council, 199 1.

Table 2 (RN-l). Total natural spawner escapement of fall chinook to the Cowlitz River by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974					0		
1975				218	0		
1976			1,354	328	0		
1977		846	2,844	372	11		
1978	272	819	2,066	266	11	3,434	3,162
1979	829	586	2,627	177	0	4,219	3,390
1980	126	750	2,197	1,044	163	4,280	4,154
1981	41	192	2,756	367	13	3,369	3,328
1982	29	500	1,340	479	226	2,574	2,545
1983	500	1,518	3,943	787	74	6,822	6,322
1984	323	1,495	6,251	3,451	140	11,660	11,337
1985	460	436	2,980	848			
1986	290	715	1,504				
1987	155	206					
1988	52						

Age composition based on scale reading analysis except:

Hatchery age composition used for the 1981 return year.

1980-1981 return year - adult proportion based on sampling data from Cowlitz Salmon Hatchery.

1985 return year - total escapement includes 244 spring chinook.

1988 return year - excludes 78 spring chinook based on CWT recoveries during fall chinook surveys.

Table 3 (RN-2). Total age of natural spawner escapement of fall chinook to the mainstem Toutle River by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974					0		
1975				3	0		
1976			18	7			
1977		12	41				
1978	4	14					
1979	0						
1980							
1981							
1982							
1983							
1984							
1985							
1986							
1987							
1988							

Age based on scale reading analysis.

Table 4 (RN-3). Total age of natural spawner escapement of fall chinook to the South Fork Toutle River by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974					0		
1975				0	0		
1976			0	9			
1977		0	53				
1978	0	19			0		
1979	0			1	0		
1980			5	2			
1981		2	5				
1982	1	1					
1983	1						
1984							
1985							
1986							
1987							
1988							

Age based on scale reading analysis except:

1981 return year- age composition from the 1981 Cowlitz terminal adult catch.

1980 return year- unsurveyable due to Mt. St. Helens eruption.

Table 5 (RN-4). Total age of natural spawner escapement of fall chinook to the Green River by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974					0		
1975				0	0		
1976			0	1			
1977		0	7				
1978	0	2					
1979	0						
1980							
1981							
1982							
1983							
1984					0		
1985				0			
1986			55				
1987		68					
1988	0						

Age based on scale reading analysis except:

1981 return year- age composition from the 1981 Cowlitz terminal adult catch.

1980 return year- no fish found during stream surveys; Mt. St. Helens eruption in May.
1990 return year- does not include 19 adults and 24 jacks passed upstream from the hatchery.

Table 6 (RN-5). Total natural spawner escapement of fall chinook to the Coweeman River by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974					0		
1975				4	0		
1976			28	4	0		
1977		18	23	6	0		47
1978	6	8	42	0	0	56	50
1979	3	15	20	11	0	49	46
1980	13	20	108	15	9	165	152
1981	0	17	113	26	0	156	156
1982	28	30	44	15	0	117	89
1983	10	18	31	44	0	103	93
1984	27	16	813	441	11	1,308	1,281
1985	24	170	262	61			
1986	81	67	100				
1987	24	69					
1988	27						

Age based on scale reading analysis except:

1980 return year - Jack proportion based on the total return to Cowlitz Hatchery and adult proportion based on Cowlitz Hatchery sampling data.

1981 return year - Age composition from 1981 Cowlitz terminal.

1982 return year - Cowlitz Hatchery age composition was used.

Table 7 (RH-1). Total hatchery returns of fall chinook to the Cowlitz River by brood year.

Brood Year	Total Age 2	3	4	5	6	Total	Adult Total
1974					0		
1975				171	0		
1976			1,088	385	2		
1977		709	3.346	360	4		
1978	221	966	2,941	277	0	4,405	4,184
1979	976	1,118	3.054	124	5	5,277	4.301
1980	993	2,965	4,394	837	0	9,189	8,196
1981	166	1,016	4,177	728	0	6,087	5,921
1982	169	1,835	2.644	318	0	4,966	4.797
1983	2,928	7,613	7,245	598	22	18,406	15,478
1984	1,695	4,454	11.869	3,351	220	21,589	19.894
1985	943	1,755	6,229	981			
1986	529	2,291	3,735				
1987	344	1,501					
1988	393						

Age based on scale reading analysis.

1988 return year includes 600 adults recycled downstream.

1987 return year excludes 6 fish released back into the river.

Cowlitz Hatchery escapement is based on actual return. However, CWT recoveries suggest some spring chinook may have been called fall chinook and vice versa.

Table 8 (RH-2). Total hatchery returns of fall chinook to the Toutle River by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974							
1975							
1976							
1977							
1978							
1979							
1980							
1981							
1982							
1983							
1984					0		
1985				2			
1986			220				
1987		31					
1988	27						

Age based on scale reading analysis.

1990 return includes 19 adults and 24 jacks put upstream to spawn naturally.

Table 9 (AE-1). Emigration of coded wire tagged fall chinook from the Cowlitz River.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Cowlitz H	Kalama, 1980	Hatchery	---	2	5
Cowlitz H	Lewis River, 1980	Spawning Ground	3,344	3	14
Cowlitz H	Lewis, 1981	Hatchery	746	1	1
Cowlitz H, released Lower Columbia streams	Grays, 1981	Hatchery	85	2	2
Cowlitz H	Cowlitz River, 1982	Spawning Ground	398	1	6
Cowlitz H	Lewis River, 1982	Spawning Ground	2,939	1	3
Cowlitz H	Lewis River, 1982	Spawning Ground	2,939	1	3
Cowlitz H, released Lower Columbia streams	Grays, 1982	Hatchery	701	1	1
Cowlitz H, released Lower Columbia streams	Cowlitz River, 1982	Spawning Ground	398	1	6
Cowlitz H, released Lower Columbia streams	Kalama River, 1982	Spawning Ground	1,263	1	3
Cowlitz H	Lewis, 1982	Hatchery	383	1	1
Cowlitz H, released Lower Columbia streams	Elochoman, 1982	Hatchery	2,062	1	1
Cowlitz H, released Lower Columbia streams	Cowlitz River, 1982	Spawning Ground	398	1	6
Cowlitz H	Abernathy, 1984	Hatchery	742	1	1
Cowlitz H	Cowlitz River, 1985	Spawning Ground	1,061	3	13
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	1	2

Table 9 (cont.) Emigration of coded wire tagged fall chinook from the Cowlitz River.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Cowlitz H	Cowlitz River, 1985	Spawning Ground	1,061	5	22
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	3	7
Cowlitz H	Cowlitz River, 1987	Spawning Ground	2,556	6	15
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	4	10
Cowlitz H	Cowlitz River, 1987	Spawning Ground	2,556	6	15
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	4	10
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	2	5
Cowlitz H	Cowlitz River, 1987	Spawning Ground	2,556	2	5
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	4	10
Cowlitz H	Cowlitz River, 1987	Spawning Ground	2,556	8	20
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	4	10
Cowlitz H	Cowlitz River, 1987	Spawning Ground	2,556	5	13
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	4	10
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	1	2
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	2	5
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	8	21

Table 9 (cont.) Emigration of coded wire tagged fall chinook from the Cowlitz River.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Cowlitz H	Cowlitz River, 1989	Spawning Ground	2,950	5	13
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	1	2
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	8	21
Cowlitz H	Cowlitz River, 1989	Spawning Ground	2,950	6	15
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	3	8
Cowlitz H	Cowlitz River, 1989	Spawning Ground	2,950	5	13
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	10	26
Cowlitz H	Cowlitz River, 1989	Spawning Ground	2,950	4	10
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	7	18
Cowlitz H	Cowlitz River, 1989	Spawning Ground	2,950	9	23
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	7	18
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	7	18
Cowlitz H	Cowlitz River, 1989	Spawning Ground	2,950	8	21
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	4	11
Cowlitz H	Cowlitz River, 1989	Spawning Ground	2,950	16	41
Cowlitz H	Cowlitz River, 1989	Spawning Ground	2,950	6	15
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Cowlitz H	Cowlitz River, 1989	Spawning Ground	2,950	2	5
Cowlitz H	Kalama Falls, 1986	Hatchery	3,672	3	3

Table 9 (cont.) Emigration of coded wire tagged fall chinook from the Cowlitz River.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Cowlitz H	Kalama Falls, 1987	Hatchery	4,307	1	1
Cowlitz H	Kalama Falls, 1986	Hatchery	3,672	1	1
Cowlitz H	Kalama Falls, 1988	Hatchery	3,438	1	1
Cowlitz H	Kalama Falls, 1989	Hatchery	2,432	1	1
Cowlitz H	Kalama River, 1988	Spawning Ground	3,814	1	8
Cowlitz H	Kalama River, 1989	Spawning Ground	3,957	1	5
Cowlitz H	Lower Kalama, 1986	Hatchery	2,495	1	1
Cowlitz H	Lower Kalama, 1986	Hatchery	2,495	1	1
Cowlitz H	N.F. Lewis River, 1986	Spawning Ground	3,375	1	5
Cowlitz H	N.F. Lewis River, 1986	Spawning Ground	3,375	2	9
Cowlitz H	N.F. Lewis River, 1987	Spawning Ground	4,939	1	4
Cowlitz H	N.F. Lewis River, 1986	Spawning Ground	3,375	3	14
Cowlitz H	N.F. Lewis River, 1986	Spawning Ground	3,375	1	5
Cowlitz H	Lewis River & Cedar Creek, 1988	Spawning Ground	3,679	1	4
Cowlitz H	Lewis River & Cedar Creek, 1988	Spawning Ground	3,679	1	4
Cowlitz H	Lewis River & Cedar Creek, 1989	Spawning Ground	5,808	1	4
Cowlitz H	Lewis River & Cedar Creek, 1989	Spawning Ground	5,808	1	4

Table 9 (cont.) Emigration of coded wire tagged fall chinook from the Cowlitz River.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Cowlitz H	Lewis River & Cedar Creek, 1989	Spawning Ground	5,808	1	4
Cowlitz H	Lewis River & Cedar Creek, 1989	Spawning Ground	5,808	1	4
Cowlitz H	Priest Rapids	Hatchery	7,813	1	2

*Based on the following tag codes: 63-19-42, 63-21-54, 63-19-51, 63-21-56, 63-21-59, 63-22-55, 63-23-27, 63-23-28, 63-24-62, 63-25-03, 63-30-19, 63-30-20, 63-31-24, 63-31-25, 63-32-35, 63-32-36, 63-32-37, 63-32-38, 63-34-48, 63-34-49, 63-34-50, 63-34-51, 63-41-08, 63-41-26, 63-38-33, and 63-25-03.

Beginning with the 1978 brood.

Table 10 (AE-2). Emigration on coded wire tagged fall chinook from the Toutle River.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Toutle Hatchery	Kalama, 1980	Hatchery	---	2	5
Toutle Hatchery	Cowlitz, 1981	Hatchery	5,673	4	4
Toutle Hatchery	Kalama, 1981	Hatchery	5,987	1	1
Toutle Hatchery	Cowlitz, 1982	Hatchery	5,414	3	3
Toutle Hatchery	Cowlitz, 1982	Hatchery	5,414	12	12
Toutle Hatchery	Kalama, 1982	Hatchery	1,711	11	11
Toutle Hatchery	Lewis, 1982	Hatchery	383	1	1
Toutle Hatchery	Kalama River, 1982	Spawning Ground	1,263	4	12
Toutle Hatchery	Cowlitz, 1983	Hatchery	5,969	1	1
Toutle Hatchery	Cowlitz, 1983	Hatchery	5,969	3	3
Toutle Hatchery	Cowlitz River, 1983	Spawning Ground	607	1	6

*Based on the following tag codes: 63-19-41, 63-18-54, and 63-18-01.

Table 11 (AI). Immigration of coded wire tagged fall chinook into the Cowlitz subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Lewis River (wild)	Cowlitz River, 1981	Spawning Ground	381	1	14
Lewis River (wild) reared at Speelyai H	Cowlitz, 1981	Hatchery	5,673	2	2
Lewis River (wild)	Cowlitz, 1981	Hatchery	5,673	1	1
Lewis River (wild) reared at Speelyai H	Cowlitz, 1982	Hatchery	5,414	1	1
Lewis River (wild) reared at Speelyai H	Cowlitz, 1982	Hatchery	5,414	2	2
Lewis River (wild)	Cowlitz, 1982	Hatchery	5,414	1	1
Lewis River(wild)	Cowlitz River, 1982	Spawning Ground	398	1	6
Toutle H	Cowlitz, 1981	Hatchery	5,673	4	4
Toutle H	Cowlitz, 1982	Hatchery	5,414	3	3
Toutle H	Cowlitz, 1982	Hatchery	5,414	12	12
Kalama Falls H	Cowlitz River, 1982	Spawning Ground	398	1	1
Cowlitz H	Cowlitz River, 1982	Spawning Ground	398	1	6
Cowlitz H, released Lower Columbia Streams	Cowlitz River, 1982	Spawning Ground	398	1	6
Cowlitz H, released Lower Columbia Streams	Cowlitz River, 1982	Spawning Ground	398	1	6
Spring Creek H, released Big White Salmon River	Cowlitz, 1981	Hatchery	5,673	1	1
Spring Creek H, released Hammond	Cowlitz, 1981	Hatchery	5,673	1	1

Table 11. (cont.) Immigration of coded wire tagged fall chinook into the Cowlitz subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Cowlitz H	Cowlitz River, 1987	Spawning Ground	2,556	5	13
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	4	10
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	1	2
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	2	5
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	8	21
Cowlitz H	Cowlitz River, 1989	Spawning Ground	2,950	5	13
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	1	2
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	8	21
Cowlitz H	Cowlitz River, 1989	Spawning Ground	2,950	6	15
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	3	8
Cowlitz H	Cowlitz River, 1989	Spawning Ground	2,950	5	13
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	10	26
Cowlitz H	Cowlitz River, 1989	Spawning Ground	2,950	4	10
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	7	18
Cowlitz H	Cowlitz River, 1989	Spawning Ground	2,950	9	23
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	7	18
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	7	18
Cowlitz H	Cowlitz River, 1989	Spawning Ground	2,950	8	21
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	4	11
Cowlitz H	Cowlitz River, 1989	Spawning Ground	2,950	16	41

Table 11. (cont.) Immigration of coded wire tagged fall chinook into the Cowlitz subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Cowlitz H	Cowlitz River, 1985	Spawning Ground	1,061	3	13
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	1	2
Cowlitz H	Cowlitz River, 1985	Spawning Ground	1,061	5	22
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	3	7
Cowlitz H	Cowlitz River, 1987	Spawning Ground	2,556	6	15
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	4	10
Cowlitz H	Cowlitz River, 1987	Spawning Ground	2,556	6	15
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	4	10
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	2	5
Cowlitz H	Cowlitz River, 1987	Spawning Ground	2,556	2	5
Cowlitz H	Cowlitz River, 1989	Spawning Ground	2,950	6	15
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Cowlitz H	Cowlitz River, 1989	Spawning Ground	2,950	2	5
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	4	10
Cowlitz H	Cowlitz River, 1987	Spawning Ground	2,556	8	20
Cowlitz H	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Cowlitz H	Cowlitz River, 1986	Spawning Ground	1,621	4	10
Lewis River (wild)	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Lewis River (wild)	Cowlitz River, 1989	Spawning Ground	2,950	2	5
Lewis River (wild)	Cowlitz River, 1989	Spawning Ground	2,950	1	3

Table 11. (cont.) Immigration of coded wire tagged fall chinook into the Cowlitz subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Lewis River (wild)	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Lewis River (wild)	Cowlitz River, 1989	Spawning Ground	2,950	2	5
Lewis River (wild)	Cowlitz River, 1989	Spawning Ground	2,950	3	8
Grays River H	Cowlitz, 1989	Hatchery	11,376	1	1
Kalama Falls H	Cowlitz, 1984	Hatchery	5,117	1	1
Kalama Falls H	Cowlitz, 1985	Hatchery	6,434	1	1
Kalama Falls H	Cowlitz River, 1984	Spawning Ground	1,151	4	10
Kalama Falls H	Cowlitz, 1986	Hatchery	10,757	1	1
Lewis River H	Cowlitz, 1988	Hatchery	13,798	1	1
Lewis River H	Cowlitz, 1988	Hatchery	13,798	3	3
Lewis River H	Cowlitz, 1989	Hatchery	11,376	1	1
Lewis River H	Cowlitz River, 1989	Spawning Ground	2,950	3	8
Lewis River H	Cowlitz, 1988	Hatchery	13,798	5	5
Lewis River H	Cowlitz, 1989	Hatchery	11,376	6	6
Lewis River H	Cowlitz River, 1989	Spawning Ground	2,950	1	3
Lower Kalama H	Cowlitz, 1985	Hatchery	6,434	1	1
Washougal H	Cowlitz, 1989	Hatchery	5,658	1	1
Washougal H	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Elochoman H	Cowlitz River, 1985	Spawning Ground	1,061	1	4
Lewis River (wild)	Cowlitz, 1983	Hatchery	5,969	1	1
Kalama Falls H	Cowlitz, 1983	Hatchery	5,969	1	1

Table 11. (cont.) Immigration of coded wire tagged fall chinook into the Cowlitz subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Lewis River H	Cowlitz River, 1983	Spawning Ground	607	1	6
Lower Kalama H	Cowlitz, 1983	Hatchery	5,969	1	1
Speelyai H	Cowlitz River, 1983	Spawning Ground	607	1	6
Toutle/Green River H	Cowlitz, 1983	Hatchery	5,969	1	1
Toutle/Green River H	Cowlitz, 1983	Hatchery	5,969	3	3
Toutle/Green River H	Cowlitz River, 1983	Spawning Ground	607	1	6
Lewis River (wild)	Cowlitz, 1986	Hatchery	10,757	1	1
Lewis River (wild)	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Lewis River (wild)	Cowlitz River, 1989	Spawning Ground	2,950	1	3
Lewis River (wild)	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Lewis River (wild)	Cowlitz River, 1989	Spawning Ground	2,950	2	5
Lewis River (wild)	Cowlitz, 1989	Hatchery	11,376	2	2
Lewis River (wild)	Cowlitz, 1987	Hatchery	11,699	1	1
Lewis River (wild)	Cowlitz, 1988	Hatchery	3,227	1	1
Lewis River (wild)	Cowlitz, 1989	Hatchery	2,950	1	1
Lewis River (wild)	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Lewis River (wild)	Cowlitz River, 1989	Spawning Ground	2,950	2	5
Lewis River (wild)	Cowlitz, 1989	Hatchery	861	1	1
Lewis River (wild)	Cowlitz River, 1989	Spawning Ground	2,950	2	5
Lewis River (wild)	Cowlitz River, 1987	Spawning Ground	2,556	1	3

Table 11. (cont.) Immigration of coded wire tagged fall chinook into the Cowlitz subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Lewis River (wild)	Cowlitz River, 1989	Spawning Ground	2,950	1	3

*Based on the following tag codes: 63-19-10, 63-19-50, H1-02-05, 63-19-20, 63-20-02, 63-19-41, 63-18-54, 63-21-05, 63-19-42, 63-21-54, 63-21-59, 03-47-01, 03-48-01, 63-31-27, 63-34-12, 63-27-38, 63-38-21, 63-38-22, 63-50-62, 63-27-37, 63-34-11, 63-18-01, 63-19-41, 63-18-01, 63-34-10, 63-22-54, 63-34-33, 63-34-16, 63-22-34, 63-18-59, 63-20-36, 63-18-13, 63-20-06, 63-19-50, 63-41-51, 63-41-53, 63-50-61, 63-33-21, 63-20-36, 63-24-60, 63-23-29, 63-34-09, 63-21-56, 63-22-55, 63-23-27, 63-23-28, 63-24-62, 63-25-03, 63-41-08, 63-41-26, 63-30-19, 63-30-20, 63-30-20, 63-31-24, 63-31-25, 63-32-35, 63-32-36, 63-32-37, 63-32-38, 63-34-48, 63-34-49, 63-34-50, and 63-34-51.

Beginning with the 1978 brood.

Table 12 (AC-1). Age composition percentage (freshwater.ocean) by brood year for fall chinook spawning naturally in the Cowlitz River.

Age Composition (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3
1978									
1979									
1980									
1981	191	2.1	12.04	59.16	19.37	0.52	0	5.24	1.57
1982	174	2.3	10.92	71.84	13.22	0.58	0	0.57	0.57
1983	471	4.25	24.42	62.63	7.01	0.21	0.21	0.21	1.06
1984	651	4.3	18.59	38.56	37.63	0.46	0	0.31	0.15
1985									
1986									
1987									
1988									

Age based on scale reading analysis.

Table 13 (AC-2). Age composition percentage (freshwater.ocean) by brood year for fall chinook spawning naturally in the Coweeman River.

		Age Composition (%)				
Brood Year	N	1.1	1.2	1.3	1.4	1.5
1978						
1979						
1980						
1981	18	0	16.67	77.78	5.55	0
1982	14	35.71	21.43	35.72	7.14	0
1983	6	0	33.33	33.33	33.34	0
1984	138	1.45	0.73	31.16	64.49	2.17
1985						
1986						
1987						
1988						

Age based on scale reading analysis.

Table 14 (AC-3). Age composition percentage (freshwater.ocean) by brood year for fall chinook returning to Cowlitz Salmon Hatchery.

Brood Year	N	Age Composition (%) 1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3
1978									
1979									
1980									
1981		2.10	17.84	69.47	7.15	0	0.25	2.69	0.50
1982		2.80	40.99	50.49	3.41	0	0.61	1.70	0
1983		21.73	49.03	25.84	1.99	0	0.13	1.15	0.13
1984		9.81	15.04	56.32	18.13	0.30	0.10	0.10	0.20
1985									
1986									
1987									
1988									

Age based on scale reading analysis.

Table 15 (AS-1). Percent females by brood year and age class (freshwater.ocean) for fall chinook spawning naturally in the Cowlitz River.

% Females

Brood Year	N	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4	Total % Female
1976											
1977											
1978					73.69				57.14	100.00	
1979				52.52	55.56			88.46	100.00		
1980			21.33	61.35	66.67			66.67	75.00		
1981	96	0	26.09	55.75	48.65	100.00	0	60.00	66.67	0	50.26
1982	90	0	15.79	60.00	47.83	100.00	0	0	0	0	51.73
1983	248	0	40.00	59.32	69.70	100.00	0	100.00	40.00	0	52.65
1984	390	0	24.79	66.53	76.73	66.67	0	100.00	100.00	0	59.90
1985											
1986											
1987											
[illegible]											

Age based on scale reading analysis.

Table 16 (AS-2). Percent females by brood year and age class (freshwater.ocean) for fall chinook spawning naturally in the Coweeman River.

Females (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	Total % Female
1976							
1977							
1978							
1979				100.00	100.00		
1980			0	68.42	100.00	100.00	
1981	7	0	0	42.86	100.00	0	38.89
1982	4	0	0	60.00	100.00	0	28.57
1983	4	0	0	100.00	100.00	0	66.67
1984	103	0	0	60.47	83.15	100.00	74.64
1985							
1986							
1987							
1988							

Age based on scale reading analysis.

Table 17 (AS-3). Percent females by brood year and age class (freshwater.ocean) for fall chinook returning to the Cowlitz Salmon Hatchery.

Females (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4	Total % Female
1976											
1977						100.00					
1978					54.84				78.13		
1979				69.33	76.92	100.00		62.32	77.78		
1980			22.04	60.75	73.39		0	64.29	100.00		
1981	572	0	20.28	54.00	72.94	0	0	53.13	66.67	0	48.11
1982	317	0	13.35	58.55	75.00	0	0	57.14	0	0	38.56
1983	779	0	29.06	68.32	84.44	0	0	76.92	0	0	34.47
1984	986	0	17.55	58.36	72.80	66.67	0	50.00	33.33	0	49.10
1985											
1986											
1987											
1988											

Age based on scale reading analysis.

Table 18 (AL-a). Mean fork length by brood year and age class (freshwater.ocean) for female fall chinook spawning naturally in the Cowlitz River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1977									99
N									1
St. Dev.									---
1978				89				89	93
N				14				4	1
St. Dev.				3.56				4.97	---
1979			84	95.2			79	82	
N			125	10			23	3	
St. Dev.			5.61	3.01			4.02	5.29	
1980		74	84	92			80	95.33	
N		16	173	16			2	3	
St. Dev.		6.67	5.41	4.94			2.12	3.21	
1981		76	84	93	72		82	90	
N		6	63	18	1		6	2	
St. Dev.		4.8	5.76	6.18	---		3.14	0.71	
1982		79	86	93					
N		3	75	11					
St. Dev.		7.02	5.77	6.68					

Table 18. (cont.) Mean fork length by brood year and age class (freshwater.ocean) for female fall chinook spawning naturally in the Cowlitz River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1983		71	83				78		
N		46	175				1		
St. Dev.		4.15	5.48				---		
1984		71							
N		30							
St. Dev.		5.58							
1985									
N									
St. Dev.									

Age based on scale reading analysis.

Table 19 (AL-b). Mean fork length by brood year and age class (freshwater.ocean) for male fall chinook spawning naturally in the Cowlitz River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1977									
N									
St. Dev.									
1978				96				92	
N				5				3	
St. Dev.				4.72				3.21	
1979			93	102			94		
N			113	8			3		
St. Dev.			7.21	8.1			7.55		
1980		69	91	102			81	102	
N		59	109	8			1	1	
St. Dev.		6.95	7.44	3.98			---	---	
1981	46	69	93	101			87	105	
N	4	17	50	19			4	1	
St. Dev.	7.09	8.49	7.73	8.39			6.68	---	
1982	42	73	90	104			88	86	
N	4	16	50	12			1	1	
St. Dev.	5.5	7.97	9.46	7.16			---	---	

Table 19. (cont). Mean fork length by brood year and age class (freshwater.ocean) for male fall chinook spawning naturally in the Cowlitz River.

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1983	48	74	92			57			
N	19	69	120			1			
St. Dev.	4.96	6.58	7.95			---			
1984	43	70							
N	28	91							
St. Dev.	5.09	9.35							
1985	41								
N	35								
St. Dev.	4.79								

Age based on scale reading analysis.

Table 20 (AL-c). Mean fork length by brood year and age class (freshwater.ocean) for female fall chinook spawning naturally in the Coweeman River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5
1979			78	95	
N			2	2	
St. Dev.			1.41	7.07	
1980			83	92	100
N			13	2	1
St. Dev.			3.73	0.71	---
1981			84	98	
N			6	1	
St. Dev.			3.27	---	
1982			88		
N			3		
St. Dev.			3.61		
1983					
N					
St. Dev.					
1984					
N					
St. Dev.					

Age based on scale reading analysis.

Table 21 (AL-d). Mean fork length by brood year and age class (freshwater.ocean) for male fall chinook spawning naturally in the Coweeman River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5
1979					
N					
St. Dev.					
1980		64	85		
N		2	6		
St. Dev.		6.36	7.47		
1981		68	90		
N		3	8		
St. Dev.		7.57	4.78		
1982	42	77	87		
N	5	3	2		
St. Dev.	3.27	4.73	2.83		
1983		65.5			
N		2			
St. Dev.		0.71			
1984	42				
N	2				
St. Dev.	2.83				

Age based on scale reading analysis.

Table 22 (AL-e). Mean fork length by brood year and age class (freshwater.ocean) for female fall chinook returning to the Cowlitz Salmon Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1977					89				
N					1				
St. Dev.					---				
1978				89				87	
N				17				25	
St. Dev.				6.49				6.16	
1979			84	92	88		80	86	
N			165	10	1		311	7	
St. Dev.			5.17	6.85	---		5.41	10.49	
1980		71	82	91			79	90	
N		164	582	91			9	3	
St. Dev.		5.07	5.71	5.93			1.51	2.65	
1981		72	84	98			82	82	
N		43	446	62			17	4	
St. Dev.		5.6	5.41	9.45			5.04	7.87	
1982		72	84				76		
N		45	243				8		
St. Dev.		3.57	5.89				3.21		
1983		73							
N		322							
St. Dev.		4.07							

Age based on scale reading analysis

Table 23 (AL-f). Mean fork length by brood year and age class (freshwater.ocean) for male fall chinook returning to the Cowlitz Salmon Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1978				97				96	
N				14				7	
St. Dev.				7.61				7.52	
1979			89	92			84	94.5	
N			73	3			188	2	
St. Dev.			7.96	4.73			6.99	3.54	
1980		69	85	99		60	78		
N		580	376	33		2	5		
St. Dev.		6.74	7.89	8.94		9.9	7.4		
1981	41	69	88	96		58	81	95	
N	25	169	380	23		3	15	2	
St. Dev.	4.83	6.82	7.74	9.45		3.1	9.26	4.24	
1982	44	70	87			55	79		
N	23	292	172			5	6		
St. Dev.	3.99	7.02	8.56			3.91	6.52		
1983	47	72				65			
N	491	786				3			
St. Dev.	3.94	6.31				3.06			
1984	46								
N	197								
St. Dev.	5.55								

Age based on scale reading analysis.

Table 24 (TR). Hatchery releases of fall chinook salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish lb.	Number Released	Release Site		CWT Code
1966	SPRING CREEK	KALAMA FALLS HATCHRY	EmFry	01/31/67	01/31/67	080	467181	COWEMAN R	(26.0003)	UNTAGGED
1966	SPRING CREEK	KALAMA FALLS HATCHRY	EmFry	01/27/67	01/27/67	080	549945	GREEN R	(26.0323)	UNTAGGED
1966	SPRING CREEK	KALAMA FALLS HATCHRY	EmFry	01/30/67	01/30/67	080	546678	GREEN R	(26.0323)	UNTAGGED
1966	SPRING CREEK	SPEELYAI HATCHERY	EmFry	01/19/67	01/19/67	031	243225	TOUTLE R	(26.0227)	UNTAGGED
1966	SPRING CREEK	SPEELYAI HATCHERY	EmFry	01/20/67	01/20/67	031	215280	TOUTLE R	(26.0227)	UNTAGGED
1966	OREGON - BIG CREEK	TOUTLE HATCHERY	EmFry	01/25/67	01/25/67	296	416000	GREEN R	(26.0323)	UNTAGGED
1966	OREGON - BIG CREEK	TOUTLE HATCHERY	Fingr	06/12/67	06/12/67	152	463459	GREEN R	(26.0323)	UNTAGGED
1966	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/15/67	06/15/67	209	789818	GREEN R	(26.0323)	UNTAGGED
1966	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/15/67	06/15/67	209	789818	GREEN R	(26.0323)	UNTAGGED
1966	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/15/67	06/15/67	209	789818	GREEN R	(26.0323)	UNTAGGED
1967	TOUTLE (GREEN RIVER)	COWLITZ HATCHERY	Fingr	05/28/68	05/28/68	85	286535	COWLITZ R	(26.0002)	UNTAGGED
1967	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/12/68	06/12/68	145	902480	COWLITZ R	(26.0002)	UNTAGGED
1967	TOUTLE (GREEN RIVER)	COWLITZ HATCHERY	Fingr	06/25/68	06/25/68	157	446822	COWLITZ R	(26.0002)	UNTAGGED
1967	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/25/68	06/25/68	150	763950	COWLITZ R	(26.0002)	UNTAGGED
1967	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/25/68	06/25/68	135	593460	COWLITZ R	(26.0002)	UNTAGGED
1967	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/25/68	06/25/68	110	884840	COWLITZ R	(26.0002)	UNTAGGED
1967	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/27/68	06/27/68	175	786800	COWLITZ R	(26.0002)	UNTAGGED
1967	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/27/68	06/27/68	173	881089	COWLITZ R	(26.0002)	UNTAGGED
1967	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	05/21/68	05/21/68	483	311855	GREEN R	(26.0323)	UNTAGGED
1967	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/29/68	06/29/68	160	2923650	GREEN R	(26.0323)	UNTAGGED
1968	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/05/69	06/05/69	88	385528	COWLITZ R	(26.0002)	UNTAGGED
1968	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/05/69	06/05/69	85	754545	COWLITZ R	(26.0002)	UNTAGGED
1968	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/25/69	06/25/69	90	384480	COWLITZ R	(26.0002)	UNTAGGED
1968	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/25/69	06/25/69	76	588924	COWLITZ R	(26.0002)	UNTAGGED
1968	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/25/69	06/25/69	74	497132	COWLITZ R	(26.0002)	UNTAGGED
1968	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/25/69	06/25/69	71	482800	COWLITZ R	(26.0002)	UNTAGGED
1968	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/30/69	06/30/69	110	693000	COWLITZ R	(26.0002)	UNTAGGED
1968	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/30/69	06/30/69	105	412965	COWLITZ R	(26.0002)	UNTAGGED
1968	TOUTLE (GREEN RIVER)	KALAMA FALLS HATCHRY	Fingr	06/17/69	06/17/69	225	393750	TOUTLE R	(26.0227)	UNTAGGED
1968	TOUTLE (GREEN RIVER)	KALAMA FALLS HATCHRY	Fingr	06/20/69	06/20/69	203	410263	TOUTLE R	(26.0227)	UNTAGGED
1968	BIG SOOS CREEK	TOUTLE HATCHERY	Fingr	06/23/69	06/23/69	140	134400	GREEN R	(26.0323)	UNTAGGED
1968	BIG SOOS CREEK	TOUTLE HATCHERY	Fingr	06/23/69	06/23/69	135	136350	GREEN R	(26.0323)	UNTAGGED
1968	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/30/69	06/30/69	186	716360	GREEN R	(26.0323)	UNTAGGED
1968	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/30/69	06/30/69	178	2131684	GREEN R	(26.0323)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/10/70	06/10/70	109	711988	COWLITZ R	(26.0002)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/10/70	06/10/70	105	834960	COWLITZ R	(26.0002)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/10/70	06/10/70	80	758000	COWLITZ R	(26.0002)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/10/70	06/10/70	72	696960	COWLITZ R	(26.0002)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/10/70	06/10/70	68	694960	COWLITZ R	(26.0002)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/10/70	06/10/70	67	701959	COWLITZ R	(26.0002)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/11/70	06/11/70	128	354432	COWLITZ R	(26.0002)	UNTAGGED
1969	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/11/70	06/11/70	128	864896	COWLITZ R	(26.0002)	UNTAGGED
1969	BIG SOOS CREEK	TOUTLE HATCHERY	Fingr	06/22/70	06/22/70	156	1547640	GREEN R	(26.0323)	UNTAGGED
1969	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/30/70	06/30/70	91	1144962	GREEN R	(26.0323)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/03/71	02/03/71	1008	300000	COWLITZ R	(26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/08/71	02/08/71	1008	180000	COWLITZ R	(26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/08/71	02/08/71	1008	205000	COWLITZ R	(26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/08/71	02/08/71	1008	235000	COWLITZ R	(26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/10/71	02/10/71	1008	120000	COWLITZ R	(26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/16/71	02/16/71	1008	32000	COWLITZ R	(26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/16/71	02/16/71	1008	136000	COWLITZ R	(26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/16/71	02/16/71	1008	240000	COWLITZ R	(26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/16/71	02/16/71	1008	248000	COWLITZ R	(26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/22/71	02/22/71	1008	272000	COWLITZ R	(26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/22/71	02/22/71	1008	360000	COWLITZ R	(26.0002)	UNTAGGED

Table 24 (cont.). Hatchery releases of fall chinook salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/04/71	03/04/71	1008	280000	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/04/71	03/04/71	1008	280000	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/04/71	03/04/71	1008	536000	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/09/71	03/09/71	1008	190000	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/09/71	03/09/71	1008	241000	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/09/71	03/09/71	1008	272000	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/29/71	03/29/71	1008	272000	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/29/71	03/29/71	1008	272000	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/29/71	03/29/71	1008	272000	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/29/71	03/29/71	1008	430000	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	04/08/71	04/08/71	1008	136000	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	04/08/71	04/08/71	1008	136000	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	04/08/71	04/08/71	1008	272000	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	04/08/71	04/08/71	1008	400000	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/17/71	05/17/71	198	693990	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/17/71	05/17/71	170	692920	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/17/71	05/17/71	161	695520	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/17/71	05/17/71	144	653040	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/11/71	06/11/71	175	730100	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/11/71	06/11/71	135	722790	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/11/71	06/11/71	125	704000	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/11/71	06/11/71	125	712500	COWLITZ R (26.0002)	UNTAGGED
1970	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	05/21/71	05/21/71	331	186450	GREEN R (26.0323)	UNTAGGED
1970	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	05/21/71	05/21/71	180	160920	GREEN R (26.0323)	UNTAGGED
1970	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/25/71	06/25/71	165	655050	GREEN R (26.0323)	UNTAGGED
1970	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/25/71	06/25/71	140	801500	GREEN R (26.0323)	UNTAGGED
1970	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/30/71	06/30/71	116	1351236	GREEN R (26.0323)	UNTAGGED
1970	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	PreSm	10/22/71	10/22/71	15	197475	GREEN R (26.0323)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/26/72	01/26/72	1008	152000	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/26/72	01/26/72	1008	264000	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/02/72	02/02/72	1008	80000	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/02/72	02/02/72	1008	320000	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/09/72	02/09/72	1008	358000	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/10/72	02/10/72	1008	246000	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/10/72	02/10/72	1008	294000	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/10/72	02/10/72	1008	342000	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/14/72	02/14/72	1008	180000	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/14/72	02/14/72	1008	180000	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/17/72	02/17/72	1008	150000	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/21/72	02/21/72	1008	112000	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/21/72	02/21/72	1008	120000	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/21/72	02/21/72	1008	120000	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/07/72	03/07/72	1008	104000	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/07/72	03/07/72	1008	112000	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/15/72	03/15/72	1008	112000	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/02/72	06/02/72	90	1298790	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/15/72	06/15/72	83	2229214	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/23/72	06/23/72	93	934185	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	08/11/72	08/11/72	48	223008	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/01/72	11/01/72	13	153790	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	02/20/73	02/20/73	5	86019	COWLITZ R (26.0002)	UNTAGGED
1971	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	EmFry	03/31/72	03/31/72	1080	216000	TOUTLE R - NF 26.0514	UNTAGGED
1971	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	EmFry	04/12/72	04/12/72	1080	307800	TOUTLE R - SF 26.0248	UNTAGGED
1971	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/26/72	06/26/72	149	2685182	GREEN R (26.0323)	UNTAGGED
1971	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	PreSm	10/20/72	10/20/72	24	38200	GREEN R (26.0323)	150714

Table 24 (cont.). Hatchery releases of fall chinook salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site		CWT Code
1971	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	PreSm	10/20/72	10/20/72	24	104572	GREEN R	(26.9323)	UNTAGGED
1971	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	PreSm	10/20/72	10/20/72	21	101388	GREEN R	(26.9323)	UNTAGGED
1971	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Smolt	01/15/73	01/15/73	17	25517	GREEN R	(26.9323)	150802
1971	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Smolt	01/15/73	01/15/73	17	1054	GREEN R	(26.9323)	UNTAGGED
1971	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Smolt	04/10/73	04/10/73	8	21376	GREEN R	(26.9323)	150804
1972	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/27/73	02/27/73	1106	339900	COWLITZ R	(26.9002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/12/73	03/12/73	1106	500500	COWLITZ R	(26.9002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/24/73	03/24/73	1106	280500	COWLITZ R	(26.9002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/14/73	06/14/73	90	421380	COWLITZ R	(26.9002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/14/73	06/14/73	85	500650	COWLITZ R	(26.9002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/14/73	06/14/73	78	498420	COWLITZ R	(26.9002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/14/73	06/14/73	62	360406	COWLITZ R	(26.9002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/14/73	06/14/73	60	493980	COWLITZ R	(26.9002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/14/73	06/14/73	55	536525	COWLITZ R	(26.9002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/15/73	06/15/73	92	514004	COWLITZ R	(26.9002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/15/73	06/15/73	90	492570	COWLITZ R	(26.9002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/15/73	06/15/73	88	737704	COWLITZ R	(26.9002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/22/73	06/22/73	92	431020	COWLITZ R	(26.9002)	UNTAGGED
1972	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/22/73	06/22/73	89	541120	COWLITZ R	(26.9002)	UNTAGGED
1972	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/05/73	06/05/73	251	152750	GREEN R	(26.9323)	UNTAGGED
1972	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/15/73	06/15/73	200	97194	GREEN R	(26.9323)	151204
1972	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/15/73	06/15/73	200	3006	GREEN R	(26.9323)	UNTAGGED
1972	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/15/73	06/15/73	187	850850	GREEN R	(26.9323)	UNTAGGED
1972	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/30/73	06/30/73	130	69030	GREEN R	(26.9323)	151213
1972	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/30/73	06/30/73	130	2210	GREEN R	(26.9323)	UNTAGGED
1972	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/30/73	06/30/73	133	1892723	GREEN R	(26.9323)	UNTAGGED
1972	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	05/31/73	05/31/73	300	201000	TOUTLE R	-NF 26.0314	UNTAGGED
1972	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	04/18/73	04/18/73	677	333200	TOUTLE R	-SF 26.0248	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/04/74	02/04/74	1106	500500	TILTON R	(26.0560)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/19/74	06/19/74	85	752675	COWLITZ R	(26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/25/74	06/25/74	98	707658	COWLITZ R	(26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/25/74	06/25/74	92	544484	COWLITZ R	(26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/25/74	06/25/74	89	743328	COWLITZ R	(26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/25/74	06/25/74	64	707904	COWLITZ R	(26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/25/74	06/25/74	60	666000	COWLITZ R	(26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/12/74	07/12/74	85	646425	COWLITZ R	(26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/15/74	07/15/74	88	478016	COWLITZ R	(26.0002)	UNTAGGED
1973	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/15/74	07/15/74	83	670391	COWLITZ R	(26.0002)	UNTAGGED
1973	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/10/74	06/10/74	200	138000	GREEN R	(26.0323)	UNTAGGED
1973	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/18/74	06/18/74	155	143220	GREEN R	(26.0323)	UNTAGGED
1973	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	07/01/74	07/01/74	114	592458	GREEN R	(26.0323)	UNTAGGED
1973	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	07/02/74	07/02/74	120	1214280	GREEN R	(26.0323)	UNTAGGED
1973	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	07/05/74	07/05/74	105	791280	GREEN R	(26.0323)	UNTAGGED
1973	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	07/17/74	07/17/74	97	9991	GREEN R	(26.0323)	UNTAGGED
1973	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	PreSm	10/05/74	10/05/74	20	30000	GREEN R	(26.0323)	010204
1973	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	PreSm	10/05/74	10/05/74	20	74639	GREEN R	(26.0323)	UNTAGGED
1973	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	PreSm	10/05/74	10/05/74	20	29840	GREEN R	(26.0323)	010205
1973	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	PreSm	10/05/74	10/05/74	20	74400	GREEN R	(26.0323)	UNTAGGED
1973	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	PreSm	10/05/74	10/05/74	20	148720	GREEN R	(26.0323)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/28/75	03/28/75	1008	51000	COWLITZ R	(26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/06/75	06/06/75	82	2283700	COWLITZ R	(26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/13/75	06/13/75	77	1781780	COWLITZ R	(26.0002)	UNTAGGED
1974	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/17/75	06/17/75	88	1304160	COWLITZ R	(26.0002)	UNTAGGED
1974	BIG SOOS CREEK	TOUTLE HATCHERY	EmFry	03/28/75	03/28/75	1055	262500	TOUTLE R	SF 26.0248	UNTAGGED
1974	BIG SOOS CREEK	TOUTLE HATCHERY	Fingr	06/10/75	06/10/75	135	273645	GREEN R	(26.0323)	UNTAGGED

Table 24 (cont.). Hatchery releases of fall chinook salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1974	BIG SOOS CREEK	TOUTLE HATCHERY	Fingr	06/17/75	06/17/75	140	103320	GREEN R (26.0323)	UNTAGGED
1974	BIG SOOS CREEK	TOUTLE HATCHERY	Fingr	06/25/75	06/25/75	137	60006	GREEN R (26.0323)	UNTAGGED
1974	BIG SOOS CREEK	TOUTLE HATCHERY	Fingr	06/30/75	06/30/75	125	1351875	GREEN R (26.0323)	UNTAGGED
1974	BIG SOOS CREEK	TOUTLE HATCHERY	Fingr	06/30/75	06/30/75	110	513590	GREEN R (26.0323)	UNTAGGED
1974	BIG SOOS CREEK	TOUTLE HATCHERY	Fingr	06/30/75	06/30/75	110	971410	GREEN R (26.0323)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/28/76	02/28/76	1008	315000	MILL CREEK (LACAMAS	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/18/76	03/18/76	1008	559000	MILL CREEK (LACAMAS	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/27/76	02/27/76	1008	110000	TILTON R (26.0560)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/08/76	03/08/76	1008	144000	TILTON R (26.0560)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/27/76	02/27/76	1008	205000	WINSTON CR (26.0541)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/18/76	03/18/76	1008	441000	WINSTON CR (26.0541)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/08/76	06/08/76	92	2920356	COWLITZ R (26.0002)	UNTAGGED
1975	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/24/76	06/24/76	85	2887406	COWLITZ R (26.0002)	UNTAGGED
1975	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	EmFry	03/24/76	03/24/76	1055	180000	GREEN R (26.0323)	UNTAGGED
1975	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/11/76	06/11/76	154	592046	GREEN R (26.0323)	UNTAGGED
1975	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/25/76	06/25/76	92	2450334	GREEN R (26.0323)	UNTAGGED
1975	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	04/13/76	04/13/76	810	200040	TOUTLE R -SF 26.0248	UNTAGGED
1976	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/20/77	05/20/77	76	812820	COWLITZ R (26.0002)	UNTAGGED
1976	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/03/77	06/03/77	87	3011592	COWLITZ R (26.0002)	UNTAGGED
1976	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	05/12/77	05/12/77	352	127300	GREEN R (26.0323)	UNTAGGED
1976	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	05/31/77	05/31/77	198	129310	GREEN R (26.0323)	UNTAGGED
1976	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/03/77	06/03/77	243	103320	GREEN R (26.0323)	UNTAGGED
1976	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/03/77	06/03/77	180	36000	GREEN R (26.0323)	UNTAGGED
1976	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/06/77	06/06/77	177	157374	GREEN R (26.0323)	UNTAGGED
1976	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/24/77	06/24/77	97	1161322	GREEN R (26.0323)	UNTAGGED
1976	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/28/77	06/28/77	122	1212901	GREEN R (26.0323)	UNTAGGED
1976	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/29/77	06/29/77	117	132500	GREEN R (26.0323)	631640
1976	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/29/77	06/29/77	117	2403995	GREEN R (26.0323)	UNTAGGED
1977	WASHOUGAL RIVER	COWLITZ HATCHERY	Fingr	04/12/78	04/12/78	300	454230	COWEMAN R (26.0003)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/18/78	05/18/78	190	261828	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/02/78	06/02/78	121	476296	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/09/78	06/09/78	126	527296	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/15/78	06/15/78	110	522917	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/19/78	06/19/78	133	146001	COWLITZ R (26.0002)	631802
1977	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/19/78	06/19/78	133	510785	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/19/78	06/19/78	133	503262	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/21/78	07/21/78	85	1297695	COWLITZ R (26.0002)	UNTAGGED
1977	TOUTLE (GREEN RIVER)	COWLITZ HATCHERY	Fingr	04/18/78	04/18/78	346	608985	TOUTLE R -NF 26.0314	UNTAGGED
1977	TOUTLE (GREEN RIVER)	COWLITZ HATCHERY	Fingr	04/17/78	04/17/78	329	582856	TOUTLE R -SF 26.0248	UNTAGGED
1977	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/08/78	09/08/78	22	529357	COWLITZ R (26.0002)	UNTAGGED
1977	TOUTLE (GREEN RIVER)	DEER SPRINGS REARING	Fingr	06/12/78	06/12/78	111	758711	DEER CR (26.0404)	UNTAGGED
1977	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	04/12/78	04/12/78	366	257580	GREEN R (26.0323)	UNTAGGED
1977	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	04/14/78	04/14/78	349	140000	GREEN R (26.0323)	UNTAGGED
1977	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	04/21/78	04/21/78	336	444000	GREEN R (26.0323)	UNTAGGED
1977	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	04/25/78	04/25/78	363	172000	GREEN R (26.0323)	UNTAGGED
1977	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/16/78	06/16/78	103	793438	GREEN R (26.0323)	UNTAGGED
1977	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/19/78	06/19/78	98	142797	GREEN R (26.0323)	631763
1977	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/19/78	06/19/78	98	1644510	GREEN R (26.0323)	UNTAGGED
1977	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/19/78	06/19/78	94	841145	GREEN R (26.0323)	UNTAGGED
1977	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	07/07/78	07/07/78	72	126522	GREEN R (26.0323)	631801
1977	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	07/07/78	07/07/78	72	9670	GREEN R (26.0323)	UNTAGGED
1978	TOUTLE (GREEN RIVER)	COWLITZ HATCHERY	EmFry	01/30/79	01/30/79	1008	343000	COWEMAN R (26.0003)	UNTAGGED
1978	TOUTLE (GREEN RIVER)	COWLITZ HATCHERY	EmFry	02/05/79	02/05/79	1106	416000	COWEMAN R (26.0003)	UNTAGGED
1978	TOUTLE (GREEN RIVER)	COWLITZ HATCHERY	EmFry	02/06/79	02/06/79	1106	416000	COWEMAN R (26.0003)	UNTAGGED
1978	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/27/79	10/16/79	55	143568	COWLITZ R (26.0002)	631942

Table 24 (cont.). Hatchery releases of fall chinook salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1978	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/27/79	10/16/79	55	4160107	COWLITZ R (26.0002)	UNTAGGED
1978	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/27/79	10/16/79	25	11080	COWLITZ R (26.0002)	631951
1978	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/27/79	10/16/79	25	321252	COWLITZ R (26.0002)	UNTAGGED
1978	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/27/79	06/27/79	85	3857940	COWLITZ R (26.0002)	UNTAGGED
1978	KALAMA RIVER	COWLITZ HATCHERY	Fingr	05/08/79	05/08/79	215	947456	TOUTLE R -SF 26.0248	UNTAGGED
1978	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/16/79	10/16/79	19	620891	COWLITZ R (26.0002)	UNTAGGED
1978	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	04/04/79	04/04/79	698	275500	GREEN R (26.0323)	UNTAGGED
1978	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/17/79	06/17/79	160	11984	GREEN R (26.0323)	631854
1978	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/17/79	06/17/79	160	218374	GREEN R (26.0323)	UNTAGGED
1978	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/17/79	06/17/79	160	132101	GREEN R (26.0323)	631941
1978	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/17/79	06/17/79	160	2407665	GREEN R (26.0323)	UNTAGGED
1978	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	06/17/79	06/17/79	160	2619537	GREEN R (26.0323)	UNTAGGED
1978	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	03/21/79	03/21/79	796	275000	OUTLET CR (26.0239)	UNTAGGED
1978	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	Fingr	03/21/79	03/21/79	744	275000	TOUTLE R -SF 26.0248	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/13/79	12/13/79	1055	341000	COWLITZ R (26.0002)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/12/80	01/12/80	1055	128000	COWLITZ R (26.0002)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/11/80	07/11/80	123	7011	COWLITZ R (26.0002)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	12/10/79	12/10/79	1055	330000	COWLITZ R (26.0002)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/21/81	04/01/81	9	20719	COWLITZ R (26.0002)	632137
1979	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/21/81	04/01/81	9	543789	COWLITZ R (26.0002)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	03/21/81	03/21/81	9	269678	COWLITZ R (26.0002)	UNTAGGED
1979	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	04/01/81	04/01/81	10	273739	COWLITZ R (26.0002)	UNTAGGED
1980	OREGON - BIG CREEK	COWLITZ HATCHERY	Fingr	05/20/81	05/20/81	127	807000	COWLITZ R (26.0002)	UNTAGGED
1980	LOWER COLUMBIA	COWLITZ HATCHERY	Fingr	06/12/81	06/28/81	77	121271	COWLITZ R (26.0002)	632255
1980	LOWER COLUMBIA	COWLITZ HATCHERY	Fingr	06/12/81	06/28/81	77	2775588	COWLITZ R (26.0002)	UNTAGGED
1980	KALAMA RIVER	COWLITZ HATCHERY	Fingr	06/12/81	06/12/81	77	177430	COWLITZ R (26.0002)	UNTAGGED
1980	COLUMBIA (N BONNEVL)	COWLITZ HATCHERY	Fingr	06/12/81	06/12/81	77	561862	COWLITZ R (26.0002)	UNTAGGED
1980	KALAMA RIVER	COWLITZ HATCHERY	Fingr	06/18/81	06/18/81	67	771186	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/27/81	06/28/81	102	153216	COWLITZ R (26.0002)	632156
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/27/81	06/28/81	102	3128707	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/27/81	06/27/81	120	649070	COWLITZ R (26 0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/27/81	06/27/81	102	759832	COWLITZ R (26 0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/27/81	06/27/81	75	826496	COWLITZ R (26 0002)	UNTAGGED
1980	KALAMA RIVER	COWLITZ HATCHERY	Fingr	06/28/81	06/28/81	100	503671	COWLITZ R (26 0002)	UNTAGGED
1980	COLUMBIA (N BONNEVL)	COWLITZ HATCHERY	Fingr	06/28/81	06/28/81	76	759216	COWLITZ R (26 0002)	UNTAGGED
1980	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/28/81	06/28/81	70	885923	COWLITZ R (26 0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/11/82	05/11/82	131	119603	COWLITZ R (26 0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/03/82	06/03/82	160	200800	COWLITZ R (26 0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/24/82	07/08/82	74	41295	COWLITZ R (26 0002)	632032
1981	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/24/82	07/08/82	74	1163179	COWLITZ R (26 0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/24/82	07/08/82	74	199176	COWLITZ R (26 0002)	632462
1981	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/24/82	07/08/82	74	5395667	COWLITZ R (26 0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/29/82	09/29/82	28	8337	COWLITZ R (26 0002)	632450
1981	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/29/82	09/29/82	28	151663	COWLITZ R (26 0002)	UNTAGGED
1981	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/29/82	09/29/82	28	47450	COWLITZ R (26 0002)	632603
1981	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	09/29/82	09/29/82	28	796550	COWLITZ R (26 0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/06/83	06/23/83	54	150236	COWLITZ R (26 0002)	632503
1982	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/06/83	06/23/83	54	4569164	COWLITZ R (26 0002)	UNTAGGED
1982	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/02/83	11/02/83	20	146355	COWLITZ R (26 0002)	632610
1982	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/02/83	11/02/83	20	815745	COWLITZ R (26 0002)	UNTAGGED
1982	COWLITZ RIVER	GRAYS R HATCHERY -WF	Fingr	06/06/83	06/06/83	100	221300	COWLITZ R (26 0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/06/84	06/21/84	68	48946	COWLITZ R (26.0002)	633019
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/06/84	06/21/84	68	1577248	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/06/84	06/21/84	68	49036	COWLITZ R (26.0002)	633020
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/06/84	06/21/84	68	1578765	COWLITZ R (26.0002)	UNTAGGED

Table 24 (cont.). Hatchery releases of fall chinook salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/06/84	06/21/84	68	48829	COWLITZ R (26.0002)	633124
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/06/84	06/21/84	68	1572769	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/06/84	06/21/84	68	49664	COWLITZ R (26.0002)	633125
1983	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/06/84	06/21/84	68	1598443	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/11/84	10/12/84	17	93495	COWLITZ R (26.0002)	632327
1983	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/11/84	10/12/84	17	391665	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/11/84	10/12/84	17	93665	COWLITZ R (26.0002)	632328
1983	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/11/84	10/12/84	17	391675	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/23/85	06/19/85	67	48634	COWLITZ R (26.0002)	633235
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/23/85	06/19/85	67	1241644	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/23/85	06/19/85	67	48246	COWLITZ R (26.0002)	633236
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/23/85	06/19/85	67	1231747	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/23/85	06/19/85	70	48382	COWLITZ R (26.0002)	633237
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/23/85	06/19/85	70	1235211	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/11/85	06/19/85	57	44126	COWLITZ R (26.0002)	633238
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/11/85	06/19/85	57	1014033	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/09/85	10/09/85	14	47627	COWLITZ R (26.0002)	633448
1984	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/09/85	10/09/85	14	199718	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/09/85	10/09/85	14	47428	COWLITZ R (26.0002)	633449
1984	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/09/85	10/09/85	14	198927	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/09/85	10/09/85	17	49727	COWLITZ R (26.0002)	633450
1984	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/09/85	10/09/85	17	186300	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/09/85	10/09/85	17	49935	COWLITZ R (26.0002)	633451
1984	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/09/85	10/09/85	17	187038	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/20/86	05/20/86	64	725000	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/31/86	06/26/86	60	197500	COWLITZ R (26.0002)	634108
1985	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/31/86	06/26/86	60	4261600	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/18/86	06/18/86	68	1421900	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/18/86	06/18/86	47	498500	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/10/86	07/10/86	62	313000	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/11/86	07/11/86	56	153200	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/20/86	10/20/86	16	484100	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/21/86	10/21/86	13	166200	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/21/86	11/21/86	13	162000	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	11/21/86	11/21/86	11	162000	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/21/86	12/21/86	1194	577000	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/10/87	01/10/87	1194	421000	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/19/87	01/19/87	1194	180000	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/22/87	01/22/87	1008	1447000	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/01/87	02/01/87	1194	170000	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/02/87	02/02/87	1194	338000	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/15/87	02/15/87	1008	1018000	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/17/87	02/17/87	1008	260000	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/05/87	03/05/87	1008	83000	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/11/87	06/19/87	79	207003	COWLITZ R (26.0002)	634126
1986	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/11/87	06/19/87	79	6059797	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/11/87	05/11/87	158	347600	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/11/87	05/11/87	88	199700	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/29/87	05/29/87	63	558300	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/18/87	06/18/87	60	742600	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/07/87	10/07/87	19	193000	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/07/87	10/07/87	18	195000	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/07/87	10/07/87	16	191000	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/09/87	10/09/87	17	188000	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/09/87	10/09/87	14	190000	COWLITZ R (26.0002)	UNTAGGED

Table 24 (cont.). Hatchery releases of fall chinook salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1986	WASHOUGAL RIVER	TOUTLE HATCHERY	Fingr	06/10/87	06/10/87	70	446300	GREEN R (26.0323)	UNTAGGED
1986	KALAMA RIVER	TOUTLE HATCHERY	Fingr	06/10/87	06/10/87	70	456100	GREEN R (26.0323)	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/15/88	01/15/88	1106	377000	COWLITZ R (26.0002)	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/15/88	01/15/88	1106	105000	COWLITZ RIVER -LOWER	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/26/88	01/26/88	1106	144000	COWLITZ RIVER -LOWER	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/02/88	02/02/88	1008	1982000	COWLITZ RIVER -LOWER	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/03/88	02/03/88	1008	145000	COWLITZ RIVER -LOWER	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/10/88	02/10/88	1008	805000	COWLITZ RIVER -LOWER	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/11/88	02/11/88	1008	115000	COWLITZ RIVER -LOWER	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/14/88	06/18/88	50	205308	COWLITZ R (26.0002)	635231
1987	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/14/88	06/18/88	50	6482492	COWLITZ R (26.0002)	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/08/88	10/08/88	21	162500	COWLITZ R (26.0002)	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/08/88	10/08/88	19	163200	COWLITZ R (26.0002)	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/08/88	10/08/88	18	163300	COWLITZ R (26.0002)	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/08/88	10/08/88	17	117900	COWLITZ R (26.0002)	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/08/88	10/08/88	16	162400	COWLITZ R (26.0002)	UNTAGGED
1987	COWLITZ RIVER	COWLITZ HATCHERY	PreSm	10/08/88	10/08/88	15	164200	COWLITZ R (26.0002)	UNTAGGED
1987	GRAYS RIVER	TOUTLE HATCHERY	Fingr	05/30/88	05/30/88	73	92931	GREEN R (26.0323)	633316
1987	GRAYS RIVER	TOUTLE HATCHERY	Fingr	05/30/88	05/30/88	73	2326069	GREEN R (26.0323)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/29/88	12/29/88	1106	844000	BLUE CR (26.0527)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/12/89	01/12/89	1008	782000	BLUE CR (26.0527)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/13/89	01/13/89	1008	967000	BLUE CR (26.0527)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/23/89	01/23/89	1008	487000	BLUE CR (26.0527)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/02/89	02/02/89	1260	30000	BLUE CR (26.0527)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/06/89	02/06/89	1260	76000	BLUE CR (26.0527)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/14/89	02/14/89	1008	316000	BLUE CR (26.0527)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	02/24/89	02/24/89	1008	49000	BLUE CR (26.0527)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/09/89	03/09/89	1296	13000	BLUE CR (26.0527)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	03/10/89	03/10/89	1260	38000	BLUE CR (26.0527)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/11/89	05/11/89	349	46500	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/24/89	06/29/89	70	206145	COWLITZ R (26.0002)	635250
1988	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/24/89	06/29/89	70	7626255	COWLITZ R (26.0002)	UNTAGGED
1988	GRAYS RIVER -WF	GRAYS R HATCHERY -WF	Fingr	06/09/89	06/09/89	64	98541	GREEN R (26.0323)	630419
1988	GRAYS RIVER -WF	GRAYS R HATCHERY -WF	Fingr	06/09/89	06/09/89	64	1419559	GREEN R (26.0323)	UNTAGGED
1988	ELOCHOMAN RIVER	TOUTLE HATCHERY	Fingr	06/09/89	06/09/89	64	868700	GREEN R (26.0323)	UNTAGGED
1989	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/27/89	12/27/89	825	194000	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/04/90	01/04/90	810	62000	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/12/90	01/12/90	825	660000	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/29/90	01/29/90	825	808000	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	01/30/90	01/30/90	825	415000	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	03/29/90	03/29/90	424	147700	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	03/29/90	03/29/90	394	103000	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	03/29/90	03/29/90	322	100700	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	03/29/90	03/29/90	306	103100	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/30/90	06/21/90	57	189406	COWLITZ R (26.0002)	630452
1989	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/30/90	06/21/90	57	6517294	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ RIVER	OLEQUA CREEK (VOL)	PreSm	12/20/90	12/20/90	436	3500	OLEQUA CR (26.0427)	UNTAGGED
1989	KALAMA RIVER	TOUTLE HATCHERY	Fingr	06/05/90	06/05/90	66	1252800	ALDER CR (26.0387)	UNTAGGED
1989	WASHOUGAL RIVER	TOUTLE HATCHERY	Fingr	06/05/90	06/05/90	66	96574	GREEN R (26.0323)	631349
1989	WASHOUGAL RIVER	TOUTLE HATCHERY	Fingr	06/05/90	06/05/90	66	2055526	GREEN R (26.0323)	UNTAGGED
1989	COWLITZ RIVER	WINLOCK ELEMENTARY	Fingr	03/30/90	03/30/90	200	200	OLEQUA CR (26.0427)	UNTAGGED
1990	COWLITZ RIVER	COWLITZ HATCHERY	EmFry	12/29/90	12/29/90	1055	179000	COWLITZ R (26.0002)	UNTAGGED

Table 25 (TD). Parasites and diseases of fall chinook at the Cowlitz Hatchery.

Disease Type	Hatchery	Specific Pathogen
Virus	Cowlitz	IHNV: Infectious Hematopoietic Necrosis
Bacteria	cowlitz	*Yersinia ruckeri* (Enteric Redmouth)
Bacteria	Cowlitz	*Aeromonas Salmonicida* (Furunculosis)
Parasite	Cowlitz	Various Ectoparasites, endoparasistes and Mvxosooridians
Parasite	Cowlitz	Ceratomyxa shasta

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COWLITZ SUBBASIN

Coho Salmon

GEOGRAPHIC LOCATION

The Cowlitz River originates from the slopes and foothills of Mount Rainier and Mount Adams. The drainage encompasses 2,408 square miles. Upper Cowlitz River major tributaries include the Clear Fork, Muddy Fork, Tilton, and Cispus Rivers. Fish migration was blocked to these streams following the construction of Mayfield Dam in 1963 at River Mile (RM) 52. In 1968, Mossyrock, another hydroelectric dam, was constructed at RM 66. The Cowlitz River enters the Columbia River at RM 68 near Longview. The Cowlitz Salmon Hatchery is located 2 miles downstream from Mayfield Dam.

The Toutle and Coweeman Rivers are the major lower river tributaries accessible to coho. The Toutle River enters the Cowlitz at RM 20 and the Coweeman enters the Cowlitz at RM 2. Major Toutle River tributaries include the North and South Fork Toutle and Green Rivers.The Toutle Hatchery was destroyed in the 1980 eruption of Mt. St. Helens. Deer Springs rearing pond was later destroyed by failure of a Corps of Engineers flood control structure in the winter of 1981 - 1982. The present salmon culture facility on the Toutle is the Beaver Slough.

ORIGIN

Native populations of coho were historically present in the Cowlitz River. Hatchery coho have been planted in the subbasin since at least 1915, when the Tilton River Hatchery operated downstream of Morton, until 1921. A salmon hatchery also operated in the upper Cowlitz near the mouth of the Clear Fork until 1949 when it was abandoned due to low water temperatures. Currently, brood stock is collected via hatchery rack returns (WDW, 1990). Late stock coho (Type-N) are informally considered synonymous with Cowlitz River stock coho. Late stock hatchery programs were developed utilizing Cowlitz River stock, their derivatives, or native late runs. Late coho used in most of the current programs are presumably a blend of all of these, although egg transfers from Cowlitz Hatchery occur most frequently (Howell et al. 1985). Cowlitz river coho became known as Type-N for turning north once they reached the ocean.

Native populations of coho were also historically present in the Toutle River. Most existing early coho (Type-S) hatchery programs are considered to be linked to native Toutle River stock coho. These fish provided the basis for coho rearing program, which began in 1952 at the Toutle Hatchery on the Green River. The hatchery program was very successful and, consequently, surplus eggs were readily available for transfer to other stations (Howell et al. 1985). Toutle River coho became known as Type-S for turning south once they reached the ocean. Since the eruption of Mt. St. Helens, several lower river hatchery brood stock have been used. The sources include Grays River, Cowlitz, Kalama, and Washougal Hatcheries (WDW, 1990).

DISTRIBUTION

Historically coho were found in all the streams of the Cowlitz River. Recently distribution has been primarily confined below Mayfield Dam. A number of lower Cowlitz River small tributaries have good to excellent coho production potential. Among these are Olequa, Lacamas, Ostrander, Blue, Otter, Brights, Mill, Arkansas, Foster, and Hill Creeks (WDF, 1973). Because coho have not been observed to host the IHN virus (infectious hematopoietic necrosis) in the Cowlitz River, coho adults are usually released annually in the Tilton River and upper Cowlitz River (WDW, 1990).

A number of Toutle River small tributaries had good to excellent coho potential before Mt. St. Helens eruption in 1980. Among these were tributaries to the North and South Forks Toutle, and

Green Rivers.

PRODUCTION

In 1951, the Washington Department of Fisheries estimated coho escapement at about 32,500 fish. In the Cowlitz River, an average of 24,579 coho were counted past Mayfield for 1961 through 1966 (Thompson and Rothfus, 1969). More than 15,700 coho were released upstream from the Cowlitz Hatchery annually to spawn naturally from 1967 through 1971 (WDF, 1973). Cowlitz Salmon Hatchery was completed in 1967. Presently, most coho in the Cowlitz River are of hatchery origin (WDW, 1990). Of the 4,635 Cowlitz River naturally spawning coho in 1985, an estimated 91 percent were thought to have originated from hatchery smolt releases (Devore, 1987). Hatchery fingerling releases could account for the additional natural fish. From 1983 through 1988 an average of 1,929 adults, mostly males, were planted into the Tilton River whereupon they tended to drop downstream out of the Tilton (Stober, 1986).

Toutle River coho were historically abundant. Toutle River run size of natural coho for 1972 through 1979 was estimated at 1,743. Coho returns to the Toutle River are rebuilding since the 1980 volcanic eruption of Mount St. Helens. Planting of fingerlings began in 1983. In 1990, the Toutle River Hatchery reported a return of 2,754 adults and 1,49 1 jacks.

Little is known of the historic or present status of Coweeman River coho. The Washington Department of Fisheries (1951) felt the Coweeman was underescaped due to the presence of splash dams blocking production areas. Run size was roughly estimated at 300 hatchery fish and 200 natural fish (WDW, 1990).

Tables 1 and 2 describe the amount of spawning and rearing habitat, by quality, available in the Cowlitz River. This data was derived from the Presence/Absence database of the Northwest Power Planning Council, 1991.

The Northwest Power Planning Council's model estimated smolt production capacity of 123,123 fish for the lower Cowlitz River. Above Mayfield on the Cowlitz River, the Northwest Power Planning Council's model estimated 131,318 smolts could be produced in the Tilton River and Winston Creek, while 155,018 could be produced above Cowlitz Falls, for a total of 286,336 smolts in the upper watershed. Easterbrooks (1980) estimated maximum coho production above Cowlitz Falls at 2,696,800 smolts.

Toutle River natural production capacity was estimated at 142,234 smolts. Present production of natural fish is depressed mainly from habitat degradation from the volcano (WDW, 1990).

Natural production capacity in the Coweeman River was estimated to be 37,797 smolts (WDW, 1990).

The Cowlitz Hatchery was completed in 1967 to maintain the coho run at a mitigation level of 25,500 adults to the hatchery rack. Original hatchery designs called for 5 million coho smolts totaling 231,820 pounds (WDW, 1990).

Cowlitz River subbasin, including the Toutle and Coweeman Rivers, coho natural spawn escapement is unavailable except for 1985. In 1985 an estimated 4,635 coho naturally spawned in the Cowlitz River (Devore, 1987).

Cowlitz Hatchery coho returns from 1978 - 1988 brood years averaged 39,576 with a low return of 20,481 for the 1987 brood and a peak of 70,401 for the 1983 brood. Cowlitz Hatchery returns by age and brood year are presented in Table 3.

From 1972 through 1979, Toutle Hatchery returns averaged 14,406 adults and 702 jacks, a total return of 15,108 fish (Ring, 1987). Toutle Hatchery returns for 1990 by age and brood year are presented in Table 4.

The Cowlitz River tributary sport catch estimates between 1979 through 1988 return years averaged 1,774 adult coho ranging from a low of 604 in 1983 to a high of 4,621 based on punch card and limited actual sampling data. However, specific age and brood year analysis for Cowlitz coho tributary sport catch is unavailable.

The Toutle River sport catch was entirely coho during 1967 - 1968 (WDF, 1973). For 1977 through 1979, harvest in the Toutle averaged 1,061 fish. The Toutle and Coweeman Rivers have been closed to adult sport harvest since 1981. Specific age and brood year analysis for Toutle and Coweeman tributary sport catch is unavailble.

ADULT LIFE HISTORY

Run size, catch and escapement

Ocean commercial and recreational fisheries off the Oregon coast are the primary harvesters of early coho. Hager and Hopley (1981) found harvest of both early Cowlitz and Toutle coho stocks contributed more south of the Columbia River as compared to late Cowlitz coho which contributed more north of the Columbia. The early component of Cowlitz coho is somewhat more southerly distributed in the ocean than the late Cowlitz component but generally not far south a the Toutle stock. The Oregon troll fishery accounts for the highest percentage of the overall catch of early coho. The System Planning Model estimated 73.1 percent of total coho production was harvested in the ocean and Columbia River.

Harvest rates have averaged 79 percent and 85 percent for Type-S and N stocks, respectively, between 1983 and 1987. Harvest of Type-S coho is occasionally constrained by one or more of the fall chinook stocks. Harvest of Type-N coho is generally not constrained by weak stocks, with hatchery escapement being the only management constraint (WDF, 1990). A commercial gill net fishery occurred in the lower Cowlitz in 1980 and 198 1. The catch was 6,618 and 2,764 coho respectively.

Strays from other lower river hatcheries are unusual. Table 5 lists Toutle Hatchery origin stray coded wire tag recoveries beginning with the 1978 brood through the 1988 brood. Tables 6 and 7 list the coded wire tags recovered within the Cowlitz and Toulte Rivers, respectively, which originated outside the Cowlitz subbasin.

Time of Migration

Early coho enter the Columbia River by mid-August and begin returning to the lower Columbia hatcheries in early September. In the mainstem Columbia River early coho predominate from August to mid-September. Stock composition shifts to late coho in late September and October. Typically, the late coho run begins entering freshwater in mid to late September with mid-October considered the main migratory period in the mainstem Columbia River (Howell et al. 1985). Both Type-S and Type-N coho exist in the Cowlitz subbasin. At the Cowlitz Hatchery all coho are considered Type-N stock.

Spawning Period

For Type-S coho, both hatchery and natural spawning occurs around late October, while for Type-N coho spawning will extend from late November through March, with the bulk occurmg in December and early January (Howell et al. 1985).

At Cowlitz Hatchery, fish are selected by arrival time with 10 percent of the eggs selected from mid-September to mid-October returning adults, 80 percent from mid-October through November arriving adults, and 10 percent from adults arriving after November. For 1989, 20 percent, 70 percent, and 10 percent of eggs were taken from the early, middle, and late group, respectively (WDW, 1990).

Spawning Areas

Natural spawning occurs in most areas accessible to coho, especially the Olequa, Lacamas, Brights, Stillwater, Campbell, and Delameter drainages. From 1983 through 1985, an average of 1,929, mostly adult males, were planted into the Tilton River.

Aee composition

Coho return as two-year-old jacks and three-year-old adults. Few coho exceed two summers in the ocean; of 170 marked groups, only eight had any fish return with a third summer in salt water (WDW, 1990). Specific age composition percentage (freshwaterocean) by brood year for coho spawning naturally and hatchery returns are unavailable.

Sex Ratio

Saltwater age composition of hatchery coho in 1977 through 1986 was based on hatchery returns which were 38 percent l-year ocean jacks, 40.2 percent 2-year ocean males, and 21.8 percent 2-year ocean females (WDW, 1990).

Mean fork length of adult returns from Cowlitz N stock for 1968 through 1971 releases was 66.3 cm. Mean lengths of jacks in 1982 through 1984 was 36.4 cm. Mean fork length of Cowlitz N stock in the Columbia River net fishery was 64.9 cm and 68.1 cm in 1971 and 1972, respectively (Hager and Hopley, 1981). However, Cowlitz River hatchery returns and natural spawn escapement mean fork length by brood year and freshwater.ocean rearing ages is unavailable.

Mean length of the 1967 (Hager and Hopley, 1981) and 1972 (Seidel and Mathews, 1977) brood Toutle coho averaged 68.9 cm. The 1972 brood averaged 67.9 cm at the hatchery. However, Toutle River hatchery returns and natural spawn escapement mean fork length by brood year and freshwaterocean rearing is unavailable.

Fecundity

Fecundity of coho spawned from 1982 through 1987 averaged 2,578 eggs per female (n= 34,623) at the Cowlitz Hatchery (WDW, 1990). Cowlitz River natural spawn escapement and hatchery return fecundity by freshwater.ocean rearing and brood year is unavailable.

For 1975 through 1979, fecundity averaged 2,632 eggs per female for Toutle River coho (WDW, 1990). Toutle River natural spawn escapement and hatchery returns fecundity by fresh,water.ocean rearing and brood year is unavailable. Coweeman River natural spawn escapement fecundity is also unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

Fry emergence in the Cowlitz River occurs from January through April (WDW, 1990). Early coho emergence time depends primarily on the temperature of the water in the stream. At 50 degrees F, fertilization to eyed-egg stage takes about 3.5 weeks, eyed-egg to hatching about 2.5 weeks, and

hatching to emergence about 8 weeks (Howell et al. 1985).

Time, age and size at migration

Hatchery release information for the Cowlitz subbasin by brood year is presented in Table 9. The Cowlitz Salmon hatchery plants about 4.8 million yearling smolts annually while over 1 million smolts were planted into the Toutle from the Toutle Hatchery prior to the eruption. In addition, from 1984 through 1987, releases of fry and fingerlings averaged 2,310,400 fish in Cowlitz tributaries, 309,500 in the Cowlitz mainstem, 755,900 in the Toutle watershed, and 252,700 fish in the Coweeman watershed (WDW, 1990).

To provide a sport fishery in the reservoirs prior to 1986, about 600,000 and 2.3 million fingerlings at about 100 to 200 fish per pound were planted from the Cowlitz hatchery into Mayfield and Riffe Lakes, respectively. Since 1986, coho plants into Mayfield Lake have been terminated and Riffe Lake plants have been reduced to 1.2 million fish. Mayfield Lake plants were terminated after 1985 when an average of 0.34 percent and 0.14 percent of Mayfield Lake and Tilton River planted marked fish were caught, respectively (Tipping, 1988).

In recent years, some smolts were produced in the upper Cowlitz by trucking adults and juveniles above Mayfield into the Tilton River and Mayfield Lake. However, the adults planted in the Tilton River tended to drop downstream from the Tilton (Stober, 1986). Juvenile coho in the lake could emigrate downstream through a migrant facility at the dam into the lower river. Of the juveniles released into the lake and river, 2.60 percent and 2.03 percent, respectively, passed through the migrant trap (Tipping, 1988). The number of smolts counted at the dam from 1978 through 1989 (except 1984) averaged 8,246 smolts ranging from a low of 145 in 1989 and a high of 17,150 in 1986. The juveniles observed at the outmigrant trap after Mayfield Lake and Tilton River juvenile plants ceased in 1985 were probably offspring from adults released into the Tilton River and/or juveniles originally released into Riffe Reservoir (WDW, 1990).

Based on coded-wire tag recovery studies by Bottom et al. (1984), arrival in the Columbia River estuary occurs soon after hatchery release. Releases of coded wire tagged 1978 and 1979 brood Toutle coho were recovered at Jones Beach and McGowan in the Columbia River estuary only a few weeks after release. The 1978 and 1979 brood Toutle coho migration rates averaged 8 km/day and 10.5 km/day based on coded wire recoveries from Jones Beach and McGowan, respectively. Jones Beach is located at Columbia River Kilometer (RM) 46.6 and McGowan is at (RM) 10.

Juvenile early run coho have been caught in the ocean primarily off Oregon in may through July and off southern Washington in September during their first summer in the ocean. Ocean distribution of coded wire tagged early run juvenile coho were sampled with purse seines during 1981-84 (Howell et al. 1985).

Length data of natural coho smolts from the Cowlitz River subbasin is unavailable. The number of natural juvenile coho salmon that migrate from the lower Cowlitz, Toutle, and Coweeman Rivers are also unavailable. During sampling of juvenile coho populations in select trubutaries, heaviest abundance of juvenile coho on the Cowlitz River was found between RM 12 to 14 on Lacamas Creek, a small tributary to the Cowlitz River at RM (WDF, 1973).

Survival Rate

Cowlitz Hatchery egg-to-fry survival was 95.1 percent for 1982 through 1986. Fry-to-smolt survival was 89.5 percent resulting in an egg-to-smolt survival of 85.1 percent. Smolt to adult survival of marked production fish for 1981 through 1983 brood years ranged from 1.67 percent to 7.14 percent and averaged 3.65 percent. Smolts released to adult hatchery returns averaged 0.57 percent for the 1981 through 1986 releases. Performance of fry and fingerling releases is unknown

in the Cowlitz and Coweeman Rivers (WDW, 1990).

On the Toutle River egg-to-fry survival averaged 90.6 percent for the 1978 and 1979 broods. Fry-to-smolt survival for the 1978 brood averaged 86.2 percent, resulting in an egg-to-smolt survival of 78.1 percent (WDW, 1990). Smolt-to-adult survival of fish released in April and May 1974 at 18 to 21 fish per pound averaged 4.11 percent (Seidel and Mathews, 1977). For the 1979 release, smolt-to-adult survival averaged 4.32 percent (WDW, 1990). Spring-to-fall survival in three nearly barren post-eruption Toutle tributaries averaged 20.2 percent (Bisson et al. 1988). The purpose of the releases was to supplement natural production.

BIOCHEMICAL-GENETIC CHARACTERISTICS

Hjort and Shreck (1982) compared the phenotypic characters (isozyme gene frequencies, life history and morphology) of coho salmon from Oregon, Washington, and California using agglomerative and divisive cluster analyses. Early coho from Bonneville, Big Creek, and Sandy River hatcheries were profiled along with Cowlitz Hatchery late coho. Although Columbia River coho tended to cluster together within broad comparisons, further segregation into early and late stocks did not occur.

DISEASE

No IHN positive coho have been isolated at Cowlitz Hatchery. Low temperature disease (Cytophaga psychrophillia) has been rated the most severe pathogen, followed by bacterial hemorrhagic septicemia and enteric redmouth (Yersinia ruckeri) (WDW, 1990). Bacteria and parasitic diseases found in the Cowlitz Hatchery are listed in Table 10. (WDF Salmon Culture, Olympia).

Table 1 (HB-1). Estimated amount of rearing and spawning habitat, by quality, of the Cowlitz River coho production area.

Distance/Area	Excellent	Good	Fair'	Poor[a]	Unknown	Total	Confidence
Miles (%)	16	28	52	04		124.2	
Acres (A)	15	26	55	04		251.4	

'Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC , 199 1.

Table 2 (HB-2). Estimated amount of rearing habitat, by quality, of the Cowlitz River coho production area.

Distance/Area	Excellent	Good	Fair[a]	Poor[a]	Unknown	Total	Confidence
Miles (%)	11	25	56	08		142.8	
Acres (%)	08	29	57	06		1135.0	

*Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 1991.

Table 3 (RI-I-l). Total hatchery returns of coho to the Cowlitz Hatchery by brood year.

Brood Year	Total Age 2	3	Total	Adult Total
1978	17,449	27,003	44,452	27,003
1979	12,183	22,528	34,711	22,528
1980	16,577	24,493	41,070	24,493
1981	10,111	26,149	36,260	26,149
1982	4,754	18,610	23,364	18,610
1983	15,296	54,685	69,981	54,685
1984	9,103	18,716	27,819	18,716
1985	19,178	30,888	50,066	30,888
1986	11,104	35,417	46,521	35,417
1987	7,468	13,009	20,477	13,009
1988	11,278			

Age composition based on hatchery personnel designation of adults and jacks. Adults assumed to be 2.1 and jacks 2.0.

Table 4 (RH-2). Total hatchery returns of coho to the Toutle River by brood year.

Brood Year	Total Age 2	3	Total	Adult Total
1978	0	0	0	0
1979	0	0	0	0
1980	0	0	0	0
1981	0	0	0	0
1982	0	0	0	0
1983	0	0	0	0
1984	0	0	0	0
1985	0	0	0	0
1986	0	0	0	0
1987	0	2,745	2,745	2,745
1988	1,491			

Age composition based on hatchery personnel designation of adults and jacks.

Table 5 (AE). Emigration of coded wire tagged coho from the Toutle subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Toutle Hatchery	Toutle (Harrington and Wyart Creeks)	Spawning Ground	3	2	2

*Based on the following tag code: 63-20-58.
Beginning with the 1978 brood.

Table 6 (AI-1). Immigration of coded wire tagged coho into the Cowlitz River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Grays River Hatchery	Cowlitz, 1986	Hatchery	54,685	1	1
Kalama Falls Hatchery	Cowlitz, 1986	Hatchery	54,685	4	4

*Based on the following tag codes: 63-32-59, and 63-31-57.
Beginning with the 1978 brood.

Table 7 (AI-2). Immigration of coded wire tagged coho into the Toutle River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Toutle Hatchery	Toutle River, 1981	Spawning Ground	3	2	2

*Based on the following tag code: 63-20-58.
Beginning with the 1978 brood.

Table 8 (AC-l). Age composition percentage (freshwater.ocean) by brood year for coho returning to Cowlitz hatchery.

Age Composition (%)

Brood Year	N	2.0	2.1
1978		39.25	60.75
1979		35.10	64.90
1980		40.36	59.64
1981		27.88	72.12
1982		20.35	79.65
1983		21.86	78.14
1984		32.72	67.28
1985		38.31	61.69
1986		23.87	76.13
1987		36.47	63.53
1988			

Age composition based on hatchery personnel designation of adults and jacks except: Adults assumed to be 2.1 and jacks 2.0.

N (number of scale samples) not applicable.

Table 9 (TR). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1965	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/26/67	04/26/67	19	112364	GREEN R (26.0323)	UNTAGGED
1965	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/26/67	04/26/67	19	1081225	GREEN R (26.0323)	UNTAGGED
1966	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	06/15/67	06/15/67	100	90100	GREEN R (26.0323)	UNTAGGED
1966	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	EmFry	03/07/67	03/07/67	1163	129950	TOUTLE R -NF 26.0314	UNTAGGED
1966	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	EmFry	03/08/67	03/08/67	1163	157550	TOUTLE R -SF 26.0248	UNTAGGED
1966	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	06/27/67	06/27/67	151	61155	TOUTLE R -NF 26.0314	UNTAGGED
1966	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/15/68	04/15/68	19	95393	GREEN R (26.0323)	UNTAGGED
1966	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/15/68	04/15/68	19	881071	GREEN R (26.0323)	UNTAGGED
1967	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/02/69	04/02/69	17	328219	COWLITZ R (26.0002)	UNTAGGED
1967	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/03/69	04/03/69	17	659617	COWLITZ R (26.0002)	UNTAGGED
1967	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/14/69	04/14/69	20	288619	COWLITZ R (26.0002)	UNTAGGED
1967	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/14/69	04/14/69	18	331908	COWLITZ R (26.0002)	UNTAGGED
1967	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/14/69	04/14/69	18	355681	COWLITZ R (26.0002)	UNTAGGED
1967	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/14/69	04/14/69	18	330588	COWLITZ R (26.0002)	UNTAGGED
1967	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/15/69	04/15/69	20	312880	COWLITZ R (26.0002)	UNTAGGED
1967	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/15/69	04/15/69	20	346924	COWLITZ R (26.0002)	UNTAGGED
1967	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/15/69	04/15/69	18	324720	COWLITZ R (26.0002)	UNTAGGED
1967	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/15/69	04/15/69	18	350118	COWLITZ R (26.0002)	UNTAGGED
1967	TOUTLE RIVER TYPE-S	COWLITZ HATCHERY	Smolt	04/15/69	04/15/69	14	348754	COWLITZ R (26.0002)	UNTAGGED
1967	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/16/69	04/16/69	18	238932	COWLITZ R (26.0002)	UNTAGGED
1967	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/16/69	04/16/69	18	327582	COWLITZ R (26.0002)	UNTAGGED
1967	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/16/69	04/16/69	17	348495	COWLITZ R (26.0002)	UNTAGGED
1967	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/16/69	04/16/69	17	355967	COWLITZ R (26.0002)	UNTAGGED
1967	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/17/69	04/17/69	18	343206	COWLITZ R (26.0002)	UNTAGGED
1967	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/08/68	02/08/68	1134	286143	COWEMAN R (26.0003)	UNTAGGED
1967	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/13/68	02/13/68	1134	206973	DELAMETER CR 26.0192	UNTAGGED
1967	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/17/69	04/17/69	18	1085263	GREEN R (26.0323)	UNTAGGED
1968	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/06/70	04/06/70	17	398488	COWLITZ R (26.0002)	UNTAGGED
1968	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/06/70	04/06/70	15	114770	COWLITZ R (26.0002)	UNTAGGED
1968	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/06/70	04/06/70	15	165001	COWLITZ R (26.0002)	UNTAGGED
1968	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/06/70	04/06/70	14	127197	COWLITZ R (26.0002)	UNTAGGED
1968	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/06/70	04/06/70	14	158700	COWLITZ R (26.0002)	UNTAGGED
1968	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/06/70	04/06/70	14	77614	COWLITZ R (26.0002)	UNTAGGED
1968	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/06/70	04/06/70	14	142774	COWLITZ R (26.0002)	UNTAGGED
1968	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/06/70	04/06/70	14	82220	COWLITZ R (26.0002)	UNTAGGED
1968	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/06/70	04/06/70	14	139118	COWLITZ R (26.0002)	UNTAGGED
1968	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/07/70	04/07/70	18	308749	COWLITZ R (26.0002)	UNTAGGED
1968	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/07/70	04/07/70	18	385992	COWLITZ R (26.0002)	UNTAGGED
1968	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/07/70	04/07/70	17	379995	COWLITZ R (26.0002)	UNTAGGED
1968	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/07/70	04/07/70	17	452948	COWLITZ R (26.0002)	UNTAGGED
1968	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/07/70	04/07/70	16	301760	COWLITZ R (26.0002)	UNTAGGED
1968	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/08/70	04/08/70	17	173250	COWLITZ R (26.0002)	UNTAGGED
1968	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/08/70	04/08/70	17	444500	COWLITZ R (26.0002)	UNTAGGED
1968	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/08/70	04/08/70	17	361541	COWLITZ R (26.0002)	UNTAGGED
1968	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/08/70	04/08/70	16	354240	COWLITZ R (26.0002)	UNTAGGED
1968	TOUTLE RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/19/69	02/19/69	1417	111930	BAIRD CR (26.0101)	UNTAGGED
1968	TOUTLE RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/04/69	02/04/69	1417	200900	COWEMAN R (26.0003)	UNTAGGED
1968	TOUTLE RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/04/69	02/04/69	1417	106190	DELAMETER CR 26.0192	UNTAGGED
1968	TOUTLE RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/19/69	02/19/69	1417	110495	MULHOLLAND CR 260084	UNTAGGED
1968	TOUTLE RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/20/69	02/20/69	1417	107625	OSTRANDER CR 26.0132	UNTAGGED
1968	TOUTLE RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/18/69	02/18/69	1417	215250	SALMON CR (26.0479)	UNTAGGED
1968	TOUTLE RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/05/69	02/05/69	1417	159285	TOUTLE R (26.0227)	UNTAGGED
1968	TOUTLE RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/24/69	02/24/69	1417	130585	TOUTLE R (26.0227)	UNTAGGED
1968	TOUTLE RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/24/69	02/24/69	1417	289870	TOUTLE R (26.0227)	UNTAGGED
1968	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	EmFry	03/21/69	03/21/69	1620	54400	COLDWATER CR 26.0418	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1968	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	EmFry	03/11/69	03/11/69	1620	59200	HOFFSTADT CR 26.0396	UNTAGGED
1968	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	EmFry	03/10/69	03/10/69	1620	120000	TOUTLE R -NF 26.0314	UNTAGGED
1968	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	EmFry	03/10/69	03/10/69	1620	179200	TOUTLE R -SF 26.0248	UNTAGGED
1968	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	07/17/69	07/17/69	180	11160	ALDER CR (26.0387)	UNTAGGED
1968	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	06/10/69	06/10/69	315	12600	BEAR CREEK (26)	UNTAGGED
1968	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	06/10/69	06/10/69	315	85995	TOUTLE R -SF 26.0248	UNTAGGED
1968	TOUTLE (GREEN) TYP-S	TOUTLE HATCHERY	Smolt	04/17/70	04/17/70	18	1390140	GREEN R (26.0323)	UNTAGGED
1969	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/01/71	04/01/71	17	303365	COWLITZ R (26.0002)	UNTAGGED
1969	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/01/71	04/01/71	17	399245	COWLITZ R (26.0002)	UNTAGGED
1969	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/01/71	04/01/71	15	259095	COWLITZ R (26.0002)	UNTAGGED
1969	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/01/71	04/01/71	15	312600	COWLITZ R (26.0002)	UNTAGGED
1969	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/01/71	04/01/71	15	420000	COWLITZ R (26.0002)	UNTAGGED
1969	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/01/71	04/01/71	15	298294	COWLITZ R (26.0002)	UNTAGGED
1969	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/01/71	04/01/71	14	302695	COWLITZ R (26.0002)	UNTAGGED
1969	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/01/71	04/01/71	13	266695	COWLITZ R (26.0002)	UNTAGGED
1969	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/01/71	04/01/71	12	231240	COWLITZ R (26.0002)	UNTAGGED
1969	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/01/71	04/01/71	11	313390	COWLITZ R (26.0002)	UNTAGGED
1969	GRAYS RIVER TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/11/70	03/11/70	1008	271880	CROOKED CREEK (26)	UNTAGGED
1969	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	03/19/70	03/19/70	1296	133110	BAIRD CR (26.0101)	UNTAGGED
1969	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	03/20/70	03/20/70	1296	199665	COWEMAN R (26.0003)	UNTAGGED
1969	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	03/19/70	03/19/70	1296	137025	MULHOLLAND CR 260084	UNTAGGED
1969	TOUTLE (GREEN) TYP-S	TOUTLE HATCHERY	EmFry	03/09/70	03/09/70	1260	78750	BEAR CREEK (26)	UNTAGGED
1969	TOUTLE (GREEN) TYP-S	TOUTLE HATCHERY	EmFry	03/09/70	03/09/70	1260	90000	DISAPPOINTMENT CR	UNTAGGED
1969	TOUTLE (GREEN) TYP-S	TOUTLE HATCHERY	EmFry	03/10/70	03/10/70	1260	120000	HOFFSTADT CR 26.0396	UNTAGGED
1969	TOUTLE (GREEN) TYP-S	TOUTLE HATCHERY	EmFry	03/18/70	03/18/70	1260	437500	SPIRIT LAKE (26)	UNTAGGED
1969	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	03/16/71	03/16/71	25	45466	GREEN R (26.0323)	UNTAGGED
1969	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	03/16/71	03/16/71	17	34848	GREEN R (26.0323)	UNTAGGED
1969	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/15/71	04/15/71	17	8500	GREEN R (26.0323)	UNTAGGED
1969	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/20/71	04/20/71	30	93780	GREEN R (26.0323)	UNTAGGED
1969	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/20/71	04/20/71	26	45184	GREEN R (26.0323)	UNTAGGED
1969	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/20/71	04/20/71	17	204765	GREEN R (26.0323)	UNTAGGED
1969	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/20/71	04/20/71	17	389963	GREEN R (26.0323)	UNTAGGED
1969	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/20/71	04/20/71	16	62368	GREEN R (26.0323)	UNTAGGED
1969	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/20/71	04/20/71	15	35025	GREEN R (26.0323)	UNTAGGED
1969	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/20/71	04/20/71	13	59840	GREEN R (26.0323)	UNTAGGED
1969	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	05/17/71	05/17/71	28	53900	GREEN R (26.0323)	UNTAGGED
1969	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	05/17/71	05/17/71	16	34549	GREEN R (26.0323)	UNTAGGED
1969	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/05/71	04/05/71	20	181898	TOUTLE R -NF 26.0314	UNTAGGED
1969	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/15/71	04/15/71	17	118800	TOUTLE R -NF 26.0314	UNTAGGED
1969	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/12/71	04/12/71	17	199410	TOUTLE R -SF 26.0248	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/22/71	04/22/71	1296	101400	CEDAR CR (26.0486)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	05/04/71	05/04/71	1296	100100	CEDAR CR (26.0486)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	05/11/71	05/11/71	1296	101400	CEDAR CR (26.0486)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	05/05/71	05/05/71	1296	191100	DEVILS CR (26.0330)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	05/05/71	05/05/71	1296	91000	ELK CR (26.0353)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	05/10/71	05/10/71	1296	110500	ELK CR (26.0353)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	05/10/71	05/10/71	1296	331500	GREEN R (26.0323)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	05/11/71	05/11/71	1296	110500	GREEN R (26.0323)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/19/71	04/19/71	1296	100100	LACAMAS CR (26.0467)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/22/71	04/22/71	1296	119600	LACAMAS CR (26.0467)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	05/17/71	05/17/71	1296	113100	LACAMAS CR (26.0467)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/19/71	04/19/71	1296	98800	SALMON CR (26.0479)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	05/04/71	05/04/71	1296	101400	SALMON CR (26.0479)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	05/11/71	05/11/71	1296	106600	SALMON CR (26.0479)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	05/11/71	05/11/71	1296	101400	SCHULTZ CR (26.0359)	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/22/71	04/22/71	1296	100100	WINSTON CR (26.0541)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	05/04/71	05/04/71	1296	100100	WINSTON CR (26.0541)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	06/24/71	06/24/71	278	200043	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	06/24/71	06/24/71	270	200610	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	06/25/71	06/25/71	183	67710	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	06/25/71	06/25/71	170	54400	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	06/30/71	06/30/71	319	144000	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/11/72	04/11/72	14	345996	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/21/72	04/21/72	15	1074990	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/21/72	04/21/72	14	1031282	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/21/72	04/21/72	13	1562067	COWLITZ R (26.0002)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/21/72	04/21/72	12	398496	COWLITZ R (26.0002)	UNTAGGED
1970	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	12/19/71	12/19/71	1163	217620	BAIRD CR (26.0101)	UNTAGGED
1970	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	12/24/71	12/24/71	1163	215280	DELAMETER CR 26.0192	UNTAGGED
1970	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	12/23/71	12/23/71	1163	215280	GOBLE CR (26.0035)	UNTAGGED
1970	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	12/22/71	12/22/71	1163	215280	MULHOLLAND CR 260084	UNTAGGED
1970	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	12/19/71	12/19/71	1163	215280	OSTRANDER CR 26.0132	UNTAGGED
1970	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Fingr	05/13/71	05/13/71	309	200200	COWEMAN R (26.0003)	UNTAGGED
1970	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Smolt	04/05/72	04/05/72	16	20800	STANKY CREEK (26)	UNTAGGED
1970	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/01/71	04/01/71	560	281120	COWEMAN R (26.0003)	UNTAGGED
1970	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/01/71	04/01/71	527	265000	COWEMAN R (26.0003)	UNTAGGED
1970	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/22/71	04/22/71	401	180000	COWLITZ R (26.0002)	UNTAGGED
1970	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/22/71	04/22/71	401	320000	COWLITZ R (26.0002)	UNTAGGED
1970	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/22/71	04/22/71	381	133000	COWLITZ R (26.0002)	UNTAGGED
1970	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/22/71	04/22/71	381	285000	COWLITZ R (26.0002)	UNTAGGED
1970	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/02/71	04/02/71	613	201019	GOBLE CR (26.0035)	UNTAGGED
1970	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/08/71	04/08/71	540	138240	OSTRANDER CR 26.0132	UNTAGGED
1970	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/08/71	04/08/71	477	118792	OSTRANDER CR 26.0132	UNTAGGED
1970	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/22/71	04/22/71	381	285000	WINSTON CR (26.0541)	UNTAGGED
1970	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	EmFry	03/21/71	03/21/71	1194	120000	BEAR CREEK (26)	UNTAGGED
1970	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	EmFry	03/22/71	03/22/71	1194	99600	CEDAR CR (26.0486)	UNTAGGED
1970	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	EmFry	03/22/71	03/22/71	1194	150000	CEDAR CR (26.0486)	UNTAGGED
1970	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	EmFry	03/23/71	03/23/71	1194	75600	CEDAR CR (26.0486)	UNTAGGED
1970	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	EmFry	03/23/71	03/23/71	1194	75600	CEDAR CR (26.0486)	UNTAGGED
1970	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	EmFry	03/21/71	03/21/71	1194	109200	GREEN R (26.0323)	UNTAGGED
1970	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	EmFry	03/21/71	03/21/71	1194	50400	RAPID CR (26.0512)	UNTAGGED
1970	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	EmFry	03/23/71	03/23/71	1194	150000	SALMON CR (26.0479)	UNTAGGED
1970	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	EmFry	03/22/71	03/22/71	1194	99600	SPIRIT LAKE (26)	UNTAGGED
1970	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	06/16/71	06/16/71	230	161000	SPIRIT LAKE (26)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	TOUTLE HATCHERY	Smolt	05/12/72	05/12/72	17	7436	BEAR CREEK (26)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	TOUTLE HATCHERY	Smolt	05/12/72	05/12/72	17	2322	BEAR CREEK (26)	UNTAGGED
1970	TYPE-N (TOUTLE)	TOUTLE HATCHERY	Smolt	04/20/72	04/20/72	16	136512	GREEN R (26.0323)	UNTAGGED
1970	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/20/72	04/20/72	16	1233616	GREEN R (26.0323)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	TOUTLE HATCHERY	Smolt	05/12, 72	05/12/72	17	6904	GREEN R (26.0323)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	TOUTLE HATCHERY	Smolt	05/12, 72	05/12/72	17	11151	GREEN R (26.0323)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	TOUTLE HATCHERY	Smolt	05/12, 72	05/12/72	17	35701	GREEN R (26.0323)	UNTAGGED
1970	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	05/12, 72	05/12/72	17	50073	GREEN R (26.0323)	UNTAGGED
1970	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	05/12, 72	05/12/72	17	18709	GREEN R (26.0323)	UNTAGGED
1970	COWLITZ TYPE-N STOCK	TOUTLE HATCHERY	Smolt	05/12, 72	05/12/72	17	2157	GREEN R (26.0323)	UNTAGGED
1970	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/06, 72	04/06/72	18	34946	STANKY CREEK (26)	UNTAGGED
1970	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/06, 72	04/06/72	18	25246	STANKY CREEK (26)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/05, 72	04/05/72	417	144200	BUTTER CR (26.1205)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/12, 72	04/12/72	417	144200	BUTTER CR (26.1205)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/17, 72	03/17/72	417	266000	CISPUS R (26.0668)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/03 72	04/03/72	417	576800	CISPUS R (26.0668)	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/24/72	04/24/72	1417	288400	CISPUS R (26.0668)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	05/04/72	05/04/72	1417	418600	CISPUS R (26.0668)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/07/72	04/07/72	1417	288400	CISPUS R -NF 26.0866	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/24/72	04/24/72	1417	288400	CISPUS R -NF 26.0866	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/13/72	04/13/72	1417	144200	HALL CREEK (26.1174)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/26/72	04/26/72	1417	144200	HALL CREEK (26.1174)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	05/05/72	05/05/72	1417	239400	JOHNSON CR (26.1142)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/14/72	04/14/72	1417	144200	LAKE CR (26.1231)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/26/72	04/26/72	1417	144200	LAKE CR (26.1231)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/27/72	04/27/72	1417	288400	OHANAPECOSH R 261304	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/04/72	04/04/72	1417	310800	SILVER CR (26.1031)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/22/72	04/22/72	1417	288400	SILVER CR (26.1031)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/05/72	04/05/72	1417	144200	SKATE CR (26.1182)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/12/72	04/12/72	1417	144200	SKATE CR (26.1182)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/25/72	04/25/72	1417	576800	SKATE CR (26.1182)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/16/72	03/16/72	1417	266000	UPPER COWLITZ RIVER	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/04/72	04/04/72	1417	1631000	UPPER COWLITZ RIVER	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/06/72	04/06/72	1417	288400	UPPER COWLITZ RIVER	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/15/72	04/15/72	1417	336000	UPPER COWLITZ RIVER	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/22/72	04/22/72	1417	288400	UPPER COWLITZ RIVER	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/23/72	04/23/72	1417	288400	UPPER COWLITZ RIVER	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/23/72	04/23/72	1417	288400	UPPER COWLITZ RIVER	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/26/72	04/26/72	1417	576800	UPPER COWLITZ RIVER	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	02/28/72	02/28/72	1512	60000	WOODS CR (26.0694)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/17/72	03/17/72	1417	144200	WOODS CR (26.0694)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	02/28/72	02/28/72	1512	60000	YELLOWJACKET CR (26)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/27/72	04/27/72	1417	310800	YELLOWJACKET CR (26)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/08/72	08/08/72	80	44000	BUTTER CR (26.1205)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/09/72	08/09/72	200	51000	BUTTER CR (26.1205)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/02/72	08/02/72	118	35990	CISPUS R (26.0668)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/15/72	08/15/72	121	97526	CISPUS R (26.0668)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/15/72	08/15/72	115	57500	CISPUS R (26.0668)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/09/72	08/09/72	200	144000	CISPUS R -NF 26.0866	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/15/72	08/15/72	121	160446	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/14/72	08/14/72	115	71185	JOHNSON CR (26.1142)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/02/72	08/02/72	118	23600	OHANAPECOSH R 261304	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/09/72	08/09/72	200	113000	RAINEY CR (26.0651)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/02/72	08/02/72	118	82600	SILVER CR (26.1031)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/01/72	08/01/72	128	83200	SKATE CR (26.1182)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/14/72	08/14/72	115	70380	SKATE CR (26.1182)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/01/72	08/01/72	128	76800	UPPER COWLITZ RIVER	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/04/72	08/04/72	115	85100	UPPER COWLITZ RIVER	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/04/72	08/04/72	115	86250	UPPER COWLITZ RIVER	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/10/72	08/10/72	150	338700	UPPER COWLITZ RIVER	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/09/72	08/09/72	200	43000	WOODS CR (26.0694)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/73	05/03/73	13	339390	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/73	05/03/73	13	324192	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/07/73	05/07/73	15	147170	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/07/73	05/07/73	15	145876	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/07/73	05/07/73	13	339001	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/09/73	05/09/73	15	299795	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/09/73	05/09/73	12	331400	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/11/73	05/11/73	14	292173	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/11/73	05/11/73	14	293216	COWLITZ R (26.0002)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/14/73	05/14/73	14	195398	COWLITZ R (26.0002)	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1971	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/14/73	05/14/73	14	322420	COWLITZ R (26.0002)	UNTAGGED
1971	WASHOUGAL R TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/13/73	04/13/73	15	36000	STANKY CREEK (26)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	TOUTLE HATCHERY	Smolt	04/13/73	04/13/73	23	27600	DELAMETER CR 26.0192	UNTAGGED
1971	COWLITZ TYPE-N STOCK	TOUTLE HATCHERY	Smolt	03/06/73	03/06/73	35	14350	GREEN R (26.0323)	UNTAGGED
1971	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/10/73	04/10/73	17	1021394	GREEN R (26.0323)	UNTAGGED
1971	WASHOUGAL R TYPE-S	TOUTLE HATCHERY	Smolt	04/24/73	04/24/73	16	105376	GREEN R (26.0323)	UNTAGGED
1971	COWLITZ TYPE-N STOCK	TOUTLE HATCHERY	Smolt	05/04/73	05/04/73	21	233058	GREEN R (26.0323)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/16/73	08/16/73	105	128310	BUTTER CR (26.1205)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/09/73	08/09/73	77	96250	CISPUS R (26.0668)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/21/73	08/21/73	37	36001	CISPUS R (26.0668)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/22/73	08/22/73	106	65826	CISPUS R (26.0668)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/27/73	08/27/73	115	166980	CISPUS R (26.0668)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/16/73	08/16/73	105	64365	CISPUS R -NF 26.0866	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/29/73	08/29/73	124	34720	HALL CREEK (26.1174)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/16/73	08/16/73	105	53235	JOHNSON CR (26.1142)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/09/73	08/09/73	77	34650	OHANAPECOSH R 261304	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/21/73	08/21/73	37	53724	OHANAPECOSH R 261304	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/21/73	08/21/73	37	22829	RAINEY CR (26.0651)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/14/73	08/14/73	110	115720	SKATE CR (26.1182)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/16/73	08/16/73	105	152040	SKATE CR (26.1182)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/18/73	07/18/73	94	24628	TILTON R (26.0560)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/09/73	08/09/73	77	38500	TILTON R (26.0560)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/16/73	08/16/73	105	124845	TILTON R (26.0560)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/18/73	07/18/73	94	223626	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/09/73	08/09/73	77	128975	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/14/73	08/14/73	110	115500	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/16/73	08/16/73	105	153405	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/21/73	08/21/73	37	22422	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/22/73	08/22/73	106	116600	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/22/73	08/22/73	106	123066	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/27/73	08/27/73	115	207345	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/28/73	08/28/73	124	301568	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/18/73	07/18/73	94	24440	WINSTON CR (26.0541)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/16/73	08/16/73	105	52920	WINSTON CR (26.0541)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/22/73	08/22/73	106	21200	YELLOWJACKET CR (26)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/06/74	05/06/74	17	40936	UPPER COWLITZ RIVER	010603
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/06/74	05/06/74	17	304096	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/06/74	05/06/74	17	40477	UPPER COWLITZ RIVER	010606
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/06/74	05/06/74	17	308210	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/06/74	05/06/74	17	41259	UPPER COWLITZ RIVER	010609
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/06/74	05/06/74	17	302923	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/06/74	05/06/74	17	37383	UPPER COWLITZ RIVER	010612
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/06/74	05/06/74	17	309383	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/06/74	05/06/74	17	302277	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/06/74	05/06/74	17	303671	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/06/74	05/06/74	17	307377	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/06/74	05/06/74	17	308329	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/06/74	05/06/74	15	341295	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/06/74	05/06/74	10	349000	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/30/74	05/30/74	14	345394	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/30/74	05/30/74	14	348810	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/30/74	05/30/74	12	348300	UPPER COWLITZ RIVER	UNTAGGED
1972	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/30/74	05/30/74	12	349896	UPPER COWLITZ RIVER	UNTAGGED
1972	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Smolt	05/02/74	05/02/74	14	31520	COWLITZ R (26.0002)	010109
1972	ELOCHOMAN RIVER	ELOKOMIN HATCHERY	Smolt	05/02/74	05/02/74	14	318	COWLITZ R (26.0002)	UNTAGGED

Table 9 (cont.) Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1972	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	03/15/73	03/15/73	1512	165000	BAIRD CR (26.0101)	UNTAGGED
1972	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	03/15/73	03/15/73	1512	165000	GOBLE CR (26.0035)	UNTAGGED
1972	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	03/16/73	03/16/73	1512	204000	GOBLE CR (26.0035)	UNTAGGED
1972	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	03/14/73	03/14/73	1512	121500	MULHOLLAND CR 260084	UNTAGGED
1972	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/10/73	04/10/73	621	103824	SPRING CR (26.0991)	UNTAGGED
1972	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	EmFry	03/24/73	03/24/73	1226	90280	GOAT CREEK	UNTAGGED
1972	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	10/16/73	10/16/73	37	19092	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	10/26/73	10/26/73	23	9200	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	05/08/73	05/08/73	428	408740	SPIRIT LAKE (26)	UNTAGGED
1972	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	06/01/73	06/01/73	341	107100	SPIRIT LAKE (26)	UNTAGGED
1972	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	09/27/73	09/27/73	46	65550	SPIRIT LAKE (26)	UNTAGGED
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	03/01/74	03/01/74	20	52220	GREEN R (26.0323)	151410
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	03/01/74	03/01/74	20	1180	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	04/01/74	04/01/74	14	31668	GREEN R (26.0323)	010107
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	04/01/74	04/01/74	14	11242	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	04/01/74	04/01/74	20	42000	GREEN R (26.0323)	151411
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	04/01/74	04/01/74	20	20980	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	04/01/74	04/01/74	30	49050	GREEN R (26.0323)	151413
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	04/01/74	04/01/74	30	480	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/01/74	04/01/74	20	20180	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/01/74	04/01/74	14	11242	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	05/01/74	05/01/74	14	30944	GREEN R (26.0323)	010106
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	05/01/74	05/01/74	14	10998	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	05/01/74	05/01/74	18	31896	GREEN R (26.0323)	010108
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	05/01/74	05/01/74	18	339541	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	05/01/74	05/01/74	18	41220	GREEN R (26.0323)	010212
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	05/01/74	05/01/74	18	438793	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	05/01/74	05/01/74	21	42756	GREEN R (26.0323)	151414
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	05/01/74	05/01/74	21	21441	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	05/01/74	05/01/74	30	41820	GREEN R (26.0323)	151501
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	05/01/74	05/01/74	30	540	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	05/01/74	05/01/74	21	21231	GREEN R (26.0323)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	TOUTLE HATCHERY	Smolt	05/01/74	05/01/74	21	140028	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	05/01/74	05/01/74	18	53640	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	05/01/74	05/01/74	18	467451	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	05/01/74	05/01/74	17	255493	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	05/01/74	05/01/74	14	10246	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	06/01/74	06/01/74	20	41340	GREEN R (26.0323)	151502
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	06/01/74	06/01/74	20	20400	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	06/01/74	06/01/74	20	20000	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	06/27/74	06/27/74	12	31068	GREEN R (26.0323)	010105
1972	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	06/27/74	06/27/74	12	5928	GREEN R (26.0323)	UNTAGGED
1972	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	06/27/74	06/27/74	12	4656	GREEN R (26.0323)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	05/13/74	05/13/74	1512	141000	BUTTER CR (26.1205)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/11/74	04/11/74	1512	120000	CISPUS R (26.0668)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/25/74	03/25/74	1512	109500	CISPUS R -NF 26.0866	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	05/15/74	05/15/74	1512	321000	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/22/74	03/22/74	1512	109500	JOHNSON CR (26.1142)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	05/14/74	05/14/74	1512	141000	JOHNSON CR (26.1142)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	05/14/74	05/14/74	1512	141000	SKATE CR (26.1182)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/17/74	03/17/74	1512	510000	TILTON R (26.0560)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/11/74	04/11/74	1512	120000	TILTON R (26.0560)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/23/74	04/23/74	1512	112500	TILTON R (26.0560)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/15/74	04/15/74	1512	150000	UPPER COWLITZ RIVER	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/22/74	04/22/74	1512	150000	UPPER COWLITZ RIVER	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/23/74	04/23/74	1512	150000	UPPER COWLITZ RIVER	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/12/74	03/12/74	1512	120000	WINSTON CR (26.0541)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/15/74	04/15/74	1512	100500	WINSTON CR (26.0541)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/15/74	04/15/74	1512	150000	WOODS CR (26.0694)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	05/13/74	05/13/74	1512	141000	WOODS CR (26.0694)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/08/74	08/08/74	92	64400	BUTTER CR (26.1205)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/74	08/12/74	107	76291	BUTTER CR (26.1205)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/01/74	08/01/74	100	69400	CISPUS R (26.0668)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/09/74	08/09/74	100	70300	CISPUS R (26.0668)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/20/74	08/20/74	110	69630	CISPUS R (26.0668)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/20/74	08/20/74	110	88660	CISPUS R (26.0668)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/09/74	08/09/74	100	70500	CISPUS R -NF 26.0866	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/20/74	08/20/74	110	77660	CISPUS R -NF 26.0866	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/28/74	08/28/74	115	83720	CISPUS R -NF 26.0866	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/09/74	08/09/74	100	176100	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/74	08/12/74	107	203300	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/13/74	08/13/74	107	74900	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/14/74	08/14/74	100	54100	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/15/74	08/15/74	154	197274	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/28/74	08/28/74	115	223100	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/08/74	08/08/74	92	64600	HALL CREEK (26.1174)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/08/74	08/08/74	92	64400	JOHNSON CR (26.1142)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/09/74	08/09/74	100	70000	JOHNSON CR (26.1142)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/01/74	08/01/74	00	70500	OHANAPECOSH R 261304	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/08/74	08/08/74	92	66424	OHANAPECOSH R 261304	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/74	08/12/74	107	75649	OHANAPECOSH R 261304	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/28/74	08/28/74	115	83720	OHANAPECOSH R 261304	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/14/74	08/14/74	100	30300	OLEQUA CR (26.0427)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/13/74	08/13/74	107	76505	SILVER CR (26.1031)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/01/74	08/01/74	100	91300	SKATE CR (26.1182)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/09/74	08/09/74	100	70000	SKATE CR (26.1182)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/74	08/12/74	107	76398	SKATE CR (26.1182)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/08/74	08/08/74	92	37260	TILTON R (26.0560)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/13/74	08/13/74	107	86777	TILTON R (26.0560)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/20/74	08/20/74	110	88000	TILTON R (26.0560)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/20/74	08/20/74	110	88000	TILTON R (26.0560)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/01/74	08/01/74	100	61200	UPPER COWLITZ RIVER	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/01/74	08/01/74	100	70200	UPPER COWLITZ RIVER	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/01/74	08/01/74	100	83400	UPPER COWLITZ RIVER	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/08/74	08/08/74	92	128984	UPPER COWLITZ RIVER	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/13/74	08/13/74	100	353500	UPPER COWLITZ RIVER	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/08/74	08/08/74	92	29900	WINSTON CR (26.0541)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/13/74	08/13/74	107	33277	WINSTON CR (26.0541)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/13/74	08/13/74	107	76933	WOODS CR (26.0694)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/13/74	08/13/74	107	77789	YELLOWJACKET CR (26)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/28/74	08/28/74	115	82570	YELLOWJACKET CR (26)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/09 75	04/09 75	15	354000	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/30 75	04/30 75	12	2120999	COWLITZ R (26.0002)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/09 75	05/09 75	13	1055538	COWLITZ R (26.0002)	UNTAGGED
1973	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	07/23 74	07/23 74	105	30975	GREEN R (26.0323)	UNTAGGED
1973	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	07/23 74	07/23 74	105	25200	TOUTLE R -NF 26.0314	UNTAGGED
1973	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	06/18 74	06/18 74	80	36000	TOUTLE R -SF 26.0248	UNTAGGED
1973	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	03/13 75	03/13 75	20	37400	GREEN R (26.0323)	UNTAGGED
1973	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/10 75	04/10 75	18	67860	GREEN R (26.0323)	UNTAGGED
1973	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/16 75	04/16 75	17	135745	GREEN R (26.0323)	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1973	TYPE-N (TOUTLE)	TOUTLE HATCHERY	Smolt	04/25/75	04/25/75	20	401080	GREEN R (26.0323)	UNTAGGED
1973	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/25/75	04/25/75	16	978656	GREEN R (26.0323)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/01/75	04/01/75	1512	111000	MILL CREEK (LACAMAS	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/01/75	04/01/75	1512	220500	WINSTON CR (26.0541)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/01/75	04/01/75	1512	141000	WOODS CR (26.0694)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/21/75	07/21/75	95	80750	BUTTER CR (26.1205)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/23/75	07/23/75	91	173810	CISPUS R (26.0668)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/30/75	07/30/75	102	113934	CISPUS R (26.0668)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/23/75	07/23/75	94	108570	COWLITZ R (26.0002)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/21/75	07/21/75	90	74250	HALL CREEK (26.1174)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/31/75	07/31/75	105	32760	HIGHLANDS CREEK (26)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/22/75	07/22/75	91	100100	JOHNSON CR (26.1142)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/30/75	07/30/75	105	79800	JOHNSON CR (26.1142)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/30/75	07/30/75	99	239085	OHANAPECOSH R 261304	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/31/75	07/31/75	105	33075	RAINEY CR (26.0651)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/21/75	07/21/75	95	28500	SALMON CR (26.0479)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/30/75	07/30/75	97	29100	SILVER CR (26.1031)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/21/75	07/21/75	95	77425	SKATE CR (26.1182)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/30/75	07/30/75	97	79055	SKATE CR (26.1182)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/22/75	07/22/75	93	67890	TILTON R (26.0560)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/31/75	07/31/75	95	28785	TILTON R (26.0560)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/11/75	08/11/75	91	96824	TILTON R (26.0560)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/30/75	07/30/75	100	480100	UPPER COWLITZ RIVER	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/75	08/12/75	97	103208	UPPER COWLITZ RIVER	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/22/75	07/22/75	94	57246	WINSTON CR (26.0541)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/31/75	07/31/75	105	21105	WINSTON CR (26.0541)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/30/75	07/30/75	96	58176	WOODS CR (26.0694)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/10/76	05/10/76	15	3525150	COWLITZ R (26.0002)	UNTAGGED
1974	KALAMA RIVER TYPE-S	TOUTLE HATCHERY	Fingr	02/23/76	02/23/76	26	700000	ALDER CR (26.0387)	UNTAGGED
1974	TOUTLE (GREEN) TYP-S	TOUTLE HATCHERY	Fingr	07/17/75	07/17/75	132	26400	GREEN R (26.0323)	UNTAGGED
1974	TOUTLE (GREEN) TYP-S	TOUTLE HATCHERY	Fingr	07/08/75	07/08/75	158	82950	TOUTLE R -NF 26.0314	UNTAGGED
1974	TOUTLE (GREEN) TYP-S	TOUTLE HATCHERY	Fingr	07/09/75	07/09/75	145	47995	TOUTLE R -NF 26.0314	UNTAGGED
1974	TOUTLE (GREEN) TYP-S	TOUTLE HATCHERY	Fingr	05/05/75	05/05/75	436	264915	TOUTLE R -SF 26.0248	UNTAGGED
1974	TOUTLE (GREEN) TYP-S	TOUTLE HATCHERY	Fingr	07/16/75	07/16/75	132	58080	TOUTLE R -SF 26.0248	UNTAGGED
1974	TOUTLE (GREEN) TYP-N	TOUTLE HATCHERY	Smolt	04/10/76	04/10/76	25	86400	GREEN R (26.0323)	UNTAGGED
1974	TOUTLE (GREEN) TYP-S	TOUTLE HATCHERY	Smolt	04/10/76	04/10/76	19	128600	GREEN R (26.0323)	UNTAGGED
1974	TOUTLE (GREEN) TYP-S	TOUTLE HATCHERY	Smolt	04/21/76	04/21/76	17	257150	GREEN R (26.0323)	UNTAGGED
1974	TOUTLE (GREEN) TYP-S	TOUTLE HATCHERY	Smolt	04/30/76	04/30/76	16	320518	GREEN R (26.0323)	UNTAGGED
1974	TOUTLE (GREEN) TYP-S	TOUTLE HATCHERY	Smolt	05/01/76	05/01/76	16	458000	GREEN R (26.0323)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	TOUTLE HATCHERY	Smolt	05/07/76	05/07/76	19	344400	GREEN R (26.0323)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/19/76	04/19/76	1417	988400	COWEMAN R (26.0003)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/27/76	04/27/76	1417	204400	DELAMETER CR 26.0192	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/08/76	03/08/76	1417	110600	LACAMAS CR (26.0467)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/05/76	04/05/76	1417	193200	LACAMAS CR (26.0467)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/29/76	04/29/76	1417	252000	MILL CREEK (LACAMAS	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/15/76	04/15/76	1417	1016400	OLEQUA CR -NF 260464	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/27/76	04/27/76	1417	204400	OSTRANDER CR 26.0132	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/23/76	04/23/76	1417	309400	SALMON CR (26.0479)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/11/76	03/11/76	1417	204400	STILLWATER CR 260429	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/16/76	04/16/76	1417	842800	STILLWATER CR 260429	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/16/76	08/16/76	152	91808	BUTTER CR (26.1205)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/10/76	08/10/76	99	141768	CISPUS R (26.0668)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/18/76	08/18/76	99	162360	CISPUS R -NF 26.0866	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/09/76	08/09/76	89	22250	HALL CREEK (26.1174)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/16/76	08/16/76	96	24000	IRON CR (26.0697)	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/18/76	08/18/76	119	198730	JOHNSON CR (26.1142)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/17/76	08/17/76	98	24500	LAKE CR (26.0590)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/11/76	08/11/76	146	39420	MILL CREEK (LACAMAS	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/18/76	08/18/76	89	178000	OHANAPECOSH R 261304	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/11/76	08/11/76	85	48450	SILVER CR (26.1031)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/09/76	08/09/76	90	216990	SKATE CR (26.1182)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/11/76	08/11/76	105	185850	TILTON R (26.0560)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/10/76	08/10/76	89	756500	UPPER COWLITZ RIVER	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/76	08/12/76	93	124620	WINSTON CR (26.0541)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/17/76	08/17/76	123	61500	WOODS CR (26.0694)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/17/76	08/17/76	152	91808	YELLOWJACKET CR (26)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/05/77	05/05/77	14	3475024	COWLITZ R (26.0002)	UNTAGGED
1975	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	04/09/76	04/09/76	782	42900	BEAR CREEK (26)	UNTAGGED
1975	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	04/28/76	04/28/76	648	64500	COLDWATER CR 26.0418	UNTAGGED
1975	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	04/09/76	04/09/76	782	175500	HOFFSTADT CR 26.0396	UNTAGGED
1975	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	04/08/76	04/08/76	782	200000	TOUTLE R -NF 26.0314	UNTAGGED
1975	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/18/77	04/18/77	17	49190	GOBLE CR (26.0035)	UNTAGGED
1975	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	03/11/77	03/11/77	18	49148	GREEN R (26.0323)	UNTAGGED
1975	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/27/77	04/27/77	17	833037	GREEN R (26.0323)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	TOUTLE HATCHERY	Smolt	05/01/77	05/01/77	18	342424	GREEN R (26.0323)	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/14/77	04/14/77	1512	192000	MILL CREEK (LACAMAS	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	01/18/77	01/18/77	1512	18000	TILTON R (26.0560)	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/30/77	03/30/77	1512	111000	TILTON R (26.0560)	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/14/77	04/14/77	1512	240000	TILTON R (26.0560)	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/14/77	04/14/77	1512	144000	WINSTON CR (26.0541)	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/19/77	07/19/77	80	60880	BUTTER CR (26.1205)	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/18/77	07/18/77	81	201204	CISPUS R (26.0668)	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/10/77	08/10/77	94	239888	CISPUS R (26.0668)	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/18/77	07/18/77	80	61440	CISPUS R -NF 26.0866	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/10/77	08/10/77	94	216200	CISPUS R -NF 26.0866	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/22/77	07/22/77	92	24012	IRON CR (26.0697)	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/77	08/12/77	94	23500	IRON CR (26.0697)	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/22/77	07/22/77	85	71145	JOHNSON CR (26.1142)	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/77	08/12/77	85	166260	JOHNSON CR (26.1142)	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/77	08/12/77	92	29532	MILL CREEK (LACAMAS	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/08/77	08/08/77	84	379848	OHANAPECOSH R 261304	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/19/77	07/19/77	82	127018	SKATE CR (26.1182)	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/11/77	08/11/77	94	173618	SKATE CR (26.1182)	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/19/77	07/19/77	84	107100	TILTON R (26.0560)	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/77	08/12/77	87	101703	TILTON R (26.0560)	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/21/77	07/21/77	86	756800	UPPER COWLITZ RIVER	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/09/77	08/09/77	89	301443	UPPER COWLITZ RIVER	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/20/77	07/20/77	80	42240	WINSTON CR (26.0541)	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/77	08/12/77	92	28336	WINSTON CR (26.0541)	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/77	08/12/77	79	39342	YELLOWJACKET CR (26)	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/78	05/01/78	25	2829078	UPPER COWLITZ RIVER	UNTAGGED
1976	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/22/78	06/22/78	18	686005	UPPER COWLITZ RIVER	UNTAGGED
1976	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	06/06/77	06/06/77	217	119980	BEAR CREEK (26)	UNTAGGED
1976	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	04/27/77	04/27/77	510	114975	COLDWATER CR 26.0418	UNTAGGED
1976	TYPE-N (TOUTLE)	TOUTLE HATCHERY	Fingr	06/13/77	06/13/77	597	210000	COWEMAN R (26.0003)	UNTAGGED
1976	TYPE-N (TOUTLE)	TOUTLE HATCHERY	Fingr	07/11/77	07/11/77	324	29200	GREEN R (26.0323)	UNTAGGED
1976	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	04/27/77	04/27/77	498	115000	HOFFSTADT CR 26.0396	UNTAGGED
1976	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	03/10/78	03/10/78	22	65000	GREEN R (26.0323)	UNTAGGED
1976	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/10/78	04/10/78	19	108794	GREEN R (26.0323)	UNTAGGED
1976	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/30/78	04/30/78	17	486174	GREEN R (26.0323)	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1976	TYPE-N (TOUTLE)	TOUTLE HATCHERY	Smolt	05/04/78	05/04/78	23	362889	GREEN R (26.0323)	UNTAGGED
1976	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	06/01/78	06/01/78	14	131296	GREEN R (26.0323)	UNTAGGED
1976	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	06/14/78	06/14/78	13	107027	GREEN R (26.0323)	UNTAGGED
1977	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/02/78	03/02/78	1745	50000	UPPER COWLITZ RIVER	UNTAGGED
1977	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/31/78	07/31/78	129	130419	BUTTER CR (26.1205)	UNTAGGED
1977	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/27/78	07/27/78	158	320266	CISPUS R (26.0668)	UNTAGGED
1977	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/31/78	07/31/78	129	132612	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/01/78	08/01/78	117	362817	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/01/78	08/01/78	110	132330	IRON CR (26.0697)	UNTAGGED
1977	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/28/78	07/28/78	129	132354	JOHNSON CR (26.1142)	UNTAGGED
1977	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/25/78	07/25/78	131	39300	MILL CREEK (LACAMAS	UNTAGGED
1977	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/26/78	07/26/78	128	257152	OHANAPECOSH R 261304	UNTAGGED
1977	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/25/78	07/25/78	131	150000	SKATE CR (26.1182)	UNTAGGED
1977	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/24/78	07/24/78	131	161130	STILLWATER CR 260429	UNTAGGED
1977	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/26/78	07/26/78	128	79872	TILTON R (26.0560)	UNTAGGED
1977	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/01/78	08/01/78	124	125116	YELLOWJACKET CR (26)	UNTAGGED
1977	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/79	05/03/79	18	743669	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/09/79	05/09/79	18	1081843	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/10/79	05/10/79	15	1013942	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/01/79	06/01/79	14	728148	COWLITZ R (26.0002)	UNTAGGED
1977	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Fingr	05/31/78	05/31/78	856	182750	GOBLE CR (26.0035)	UNTAGGED
1977	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	EmFry	03/11/78	03/11/78	1194	22838	HEMLOCK CREEK	UNTAGGED
1977	TYPE-N (TOUTLE)	TOUTLE HATCHERY	Fingr	06/14/78	06/14/78	249	150640	GREEN R (26.0323)	UNTAGGED
1977	TYPE-N (TOUTLE)	TOUTLE HATCHERY	Smolt	04/02/79	04/02/79	22	96076	GREEN R (26.0323)	UNTAGGED
1977	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/02/79	04/02/79	22	182914	GREEN R (26.0323)	UNTAGGED
1977	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Smolt	04/23/79	04/23/79	17	670000	GREEN R (26.0323)	UNTAGGED
1977	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	05/07/79	05/07/79	18	42422	GREEN R (26.0323)	631911
1977	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	05/07/79	05/07/79	18	428	GREEN R (26.0323)	UNTAGGED
1977	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	05/07/79	05/07/79	18	34688	GREEN R (26.0323)	631912
1977	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	05/07/79	05/07/79	18	262	GREEN R (26.0323)	UNTAGGED
1977	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	06/07/79	06/07/79	18	39770	GREEN R (26.0323)	631758
1977	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	06/07/79	06/07/79	18	140	GREEN R (26.0323)	UNTAGGED
1977	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	06/07/79	06/07/79	20	40498	GREEN R (26.0323)	631913
1977	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	06/07/79	06/07/79	20	142	GREEN R (26.0323)	UNTAGGED
1977	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	07/06/79	07/06/79	18	39756	GREEN R (26.0323)	631928
1977	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	07/06/79	07/06/79	18	321	GREEN R (26.0323)	UNTAGGED
1977	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	07/06/79	07/06/79	18	41146	GREEN R (26.0323)	631929
1977	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	07/06/79	07/06/79	18	332	GREEN R (26.0323)	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	02/27/79	02/27/79	1814	1318000	COWLITZ R (26.0002)	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/31/79	08/31/79	81	81989	BUTTER CR (26.1205)	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/30/79	08/30/79	61	62342	CISPUS R (26.0668)	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/31/79	08/31/79	51	53907	CISPUS R (26.0668)	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/01/79	09/01/79	50	50292	CISPUS R (26.0668)	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/04/79	09/04/79	50	50292	CISPUS R (26.0668)	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/31/79	08/31/79	51	53040	CISPUS R -NF 26.0866	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	10/01/79	10/01/79	40	253800	COWLITZ R (26.0002)	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	10/01/79	10/01/79	32	400000	COWLITZ R (26.0002)	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/30/79	08/30/79	51	57018	JOHNSON CR (26.1142)	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/28/79	08/28/79	61	134993	OHANAPECOSH R 261304	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/31/79	08/31/79	81	86064	SKATE CR (26.1182)	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/27/79	08/27/79	62	127658	STILLWATER CR 260429	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/23/79	07/23/79	100	100501	TILTON R (26.0560)	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/27/79	08/27/79	62	126480	TILTON R (26.0560)	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/28/79	08/28/79	61	65392	UPPER COWLITZ RIVER	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/28/79	08/28/79	58	57478	UPPER COWLITZ RIVER	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/29/79	08/29/79	61	62098	UPPER COWLITZ RIVER	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/30/79	08/30/79	61	62342	UPPER COWLITZ RIVER	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/01/79	09/01/79	50	50688	UPPER COWLITZ RIVER	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/04/79	09/04/79	50	50688	UPPER COWLITZ RIVER	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/29/79	08/29/79	79	181305	YELLOWJACKET CR (26)	UNTAGGED
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/80	05/01/80	15	3832659	COWLITZ R (26.0002)	UNTAGGED
1978	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	EmFry	05/18/80	05/18/80		0	GREEN R (26.0323)	631932
1978	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	EmFry	05/18/80	05/18/80		0	GREEN R (26.0323)	631933
1978	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	EmFry	05/18/80	05/18/80		0	GREEN R (26.0323)	632028
1978	TOUTLE (GREEN RIVER)	TOUTLE HATCHERY	EmFry	05/18/80	05/18/80		0	GREEN R (26.0323)	632029
1978	TOUTLE (GREEN) TYP-S	TOUTLE HATCHERY	Fingr	01/12/80	01/12/80	27	494000	ALDER CR (26.0387)	UNTAGGED
1978	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	03/16/79	03/16/79	1008	300000	BEAR CREEK (26)	UNTAGGED
1978	TOUTLE RIVER TYPE-S	TOUTLE HATCHERY	Fingr	06/08/79	06/08/79	319	182400	GREEN R (26.0323)	UNTAGGED
1978	TYPE-N (TOUTLE)	TOUTLE HATCHERY	Fingr	05/24/79	05/24/79	986	150000	SPIRIT LAKE (26)	UNTAGGED
1978	TOUTLE (GREEN) TYP-S	TOUTLE HATCHERY	Smolt	04/21/80	04/21/80	20	1057000	GREEN R (26.0323)	UNTAGGED
1978	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	05/07/80	05/07/80	18	38612	GREEN R (26.0323)	631931
1978	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	05/07/80	05/07/80	18	2007	GREEN R (26.0323)	UNTAGGED
1978	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	05/07/80	05/07/80	20	39496	GREEN R (26.0323)	632058
1978	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	05/07/80	05/07/80	20	2071	GREEN R (26.0323)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	02/17/80	02/17/80	1814	90000	COWLITZ R (26.0002)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	02/27/80	02/27/80	1814	160000	COWLITZ R (26.0002)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/02/80	09/02/80	64	71040	BUTTER CR (26.1205)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/26/80	08/26/80	69	109020	CISPUS R (26.0668)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/02/80	09/02/80	64	75200	IRON CR (26.0697)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/26/80	08/26/80	75	75000	OHANAPECOSH R 261304	UNTAGGED
1979	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/29/80	08/29/80	71	83425	OHANAPECOSH R 261304	UNTAGGED
1979	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/28/80	08/28/80	69	69000	SKATE CR (26.1182)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/25/80	08/25/80	72	286000	TILTON R (26.0560)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	06/12/80	06/12/80	547	1454756	UPPER COWLITZ RIVER	UNTAGGED
1979	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/26/80	08/26/80	75	75000	UPPER COWLITZ RIVER	UNTAGGED
1979	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/28/80	08/28/80	69	83007	UPPER COWLITZ RIVER	UNTAGGED
1979	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/28/80	08/28/80	66	67975	UPPER COWLITZ RIVER	UNTAGGED
1979	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/02/80	09/02/80	64	21248	UPPER COWLITZ RIVER	UNTAGGED
1979	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/28/80	08/28/80	65	66820	YELLOWJACKET CR (26)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/24/81	04/24/81	18	1212463	COWLITZ R (26.0002)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/04/81	05/04/81	18	2453154	COWLITZ R (26.0002)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/01/81	06/01/81	18	1183380	COWLITZ R (26.0002)	UNTAGGED
1979	ELOCHOMAN R TYPE-S	RYDERWOOD	EmFry	03/30/80	03/30/80	1031	250000	CAMPBELL CR 26.0443	UNTAGGED
1979	ELOCHOMAN R TYPE-S	UNSPECIFIED EGG BOX	EmFry	03/30/80	03/30/80	1031	250000	CAMPBELL CR 26.0443	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	02/11/81	02/11/81	1296	165000	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	02/23/81	02/23/81	1296	314000	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/15/81	03/15/81	1417	2740000	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/20/81	03/20/81	1334	720000	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/23/81	03/23/81	1334	2760000	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/28/81	03/28/81	1375	80000	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/05/81	04/05/81	1334	920000	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/07/81	04/07/81	1334	140000	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/13/81	04/13/81	1334	1240000	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/20/81	03/20/81	1334	350000	KING CR (26.0461)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/20/81	03/20/81	1334	350000	KING CR (26.0461)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	01/30/81	01/30/81	1417	540000	LACAMAS CR (26.0467)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/19/81	03/19/81	1334	350000	OLEQUA CR (26.0427)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/19/81	03/19/81	1334	350000	OLEQUA CR (26.0427)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/20/81	03/20/81	1334	350000	OLEQUA CR (26.0427)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/20/81	03/20/81	1334	350000	OLEQUA CR (26.0427)	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/02/81	03/02/81	1296	390000	OSTRANDER CR 26.0132	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	01/21/81	01/21/81	1296	676800	SALMON CR (26.0479)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/06/81	08/06/81	131	170300	JOHNSON CR (26.1142)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/81	08/12/81	115	71875	MAYFIELD LAKE (26)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/06/81	08/06/81	131	157200	OHANAPECOSH R 261304	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/81	08/12/81	106	95400	TILTON R (26.0560)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/81	08/12/81	106	106000	TILTON R (26.0560)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/81	08/12/81	125	43750	WINSTON CR (26.0541)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/81	08/12/81	115	72450	WINSTON CR (26.0541)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/81	08/12/81	106	106000	WINSTON CR (26.0541)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/81	08/12/81	106	106000	WINSTON CR (26.0541)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	9792	COWLITZ R (26.0002)	632420
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	111394	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	9854	COWLITZ R (26.0002)	632421
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	112099	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	10353	COWLITZ R (26.0002)	632422
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	117775	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	10291	COWLITZ R (26.0002)	632423
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	117070	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	10104	COWLITZ R (26.0002)	632424
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	114943	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	18	10527	COWLITZ R (26.0002)	632425
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	18	100728	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	18	10472	COWLITZ R (26.0002)	632426
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	18	100202	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	18	10417	COWLITZ R (26.0002)	632427
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	18	99676	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	18	10528	COWLITZ R (26.0002)	632428
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	18	100738	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	18	10417	COWLITZ R (26.0002)	632429
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	18	99676	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	20	10580	COWLITZ R (26.0002)	632430
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	20	86784	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	20	10532	COWLITZ R (26.0002)	632431
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	20	86390	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	20	10197	COWLITZ R (26.0002)	632432
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	20	83643	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	20	10436	COWLITZ R (26.0002)	632433
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	20	85603	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	20	10484	COWLITZ R (26.0002)	632434
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	20	85997	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	10330	COWLITZ R (26.0002)	632435
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	82111	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	10324	COWLITZ R (26.0002)	632436
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	82063	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	10129	COWLITZ R (26.0002)	632437
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	80513	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	10243	COWLITZ R (26.0002)	632438
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	81419	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	10343	COWLITZ R (26.0002)	632439
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	82214	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	18	10568	COWLITZ R (26.0002)	632440
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	18	76363	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	18	10679	COWLITZ R (26.0002)	632441
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	18	77165	COWLITZ R (26.0002)	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	18	10671	COWLITZ R (26.0002)	632442
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	18	77107	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	18	10461	COWLITZ R (26.0002)	632443
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	18	75590	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	18	10745	COWLITZ R (26.0002)	632444
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	18	77642	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	16	10251	COWLITZ R (26.0002)	632445
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	16	63129	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	16	10371	COWLITZ R (26.0002)	632446
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	16	63868	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	16	10573	COWLITZ R (26.0002)	632447
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	16	65112	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	16	10286	COWLITZ R (26.0002)	632448
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	16	63345	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	16	10053	COWLITZ R (26.0002)	632449
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	16	63473	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	497000	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/82	05/03/82	19	480130	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/01/82	06/01/82	21	459000	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/01/82	06/01/82	19	478000	COWLITZ R (26.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Fingr	09/30/81	09/30/81	70	200000	COWEMAN R (26.0003)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	RYDERWOOD	EmFry	04/01/81	04/01/81	1080	479575	CAMPBELL CR 26.0443	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	01/19/82	01/19/82	1334	120000	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/17/82	08/17/82	110	165000	BUTTER CR (26.1205)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/04/82	08/04/82	128	96000	CISPUS R (26.0668)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/11/82	08/11/82	120	96000	CISPUS R (26.0668)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/30/82	08/30/82	98	43610	IRON CR (26.0697)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/18/82	08/18/82	91	227500	JOHNSON CR (26.1142)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/27/82	08/27/82	98	107800	LAKE CR (26.1231)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/03/82	09/03/82	82	87740	MAYFIELD LAKE (26)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/17/82	08/17/82	101	252500	OHANAPECOSH R 261304	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/04/82	08/04/82	128	80000	RIFFE LAKE (26)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/16/82	09/16/82	102	58600	RIFFE LAKE (26)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/11/82	08/11/82	117	105300	UPPER COWLITZ RIVER	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/16/82	08/16/82	99	79200	UPPER COWLITZ RIVER	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/16/82	08/16/82	99	198000	UPPER COWLITZ RIVER	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/17/82	09/17/82	67	56900	UPPER COWLITZ RIVER	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	10893	COWLITZ R (26.0002)	632613
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	115330	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	10358	COWLITZ R (26.0002)	632614
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	109666	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	10446	COWLITZ R (26.0002)	632615
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	110597	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	10673	COWLITZ R (26.0002)	632616
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	113000	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	10014	COWLITZ R (26.0002)	632617
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	106023	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	10048	COWLITZ R (26.0002)	632618
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	94989	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	10237	COWLITZ R (26.0002)	632619
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	96776	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	10084	COWLITZ R (26.0002)	632620
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	95329	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	10315	COWLITZ R (26.0002)	632621
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	97513	COWLITZ R (26.0002)	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	10495	COWLITZ R (26.0002)	632622
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	99214	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	10554	COWLITZ R (26.0002)	632623
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	81179	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	10157	COWLITZ R (26.0002)	632624
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	78125	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	10278	COWLITZ R (26.0002)	632625
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	79057	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	10582	COWLITZ R (26.0002)	632626
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	81394	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	10432	COWLITZ R (26.0002)	632627
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	80242	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	20	10204	COWLITZ R (26.0002)	632628
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	20	72809	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	20	10343	COWLITZ R (26.0002)	632629
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	20	73801	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	20	10376	COWLITZ R (26.0002)	632630
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	20	74037	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	20	10249	COWLITZ R (26.0002)	632631
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	20	73132	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	20	10577	COWLITZ R (26.0002)	632632
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	20	75472	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	20	10489	COWLITZ R (26.0002)	632633
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	20	60427	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	20	10094	COWLITZ R (26.0002)	632634
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	20	58151	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	20	10556	COWLITZ R (26.0002)	632635
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	20	60814	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	20	10394	COWLITZ R (26.0002)	632636
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	20	59880	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	20	10530	COWLITZ R (26.0002)	632637
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	20	60664	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	10523	COWLITZ R (26.0002)	632638
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	79357	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	10145	COWLITZ R (26.0002)	632639
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	76508	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	10214	COWLITZ R (26.0002)	632640
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	77027	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	10021	COWLITZ R (26.0002)	632641
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	75573	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	10728	COWLITZ R (26.0002)	632642
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	80904	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	19	261000	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	18	260000	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	261000	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/83	05/03/83	17	261000	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/30/83	05/30/83	19	524000	COWLITZ R (26.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/30/83	05/30/83	19	509000	COWLITZ R (26.0002)	UNTAGGED
1981	COLUMBIA R - TYPE-S	UNSPECIFIED EGG BOX	EmFry	03/01/82	03/01/82	926	204000	CAMPBELL CR 26.0443	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	01/30/83	01/30/83	1334	8000	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/06/83	04/06/83	621	55800	ALDER CR (26.0387)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/06/83	04/06/83	621	55800	ALDER CR (26.0387)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/07/83	04/07/83	621	55800	ALDER CR (26.0387)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/26/83	04/26/83	856	31400	BEAR CREEK (26)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/28/83	04/28/83	825	50000	BEAR CREEK (26)	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	06/22/83	06/22/83	202	15200	BEAR CREEK (26)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/13/83	07/13/83	138	110400	BUTTER CR (26.1205)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/01/83	08/01/83	120	96000	BUTTER CR (26.1205)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/22/83	07/22/83	113	90400	CISPUS R (26.0668)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/27/83	07/27/83	115	92000	CISPUS R (26.0668)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/02/83	08/02/83	118	94400	CISPUS R (26.0668)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	11/07/83	11/07/83	50	40000	CISPUS R (26.0668)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	11/07/83	11/07/83	50	40000	CISPUS R (26.0668)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	11/08/83	11/08/83	50	40000	CISPUS R (26.0668)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	11/10/83	11/10/83	50	37500	CISPUS R (26.0668)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/29/83	04/29/83	732	8100	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/07/83	04/07/83	621	62000	DEVILS CR (26.0330)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/07/83	04/07/83	621	62000	DEVILS CR (26.0330)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/05/83	04/05/83	613	47500	ELK CR (26.0353)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/05/83	04/05/83	613	48700	ELK CR (26.0353)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/06/83	04/06/83	621	41500	ELK CR (26.0353)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/26/83	04/26/83	856	31400	HERRINGTON CR 260294	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	06/22/83	06/22/83	202	15200	HOFFSTADT CR 26.0396	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/01/83	08/01/83	120	96000	IRON CR (26.0697)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/28/83	04/28/83	825	63400	JOHNSON CR (26.0254)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/12/83	07/12/83	138	110400	JOHNSON CR (26.1142)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/14/83	07/14/83	138	110400	LAKE CR (26.1231)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	11/09/83	11/09/83	50	40000	LAKE CR (26.1231)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/22/83	07/22/83	112	11000	MAYFIELD LAKE (26)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/01/83	08/01/83	129	103200	MAYFIELD LAKE (26)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/15/83	07/15/83	136	108800	OHANAPECOSH R 261304	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/22/83	07/22/83	112	89600	OHANAPECOSH R 261304	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/29/83	04/29/83	810	60000	OUTLET CR (26.0239)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/22/83	07/22/83	113	90400	RIFFE LAKE (26)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/22/83	07/22/83	113	73400	RIFFE LAKE (26)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/25/83	07/25/83	112	89600	RIFFE LAKE (26)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/01/83	08/01/83	129	103200	RIFFE LAKE (26)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/29/83	04/29/83	810	102700	SALMON CR (26.0187)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/28/83	04/28/83	825	73200	STUDEBAKER CR 260249	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/28/83	04/28/83	825	60000	THIRTEEN CR 26.0265	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/29/83	07/29/83	120	96000	TILTON R (26.0560)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/02/83	08/02/83	118	94400	TILTON R (26.0560)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/03/83	08/03/83	122	97600	TILTON R (26.0560)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/04/83	08/04/83	118	94400	TILTON R (26.0560)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/26/83	04/26/83	856	31400	UNNAMED STREAM (26)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/26/83	04/26/83	856	31400	UNNAMED STREAM (26)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/29/83	04/29/83	810	52200	UNNAMED STREAM (26)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/29/83	04/29/83	810	70000	UNNAMED STREAM (26)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/02/83	08/02/83	118	94400	UPPER COWLITZ RIVER	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/04/83	08/04/83	118	103200	UPPER COWLITZ RIVER	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	11/08/83	11/08/83	50	40000	UPPER COWLITZ RIVER	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	11/08/83	11/08/83	50	40000	UPPER COWLITZ RIVER	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	11/08/83	11/08/83	50	42500	UPPER COWLITZ RIVER	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	11/09/83	11/09/83	50	40000	UPPER COWLITZ RIVER	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	11/10/83	11/10/83	50	2500	UPPER COWLITZ RIVER	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/13/83	04/13/83	560	46000	WYANT CR (26.0315)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/13/83	04/13/83	553	44000	WYANT CR (26.0315)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/13/83	04/13/83	553	45000	WYANT CR (26.0315)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/02/84	05/02/84	19	245000	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/02/84	05/02/84	18	245000	COWLITZ R (26.0002)	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	9769	COWLITZ R (26.0002)	632912
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	95633	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	10039	COWLITZ R (26.0002)	632913
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	98276	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	10201	COWLITZ R (26.0002)	632914
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	99862	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	10363	COWLITZ R (26.0002)	632915
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	101447	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	10363	COWLITZ R (26.0002)	632916
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	101447	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	17	10417	COWLITZ R (26.0002)	632917
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	17	113665	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	17	10417	COWLITZ R (26.0002)	632918
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	17	113665	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	17	10478	COWLITZ R (26.0002)	632919
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	17	114331	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	17	10355	COWLITZ R (26.0002)	632920
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	17	112990	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	17	10417	COWLITZ R (26.0002)	632921
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	17	113665	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	17	10175	COWLITZ R (26.0002)	632922
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	17	98618	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	17	10284	COWLITZ R (26.0002)	632923
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	17	99674	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	17	10066	COWLITZ R (26.0002)	632924
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	17	97562	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	17	10503	COWLITZ R (26.0002)	632925
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	17	101796	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	17	10449	COWLITZ R (26.0002)	632926
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	17	101273	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	19	10160	COWLITZ R (26.0002)	632927
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	19	87307	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	19	10257	COWLITZ R (26.0002)	632928
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	19	88141	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	19	10160	COWLITZ R (26.0002)	632929
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	19	87307	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	19	10306	COWLITZ R (26.0002)	632930
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	19	88564	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	19	10257	COWLITZ R (26.0002)	632931
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	19	88141	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	10171	COWLITZ R (26.0002)	632932
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	79617	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	10306	COWLITZ R (26.0002)	632933
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	80673	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	10306	COWLITZ R (26.0002)	632934
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	80673	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	10576	COWLITZ R (26.0002)	632935
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	82786	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	10081	COWLITZ R (26.0002)	632936
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	78911	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	10248	COWLITZ R (26.0002)	632937
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	65178	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	10436	COWLITZ R (26.0002)	632938
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	66374	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	10436	COWLITZ R (26.0002)	632939

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	66374	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	10136	COWLITZ R (26.0002)	632940
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	64465	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	10211	COWLITZ R (26.0002)	632941
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/84	05/03/84	18	64942	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/21/84	05/21/84	18	246000	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/03/84	06/03/84	17	240000	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/03/84	06/03/84	17	241400	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/04/84	06/04/84	17	244500	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/04/84	06/04/84	17	244500	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/04/84	06/04/84	17	254700	COWLITZ R (26.0002)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Fingr	04/20/83	04/20/83	648	399000	COWEMAN R (26.0003)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Fingr	04/20/83	04/20/83	648	200000	GOBLE CR (26.0035)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	03/01/84	03/01/84	965	28000	ALDER CR (26.0387)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	03/15/84	03/15/84	1106	70000	ALDER CR (26.0387)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/09/84	05/09/84	986	88400	ALDER CR (26.0387)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/14/84	05/14/84	1194	48800	BAIRD CR (26.0101)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/14/84	05/14/84	1194	59500	BEAR CREEK (26)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/03/84	08/03/84	103	82400	BUTTER CR (26.1205)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/03/84	08/03/84	103	82400	BUTTER CR (26.1205)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/16/84	05/16/84	1194	47600	CAMPBELL CR 26.0443	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/02/84	08/02/84	116	92800	CISPUS R (26.0668)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/07/84	08/07/84	147	117600	CISPUS R (26.0668)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/15/84	05/15/84	1194	95300	DELAMETER CR 26.0192	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/15/84	05/15/84	1194	95300	DELAMETER CR 26.0192	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/16/84	05/16/84	1194	95300	DELAMETER CR 26.0192	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/16/84	05/16/84	1194	95300	DEVILS CR (26.0330)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/17/84	05/17/84	1194	82200	DEVILS CR (26.0330)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/16/84	05/16/84	1194	95300	ELK CR (26.0353)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/17/84	05/17/84	1194	78600	ELK CR (26.0353)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/14/84	05/14/84	1194	71500	GOBLE CR (26.0035)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/14/84	05/14/84	1194	83400	GOBLE CR (26.0035)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/08/84	05/08/84	986	14700	HERRINGTON CR 260294	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/08/84	05/08/84	986	14700	HOFFSTADT CR 26.0396	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/03/84	08/03/84	118	64900	IRON CR (26.0697)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/10/84	05/10/84	986	76600	JOHNSON CR (26.0254)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/14/84	05/14/84	1194	47600	JOHNSON CR (26.0254)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/07/84	08/07/84	147	117600	JOHNSON CR (26.1142)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/07/84	05/07/84	926	14000	JONES CR (26.0531)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/07/84	05/07/84	926	158300	KING CR (26.0461)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/08/84	05/08/84	986	73600	LACAMAS CR (26.0467)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/08/84	05/08/84	986	73600	LACAMAS CR (26.0467)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/15/84	05/15/84	1194	95300	LACAMAS CR (26.0467)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/31/84	07/31/84	150	35800	MAYFIELD LAKE (26)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/10/84	09/10/84	75	123700	MAYFIELD LAKE (26)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/10/84	09/10/84	58	116000	MAYFIELD LAKE (26)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/15/84	05/15/84	1194	95300	MONAHAN CR (26.0195)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/14/84	05/14/84	1194	47600	MULHOLLAND CR 260084	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/02/84	08/02/84	167	75200	OHANAPECOSH R 261304	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/02/84	08/02/84	116	40600	OHANAPECOSH R 261304	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/07/84	05/07/84	926	9300	OLEQUA CR -EF 260427	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/07/84	05/07/84	926	52100	OLEQUA CR -MF 260427	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/07/84	05/07/84	926	8400	OLEQUA CR -NF 260464	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/16/84	05/16/84	1194	95300	OSTRANDER CR 26.0132	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/10/84	05/10/84	986	43200	OUTLET CR (26.0239)	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/01/84	08/01/84	115	23000	RIFFE LAKE (26)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/20/84	09/20/84	49	107400	RIFFE LAKE (26)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/21/84	09/21/84	85	151800	RIFFE LAKE (26)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/14/84	05/14/84	1194	95300	SALMON CR (26.0187)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/16/84	05/16/84	1194	47600	SALMON CR (26.0187)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/16/84	05/16/84	1194	95300	SALMON CR (26.0187)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/08/84	05/08/84	986	14700	SCHULTZ CR (26.0359)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/20/84	09/20/84	81	54600	SKATE CR (26.1182)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/15/84	05/15/84	1194	95300	STILLWATER CR 260429	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/15/84	05/15/84	1194	95300	STILLWATER CR 260429	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/16/84	05/16/84	1194	47600	STILLWATER CR 260429	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/10/84	05/10/84	986	72700	STUDEBAKER CR 260249	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/14/84	05/14/84	1194	47600	STUDEBAKER CR 260249	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/10/84	05/10/84	986	68700	THIRTEEN CR 26.0265	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	06/21/84	06/21/84	193	77200	TILTON R (26.0560)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	06/21/84	06/21/84	193	77200	TILTON R (26.0560)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/06/84	08/06/84	153	76500	TILTON R (26.0560)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/12/84	09/12/84	85	106200	TILTON R (26.0560)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/10/84	05/10/84	986	29500	UNNAMED STREAM (26)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/16/84	05/16/84	1194	47600	UNNAMED STREAM (26)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/02/84	08/02/84	103	82400	UPPER COWLITZ RIVER	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/06/84	08/06/84	153	122400	UPPER COWLITZ RIVER	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/07/84	08/07/84	147	70500	UPPER COWLITZ RIVER	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/09/84	05/09/84	986	76500	WYANT CR (26.0315)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/09/84	05/09/84	986	83400	WYANT CR (26.0315)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	04/22/85	04/22/85	17	490000	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/85	05/01,'85	17	23309	COWLITZ R (26.0002)	633161
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/85	05/01,'85	17	230446	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/85	05/01,'85	18	23468	COWLITZ R (26.0002)	633162
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/85	05/01,'85	18	230450	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/85	05/01,'85	17	23021	COWLITZ R (26.0002)	633249
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/85	05/01,'85	17	231009	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/85	05/01,'85	17	23784	COWLITZ R (26.0002)	633250
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/85	05/01,'85	17	231013	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	05/01/85	05/01,'85	19	1212900	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	05/31/85	06/06,'85	16	23428	COWLITZ R (26.0002)	633251
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	05/31/85	06/06,'85	16	558469	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	05/31/85	06/06,'85	16	23434	COWLITZ R (26.0002)	633252
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	05/31/85	06/06,'85	16	558469	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	COWLITZ HATCHERY	Smolt	05/31/85	05/31,'85	18	395000	COWLITZ R (26.0002)	UNTAGGED
1983	COWLITZ RIVER	TOLEDO HI SCHOOL	Fingr	04/11/84	04/11,'84	80	320	LACAMAS CR (26.0467)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/01/85	04/01,'85	605	44300	BEAR CREEK (26)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/01/85	04/01,'85	597	5400	BEAR CREEK (26)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/01/85	04/01,'85	597	5400	BEAR CREEK (26)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/28/85	05/28,'85	515	6200	BEAR CREEK (26)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/02/85	04/02,'85	589	23700	BECKER CR (26.0448)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/28/85	05/28,'85	521	2600	BECKER CR (26.0448)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/02/85	04/02,'85	589	13000	BRIM CR (26.0432)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/02/85	04/02,'85	589	20700	BRIM CR (26.0432)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/02/85	04/02,'85	589	34300	BRIM CR (26.0432)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/02/85	04/02,'85	589	35500	BRIM CR (26.0432)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/28/85	05/28,'85	521	4700	BRIM CR (26.0432)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/28/85	05/28,'85	515	8800	BRIM CR (26.0432)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	10/04/85	10/04,'85	45	72000	BUTTER CR (26.1205)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	10/07/85	10/07,'85	50	61200	BUTTER CR (26.1205)	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/01/85	04/01/85	605	14000	CAMPBELL CR 26.0443	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/28/85	05/28/85	515	3100	CAMPBELL CR 26.0443	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/23/85	04/23/85	440	62700	CEDAR CR (26.0486)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/10/85	07/10/85	145	58000	CISPUS R (26.0668)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/16/85	07/16/85	155	62000	CISPUS R (26.0668)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/17/85	07/17/85	142	56800	CISPUS R (26.0668)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/22/85	07/22/85	85	31900	CISPUS R (26.0668)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	08/12/85	08/12/85	133	26600	CISPUS R (26.0668)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/29/85	06/29/85	117	232800	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	10/07/85	10/07/85	49	39200	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/05/85	04/05/85	907	81900	DELAMETER CR 26.0192	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/05/85	04/05/85	677	68200	DELAMETER CR 26.0192	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/22/85	04/22/85	440	16700	DELAMETER CR 26 0192	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/22/85	04/22/85	440	17600	DELAMETER CR 26 0192	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/22/85	04/22/85	440	18100	DELAMETER CR 26 0192	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/22/85	04/22/85	440	18100	DELAMETER CR 26 0192	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/22/85	04/22/85	440	33500	DELAMETER CR 26.0192	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/29/85	05/29/85	449	18000	DELAMETER CR 26 0192	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/29/85	05/29/85	449	22500	DELAMETER CR 26.0192	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/19/85	04/19/85	553	16500	GOBLE CR (26.0035)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/19/85	04/19/85	553	17100	GOBLE CR (26.0035)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/19/85	04/19/85	553	17100	GOBLE CR (26.0035)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/19/85	04/19/85	553	22600	GOBLE CR (26.0035)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/19/85	04/19/85	553	45200	GOBLE CR (26.0035)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/28/85	05/28/85	521	15600	GOBLE CR (26.0035)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/11/85	07/11/85	167	66800	IRON CR (26.0097)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	08/12/85	08/12/85	133	29900	IRON CR (26.0097)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/15/85	07/15/85	131	52400	JOHNSON CR (26.1142)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/16/85	07/16/85	162	64700	JOHNSON CR (26.1142)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/04/85	06/04/85	40	13000	JONES CR (26.0531)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	03/29/85	03/29/85	698	26600	KING CR (26.0461)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	03/29/85	03/29/85	698	27200	KING CR (26.0461)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	03/29/85	03/29/85	698	28000	KING CR (26.0461)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/28/85	05/28/85	515	8800	KING CR (26.0461)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/03/85	04/03/85	621	29100	LACAMAS CR (26.0467)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/03/85	04/03/85	613	23900	LACAMAS CR (26.0467)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/03/85	04/03/85	613	55700	LACAMAS CR (26.0467)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/03/85	04/03/85	613	55700	LACAMAS CR (26.0467)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/03/85	04/03/85	613	56100	LACAMAS CR (26.0467)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/03/85	04/03/85	613	61300	LACAMAS CR (26.0467)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/03/85	04/03/85	605	26000	LACAMAS CR (26.0467)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/29/85	05/29/85	449	6300	LACAMAS CR (26.0467)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/29/85	05/29/85	449	9000	LACAMAS CR (26.0467)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/04/85	06/04/85	375	3000	LENOYE CREEK (26)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	08/01/85	08/01/85	31	165000	MAYFIELD LAKE (26)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	08/05/85	08/05/85	64	64000	MAYFIELD LAKE (26)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	12/09/85	12/09/85	29	168200	MAYFIELD LAKE (26)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/05/85	04/05/85	907	16300	MONAHAN CR (26.0195)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/22/85	04/22/85	440	43300	MULHOLLAND CR 260084	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/28/85	05/28/85	521	16700	MULHOLLAND CR 260084	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/11/85	07/11/85	154	61600	OHANAPECOSH R 261304	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/15/85	07/15/85	131	52400	OHANAPECOSH R 261304	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/17/85	07/17/85	142	56800	OHANAPECOSH R 261304	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/18/85	07/18/85	142	60300	OHANAPECOSH R 261304	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	03/26/85	03/26/85	698	40600	OLEQUA CR 26.0427)	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	03/26/85	03/26/85	698	40600	OLEQUA CR (26.0427)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	03/26/85	03/26/85	698	40600	OLEQUA CR (26.0427)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	03/27/85	03/27/85	698	40600	OLEQUA CR (26.0427)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	03/27/85	03/27/85	698	40600	OLEQUA CR (26.0427)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	03/27/85	03/27/85	698	40600	OLEQUA CR (26.0427)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	03/28/85	03/28/85	698	33600	OLEQUA CR (26.0427)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	03/28/85	03/28/85	698	42000	OLEQUA CR (26.0427)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	03/28/85	03/28/85	698	58800	OLEQUA CR (26.0427)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/28/85	05/28/85	521	52300	OLEQUA CR (26.0427)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/29/85	05/29/85	449	9000	OLEQUA CR (26.0427)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/04/85	04/04/85	613	68000	OSTRANDER CR 26.0132	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/04/85	04/04/85	605	68900	OSTRANDER CR 26.0132	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/22/85	04/22/85	440	12800	OSTRANDER CR 26.0132	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/22/85	04/22/85	440	25600	OSTRANDER CR 26.0132	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/28/85	05/28/85	521	14600	OSTRANDER CR 26.0132	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/28/85	06/28/85	117	198900	RIFFE LAKE (26)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	06/29/85	06/29/85	117	70200	RIFFE LAKE (26)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/05/85	07/05/85	339	203400	RIFFE LAKE (26)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/11/85	07/11/85	48	49200	RIFFE LAKE (26)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/12/85	07/12/85	48	116400	RIFFE LAKE (26)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	10/05/85	10/05/85	53	129800	RIFFE LAKE (26)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/19/85	04/19/85	553	64000	SALMON CR (26.0479)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/19/85	04/19/85	553	64500	SALMON CR (26.0479)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/23/85	04/23/85	440	50800	SALMON CR (26.0479)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/23/85	04/23/85	440	51200	SALMON CR (26.0479)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/23/85	04/23/85	440	58300	SALMON CR (26.0479)	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/29/85	05/29/85	449	82500	SALMON CR (26.0479)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	03/29/85	03/29/85	698	28000	STILLWATER CR 260429	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	03/29/85	03/29/85	698	28700	STILLWATER CR 260429	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/01/85	04/01/85	605	50500	STILLWATER CR 260429	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	05/28/85	05/28/85	521	12500	STILLWATER CR 260429	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/16/85	07/16/85	146	58500	UPPER COWLITZ RIVER	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/17/85	07/17/85	142	113600	UPPER COWLITZ RIVER	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	07/19/85	07/19/85	88	35200	UPPER COWLITZ RIVER	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	08/07/85	08/07/85	116	185600	UPPER COWLITZ RIVER	UNTAGGED
1984	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	08/08/85	08/08/85	116	74200	UPPER COWLITZ RIVER	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	17	10527	COWLITZ R (26.0002)	633063
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	17	63023	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	17	10465	COWLITZ R (26.0002)	633101
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	17	62648	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	17	10340	COWLITZ R (26.0002)	633102
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	17	61897	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	12	10419	COWLITZ R (26.0002)	633103
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	12	44461	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	12	9842	COWLITZ R (26.0002)	633104
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	12	41998	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	12	10116	COWLITZ R (26.0002)	633105
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	12	43164	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	11	9983	COWLITZ R (26.0002)	633106
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	11	42982	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	11	9717	COWLITZ R (26.0002)	633142
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	11	41837	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	11	9835	COWLITZ R (26.0002)	633143
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	11	42346	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	16	26329	COWLITZ R (26.0002)	633521

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	16	49200	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	16	25863	COWLITZ R (26.0002)	633522
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	16	48329	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	16	25476	COWLITZ R (26.0002)	633523
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	16	47603	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/01/86	05/01/86	17	3147500	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/02/86	06/02/86	16	26464	COWLITZ R (26.0002)	633524
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/02/86	06/02/86	16	330812	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/02/86	06/02/86	16	26305	COWLITZ R (26.0002)	633525
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/02/86	06/02/86	16	328825	COWLITZ R (26.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/02/86	06/02/86	16	26702	COWLITZ R (26.0002)	633526
1984	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/02/86	06/02/86	16	333792	COWLITZ R (26.0002)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/16/85	04/16/85	428	9000	BEAVER CR (26.0325)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/16/85	04/16/85	428	26900	BEAVER CR (26.0325)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/16/85	04/16/85	424	5100	CLANCY CREEK (26)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/16/85	04/16/85	424	5100	DISAPPOINTMENT CR	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/16/85	04/16/85	424	5100	FLY CR (TOUTLE TRIB)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/09/85	04/09/85	498	35000	GREEN R (26.0323)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/09/85	04/09/85	498	35000	GREEN R (26.0323)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/12/85	04/12/85	468	14100	HERRINGTON CR 260294	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/12/85	04/12/85	468	14100	HOFFSTADT CR 26.0396	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/10/85	04/10/85	498	23800	JIM CR (26.0329)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/10/85	04/10/85	498	33000	JORDAN CR (26.0262)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/16/85	04/16/85	428	51200	PULLEN CR (26.0386)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/12/85	04/12/85	468	14100	SCHULTZ CR (26.0359)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/17/85	04/17/85	498	60000	TOUTLE R -SF 26.0248	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/17/85	04/17/85	498	60000	TOUTLE R -SF 26.0248	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/10/85	04/10/85	498	24300	UNNAMED STREAM (26)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/11/85	04/11/85	472	56500	UNNAMED STREAM (26)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/11/85	04/11/85	472	56500	UNNAMED STREAM (26)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/12/85	04/12/85	472	37700	UNNAMED STREAM (26)	UNTAGGED
1984	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	04/12/85	04/12/85	468	18800	UNNAMED STREAM (26)	UNTAGGED
1984	COLUMBIA R - TYPE-S	TOUTLE HATCHERY	Smolt	05/20/86	05/20/86	16	155250	GREEN R (26.0323)	UNTAGGED
1984	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	03/26/85	03/26/85	698	205100	ALDER CR (26.0387)	UNTAGGED
1984	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	05/10/85	05/10/85	240	72700	DEVILS CR (26.0330)	UNTAGGED
1984	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	05/14/85	05/14/85	225	11200	DEVILS CR (26.0330)	UNTAGGED
1984	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	04/03/85	04/03/85	597	156000	ELK CR (26.0353)	UNTAGGED
1984	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	03/26/85	03/26/85	698	148800	JOHNSON CR (26.0254)	UNTAGGED
1984	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	03/26/85	03/26/85	698	44100	OUTLET CR (26.0239)	UNTAGGED
1984	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	05/13/85	05/13/85	235	13400	STUDEBAKER CR 260249	UNTAGGED
1984	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	05/14/85	05/14/85	222	33400	STUDEBAKER CR 260249	UNTAGGED
1984	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	05/13/85	05/13/85	236	57300	THIRTEEN CR 26.0265	UNTAGGED
1984	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	05/09/85	05/09/85	239	26000	UNNAMED STREAM (26)	UNTAGGED
1984	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	05/09/85	05/09/85	237	38000	UNNAMED STREAM (26)	UNTAGGED
1984	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	03/26/85	03/26/85	698	154700	WYANT CR (26.0315)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/31/86	03/31/86	1260	63000	BEAR CREEK (26)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/31/86	03/31/86	1512	3000	COON CR (26.0469)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/31/86	03/31/86	1296	13000	MILL CREEK (COWLITZ	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/31/86	03/31/86	1194	12000	MILL CREEK (COWLITZ	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/29/86	04/29/86	589	37000	BAXTER CR (26.0213)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/29/86	04/29/86	589	27000	BECKER CR (26.0448)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/29/86	04/29/86	468	43600	BRIM CR (26.0432)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/20/86	05/20/86	436	47100	BRIM CR (26.0432)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/02/86	07/02/86	309	35200	BRIM CR (26.0432)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/29/86	04/29/86	589	18200	CAMPBELL CR 26.0443	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/21/86	05/21/86	648	52000	CEDAR CR (26.0486)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/01/86	07/01/86	309	129200	CEDAR CR (26.0486)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/02/86	07/02/86	309	117400	CEDAR CR (26.0486)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/04/86	08/04/86	115	161000	CISPUS R (26.0668)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/86	08/12/86	94	136000	CISPUS R (26.0668)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/12/86	08/12/86	87	26100	CISPUS R (26.0668)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/21/86	08/21/86	49	78400	CISPUS R (26.0668)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/22/86	08/22/86	49	39200	CISPUS R (26.0668)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/25/86	08/25/86	49	39200	CISPUS R (26.0668)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/29/86	08/29/86	49	39200	CISPUS R (26.0668)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/22/86	09/22/86	50	40000	CISPUS R (26.0668)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/22/86	07/22/86	163	81500	CISPUS R -NF 26.0866	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/30/86	07/30/86	106	74200	CISPUS R -NF 26.0866	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/08/86	04/08/86	504	24700	COON CR (26.0469)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/30/86	07/30/86	97	112400	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	11/18/86	11/18/86	32	31900	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	02/05/87	02/05/87	40	12000	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/29/86	04/29/86	589	35200	DELAMETER CR 26.0192	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/29/86	04/29/86	589	36400	DELAMETER CR 26.0192	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/30/86	04/30/86	468	136000	DELAMETER CR 26.0192	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/02/86	07/02/86	309	51300	DELAMETER CR 26.0192	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/24/86	04/24/86	720	48900	GOBLE CR (26.0035)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/24/86	04/24/86	720	57500	GOBLE CR (26.0035)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/21/86	05/21/86	428	98900	GOBLE CR (26.0035)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/02/86	07/02/86	309	108200	HILL CR (26.0102)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/13/86	08/13/86	75	105000	IRON CR (26.0697)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/29/86	07/29/86	106	53000	JOHNSON CR (26.1142)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/30/86	07/30/86	106	63600	JOHNSON CR (26.1142)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/09/86	04/09/86	621	56200	KING CR (26.0461)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/09/86	04/09/86	613	12300	KING CR (26.0461)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/09/86	04/09/86	504	15600	KING CR (26.0461)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/09/86	04/09/86	504	57900	KING CR (26.0461)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/20/86	05/20/86	436	19200	KING CR (26.0461)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/25/86	04/25/86	720	264600	LACAMAS CR (26.0467)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/20/86	05/20/86	436	82000	LACAMAS CR (26.0467)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/02/86	07/02/86	311	9300	LACAMAS CR (26.0467)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/08/86	04/08/86	504	31200	LENOYE CREEK (26)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/09/86	04/09/86	621	95700	LITTLE SALMON CR 26	UNTAGGED
1985	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	04/29/86	04/29/86	744	21400	MONAHAN CR (26.0195)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/02/86	07/02/86	309	30900	MONAHAN CR (26.0195)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/24/86	04/24/86	720	59700	MULHOLLAND CR 260084	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/15/86	09/15/86	49	39200	OHANAPECOSH R 261304	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/17/86	09/17/86	49	39200	OHANAPECOSH R 261304	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/17/86	09/17/86	49	117600	OHANAPECOSH R 261304	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/22/86	09/22/86	50	40000	OHANAPECOSH R 261304	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/25/86	09/25/86	50	87500	OHANAPECOSH R 261304	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/08/86	04/08/86	504	29200	OLEQUA CR (26.0427)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/08/86	04/08/86	504	30700	OLEQUA CR (26.0427)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/08/86	04/08/86	504	49900	OLEQUA CR (26.0427)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/09/86	04/09/86	504	57900	OLEQUA CR (26.0427)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/09/86	04/09/86	504	57900	OLEQUA CR (26.0427)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/09/86	04/09/86	504	57900	OLEQUA CR (26.0427)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/24/86	04/24/86	720	46000	OSTRANDER CR 26.0132	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/24/86	04/24/86	720	61100	OSTRANDER CR 26.0132	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/01/86	07/01/86	309	117400	OSTRANDER CR 26.0132	UNTAGGED

able 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/22/86	07/22/86	163	195600	RIFFE LAKE (26)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/23/86	07/23/86	163	61100	RIFFE LAKE (26)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/29/86	07/29/86	106	53000	RIFFE LAKE (26)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/29/86	07/29/86	106	95400	RIFFE LAKE (26)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/13/86	08/13/86	75	71200	RIFFE LAKE (26)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/21/86	08/21/86	49	156800	RIFFE LAKE (26)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/22/86	08/22/86	49	39200	RIFFE LAKE (26)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/25/86	08/25/86	49	39200	RIFFE LAKE (26)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/25/86	08/25/86	49	39200	RIFFE LAKE (26)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/29/86	08/29/86	49	39200	RIFFE LAKE (26)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/29/86	08/29/86	46	44700	RIFFE LAKE (26)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/15/86	09/15/86	49	78400	RIFFE LAKE (26)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/22/86	09/22/86	50	40000	RIFFE LAKE (26)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/22/86	09/22/86	50	80000	RIFFE LAKE (26)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/24/86	09/24/86	50	80000	RIFFE LAKE (26)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/09/86	04/09/86	621	92700	SALMON CR (26.0187)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/30/86	04/30/86	796	136700	SALMON CR (26.0479)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/30/86	04/30/86	468	79700	SALMON CR (26.0479)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/20/86	05/20/86	428	150700	SALMON CR (26.0479)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/15/86	09/15/86	49	39200	SKATE CR (26.1182)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/29/86	04/29/86	589	78700	STILLWATER CR 260429	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/29/86	04/29/86	468	40800	STILLWATER CR 260429	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/09/86	04/09/86	613	18500	UNNAMED STREAM (26)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/09/86	04/09/86	613	18500	UNNAMED STREAM (26)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/04/86	08/04/86	115	160300	UPPER COWLITZ RIVER	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/14/86	08/14/86	92	110400	UPPER COWLITZ RIVER	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/15/86	09/15/86	49	39200	UPPER COWLITZ RIVER	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/17/86	09/17/86	49	39200	UPPER COWLITZ RIVER	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/18/86	09/18/86	49	45300	UPPER COWLITZ RIVER	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/24/86	09/24/86	50	80000	UPPER COWLITZ RIVER	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/29/86	04/29/86	744	39100	WHITTLE CR (26.0225)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/05/87	05/05/87	20	30326	COWLITZ R (26.0002)	634132
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/05/87	05/05/87	20	207274	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/05/87	05/05/87	12	30919	COWLITZ R (26.0002)	634135
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/05/87	05/05/87	12	122281	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/05/87	05/05/87	13	30412	COWLITZ R (26.0002)	634138
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/05/87	05/05/87	13	123888	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/05/87	05/05/87	19	76007	COWLITZ R (26.0002)	634208
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/05/87	05/05/87	19	160393	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/05/87	05/05/87	23	502100	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/05/87	05/05/87	15	502000	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/07/87	05/07/87	20	499900	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/07/87	05/07/87	19	490400	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/07/87	05/07/87	18	487600	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/07/87	05/07/87	16	502500	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/01/87	06/01/87	20	77020	COWLITZ R (26.0002)	634211
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/01/87	06/01/87	20	414280	COWLITZ R (26.0002)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/01/87	06/01/87	18	500700	COWLITZ R (26.0002)	UNTAGGED
1985	COLUMBIA R - TYPE-S	KALAMA FALLS HATCHRY	Fingr	03/25/86	03/25/86	796	187200	ALDER CR (26.0387)	UNTAGGED
1985	COLUMBIA R - TYPE-S	KALAMA FALLS HATCHRY	Fingr	03/19/86	03/19/86	872	110400	JOHNSON CR (26.0254)	UNTAGGED
1985	COLUMBIA R - TYPE-S	KALAMA FALLS HATCHRY	Fingr	03/26/86	03/26/86	796	43200	OUTLET CR (26.0239)	UNTAGGED
1985	COLUMBIA R - TYPE-S	KALAMA FALLS HATCHRY	Fingr	03/26/86	03/26/86	796	117600	STUDEBAKER CR 260249	UNTAGGED
1985	COLUMBIA R - TYPE-S	KALAMA FALLS HATCHRY	Fingr	03/19/86	03/19/86	872	29800	UNNAMED STREAM (26)	UNTAGGED
1985	COLUMBIA R - TYPE-S	KALAMA FALLS HATCHRY	Fingr	03/19/86	03/19/86	872	43800	UNNAMED STREAM (26)	UNTAGGED
1985	COLUMBIA R - TYPE-S	KALAMA FALLS HATCHRY	Fingr	03/19/86	03/19/86	872	40300	WYANT CR (26.0315)	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1985	COLUMBIA R - TYPE-S	KALAMA FALLS HATCHRY	Fingr	03/26/86	03/26/86	796	85600	WYANT CR (26.0315)	UNTAGGED
1985	COLUMBIA R - TYPE-S	TOUTLE HATCHERY	Smolt	04/14/87	04/14/87	20	148750	GREEN R (26.0323)	UNTAGGED
1985	COLUMBIA R - TYPE-S	TOUTLE HATCHERY	Smolt	04/14/87	04/14/87	20	184600	GREEN R (26.0323)	UNTAGGED
1985	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	05/15/86	05/15/86	189	56700	DEVILS CR (26.0330)	UNTAGGED
1985	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	06/18/86	06/18/86	135	41400	DEVILS CR (26.0330)	UNTAGGED
1985	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	05/12/86	05/12/86	196	58800	ELK CR (26.0353)	UNTAGGED
1985	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	06/17/86	06/17/86	135	50000	ELK CR (26.0353)	UNTAGGED
1985	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	06/20/86	06/20/86	162	45000	ELK CR (26.0353)	UNTAGGED
1985	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	06/19/86	06/19/86	135	15000	HERRINGTON CR 260294	UNTAGGED
1985	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	06/19/86	06/19/86	135	15000	HOFFSTADT CR 26.0396	UNTAGGED
1985	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	06/19/86	06/19/86	135	15000	SCHULTZ CR (26.0359)	UNTAGGED
1985	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Fingr	05/19/86	05/19/86	172	52200	THIRTEEN CR 26.0265	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/30/87	04/30/87	1296	83000	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/28/87	04/28/87	445	11600	AGREN CR (26.0428)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/28/87	04/28/87	445	33800	BAXTER CR (26.0213)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/22/87	04/22/87	720	72700	BEAR CREEK (26)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/27/87	04/27/87	540	24300	BECKER CR (26.0448)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/06/87	05/06/87	667	37300	BLUE CR (26.0527)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/16/87	04/16/87	510	127500	BRIM CR (26.0432)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/27/87	04/27/87	540	105800	CAMPBELL CR 26.0443	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/22/87	04/22/87	720	273600	CEDAR CR (26.0486)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/21/87	08/21/87	47	37600	CISPUS R (26.0668)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/24/87	08/24/87	47	75200	CISPUS R (26.0668)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/14/87	09/14/87	51	81600	CISPUS R (26.0668)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/15/87	09/15/87	51	81600	CISPUS R (26.0668)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/16/87	09/16/87	51	75200	CISPUS R (26.0668)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/22/87	04/22/87	720	2900	COON CR (26.0469)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/28/87	04/28/87	449	7600	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/26/87	08/26/87	46	39100	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/27/87	08/27/87	57	142500	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/02/87	09/02/87	75	483000	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/02/87	09/02/87	67	54000	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/17/87	04/17/87	416	148600	DELAMETER CR 26.0192	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/27/87	04/27/87	540	48100	DELAMETER CR 26.0192	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/28/87	04/28/87	445	53000	DELAMETER CR 26.0192	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/22/87	04/22/87	720	19400	FERRIER CR (26.0457)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/06/87	05/06/87	369	31800	FOSTER CR (26.0475)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/17/87	04/17/87	416	79300	GOBLE CR (26.0035)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/17/87	04/17/87	416	81300	GOBLE CR (26.0035)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/06/87	05/06/87	369	98400	HILL CR (26.0102)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/06/87	05/06/87	667	12000	JONES CR (26.0531)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/13/87	04/13/87	510	85700	KING CR (26.0461)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/21/87	04/21/87	720	288000	LACAMAS CR (26.0467)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/21/87	04/21/87	498	193000	LACAMAS CR (26.0467)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/30/87	04/30/87	428	77000	LECKLER CR (26.0169)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/06/87	05/06/87	667	58600	LITTLE SALMON CR 26	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/17/87	04/17/87	416	19900	MONAHAN CR (26.0195)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/27/87	04/27/87	540	122000	MULHOLLAND CR 260084	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/20/87	08/20/87	47	37600	OHANAPECOSH R 261304	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/13/87	04/13/87	510	58600	OLEQUA CR (26.0427)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/13/87	04/13/87	510	59200	OLEQUA CR (26.0427)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/13/87	04/13/87	510	64300	OLEQUA CR (26.0427)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/16/87	04/16/87	510	40800	OLEQUA CR (26.0427)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/16/87	04/16/87	510	58100	OLEQUA CR (26.0427)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/16/87	04/16/87	510	58600	OLEQUA CR (26.0427)	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/16/87	04/16/87	510	58600	OLEQUA CR (26.0427)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/27/87	04/27/87	540	55100	OLEQUA CR (26.0427)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/20/87	04/20/87	498	190000	OSTRANDER CR 26.0132	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/27/87	04/27/87	540	84200	OSTRANDER CR 26.0132	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/30/87	04/30/87	445	64500	OWL CREEK (26.1441)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/27/87	07/27/87	44	35200	RIFFE LAKE (26)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/27/87	07/27/87	44	70400	RIFFE LAKE (26)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/28/87	07/28/87	44	35200	RIFFE LAKE (26)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/20/87	08/20/87	47	37600	RIFFE LAKE (26)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/20/87	08/20/87	47	75200	RIFFE LAKE (26)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/21/87	08/21/87	47	37600	RIFFE LAKE (26)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/21/87	08/21/87	47	75200	RIFFE LAKE (26)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/24/87	08/24/87	47	75200	RIFFE LAKE (26)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/15/87	09/15/87	51	168300	RIFFE LAKE (26)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/16/87	09/16/87	51	81600	RIFFE LAKE (26)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/20/87	04/20/87	498	176000	SALMON CR (26.0479)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/06/87	05/06/87	667	136500	SALMON CR (26.0479)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/16/87	04/16/87	510	60200	STILLWATER CR 260429	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/27/87	04/27/87	540	29200	STILLWATER CR 260429	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/27/87	07/27/87	44	35200	UPPER COWLITZ RIVER	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/28/87	07/28/87	44	35200	UPPER COWLITZ RIVER	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/28/87	07/28/87	44	35200	UPPER COWLITZ RIVER	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/20/87	08/20/87	47	37600	UPPER COWLITZ RIVER	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/21/87	08/21/87	47	37600	UPPER COWLITZ RIVER	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/28/87	04/28/87	445	38300	WHITTLE CR (26.0225)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/02/88	05/02,88	20	497400	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/02/88	05/02,88	19	542700	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/88	05/05,88	20	78626	COWLITZ R (26.0002)	634213
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/88	05/05,88	20	2495674	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/03/88	05/03,88	21	536800	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/07/88	06/08,88	15	77308	COWLITZ R (26.0002)	634214
1986	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/07/88	06/08/88	15	926992	COWLITZ R (26.0002)	UNTAGGED
1986	COWLITZ RIVER	OLEQUA CREEK (VO	Fingr	07/11/87	07/11/87	100	800	OLEQUA CR (26.0427)	UNTAGGED
1986	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	04/25/88	04/25/88	14	49450	GREEN R (26.0323)	634735
1986	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	04/25/88	04/25/88	14	257450	GREEN R (26.0323)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/06/88	03/06/88	1296	114000	COWLITZ R (26.0002)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/06/88	04/06/88	1334	420000	COWLITZ R (26.0002)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/12/88	04/12/88	1296	108000	COWLITZ R (26.0002)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	1/26/88	01/26/88	1194	158000	COWLITZ RIVER -LOWER	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/05/88	04/05/88	1296	111000	KING CR (26.0461)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/05/88	04/05/88	1296	111000	OLEQUA CR -NF 260464	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EiFry	04/05/88	04/05/88	1296	111000	OLEQUA CR -NF 260464	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	4/25/88	04/25/88	621	100100	CEDAR CR (26.0486)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	6/28/88	06/28/88	39	15600	CISPUS R (26.0668)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	9/02/88	09/02/88	47	37600	CISPUS R (26.0668)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	9/12/88	09/12/88	46	36800	CISPUS R (26.0668)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	6/18/88	06/18/88	153	321800	COWLITZ R (26.0002)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	4/25/88	04/25/88	621	39400	LACAMAS CR (26.0467)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	6/30/88	06/30/88	39	23400	OHANAPECOSH R 261304	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	9/09/88	09/09/88	46	73600	OHANAPECOSH R 261304	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	9/12/88	09/12/88	46	35800	OHANAPECOSH R 261304	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	9/13/88	09/13/88	46	36300	OHANAPECOSH R 261304	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	4/25/88	04/25/88	621	100100	OLEQUA CR (26.0427)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	4/25/88	04/25/88	621	100100	OLEQUA CR (26.0427)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	6/28/88	06/28/88	39	15600	RIFFE LAKE (26)	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	06/29/88	6/29/88	39	15600	RIFFE LAKE (26)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/16/88	8/16/88	50	40200	RIFFE LAKE (26)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/17/88	8/17/88	50	12600	RIFFE LAKE (26)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/02/88	9/02/88	47	37600	RIFFE LAKE (26)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/02/88	9/02/88	47	75200	RIFFE LAKE (26)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/08/88	9/08/88	46	34500	RIFFE LAKE (26)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/08/88	9/08/88	46	70800	RIFFE LAKE (26)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/13/88	9/13/88	46	64400	RIFFE LAKE (26)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/19/88	9/19/88	46	15400	RIFFE LAKE (26)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/21/88	4/21/88	567	107000	SALMON CR (6.0479)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	04/21/88	4/21/88	326	100300	SALMON CR (6.0479)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	06/29/88	6/29/88	39	15600	UPPER COWLITZ RIVER	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/02/88	9/02/88	47	37600	UPPER COWLITZ RIVER	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/08/88	9/08/88	46	71300	UPPER COWLITZ RIVER	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/09/88	9/09/88	46	36800	UPPER COWLITZ RIVER	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/04/89	5/15/89	18	90189	COWLITZ R (6.0002)	634767
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/04/89	5/15/89	18	3604643	COWLITZ R (6.0002)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/06/89	6/06/89	15	435100	COWLITZ R (6.0002)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/07/89	6/07/89	18	472000	COWLITZ R (6.0002)	UNTAGGED
1987	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/31/88	3/31, 88	270	62900	ELK CR (6.0353)	UNTAGGED
1987	COLUMBIA R - TYPE-S	GRAYS R HATCHERY -WF	Fingr	03/30/88	3/30, 88	270	69400	WYANT CR (6.0315)	UNTAGGED
1987	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/25/88	4/25, 88	477	47500	DEVILS CR (6.0330)	UNTAGGED
1987	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/26/88	4/26, 88	477	11400	DOLLAR CREEK	UNTAGGED
1987	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/26/88	4/26, 88	477	13775	GOAT CREEK	UNTAGGED
1987	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/26/88	4/26, 88	477	16150	HEMLOCK CREEK	UNTAGGED
1987	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/26/88	4/26, 88	477	5700	HERRINGTON CR 260294	UNTAGGED
1987	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/26/88	4/26, 88	477	31350	JOHNSON CR (26.0254)	UNTAGGED
1987	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/25/88	4/25, 88	477	19000	MINERS CR (26.0365)	UNTAGGED
1987	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/25/88	4/25, 88	477	29925	OUTLET CR (26.0239)	UNTAGGED
1987	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/25/88	4/25, 88	477	8075	STUDEBAKER CR 260249	UNTAGGED
1987	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/26/88	4/26, 88	477	26125	THIRTEEN CR 26.0265	UNTAGGED
1987	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/26/88	4/26, 88	477	16625	TOUTLE R (26.0227)	UNTAGGED
1987	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/26/88	4/26, 88	477	21375	TROUBLE CR (NON DOE	UNTAGGED
1987	COWLITZ TYPE-N STOCK	OLEQUA CREEK (VOL)	Fingr	05/30/88	5/30, 88	182	2000	OLEQUA CR (26.0427)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	OLEQUA CREEK (VOL)	Fingr	06/12/88	6/12, 88	150	6000	OLEQUA CR (26.0427)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	TOLEDO HI SCHOOL	Fingr	01/12/88	1/12, 88	498	10000	LACAMAS CR (26.0467)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	TOLEDO HI SCHOOL	Fingr	01/12/88	1/12, 88	498	10000	SALMON CR (26.0479)	UNTAGGED
1987	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	06/02/89	6/02, 89	14	49539	GREEN R (26.0323)	635507
1987	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	06/02/89	6/02, 89	14	164761	GREEN R (26.0323)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/25/89	8/25, 89	52	39000	CISPUS R (26.0668)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/25/89	8/25, 89	46	9500	CISPUS R (26.0668)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/13/89	9/13, 89	48	28800	CISPUS R (26.0668)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/12/89	7/12, 89	222	89800	COWEMAN R (26.0003)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/14/89	7/14, 89	222	88700	COWEMAN R (26.0003)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/11/89	7/11, 89	83	10000	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/12/89	7/12, 89	105	31500	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/12/89	7/12, 89	105	4600	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/12/89	7/12, 89	104	21300	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/14/89	7/14, 89	223	632600	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/15/89	9/15, 89	47	7600	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/26/89	9/26, 89	76	97500	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/11/89	7/11, 89	84	16800	LACAMAS CR (26.0467)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/23/89	8/23, 89	48	21300	OHANAPECOSH R 261304	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/23/89	8/23, 89	44	7300	OHANAPECOSH R 261304	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/24/89	8/24, 89	43	25800	OHANAPECOSH R 261304	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz R ver subbasin sorted by br∞ d year, hatchery and lif≈ stage CONTINUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/12/89	09/12/89	48	28800	OHANAPECOSH R 261304	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/13/89	09/13/89	48	28800	OHANAPECOSH R 261304	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/14/89	09/14/89	48	57100	OHANAPECOSH R 261304	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/15/89	09/15/89	48	57600	OHANAPECOSH R 261304	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/02/89	08/02/89	48	9600	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/02/89	08/02/89	48	28800	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/02/89	08/02/89	48	33600	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/02/89	08/02/89	48	28300	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/22/89	08/22/89	48	39000	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/22/89	08/22/89	47	36400	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/22/89	08/22/89	47	37300	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/23/89	08/23/89	44	35200	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/23/89	08/23/89	44	13400	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/23/89	08/23/89	43	34400	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/23/89	08/23/89	43	12400	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/24/89	08/24/89	46	27600	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/24/89	08/24/89	46	36900	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/24/89	08/24/89	43	23800	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/25/89	08/25/89	52	34600	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/25/89	08/25/89	52	34900	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/25/89	08/25/89	46	36700	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/12/89	09/12/89	48	16800	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/12/89	09/12/89	48	76300	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/13/89	09/13/89	48	48000	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/14/89	09/14/89	48	38400	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/15/89	09/15/89	48	76800	RIFFE LAKE (26)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/06/89	07/06/89	105	15750	SALMON CR (26.0479)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/06/89	07/06/89	105	21000	SALMON CR (26.0479)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/10/89	07/10/89	104	21300	SALMON CR (26.0479)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/12/89	07/12/89	105	20200	SALMON CR (26.0479)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/10/89	07/10/89	104	42600	STILLWATER CR 260429	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	07/10/89	07/10/89	84	50400	STILLWATER CR 260429	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/22/89	08/22/89	47	28200	UPPER COWLITZ RIVER	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/12/89	09/12/89	48	28800	UPPER COWLITZ RIVER	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/13/89	09/13/89	48	28800	UPPER COWLITZ RIVER	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/02,90	05/04/90	19	64497	COWLITZ R (26.0002)	130762
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/02,90	05/04/90	19	2550046	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/02,90	05/02/90	17	45781	COWLITZ R (26.0002)	630238
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/02,90	05/02/90	17	346066	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/02,90	05/04/90	18	73058	COWLITZ R (26.0002)	630762
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/02,90	05/04/90	18	2550046	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/04,90	05/04/90	15	47742	COWLITZ R (26.0002)	630241
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/04,90	05/04/90	15	723807	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/04,90	06/04/90	17	481400	COWLITZ R (26.0002)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/04,90	06/04/90	16	418300	COWLITZ R (26.0002)	UNTAGGED
1988	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Fingr	01/08,90	01/08/90	18	10000	TOUTLE R (26.0227)	UNTAGGED
1988	COWLITZ RIVER	OLEQUA CREEK (VOL)	EmFry	02/27,89	02/27/89	1972	20000	OLEQUA CR (26.0427)	UNTAGGED
1988	COWLITZ RIVER	OLEQUA CREEK (VOL)	EmFry	03/05,89	03/05/89	1972	10000	OLEQUA CR (26.0427)	UNTAGGED
1988	COWLITZ RIVER	TOLEDO HI SCHOOL	EmFry	01/10,89	01/10/89	1972	20000	LACAMAS CR (26.0467)	UNTAGGED
1988	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	05/04,90	05/04/90	13	49192	GREEN R (26.0323)	630141
1988	TOUTLE R TYPE-S	TOUTLE HATCHERY	Smolt	05/04,90	05/04/90	13	746408	GREEN R (26.0323)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	02/28,90	02/28/90	1463	13000	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/14,90	03/14/90	1512	135000	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/17,90	03/17/90	1512	240000	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	03/26,90	03/26/90	1512	1336000	COWLITZ R (26.0002)	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Cowlitz River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	04/05/90	04/05/90	1512	136000	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/23/90	08/23/90	49	38700	CISPUS R (26.0668)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/24/90	08/24/90	49	39200	CISPUS R (26.0668)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/24/90	08/24/90	49	39200	CISPUS R (26.0668)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/27/90	08/27/90	49	40200	CISPUS R (26.0668)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/30/90	08/30/90	49	39200	CISPUS R (26.0668)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/06/90	09/06/90	50	40000	CISPUS R (26.0668)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/21/90	05/21/90	187	2800	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/25/90	05/25/90	200	10000	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ RIVER	COWLITZ HATCHERY	Fingr	09/06/90	09/06/90	50	1500	COWLITZ R (26.0002)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/23/90	08/23/90	49	39200	OHANAPECOSH R 261304	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/24/90	08/24/90	49	38200	OHANAPECOSH R 261304	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/27/90	08/27/90	49	39200	OHANAPECOSH R 261304	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/30/90	08/30/90	45	36700	OHANAPECOSH R 261304	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/06/90	09/06/90	50	40000	OHANAPECOSH R 261304	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/20/90	08/20/90	57	91200	RIFFE LAKE (26)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/20/90	08/20/90	57	91200	RIFFE LAKE (26)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/23/90	08/23/90	49	39200	RIFFE LAKE (26)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/23/90	08/23/90	49	78400	RIFFE LAKE (26)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/24/90	08/24/90	49	40400	RIFFE LAKE (26)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/27/90	08/27/90	49	39700	RIFFE LAKE (26)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/30/90	08/30/90	49	30600	RIFFE LAKE (26)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/31/90	08/31/90	50	40000	RIFFE LAKE (26)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/31/90	08/31/90	50	85000	RIFFE LAKE (26)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/31/90	08/31/90	50	120000	RIFFE LAKE (26)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/06/90	09/06/90	50	36800	RIFFE LAKE (26)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	09/06/90	09/06/90	50	39500	RIFFE LAKE (26)	UNTAGGED
1989	LEWIS RIVER	DIST 5 FIREFIGHTERS	Fingr	01/19/90	01/19/90	856	31480	SALMON CR (26.0479)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	TOLEDO HI SCHOOL	EmFry	12/20/89	12/20/89	1972	10000	LACAMAS CR (26.0467)	UNTAGGED
1990	COWLITZ RIVER	TOLEDO HI SCHOOL	EmFry	12/18/90	12/18/90	1814	20000	LITTLE SALMON CR 26	UNTAGGED

Table 10 (TD). Parasites and diseases of coho at the Cowlitz Hatchery.

Disease type	Hatchery	Specific Pathogen .
Virus	cowlitz	IHNV Infectious Hematopoietic Necrosis
virus	Cowlitz	EIBS Erythrocytic Inclusion Body Syndrome
Bacteria	Cowlitz	Cytophaga psychrophila (Cold Water Disease)
Parasite	cowlitz	Various Ectoparasites, endoparasistes and Myxosporidians

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

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COWLITZ RIVER SUBBASIN

Hatchery Produced Summer Steelhead

GEOGRAPHIC LOCATION

The Cowlitz River is located in southwest Washington, within Lewis and Cowlitz Counties. From its headwaters in the Cascade Mountains the Cowlitz River flows southwesterly joining the Columbia River at river mile (RM) 68. Total drainage encompasses approximately 2,480 square miles and includes the major tributaries of the Toutle River, with a drainage of 512 square miles joining the Cowlitz at RM 20, and the Coweeman River, with a drainage of 127 square miles joining the Cowlitz at RM 1.7.

ORIGIN

Summer steelhead within the Cowlitz Subbasin are an introduced stock. The Cowlitz broodstock was derived from Skamania hatchery-stock steelhead, but starting in the early 1970's summer steelhead returning to the Cowlitz River were used to develop the Cowlitz hatchery-stock. Historically, the Cowlitz River did not support a native summer steelhead run although summer steelhead do reproduce naturally in the subbasin; these fish are hatchery origin steelhead or strays which successfully spawned in the subbasin. Wild summer steelhead within the subbasin constitute a small portion of the total. In 1980 and 1981, natural summer steelhead contributed a mean 8.7 percent of sampled adults (Tipping 1981; 1982). In another survey taken in 1981 on the Toutle River, 6.9 percent of sampled adults were natural fish (Schuck and Kruse 1982).

DISTRIBUTION

Table 1 lists spawning and rearing habitat, by quality, for Cowlitz River steelhead based on estimates from the Northwest Power Planning Council.

Summer steelhead within the Cowlitz Subbasin are primarily hatchery fish with few natural fish present. Natural summer steelhead which spawn in the subbasin are limited to the Cowlitz River below Mayfield Dam with some fish also entering the Toutle River.

PRODUCTION

Production Facilities

The Cowlitz Trout Hatchery located on the Cowlitz River at RM 42 is the only facility producing steelhead (summer and winter) in the subbasin. The hatchery consists of 104 hatching troughs, eight 10 ft. x 100 ft. raceways, twenty-four 20 ft. x 90 ft. raceways and four five acre rearing ponds. Water is supplied by nine wells and pumped river water (river water supplys over 90 percent of the total water used). Well water is used for egg incubation and fry rearing. Ceratomyxa shasta, a prevalent fish pathogen which has caused severe fish losses at Cowlitz Hatchery, has resulted in the installation of an ozone water treatment system to disinfect up to 20 cfs of the hatchery water supply.

Production Summary

Production from the small number of summer steelhead which spawn naturally is not known. Hatchery adults are spawned at the Cowlitz Hatchery. Cowlitz Hatchery summer steelhead production, as measured by number of steelhead smolts released, for 1987 through 1991 was 56,908 in 1987, 82,153 in 1988, 222,764 in 1989, 254,681 in 1990, and 268,954 in 1991. For the 1980's mortality of hatchery fish from the fish pathogen C. Shasta often limited production with mortality

ranging as high as 80 percent. These high fish losses led to the installation of a new ozone water treatment system. Although the system has only been operating a short time, early indications show a vast reduction in mortality.

ADULT LIFE! HISTORY

Run Size and Escapement

Steelhead run size, based on sport catch and hatchery returns, for 1979 through 1989 ranged from 759 steelhead in 1983 to 9,019 fish in 1986 (Tables 2, 4, 5, and 7).

Time of migration

Entry time for returning adults is generally April through October, peaking in June and July. Summer steelhead return to the Cowlitz Hatchery primarily (approximately 70%) in October and November. The freshwater life history of summer steelhead in the Cowlitz River is illustrated in Figure 1.

Harvest

Ocean catches of Cowlitz River steelhead are unknown.

The Columbia River sport fishery catches large numbers of steelhead and although the number of Cowlitz River steelhead caught is not known, some Cowlitz fish are probably part of the harvest.

Based on estimates from punchcard returns, sport catch within the Cowlitz Subbasin from 1980 through 1990 ranged from 531 fish in 1983 to 6,313 fish in 1986 (Tables 3 and 6).

Treaty harvest does not occur in the Cowlitz Subbasin.

Spawning period

Summer steelhead spawning within the subbasin occurs from December through May, peaking in February and March (Howell et al. 1985). Cowlitz hatchery stock are spawned at the Cowlitz Hatchery from mid-December through February.

Spawning area

Spawning occurs at the Cowlitz Hatchery. Steelhead which spawn naturally within the subbasin are restricted to the Cowlitz River below Mayfield Dam and also within portions of the Toutle River.

Fecundity

Fecundity for Cowlitz hatchery-stock summer steelhead ranged from 3,888 eggs per female based on 17 females spawned in 1985 to 4,999 eggs per female based on 46 females spawned in 1986 Table 15.

Age Composition

Age composition of summer steelhead returning to the Cowlitz River in 1979, 1980 and 1981 showed wild fish constituted 9.7 percent, 5.4 percent and 10.5 percent respectively. Wild fish in this case indicates fish with more than 1 year of freshwater growth as determined by scale analysis. Wild Cowlitz summer steelhead are progeny of hatchery origin or steelhead strays which successfully spawned in the subbasin. Age structure for summer steelhead collected in the Cowlitz

River in 1979, 1980 and 1981 averaged 5.4% for l-ocean fish, 80.2% for 2-ocean fish, 11.9% for 3-ocean fish, and 1.6% were repeat spawners (Tables 9 and 10).

Size

Fork lengths from returning Cowlitz summer steelhead in 1979 and 1981 was 62.8 cm for l-ocean fish, 73.2 cm for 2-ocean, 84.0 for 3-ocean, and 96.0 cm for repeat spawners (Howell et al. 1985). Wild steelhead were not included in the analysis. Lengths by individual age class, including wild fish, for the Cowlitz and Toutle rivers is presented in Tables 13 and 14, respectively.

Sex ratio

Data obtained from 153 fish collected from the Cowlitz River between 1979 and 1981 were 50.9 percent female (Table 6). In addition, 352 fish collected from the Toutle River in 1981, 1989, and 1990 were 65.9 percent female (Tables 11 and 12).

Survival Rate

Return rates for smolts planted to adult hatchery rack returns for the period 1980 through 1987 averaged 3.07 (Table 8).

JUVENILE LIFE HISTORY

Egg

No data is available on egg production or egg to smolt survival.

Emergence

Eggs are incubated and hatched in hatchery environment.

Juvenile rearing

Cowlitz smolts are reared approximately one year to an average size ranging between 65-114 grams each (4-7 fish per Round) at time of release.

Hatchery Releases

Summer steelhead were introduced into the Cowlitz Subbasin in 1968 in an attempt to provide a sport fishery and enough escapement to maintain hatchery production. Skamania summer steelhead were originally released into the subbasin (1968) but starting in 1972 broodstock were developed from Cowlitz River steelhead. The successful establishment of a summer steelhead run has led to continued releases of hatchery smolts into the subbasin. Tables 16 and 17 outlines smolt releases into the Cowlitz Subbasin for the period 1980 through 1990.

Straying

A terminal fishery on the Cowlitz in 1980 captured steelhead which strayed into the Cowlitz River. This data is presented in Table 18.

BIOCHEMICAL-GENETIC CHARACTERISTICS

The only data on genetic features of Cowlitz summer steelhead is from Thorgaard (1977) who determined that 83.3 % of the Cowlitz stock had 58 chromosomes and 16.7% had 59 chromosomes. These values correspond with the Skamania stock summer steelhead, from which-the Cowlitz stock was derived, that also have 58 chromosomes (Howell et al. 1985).

DISEASES

Cowlitz summer steelhead have suffered repeated infestations of the myxosporidian Ceratomyxa shasta. In an effort to control and eradicate this parasite, an ozone water treatment system was installed and preliminary indications on the success of the ozone system are positive. Disease history for the Cowlitz Hatchery is presented in Table 19.

REFERENCES

The references for this section appear at the end of the following hatchery produced winter steelhead section.

Figure 1 (TT). Freshwater life history of Cowlitz Subbasin summer steelhead. The developmental stage timing represents basinwide averages. Local conditions may cause some variability.

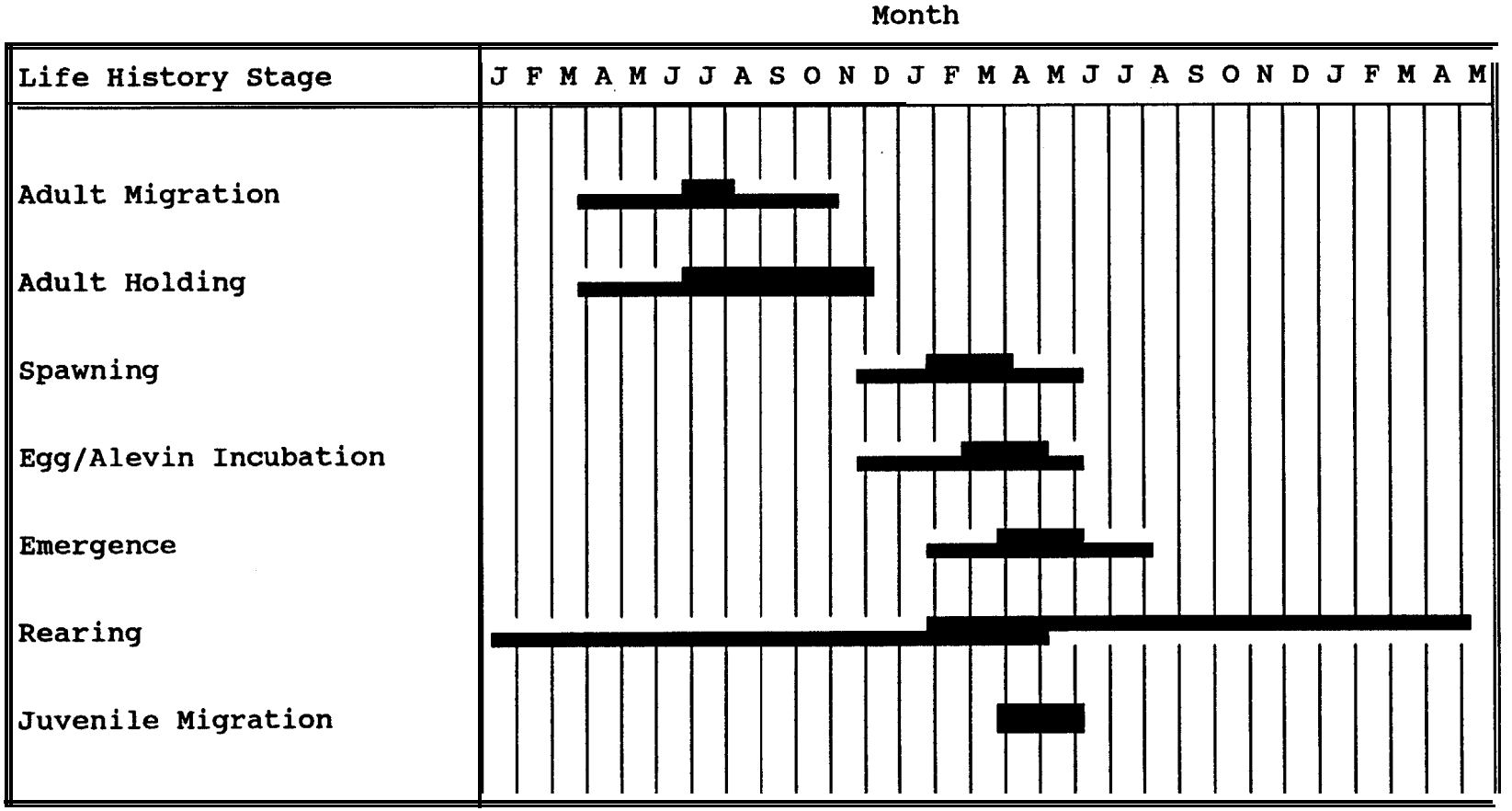

Table 1 (HB-1). Estimated* amount of spawning/rearing habitat, by quality, of Cowlitz River subbasin summer steelhead.

Area	Excellent	Good	Fair[B]	Poor[B]	Unknown	Total	Confidence
Miles	10.8%	28.0%	44.7%	16.4%		203.6	unknown
Acres	5.6%	44.7%	40.6%	9.2%		751.7%	Unknown

*Northwest Power Planning Council estimates based on limited observations.

[B]Ratings of fair and poor may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/absence database, NPPC 199 1.

Table 2 (RR-a). Returns (sport catch and escapement) of hatchery summer steelhead to the Cowlitz River by return year and total age.

	Total Age					
Return Year	2	3	4	5	Repeat Spawners	Adult Totals
1979-80		2,197	438	49		2,686
1980-81		6,038	2,187	258	129	8,614
1981-82	224	3,036	714	112	67	4,147
1982-83						759
1983-84						1,826
1984-85						1,837
1985-86						9,019
1986-87						7,106
1987-88						3,350
1988-89						2,410

Estimated that harvest comprises 70% of total return.
Age data for years 1979, 1980 and 1981 based on age breakdown from table 5.
This table sums tables 3 and 4.

Source: Jack Tipping, Washington Department of Wildlife, 1991.
Catch totals from WDW permit-card harvest estimates.

Table 3 (RS-a). Sport catch of hatchery summer steelhead in the Cowlitz River by return year and age (freshwater.ocean). In this nomenclature, the freshwater and ocean ages sum to the total age of the fish. The "s" indicates a spawning year, thus a 1.1s1 is a total of 4 years old.

Number of Fish per Age Class

Return Year	1.1	1.1s1	1.2	1.2s1	1.3	2.2	2.3	3.2	Adult Total
1979-80			1,538		239	68		34	1,880
1980-81			4,227	90	1,079	452	90	90	6,030
1981-82	157	32	2,125	15	328	171	46	32	2,903
1982-83									531
1983-84									1,278
1984-85									1,286
1985-86									6,313
1986-87									4,974
1987-88									2,345
1988-89									1,687

Source: Catch totals from WDW permit-card harvest estimates.
Age breakdown from Table 5, for years of 1979, 1980 and 1981.

Table 4 (RH-a). Escapement of hatchery summer steelhead in the Cowlitz River by return year and age (freshwater.ocean). In this nomenclature, the freshwater and ocean ages sum to the total age of the fish. The "s" indicates a spawning year, thus a 1.1s1 is a total of 4 years old.

Number of Fish per Age Class

Return Year	1.1	1.1s1	1.2	1.2s1	1.3	2.2	2.3	3.2	Adult Total
1979-80			659		102	29		15	806
1980-81			1,811	39	462	194	39	39	2,584
1981-82	67	14	911	6	141	73	20	14	1,244
1982-83									228
1983-84									548
1984-85									551
1985-86									2,706
1986-87									2,132
1987-88									1,005
1988-89									723

Escapement estimated at 30% of total run size.

Source: Jack Tipping, Washington Department of Wildlife, 1991.
Catch totals from WDW permit-card harvest estimates.
Age data for years 1979, 1980 and 1981 based on age breakdown from Table 5.

Table 5 (RB-b). Returns (sport catch and escapement) of hatchery summer steelhead in the Toutle River by return year and total age.

Total Age

Return Year	2	3	4	5	Repeat Spawners	Adult Total
1986	77	708	216	11	61	1,171
1987	54	489	149	8	40	806
1988	166	1,520	474	23	122	2,508
1989		2,322	52		6	2,374

This tables sums tables 6 and 7.

Source: Harvest data from Washington Department of Wildlife permit-card. Sport harvest closed from 1980-1985 due to eruption of Mt. St. Helens.
Sport harvest estimated to be 65% of total run (R. Lucas, WDW).

Table 6 (RS-b). Sport catch of hatchery summer steelhead in the Toutle River by return year and age (freshwater. ocean). In this nomenclature, the freshwater and ocean ages sum to the total age of the fish. The "s" indicates a spawning year, thus 1.1s1 is a total of 4 years old.

Number of Fish per Age Class

Return Year	1.1	1.1s1	1.1s1s1	1.2	11.3	2.1	2.1s1	2.2	2.2s1	2.3	Total
1986	50	20	3	451	103	9	7	37	7	7	761
1987	35	14	2	311	71	7	5	26	5	5	524
1988	108	42	7	967	222	21	15	80	15	15	1,630
1989				1,509	34				3		1,543

Source: Harvest data from WDW permit-card harvest estimates.
Sport harvest closed from 1980-1985 due to eruption of Mt. St. Helens.

Table 7 (RH-b). Escapement of hatchery summer steelhead in the Toutle River by return year and age (freshwater. ocean). In this nomenclature, the freshwater and ocean ages sum to the total age of the fish. The "s" indicates a spawning year, thus 1.1s1 is a total of 4 years old.

Number of Fish per Age Class

Return Year	1.1	1.1s1	1.1s1s1	1.2	1.3	2.1	2.1s1	2.2	2.2s1	2.3	Total
1986	27	11	2	243	56	5	4	20	4	4	410
1987	19	7	1	167	38	4	3	14	3	3	282
1988	58	23	4	521	119	11	8	43	8	8	878
1989				813	18				3		831

Source: Harvest data from WDW permit-card harvest estimates.
Sport harvest closed from 1980-1985 due to eruption of Mt. St. Helens.
Sport harvest estimated to be 65% of total run, (R. Lucas, WDW).

Table 8 **(TS-a).** Smolt to adult return rates for Cowlitz Hatchery summer steelhead.

Release Year	Smolts Planted	Adult Returns	Percent Return
1980	90,144	2,740	4.04
1981	125,452	764	0.61
1982	31,131	1,239	3.98
1983	56,922	1,989	3.49
1984	122,116	5,854	4.76
1985	144,116	4,678	3.25
1986	113,325	2,395	2.11
1987	56,908	1,875	3.30
1988	82,153		
1989	222,764		
1990	254,681		
1991	268,954		

Source: Tipping, J. Cowlitz Annual Report for 1991, report # 92-2.

Table 9 (AC-a). Age composition percentage (freshwater.ocean) by return year for summer steelhead originating in the Cowlitz River. In this nomenclature, the freshwater and ocean ages sum to the total age of the fish. The "s" indicates a spawning year, thus 1.1sl is a total of four years old.

Age Composition (%)

Return Year	N	1.1	1.1s1	1.2	1.2s1	1.3	2.2	2.3	3.2
1979	31	16.1	3.2	67.7		3.2	6.5	3.2	
1980	55			81.8		12.7	3.6		1.8
1981	67			70.1	1.5	17.9	7.5	1.5	1.5
Average		5.4	1.1	73.2	0.5	11.3	5.9	1.6	1.1

Sources: Scale analysis of sport caught fish.
Tipping, J. and S. Springer. 1980. Cowlitz River sea-run cutthroat creel census and and life history study. Washington Department of Wildlife.
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Tipping, J. 1982. Cowlitz River sea-run cutthroat 1979-1981. Wash. Dept. of Wildlife, # 82-9.

Table 10 (AC-b). Age composition percentage (freshwater.ocean) by return year for summer steelhead originating in the Toutle River. In this nomenclature the freshwater and ocean ages sum to the total age of the fish. The "s" indicates a spawning year, thus 1.1s1 is a total of four years old.

Age Composition (%)

Return Year	N	1.1	1.1s1	1.1s1s1	1.2	1.3	2.1	2.1s1	2.2	2.2s1	2.3
1981	1⊂	1.7			77.6	13.8			4.3		2.6
1989	139				97.8	2.2					
1990	77	18.2	7.8	1.3	26.0	24.7	3.9	2.6	10.4	2.6	
Average		6.6	2.6	0.4	59.3	13.6	1.3	0.9	4.9	0.9	0.9

Sources: Loch, J. and P. Downing. 1990. 1989 Toutle River fish collection facility operation and salmonid investigations, Washington Department of Wildlife, # 89-13.
Loch, J. 1991. 1990 Toutle River fish collection facility operation and salmonid investigations, Wash. Dept. Wildlife. # 91-13.
Schuck, M.L. and H.T. Kurose. 1982. South Fork Toutle fish trap operation and salmonid investigations, 1981-82.
Scale analysis of fish returning to collection facilities.

Table 11 (AS-a). Percent females by age class (freshwater.ocean) for summer steelhead originating in the Cowlitz River. In this nomenclature, the freshwater and ocean ages sum to the total age of the fish. The "s" indicates a spawning year, thus 1.1s1 is a total of 4 years old.

% Female

Return Year	Total[A]	1.1	1.1s1	1.2	1.2s1	1.3	2.2	2.3	3.2	Total % Female
1979	31	20.0		38.1	-	100	100		-	38.7
1980	55	-	-	62.2	-	57.1	100	-		75.6
1981	67	-	-	53.2		50.0	40.0	100	100	52.2

[A]Includes both male and female.

Sources: Tipping, J. and S. Springer. 1980. Cowlitz River sea-run cutthroat creel census and life history study. Washington Department of Wildlife.
Tipping, J. 1981. Cowlitz sea-run cutthroat study, 1980-81. Wash. Dept. Wildlife, # 81-12.
Tipping, J. 1982. Cowlitz River sea-run cutthroat 1979-1981. Wash. Dept. Wildlife, # 82-9.
Scale analysis of sport caught fish.

Table 12 (AS-b). Percent females by age class (freshwater.ocean) for summer steelhead originating in the Toutle River. In this nomenclature, the freshwater and ocean ages sum to the total age of the fish. The "s" indicates a spawning year, thus 1.1s1 is a total of 4 years old.

% Females

Return Year	Total^	1.1	1.1s1	1.1s1s1	1.2	1.2s1	1.3	2.1	2.1s1	2.2	2.2s1	2.3	Total % Female
1981	116	50.0	-	-	66.7	-	50.0	-	-	60.0	-	33.3	62.9
1989	139	-	-	-	69.1	-	33.3	-	-	-	-	-	69.9
1990	97	92.8	83.3	100	40.0	50.0	15.8	66.7	100	100	100	-	63.9

^Total sample size, includes both male and female.

Sources: Loch, J. and P. Downing. 1990. 1989 Toutle River fish collection facility operation and salmonid investigations. Wash. Dept. Wildlife. #89-13.
Loch, J. 1991. 1990 Toutle River fish collection facility operation and salmonid investigations. Wash. Dept. Wildlife. #91-13.
Schuck, M.L. and H.T. Kurose. 1982. South Fork Toutle fish trap operation and salmonid investigations, 1981-82. Scale analysis of fish returning to collection facilities.

Table 13 (AL-a). Mean fork length by return year and age class (freshwater.ocean) for summer steelhead originating in the Cowlitz River. In this nomenclature, the freshwater and ocean ages sum to the total age of the fish. The "s" indicates a spawning year, thus 1.1s1 is a total of 4 years old.

Mean Fork Length (cm)

Return Year	N	1.1	1.1s1	1.2	1.2s1	1.3	2.2	2.3	3.2
1979	31	62.8	97.5	72.1		67.0	68.0	90.0	-
1980	55	-	-	70.5	-	84.4	71.0	-	68.0
1981	67	-	-	73.7	95.0	85.0	78.6	81.0	71.0

Source: Scale analysis of sport caught fish.
Source: Tipping, J. and S. Springer. 1980. Cowlitz River sea-run cutthroat creel census and life history study. Wash. Dept. Wildlife.
Tipping, J. 1981. Cowlitz sea-run cutthroat study, 1980-81. Wash. Dept. Wildlife, # 81-12.
Tipping, J. 1982. Cowlitz River sea-run cutthroat 1979-1981. Wash. Dept. Wildlife, # 82-9.

Table 14 (AL-b). Mean fork length by return year and age class (freshwater.ocean) for summer steelhead originating in the Toutle River. In this nomenclature, the freshwater and ocean ages sum to the total age of the fish. The "s" indicates a spawning year, thus 1.1s1 is a total of 4 years old.

Mean Fork Length (cm)

Return Year	N	1.1	1.1s1	1.1s1s1	1.2	1.3	2.1	2.1s1	2.2	2.2s1	2.3
1981	116	59.6	-	-	71.3	86.7	-	-	71.6	-	81.1
1989	139	-	-	-	68.4	78.4	-	-	-	-	-
1990	77	68.3	75.0	85.5	74.6	87.1	70.2	77.8	73.0	87.4	0

Source: Age determined from scale analysis, fish were sampled at collection facilities.
Sources: Loch, J. and P. Downing. 1990. 1989 Toutle River fish collection facility operation and salmonid investigations. Wash. Dept. Wildlife. #89-13.
Loch, J. 1991. 1990 Toutle River fish collection facility operation and salmonid investigations. Wash. Dept. Wildlife. #91-13.
Schuck, M.L. and H.T. Kurose. 1982. South Fork Toutle fish trap operation and salmonid investigations, 1981-82.

Table 15 **(AF-a).** Mean fecundity by brood year for hatchery summer steelhead returning to the Cowlitz Hatchery.

Brood Year	N	Mean Length	Average Number of Eggs[A]
1981-82	31	72.9	4,224
	49	73.1	4,265
	44	73.5	4,750
	20	72.9	4,299
1982-83	33	74.5	3,783
	21	75.7	4,546
	31	74.1	4,974
	35	74.5	4,896
	43	73.0	4,326
	17	70.3	3,888
1984-85	48	71.4	4,619
	36	71.7	4,879
	46	69.4	4,720
1985-86	28	71.8	4,681
	47	70.4	4,987
	46	71.0	4,999
1986-87	40	72.1	4,545
	35	71.5	4,819
	48	71.2	4,780

*Average Fecundity determined by dividing total eggs by total females spawned.

Source: Cowlitz Hatchery spawning records. No age data was available.
Each line represents one or more egg takes.

Table 1≤ (TR-1). Hatchery releases of summer steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish/ lb.	Number Released	Release Site	CWT Code /Fin Clips
1981	Cowlitz	Cowlitz	Non-Smolt	01-13-82		43.6	8,676	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	04-27-82		6.2	4,154	Cowlitz	
1981	Cowlitz	Cowlitz	Non-Smolt	09-09-82		95.0	13,300	Cowlitz	
1981	Cowlitz	Cowlitz	Non-Smolt	10-08-82		47.0	13,731	Cowlitz	
1981	Cowlitz	Cowlitz	Non-Smolt	10-25-82		66.0	23,760	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	05-09-83		6.8	14,960	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	05-09-83		7.0	16,300	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	05-11-83		9.6	51,024	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	06-16-83		366.0	3,298	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	07-06-83		95.0	25,080	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	07-06-83		101.0	36,360	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	07-06-83		105.0	84,000	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	08-08-83		37.0	62,308	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	08-08-83		60.0	73,680	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	09-07-83		33.0	30,690	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	09-12-83		57.0	42,750	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	09-24-83		34.0	5,440	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	09-24-83		27.0	3,240	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	09-28-83		28.0	11,340	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	04-16-84		4.2	2,646	Cowlitz	

Table 16 (cont.). Hatchery releases of summer steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish/ lb.	Number Released	Release Site	CWT Code /Fin Clips
1983	Cowlitz	Cowlitz	Smolt	04-16-84		4.0	16,240	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	04-16-84		4.2	15,435	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	04-16-84		6.2	16,244	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	04-17-84		5.7	15,818	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	04-17-84		5.1	16,065	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	04-20-84		6.6	16,038	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	04-20-84		6.6	3,696	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	04-20-84		6.6	6,897	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-01-84		6.0	25,980	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-01-84		6.6	14,421	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-08-84		7.3	22,082	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-08-84		6.9	14,145	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-09-84		7.6	6,346	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-15-84		6.0	7,380	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-15-84		6.0	5,700	Cowlitz	
1983	Cowlitz	Cowlitz	Non-Smolt	01-24-84		26.0	5,512	Cowlitz	
1983	Cowlitz	Cowlitz	Non-Smolt	07-02-84		108.0	11,880	Cowlitz	
1983	Cowlitz	Cowlitz	Non-Smolt	08-14-84		58.0	42,166	Cowlitz	
1983	Cowlitz	Cowlitz	Non-Smolt	08-16-84		88.0	17,336	Cowlitz	
1983	Cowlitz	Cowlitz	Non-Smolt	08-17-84		58.0	48,082	Cowlitz	

Table 16 (cont.). Hatchery releases of summer steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish/ lb.	Number Released	Release Site	CWT Code /Fin Clips
1983	Cowlitz	Cowlitz	Non-Smolt	10-08-84		20.0	30,000	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	04-29-85		4.6	15,272	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	04-29-85		5.4	3,310	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	04-29-85		6.5	18,428	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	04-30-85		5.3	11,194	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	04-30-85		7.5	16,193	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-01-85		5.9	53,584	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-02-85		5.9	9,110	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-13-85		7.2	13,795	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-13-85		4.7	21,174	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-10-85		5.8	27,173	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-14-85		4.5	13,635	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-15-85		6.1	27,511	Cowlitz	
1984	Cowlitz	Cowlitz	Non-Smolt	05-23-85		826.0	7,847	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	04-16-86		6.7	1,213	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	04-29-86		7.2	11,702	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	04-30-86		6.1	25,589	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-01-86		6.0	12,933	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-02-86		6.8	3,691	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-03-86		6.8	7,850	Cowlitz	

Table 16 (cont.). Hatchery releases of summer steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish/ lb.	Number Released	Release Site	CWT Code /Fin Clips
1985	Cowlitz	Cowlitz	Smolt	05-04-86		7.9	5,003	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-05-86		8.0	3,664	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-06-86		7.9	12,637	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-24-86		9.0	1,800	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-27-86		8.0	320	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-27-86		6.1	10,980	Cowlitz	AD
1985	Cowlitz	Cowlitz	Smolt	05-28-86		8.0	640	Cowlitz	AD
1985	Cowlitz	Cowlitz	Smolt	05-28-86		6.1	28,365	Cowlitz	AD
1985	Cowlitz	Cowlitz	Smolt	04-30-86		13.3	29,134	Cowlitz	AD
1986	Cowlitz	Cowlitz	Smolt	04-17-87		9.0	5,868	Cowlitz	AD
1986	Cowlitz	Cowlitz	Smolt	04-17-87		6.0	7,938	Cowlitz	AD
1986	Cowlitz	Cowlitz	Smolt	05-04-87		9.0	1,050	Cowlitz	AD
1986	Cowlitz	Cowlitz	Smolt	05-04-87		5.0	9,450	Cowlitz	AD
1986	Cowlitz	Cowlitz	Smolt	05-04-87		5.5	10,972	Cowlitz	AD
1986	Cowlitz	Cowlitz	Smolt	05-12-87		5.1	28,548	Cowlitz	AD
1986	Cowlitz	Cowlitz	Non-Smolt	05-04-87		11.0	2,090	Cowlitz	AD
1986	Cowlitz	Cowlitz	Non-Smolt	05-12-87		11.3	1,822	Cowlitz	AD
1987	Cowlitz	Cowlitz	Smolt	04-19-88		5.2	11,317	Cowlitz	AD
1987	Cowlitz	Cowlitz	Smolt	04-19-88		9.6	6,063	Cowlitz	AD
1987	Cowlitz	Cowlitz	Smolt	05-15-88		5.7	70,836	Cowlitz	AD

Table 16 (cont.). Hatchery releases of summer steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish/ lb.	Number Released	Release Site	CWT Code /Fin Clips
1987	Cowlitz	Cowlitz	Non-Smolt	05-15-88		13.1	45,914	Cowlitz	AD
1987	Cowlitz	Cowlitz	Smolt	04-24-89		5.4	656	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	04-24-89		6.2	8,958	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	04-24-89		9.9	38	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	04-24-89		9.7	7,720	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	04-25-89		5.4	8,549	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	04-25-89		5.4	3,328	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	04-25-89		6.2	11,681	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	04-25-89		8.7	2,297	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	04-25-89		7.8	163	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	04-25-89		9.7	8,321	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	04-26-89		5.3	5,651	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	04-26-89		10.0	225	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	04-27-89		5.6	2,692	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	04-27-89		7.4	6,373	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	04-27-89		5.6	1,349	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	04-27-89		8.2	168	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	04-27-89		9.4	85	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	04-28-89		5.1	1,561	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	04-28-89		8.0	72	Cowlitz	AD

Table 16 (cont.). Hatchery releases of summer steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish/ lb.	Number Released	Release Site	CWT Code /Fin Clips
1988	Cowlitz	Cowlitz	Smolt	04-29-89		5.1	1,038	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	04-29-89		8.0	48	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-04-89		5.4	6,360	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-04-89		10.0	357	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-05-89		5.3	12,200	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-05-89		5.2	9,278	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-05-89		5.4	5,355	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-05-89		9.0	1,277	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-05-89		6.0	229	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-06-89		5.3	31,040	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-06-89		5.6	7,135	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-06-89		8.5	2,237	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-06-89		9.5	980	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-07-89		5.6	19,289	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-07-89		5.6	6,576	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-07-89		9.0	1,873	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-08-89		5.6	18,786	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-08-89		5.2	36,875	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-12-89		6.8	18,034	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-12-89		9.9	10,820	Cowlitz	AD

Table 16 (cont.). Hatchery releases of summer steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish/ lb.	Number Released	Release Site	CWT Code /Fin Clips
1988	Cowlitz	Cowlitz	Smolt	05-15-89		5.0	383	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	04-27-89		12.7	31,113	Cowlitz	AD
1988	Cowlitz	Cowlitz	Non-Smolt	05-05-89		11.3	965	Cowlitz	AD
1988	Cowlitz	Cowlitz	Non-Smolt	05-07-89		10.3	1,423	Cowlitz	AD
1988	Cowlitz	Cowlitz	Non-Smolt	05-08-89		10.3	3,019	Cowlitz	AD
1988	Cowlitz	Cowlitz	Non-Smolt	05-08-89		11.0	9,134	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	04-16-90		6.0	642	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	04-17-90		6.0	78	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	04-17-90		6.0	522	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	04-18-90		6.0	1,062	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	04-20-90		5.8	1,172	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	04-20-90		5.5	3,883	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	04-20-90		5.5	1,392	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	04-21-90		5.6	5,611	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	04-23-90		5.5	11,303	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	04-23-90		4.5	32,000	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	04-30-90		5.4	10,352	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	05-01-90		5.6	3,909	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	05-01-90		5.6	5,034	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	05-01-90		5.3	35,537	Cowlitz	AD

Table 16 (cont.). Hatchery releases of summer steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish/ lb.	Number Released	Release Site	CWT Code /Fin Clips
1989	Cowlitz	Cowlitz	Smolt	05-01-90		5.2	4,170	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	05-02-90		5.6	31,819	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	05-03-90		5.6	24,046	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	05-04-90		5.3	25,520	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	05-06-90		5.2	26,603	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	05-07-90		5.1	8,293	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	05-10-90		6.1	15,945	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	05-14-90		6.0	588	Cowlitz	AD
1989	Cowlitz	Cowlitz	Smolt	05-30-90		3.0	5,200	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	04-16-90		13.3	479	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	04-17-90		13.3	53	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	04-17-90		12.0	192	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	04-18-90		12.0	408	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	04-20-90		12.3	824	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	04-20-90		11.3	1,537	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	04-20-90		11.3	554	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	04-21-90		11.3	2,509	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	04-23-90		11.3	1,887	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	04-23-90		12.0	2,004	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	04-30-90		14.7	2,543	Cowlitz	AD

Table 16 (cont.). Hatchery releases of summer steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish/ lb.	Number Released	Release Site	CWT Code /Fin Clips
1989	Cowlitz	Cowlitz	Non-Smolt	05-01-90		12.0	804	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	05-01-90		12.0	1,308	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	05-01-90		13.5	8,910	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	05-01-90		13.0	611	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	05-02-90		11.0	10,934	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	05-03-90		12.6	12,449	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	05-04-90		11.1	10,290	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	05-06-90		11.2	10,830	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	05-07-90		11.0	1,474	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	05-10-90		11.9	14,542	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	05-14-90		10.4	541	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	09-07-90		110.0	11,550	Cowlitz	AD
1989	Cowlitz	Cowlitz	Non-Smolt	09-10-90		96.3	5,970	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	04-23-91		5.0	605	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	04-23-91		8.0	8	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	04-24-91		5.0	875	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	04-24-91		8.5	9	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	04-29-91		5.0	6,360	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	04-29-91		8.5	85	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	04-30-91		5.3	5,295	Cowlitz	AD

Table 16 (cont.). Hatchery releases of summer steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish/ lb.	Number Released	Release Site	CWT Code /Fin Clips
1990	Cowlitz	Cowlitz	Smolt	04-30-91		4.8	5,280	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	04-30-91		5.3	11,596	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	04-30-91		5.6	1,506	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	04-30-91		9.7	1,921	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	05-01-91		5.5	24,481	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	05-02-91		5.3	38,218	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	05-02-91		5.4	25,904	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	05-02-91		9.0	657	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	05-03-91		5.2	12,943	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	05-04-91		5.4	15,336	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	05-05-91		5.4	62,910	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	05-08-91		5.8	15,776	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	05-09-91		6.4	21,034	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	05-09-91		6.3	14,761	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	05-09-91		9.8	11,172	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	05-13-91		5.8	6,084	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	05-23-91		3.4	39,998	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	05-23-91		3.0	9,999	Cowlitz	AD

Source: Terry Lovgren, WDW Hatchery Stocking Database, 1991.

[p] D = Adipose clip.

Table 17 (TR-2). Hatchery releases of summer steelhead into the Toutle River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish / lb.	Number Released	Release Site	CWT Code /Fin Clips
1981	Cowlitz R	Cowlitz H	Non-Smolt	1/13/82		43.6	8,676	Cowlitz R	
1982	Washougal R	Beaver Creek H	Non-Smolt	5/14/82		12.0	16,440	Unknown	
1983	Washougal R	Beaver Creek H	Smolt	5/08/84		6.2	7,440	Unknown	
1983	Washougal R	Beaver Creek H	Smolt	5/10/84		6.5	8,125	Unknown	
1983	Washougal R	Beaver Creek H	Smolt	5/11/84		8.2	10,250	Unknown	
1983	Washougal R	Skamania H	Non-Smolt	5/26/83		665	4,655	Toutle R - South Fk	
1983	Washougal R	Skamania H	Non-Smolt	5/26/83		945	103,950	Toutle R - South Fk	
1983	Washougal R	Skamania H	Non-Smolt	5/26/83		665	4,655	Unknown	
1983	Washougal R	Skamania H	Non-Smolt	5/26/83		945	103,950	Unknown	
1983	Washougal R	Toutle River Trap (SF Toutle)	Smolt	5/03/84		7.3	20,600	Toutle R - South Fk	AD
1984	Washougal R -	Beaver Creek H	Smolt	5/01/85		7.0	8,750	Green R	AD
1984	Washougal R -	Beaver Creek H	Smolt	5/07/85		7.0	6,650	Green R	AD

Table 17 (cont.). Hatchery releases of summer steelhead into the Toutle River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish / lb.	Number Released	Release Site	CWT Code /Fin Clips
1984	Washougal R -	Beaver Creek H	Smolt	5/16/85		6.9	7,590	Green R	AD
1985	Elokomin R	Beaver Creek H	Smolt	4/24/86		5.4	6,804	Toutle R - South Fk	AD
1985	Elokomin R	Beaver Creek H	Smolt	4/25/86		5.4	24,720	Green R	AD
1985	Elokomin R	Beaver Creek H	Smolt	5/06/86		5.4	7,290	Green R	AD
1985	Washougal R -	Beaver Creek H	Smolt	5/16/86		5.2	9,880	Toutle R - South Fk	AD
1985	Washougal R -	Toutle River Trap (SF Toutle)	Smolt	4/26/86		6.5	23,660	Toutle R - South Fk	AD
1986	Elokomin R	Beaver Creek H	Smolt	5/04/87		5.7	8,550	Green R	AD
1986	Washougal R	Alder Creek Pond (Toutle NF)	Smolt	5/08/87		4.8	49,440	Alder Cr	AD
1986	Washougal R	Toutle River Trap (SF Toutle)	Smolt	5/01/87		5.0	22,385	Toutle R - South Fk	AD
1987	Washougal R	Alder Creek Pond (Toutle NF)	Smolt	5/10/88		5.7	30,210	Toutle R - North Fk	AD
1987	Washougal R	Beaver Creek H	Smolt	5/13/88		4.9	7,350	Toutle R - South Fk	AD
1987	Washougal R	Beaver Creek H	Smolt	5/19/88		4.8	7,200	Toutle R - South Fk	AD

Table 17 (cont.). Hatchery releases of summer steelhead into the Toutle River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish / lb.	Number Released	Release Site	CWT Code /Fin Clips
1987	Washougal R	Beaver Creek H	Smolt	5/20/88		5.8	4,060	Toutle R - South Fk	AD
1987	Washougal R	Beaver Creek H	Smolt	5/20/88		6.4	1,280	Toutle R - South Fk	AD
1987	Washougal R	Beaver Creek H	Smolt	5/14/88		4.9	7,595	Green R	AD
1987	Washougal R	Beaver Creek H	Smolt	5/16/88		4.9	4,043	Green R	AD
1987	Washougal R	Beaver Creek H	Smolt	5/16/88		4.8	3,480	Green R	AD
1987	Washougal R	Beaver Creek H	Smolt	5/20/88		5.8	5,220	Green R	AD
1988	Washougal R	Beaver Creek H	Smolt	5/10/89		5.6	8,400	Toutle R	AD
1988	Washougal R	Beaver Creek H	Smolt	5/11/89		5.6	16,520	Toutle R	AD
1988	Washougal R	Beaver Creek H	Smolt	5/02/89		4.6	6,900	Toutle R - North Fk	AD
1988	Washougal R	Beaver Creek H	Smolt	5/02/89		5.6	8,400	Toutle R - North Fk	AD
1988	Washougal R	Beaver Creek H	Smolt	5/12/89		6.6	9,900	Toutle R - North Fk	AD
1988	Washougal R	Beaver Creek H	Smolt	4/28/89		4.8	6,000	Toutle R - South Fk	AD

Table 17 (cont.). Hatchery releases of summer steelhead into the Toutle River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish / lb.	Number Released	Release Site	CWT Code /Fin Clips
1988	Washougal R	Beaver Creek H	Smolt	5/01/89		4.6	12,650	Toutle R - South Fk	AD
1988	Washougal R	Beaver Creek H	Smolt	5/15/89		5.6	3,360	Toutle R - South Fk	AD
1988	Washougal R	Beaver Creek H	Smolt	4/28/89		4.4	6,380	Green R	AD
1988	Washougal R	Beaver Creek H	Smolt	4/28/89		4.8	6,000	Green R	AD
1988	Washougal R	Beaver Creek H	Smolt	5/03/89		5.6	6,580	Green R	AD
1988	Washougal R	Beaver Creek H	Smolt	5/03/89		5.7	9,234	Green R	AD
1988	Washougal R	Beaver Creek H	Smolt	5/15/89		5.6	1,120	Green R	AD
1988	Washougal R	Toutle River Trap (SF Toutle)	Smolt	4/27/89		4.2	6,006	Toutle R - South Fk	AD
1989	Washougal R	Beaver Creek H	Smolt	5/11/90		6.2	7,130	Green R	AD
1989	Washougal R	Beaver Creek H	Smolt	5/11/90		6.4	8,000	Green R	AD
1989	Washougal R	Beaver Creek H	Smolt	5/11/90		6.4	8,000	Green R	AD
1989	Washougal R	Beaver Creek H	Smolt	5/18/90		6.6	8,250	Green R	AD

Table 17 (cont.). Hatchery releases of summer steelhead into the Toutle River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish / lb.	Number Released	Release Site	CWT Code /Fin Clips
1989	Washougal R	Beaver Creek H	Smolt	5/14/90		6.4	3,200	Toutle R	AD
1989	Washougal R	Beaver Creek H	Smolt	5/14/90		7.3	6,935	Toutle R	AD
1989	Washougal R	Beaver Creek H	Smolt	5/15/90		7.3	6,935	Toutle R	AD
1989	Washougal R	Beaver Creek H	Smolt	4/25/90		7.2	10,800	Toutle R - North Fk	AD
1989	Washougal R	Beaver Creek H	Smolt	5/01/90		6.6	6,270	Toutle R - North Fk	AD
1989	Washougal R	Toutle River Trap (SF Toutle)	Smolt	4/27/90		4.7	21,996	Toutle R - South Fk	AD
1990	Washougal R -	Beaver Creek H	Smolt	4/16/91		5.7	8,550	Green R	AD
1990	Washougal R -	Beaver Creek H	Smolt	4/16/91		5.8	6,380	Green R	AD
1990	Washougal R -	Beaver Creek H	Smolt	4/23/91		7.5	7,500	Green R	AD
1990	Washougal R -	Beaver Creek H	Smolt	4/24/91		7.5	9,375	Green R	AD
1990	Washougal R -	Beaver Creek H	Smolt	4/04/91		6.2	3,007	Toutle R - North Fk	AD
1990	Washougal R -	Beaver Creek H	Smolt	4/16/91		5.7	6,840	Toutle R - North Fk	AD

Table 17 (cont.). Hatchery releases of summer steelhead into the Toutle River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish / lb.	Number Released	Release Site	CWT Code /Fin Clips
1990	Washougal R -	Beaver Creek H	Smolt	5/07/91		4.9	7,840	Toutle R - North Fk	AD
1990	Washougal R -	Beaver Creek H	Smolt	5/08/91		5.4	8,640	Toutle R - North Fk	AD
1990	Washougal R -	Beaver Creek H	Smolt	4/23/91		7.5	9,000	Toutle R - South Fk	AD
1990	Washougal R -	Beaver Creek H	Smolt	4/30/91		5.7	7,410	Toutle R - North Fk	AD
1990	Washougal R -	Toutle River Trap (SF Toutle)	Smolt	4/27/91		4.3	21,715	Toutle R - South Fk	AD

Source: Terry Lovgren, WDW Hatchery Stocking Database, 1991.

Table 18 (AI). Immigration of coded wire tagged adult summer steelhead in the Cowlitz Subbasin.

Hatchery/Release Site	Recovery site and Year	Recovery Method	Number Recovered	Code	Total Number Estimated, (PSMFC)
North Fork Clearwater River	Cowlitz 1980	Net[A]	4	10-2-31	
Dworshak Hatchery/Below Bonneville Dam	Cowlitz 1980	Net	2	RD-YW	
Snake River	Cowlitz 1980	Net	1	OR-PK	
Below Bonneville Dam	Cowlitz 1980	Net	1	GM-WH	
Wenatchee River	Cowlitz 1980	Net	3 1	LB-WH RD-PK	
Pahsimeroi River	Cowlitz 1980	Net	2	10-3-44	
Methow River	Cowlitz 1980	Net	1	OR-GN-OR	

[A]A terminal net fishery for chinook and coho salmon existed in the early 1980's on the lower Cowlitz River and although steelhead were not targeted by this fishery some fish were incidentally harvested.

Source: 1980-81 Columbia River Tag Recovery. Report # 81-19.

Table 19 (TD). Parasites and diseases isolated at the Cowlitz Hatchery located on the Cowlitz River.

Disease Type	Hatchery	Specific Pathogen
Parasite	cowlitz	*Ceratomyxa shasta.*
Viral	Cowlitz	Infectious hematopoietic necrosis (IHN)
Parasite	Cowlitz	*Gyrodactylus sp.*
Parasite	cowlitz	*Hexamita sp.*
Parasite	Cowlitx	*Trichodina* sp.

Source: WDW pathologist, Steve Roberts, 1991.

COWLITZ RIVER SUBBASIN

Naturally Produced Winter Steelhead

GEOGRAPHIC LOCATION

The Cowlitz River is located in southwest Washington, within Lewis and Cowlitz Counties. From its headwaters in the Cascade Mountains the Cowlitz River flows southwesterly, joining the Columbia River at river mile (RM) 68. Total drainage encompasses approximately 2,480 square miles and includes the Toutle River, with a drainage of 512 square miles entering the Cowlitz at RM 20, and the Coweeman River, with a drainage of 127 square miles joining the Cowlitz at RM 1.7.

ORIGIN

Cowlitz winter steelhead arc indigenous although interbreeding has probably occurred with Cowlitz hatchery-stock steelhead.

The Toutle and Coweeman rivers each contain their own native winter steelhead stocks. The Toutle stock has probably been genetically influenced by Chambers Creek, Elokomin and Cowlitz hatchery-stocks. The Coweeman stock has probably incurred some interbreeding with the introduced Chambers Creek, Cowlitz and Elokomin hatchery fish.

DISTRIBUTION

Table 1 lists estimated amount of rearing/spawning habitat, by quality, for Cowlitz Subbasin steelhead based on estimates from the Northwest Power Planning Council.

Tables 2, 3, and 4 list estimated amount of rearing/spawning habitat and potential smolt production for the Cowlitz River, Toutle River and Coweeman River based on Washington Department of Wildlife gradient, area and flow methodology. Figures 1 and 2 illustrate the probable spawning areas of steelhead in the Cowlitz subbasin (Howell et al. 1985).

Distribution of winter steelhead is throughout the subbasin including the Toutle River, Coweeman River and the mainstem Cowlitz. Within the Cowlitz River, winter steelhead are found primarily below Mayfield and Mossyrock dams. These dams block anadromous fish migrations into the upper Cowlitz River and eliminate more than 50 percent of winter steelhead spawning and rearing habitat. Within the Toutle River little is known on exact distribution of winter steelhead although they were probably distributed throughout the watershed. The 1980 eruption of Mount St. Helens greatly altered the habitat on the Toutle River. Steelhead in the Coweeman River are distributed throughout the watershed including the mainstem Coweeman, Goble Creek and other tributaries. The volcanic eruption had little impact on the Coweeman River.

PRODUCTION

Production Facilities

The Cowlitz Trout Hatchery located on the Cowlitz River at RM 42 is the only hatchery producing steelhead (summer and winter) in the subbasin.

Production Summary

No data is available on wild smolt production. Natural production occurs in both the mainstem Cowlitz and throughout many tributaries. Production is limited on the Cowlitz River by the loss of

upstream spawning/rearing habitat. Production on the Toutle River is unknown but was severely reduced during the early 1980's by the eruption of Mount St. Helens. Production within the Coweeman watershed is unknown.

ADULT LIFE HISTORY

Run Size and Escapement

Historical estimates point to large runs of winter steelhead in the Cowlitz River. Over 20,000 wild winter steelhead were estimated to return annually to the Cowlitz River (Meigs, no date; Moore and Clark, no date). Current wild steelhead returns in the Cowlitz River are small. For 1977-78, 1978-79 and 1982-84, wild fish contributed an average of 1.7 percent of adult returns (Tables 5 and 7). Applying the 1.7 percent wild run estimate for 1977 through 1979 and 1985 through 1989, yields 309 wild fish annually. However, large numbers of hatchery-stock steelhead spawn in the Cowlitz River. In 1985, Tipping (1985) estimated Cowlitz River spawning escapement (hatchery and wild fish) at 5,703 fish.

No data is available on historical run size of Toutle River winter steelhead. The eruption of Mount St. Helens in 1980 destroyed a significant amount of Toutle spawning and rearing habitat which reduced production and run size. After the eruption, returning Toutle River steelhead were observed straying to other streams such as the Kalama River (Leider 1989). Toutle River habitat has improved: Lucas (1986 and 1987), and Lucas and Pointer (1987) estimated that between 1985 and 1989 an average of 2,743 winter steelhead escaped annually to spawn (Tables 8 and 10).

Winter steelhead escapement to the Coweeman River was estimated at 889 fish, 1,088 fish, and 392 fish in 1987, 1988, and 1989, respectively (Lucas and Pointer 1987). Based on 1989 punchcard data, 38.6 percent of the Coweeman River winter steelhead sport catch were wild fish.

Time of migration

Entry time into the Cowlitz River for returning wild adults is generally from late November through early May, peaking in March and April. Figure 3 illustrates the freshwater life history of winter steelhead in the Cowlitz River.

Toutle River winter steelhead migration is January through May with peak movement in March and April.

Coweeman River winter steelhead migration period is believed to be January through May, peaking in March.

Harvest

Ocean catches of Cowlitz Subbasin (Cowlitz, Toutle and Coweeman rivers) steelhead are unknown.

The Columbia River sport fishery catch large numbers of steelhead. An estimated 6.2 percent of returning Cowlitz steelhead are harvested in the Columbia River.

Sport harvest of winter steelhead within the Cowlitz River is primarily hatchery fish. Based on winter steelhead sampled in 1977-1978, 1978-1979 and 1983-1984 wild steelhead contributed 1.2 percent, 1.3 percent, and 1.5 percent respectively, of the total sport catch (Table 6).

Toutle River sport harvest was suspended during the early 1980's with a reopening of sport fishing in 1983. New restrictions were issued which included limiting fishing to the South Fork only, reducing the fishing season and a one-fish catch limit. Based on punchcard estimates, annual sport

harvest for the period 1987 through 1990 averaged 223 steelhead (Table 9). Based on punchcard estimates, annual sport catch within the Coweeman River from 1986 through 1989 averaged 241 fish. Regulations implemented in 1989 restrict harvest in the Coweeman River to fin-clipped hatchery fish only, so that all wild steelhead must be released.

Spawning period

Winter steelhead spawn in the Cowlitz River from December through June with peak spawning occurring April through June.

Toutle River winter steelhead spawn from March through June.

Coweeman River winter steelhead spawn from March through June.

Spawning area

Due to the two dams which block anadromous fish migrations, spawning is restricted to the lower mainstem Cowlitz River including tributaries.

All spawning areas on the Toutle River were reduced significantly by the eruption of Mount St. Helens although the lower mainstem river suffered the greatest damage. Spawning currently occurs in the North and South Fork Toutle and many tributaries including the Green River and Alder Creek.

Wild steelhead spawn throughout the mainstem Coweeman River and Goble Creek, plus the lower sections of Mulholland and Baird creeks.

Fecundity

The availability of fecundity data for Cowlitz Subbasin wild winter steelhead is meager. Two separate spawnings of Toutle River fish showed the following: 49 females live-spawn& in 1988 with a mean length of 70.4 cm yielded 3,900 eggs per female; and in 1982, Schuck and Kurose live-spawned 26 steelhead with a mean fecundity of 2,251 eggs per female. It is important to note that live-spawning does not strip all eggs from a fish, thus it is not an exact measure of fecundity.

Age Composition

Age composition of wild winter steelhead returning to the Cowlitz River in 1977-1978, 1978-1979 and 1983-1984 averaged 62.2 percent 2-ocean fish, 32.2 percent 3-ocean fish, 2.0 percent 4-ocean fish and 3.3 percent repeat spawners (Table 13).

Age structure of wild steelhead returning to the Toutle River in 1981, 1989 and 1990 were predominately 2-ocean fish (Table 14).

No data is available for the Coweeman River.

Fork Lengths

Data is limited on lengths of Cowlitz River wild steelhead. From wild winter steelhead collected in 1977-1978, 1978-1979 and 1983-1984 mean lengths averaged 69.4 cm for 2-ocean fish, 81.3 cm for 3-ocean fish, 86.0 cm for 4-ocean fish and 74.5 cm for repeat spawners (Table 17).
Lengths obtained from wild winter steelhead trapped in the South Fork Toutle River in 1981, 1989 and 1990 averaged 44.7 cm for l-ocean fish, 66.8 cm for 2-ocean fish, 80.1 cm for 3-ocean fish and 8 1.5 cm for repeat spawners (Table 18). No data is available for Coweeman River steelhead.

Sex ratio

Percent females for wild Cowlitz River winter steelhead in the 1977-1978, 1978-1979 and 1983-1984 run years were 35.7 percent, 36.0 percent and 41.1 percent respectively (Table 15).

Percent females for Toutle River steelhead for the run years 1980-1981, 1988-1989 and 1989-1990 were 50 percent, 64.7 percent and 90.6 percent, respectively (Table 16). No data is available for the Coweeman River.

Survival Rate

No data is available on survival rates for Cowlitz Subbasin wild winter steelhead.

JUVENILE LIFE HISTORY

Egg

No data is available on egg production or egg-to-smolt survival for Cowlitz Subbasin wild steelhead.

Emergence

For the Cowlitz River, emergence occurs from February through July, peaking in May and June.

Juvenile rearing;

Cowlitz River smolts, based on a three year mean, showed that 90.0 percent resided for two years while 9.1 percent resided for three years, prior to emigrating to saltwater (Tipping 1984; Tipping et al. 1979).

Toutle River smolts emigrated at the ratio of 86.5 percent two year old fish and 13.5 percent three year old fish (Schuck and Kruse 1982).

Juvenile Cowlitz Subbasin steelhead emigrate in April and May, generally peaking in early May (Table 12).

Straying

No data are available on Cowlitz Subbasin steelhead.

BIOCHEMICAL-GENETIC CHARACTERISTICS

No data is available on Cowlitz Subbasin wild steelhead.

DISEASES

No data is available on diseases which effect wild steelhead. In the mainstem Cowlitz, the pathogen Ceratomyxa Shasta, which is prevalent in this drainage, may affect wild stocks. y f o r hatchery winter steelhead is listed in the Cowlitz River winter steelhead (hatchery) report.

REFERENCES

The references for this section appear at the end of the following steelhead section.

Figure 1 (AD-1). Probable past and present spawning areas of steelhead trout in the Cowlitz River, Washington (Fulton 1970; B. Crawford and J. Tipping, Washington Department of Game, personal communication)., in Howell et al. 1985.

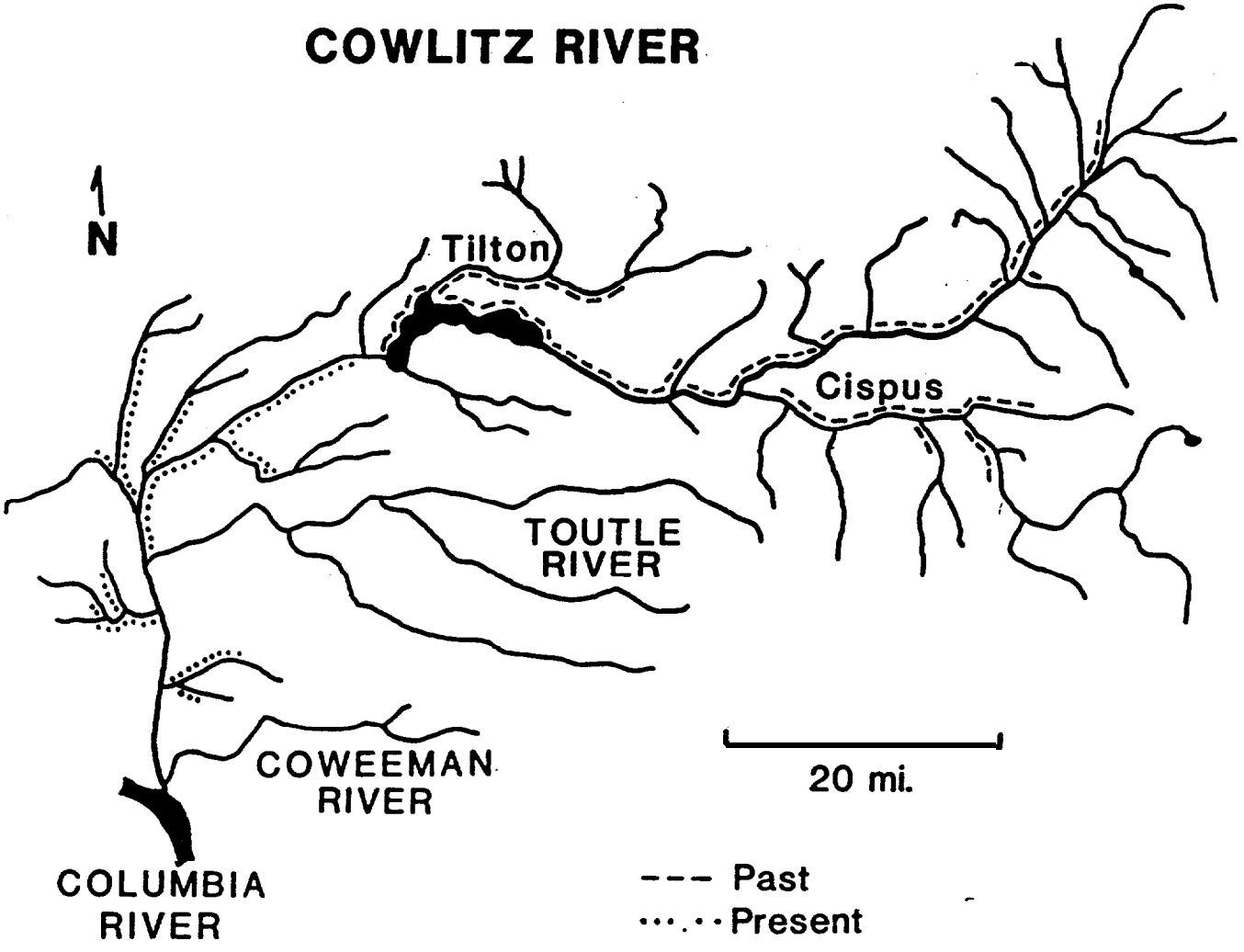

Figure 2 (AD-2). Probable pre- and post-eruption (i.e., late 1970's vs. 1984) spawning areas of wild winter steelhead in the Toutle River, Washington (B. Lucas, WDG, personal communication)., in Howell et al. 1985.

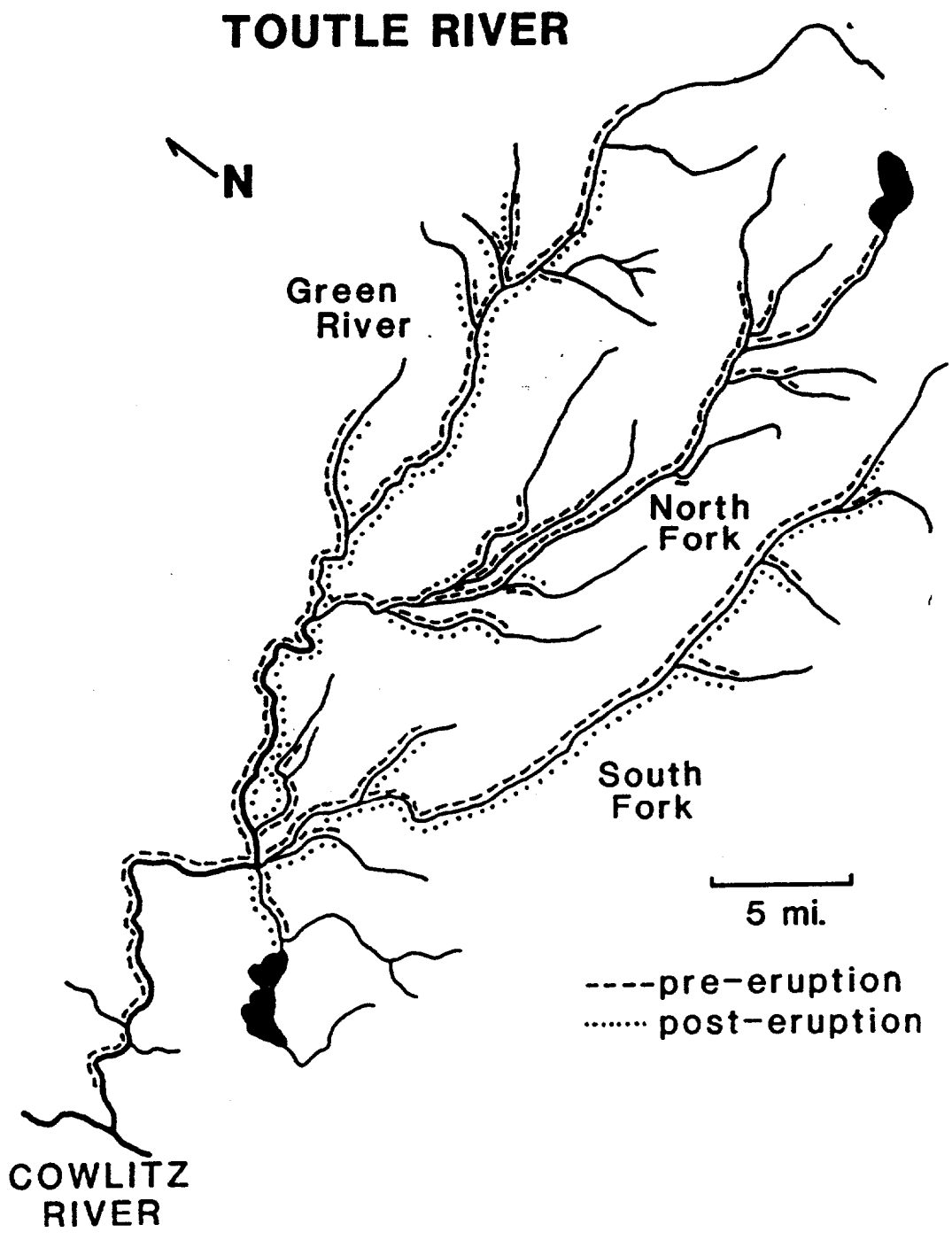

Figure 3 (TT). Freshwater life history of Cowlitz Subbasin winter steelhead. The developmental stage timing represents basinwide averages. Local conditions may cause some variability.

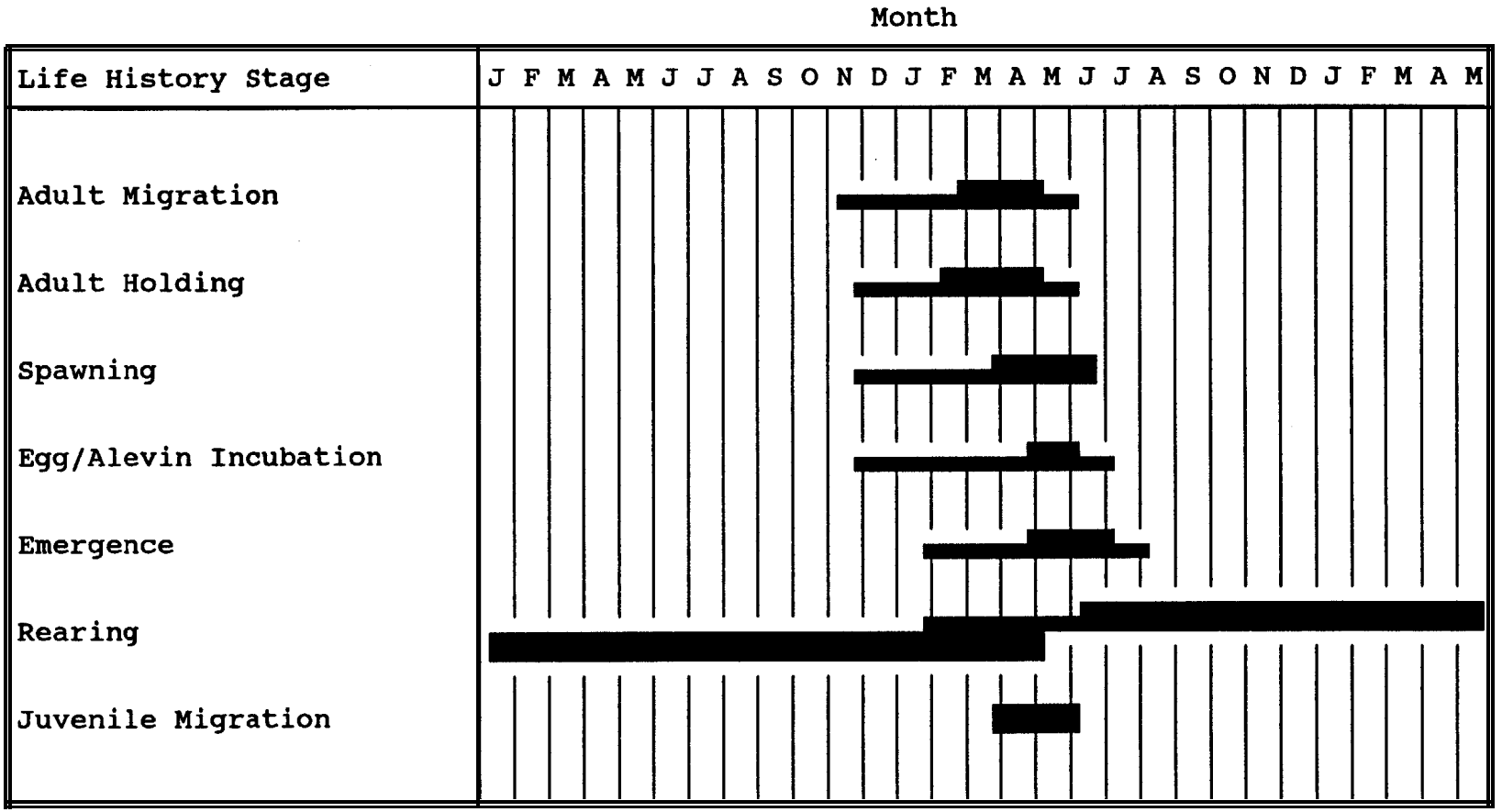

Table 1 (HB-1). Estimated* amount of spawning/rearing habitat, by quality, of Cowlitz River Subbasin winter steelhead.

Area	Excellent	Good	Fair[B]	Poor[B]	Unknown	Total	Confidence
Miles	8.8%	32.9%	44.4%	13.9%		251.3	Unknown
Acres	4.1%	49.5 %	39.5%	6.9%		1019.5	Unknown

*Northwest Power Planning Council estimates based on limited observations.

[B]Ratings of poor and fair may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/absence database, NPPC 1991.

Table 2 (HB-2). Estimated amount of spawning/rearing habitat and potential steelhead smolt production for the Cowlitz River. Based on the gradient, area, and flow methodolgy (GAFM).

Water Name	From	To	Length miles	Width feet	Area 100m^2	Gradient	Smolt Potential
Cowlitz	mouth	Coweeman	3.7	348	6,318	0.13	0
Cowlitz	Coweeman	Ostrander Cr	4.8	348	8,197	0.13	1,405
Ostander Cr	mouth	headwaters	9.9	15	729	1.49	3,806
Cowlitz	Ostander Cr	Arkansas Cr	7.9	348	13,490	0.13	2,313
Arkansas Cr	mouth	Delemeter Cr	1.8	25	221	0.10	93
Delemeter Cr	mouth	Monahan Cr	1.9	25	233	0.10	99
Monahan Cr	mouth	headwaters	4.5	10	221	3.37	1,961
Delemater Cr	Monahan Cr	headwaters	4.9	15	361	1.24	1,604
Arkansas Cr	Delemeter	headwaters	7.5	20	736	1.23	3,247
Cowlitz	Arkansas Cr	Toutle R	3.4	320	5,339	0.13	915
Cowlitz	Toutle R	Olequa Cr	5.2	320	8,165	0.13	1,555
Olequa Cr	mouth	Stillwater Cr	3.3	30	486	0.46	896
Stillwater	mouth	Brim Cr	1.3	50	319	1.17	1,351
Brim Cr	mouth	headwaters	4.6	15	339	0.33	457
Stillwater	Brim Cr	Campbell Cr	3.7	40	726	0.41	1,203
Campbell Cr	mouth	headwaters	3.5	15	258	3.03	2,161
Stillwater	Campbell	headwaters	6.6	15	486	1.26	2,188
Olequa Cr	Stillwater	Curtis Cr	4.0	30	589	0.80	1,800
Curtis Cr	mouth	headwaters	0.50	3	7	2.02	45
Olequa Cr	Curtis Cr	King Cr	3.6	30	530	0.80	1,619

Table 2 (cont.). Estimated amount of spawning/rearing habitat and potential smolt production for the Cowlitz river.

Water Name	From	To	Length miles	Width feet	Area 100m^2	Gradient	Smolt Potential
King Cr	mouth	headwaters	3.0	10	147	1.52	769
Olequa Cr	King Cr	headwaters	4.7	20	461	2.02	2,980
Cowlitz R	Olequa Cr	Lacamas Cr	3.0	320	4,711	0.20	1,346
Lacamas Cr	mouth	Bear Cr	1.0	20	98	0.40	159
Bear Cr	mouth	headwaters	3.5	10	172	3.9	1,635
Lacamas Cr	Bear Cr	Coon Cr	0.50	20	49	0.70	133
Coon Cr	mouth	headwaters	2.25	5	55	3.37	488
Lacamas Cr	Coon Cr	headwaters	18.6	15	1,369	1.11	5,549
Cowlitz R	Lacamas Cr	Salmon Cr	5.4	320	8,479	0.28	3,392
Salmon Cr	mouth	Little Salmon	4.0	40	785	0.39	1,241
Little Salmon	mouth	headwaters	3.5	4	69	2.16	467
Salmon Cr	Little Salmon	Cedar Cr	5.2	30	766	0.29	913
Cedar Cr	mouth	headwaters	0.5			0.38	
Salmon Cr	Cedar Cr	headwaters	13.7	10	672	0.77	1.984
Cowlitz R	Salmon Cr	Skoot Cr	8.0	291	11,424	0.30	4,874
Skoot Cr	mouth	headwaters	2.25	7	77	2.69	602
Cowlitz R	Skoot Cr	Blue Cr	4.0	291	5,712	0.30	2,437
Blue Cr	mouth	hatchery rack	1.0	25	123	1.0	402
Cowlitz R	Blue Cr	Jones Cr	3.2	291	4,569	0.30	1,949
Jones Cr	mouth	headwaters	1.0	7	34	1.52	178

Table 2 (cont.). Estimated amount of spawning/rearing habitat and pote al smolt production for the Cowlitz river.

Water Name	From	To	Length miles	Width feet	Area 100m^2	Gradient	Smolt Potential
Cowlitz R	Jones Cr	Brights Cr	2.5	291	3,570	0.30	1,523
Brights Cr	mouth	headwaters	1.5	5	37	3.03	310
Cowlitz R	Brights Cr	Mill Cr	1.0	291	1,428	0.30	615
Mill Cr	mouth	headwaters	1.1	10	54	2.75	428
Cowlitz R	Mill Cr	Barrier Dam	0.50	291	714	0.30	307

Source: Northwest Power Planning Council, Presence/Absence database, 1991.
Jack Tipping, Washington Department of Wildlife, 1991.

Table 3 (HB-3). Estimated amount of spawning/rearing habitat and potential steelhead smolt production for the Toutle River. Based on the gradient, area, and flow methodolgy (GAFM).

Water Name	From	To	Length miles	Width feet	Area 100m	Gradient	Smolt Potential
Toutle R	mouth	Outlet Cr	15.2	99	14,843	0.70	22,315
Outlet Cr	mouth	Silver Lake	2.5	10	123	0.61	299
Hemlock Cr	mouth	headwaters	1.7	5	42	0.38	66
Toutle R	Outlet Cr	SF Toutle	0.40	199	391	0.70	588
SF Toutle	mouth	Bear Cr	16.6	100	8,146	0.82	19,960
Bear Cr	mouth	headwaters	1.6	20	157	6.10	1,723
SF Toutle	Bear Cr	Herrington Cr	1.4	50	343	1.1	1,114
Herrington Cr	mouth	headwaters	1.6	7	55	4.0	536
SF Toutle	Herrington	headwaters	13.0	50	3,190	3.5	24,509
NF Toutle	mouth	Wyant Cr	1'.1	50	270	0.60	394
Wyant Cr	mouth	headwaters	6.4	10	314	0.71	875
NF Toutle	Wyant Cr	Green R	9.3	50	2,282	0.65	3,598
Green R	mouth	Devils Cr	4.2	50	1,030	0.72	2,400
Devils Cr	mouth	headwaters	5.0	25	613	1.52	3,253
Green R	Devils Cr	Elk Cr	11.2	50	2,748	0.81	8,613
Elk Cr	mouth	headwaters	5.8	15	427	.57	,954
Green R	Elk Cr	Schultz Cr	1.4	50	343	1.08	1,213
Schultz Cr	mouth	headwaters	0.75	15	55	4.04	539
Green R	Schultz Cr	Miners Cr	5.8	50	1,423	1.34	6,830

Table 3 (cont.). Estimated amount of spawning/rearing habitat and potential steelhead smolt production for the Toutle River.

Water Name	From	To	Length miles	Width feet	Area 100m	Gradient	Smolt Potential
Miners Cr	mouth	headwaters	0.80	20	79	3.79	753
Green R	Miners Cr	headwaters	0.75	50	184	3.03	1,564
NF Toutle	Green R	Alder Cr	0.5	50	123	0.60	294
Alder Cr	mouth	headwaters	3.8	25	466	3.4	4,212
NF Toutle	Alder Cr	Hoffstadt Cr	1.8	50	442	0.60	709
Bear Cr	mouth	headwaters	3.7	8	145	0.82	459
Hoffstadt Cr	Bear Cr	headwaters	4.4	20	432	1.38	2,124
NF Toutle	Hoffstadt	Deer Cr	0	0	0	0	0
Deer Cr	mouth	headwaters	2.5	10	123	1.22	547
NF Toutle	Deer Cr	Jackson Cr	7.1	50	1,742	1.49	6,732
Jackson cr	mouth	headwaters	0	0	0	0	0
NF Toutle	Jackson Cr	Castle Cr	4.5	50	1,104	1.35	4,173
Castle Cr	mouth	headwaters	2.0	5	12	6.0	131
NF Toutle	Castle Cr	Coldwater Cr	0.90	50	221	1.68	1,065
Coldwater Cr	mouth	headwaters	1.0	40	196	1.5	1,029
NF Toutle	Coldwater Cr	headwaters	6.0	50	1,472	2.75	11,002

Source: Northwest Power Planning Council, Presence/Absence database, 1991.
Jack Tipping, Washington Department of Wildlife, 1991.

Table 4 (HB-4). Estimated amount of spawning/rearing habitat and potential steelhead smolt production for the Coweeman River. Based on the gradient, area, and flow methodolgy (GAFM).

Water Name	From	To	Length miles	Width feet	Area 100m^2	Gradient	Smolt Potential
Coweeman R	mouth	Goble Cr	8.3	71	2,892	0.23	2,638
Goble Cr	mouth	NF Goble	1.9	30	280	0.80	868
NF Goble	mouth	headwaters	5.1	15	375	3.34	3,359
Goble Cr	NF Goble	headwaters	1.7	30	250	3.86	2,401
Coweeman R	Goble Cr	Mulholland Cr	6.7	71	2,334	0.68	6,251
Mulholland Cr	mouth	headwaters	6.3	30	927	2.73	7,416
Coweeman R	Mulholland Cr	Baird Cr	7.0	71	2,439	0.65	6,278
Baird Cr	mouth	headwaters	2.7	30	397	3.37	3,573
Coweeman R	Baird Cr	headwaters	4.3	45	950	1.68	5,445

Source: Northwest Power Planning Council, Presence/Absence database, 1991.
Jack Tipping, Washington Department of Wildlife, 1991.

Table 5 (RB-a). Returns (sport catch and escapement) of wild winter steelhead in the Cowlitz River by return year and age (freshwater.ocean). This table sums tables 6 and 7. The + indicates less than a full year of ocean residence. In this nomenclature, the freshwater and ocean ages sum to the total age of the fish.

Return Year	2.1+	2.2+	2.3+	3.1+	Adult Total Wild Fish	Adult Totals Hatchery Fish	Percent Run Wild Fish
1977-78	153	153		25	328	25,033	1.3
1978-79	66	148		55	269	18,119	1.5
1983-84	93	37	10	13	153	9,457	1.6

Source: 1977-78, 1978-79, 1983-84 from scale analysis of sport catch and barrier dam returning fish.
An additional 10 fish of age 2.1+s+ are included in the 1983-84 return only.
An additional 10 fish of age 2.2+s+ are included in the 1983-84 return only.

Table 6 (RS-a). Sport catch of wild winter steelhead in the Cowlitz River by return year and age (freshwater. ocean). The + indicates less than a full year of ocean residence. In this nomenclature, the freshwater and ocean ages sum to the total age of the fish.

Return Year	2.1+	2.2+	2.3+	3 +	Total Sport Catch
1977-78	109	109		18	336
1978-79	13	105		39	157
1983-84	68	20	7	7	102

Source: 1977-78, 1978-79, 1983-84 from scale analysis of sport catch.
An additional 7 fish of age 2.1+s+ are included in the 1983-84 return only.
An additional 7 fish of age 2.2+s+ are included in the 1983-84 return only.
Sport catch from permit-card harvest estimates.

Table 7 (RN-a). Escapement of wild winter steelhead in the Cowlitz River by return year and age (freshwater. ocean). The + indicates less than a full year of ocean residence. In this nomenclature, the freshwater and ocean ages sum to the total age of the fish.

Return Year	2.1+	2.2+	2.3+	3.1+	Total Escapement
1977-78	44	44		7	95
1978-79	53	43		16	112
1983-84	25	17	3	6	51

Source: 1977-78, 1978-79, 1983-84 from scale analysis of sport catch and barrier dam returning fish.
An additional 3 fish of age 2.1+s+ are included in the 1983-84 return only.
An additional 3 fish of age 2.2+s+ are included in the 1983-84 return only.

Table 8 (RR-b). Returns (sport catch and escapement) of wild winter steelhead in the Toutle River by return year.

Return Year	Adult Total
1985	3,955
1986	3,047,
1987	2,873
1988	2,854
1989	1,753
1990	992

Source: Loch, J. and P. Downing. 1989 Toutle River fish collection facility operation and salmonid investigations. WDW report 89-13. Loch J. 1991. 1990 Toutle River fish collection facility operation and salmonid investigations. WDW report 91-13. Schuck, M. and H. Kurose. 1982. South Fork Toutle fish trap operation and salmonid investigations, 1981-82.

Table 9 (RS-b). Sport catch of wild winter steelhead in the Toutle River by return year.

Return Year	Total
1987	285
1988	288
1989	195
1990 I	124

Source: Harvest data from WDW permit-card estimates. November and December harvest were omitted because they were summer steelhead. Returns were affected by eruption of Mt. St. Helens.

Table 10 (RN-b). Escapement of wild winter steelhead in the Toutle River by return year.

Return Year	Total
1985	3,955
1986	3,047
1987	2,588
1988	2,566
1989	1,558
1990	868

Source: Lucas, R. 1986. Recovery of the winter-run steelhead in the Toutle River watershed. WDW report #86-6. Lucas, R. 1987. Recovery of the winter-run steelhead in the Toutle River watershed. 1986 progress report, unpublished. Lucas, R. and K. Pointer. 1987. Wild steelhead spawning escapement estimates for southwest Washington streams. WDW report 87-6. Lucas, R., WDW, personal communication. Returns affected by eruption of Mt. St. Helens.

Table 11 (JM). Number of natural juvenile winter steelhead that migrated from the Cowlitz, Toutle and Coweeman rivers.

Time of Migration

Brood Year	Time of Migration	Peak Migration	Total
			No Data

Table 12 (SL). Lengths of wild winter steelhead smolts from the Cowlitz River.

Location and year	No. Fish	Length ave. (mm)	Length range (mm)	Reference
Mayfield Dam 1986	1,144	21.5 cm	16.5-32.5	Tipping, J. 1988. Riffe and Mayfield Reservoirs fishery evaluation, 1985-87.
May 1966 Mayfield Dam		18.5 cm		Thompson, J. and L. Rothfus. 1969. Biological observations of salmonids passing Mayfield Dam.
May 1965 Mayfield Dam		17.7 cm		Thompson and Rothfus.
March 1964 May June Mayfield Dam		23.1 cm 18.6 17.7		Thompson and Rothfus.

* Note: Steelhead smolts above Mayfield Dam are thought to be larger than normal due to growth in the reservoir. No data are available for below Mayfield.

Table 13 (AC-a). Age composition percentage (freshwater.ocean) by return year for wild winter steelhead originating in the Cowlitz River. The + indicates less than a full year ocean residence. In this nomenclature, the freshwater and ocean ages sum to the total age of the fish.

Age Composition (%)

Return Year	N	2.1+	2.1+s+	2.2+	2.2+s+	2.3+	3.1+
1977-78	14	50.0		42.9			7.1
1978-79	25	48.0		36.0	4.0		12.0
1983-84	17	64.7	5.9	17.6		5.9	5.9

Source: Scale analysis of sport caught and barrier dam returning fish.
Tipping, J., S. Springer, P. Buckley, and J. Danielson. 1979. Cowlitz River steelhead spawning, fry emergence and stranding, 1977-79 and adult life history study 1977-79.
1983-84 from WDW unpublished data (Tipping).

Table 14 (AC-b). Age composition percentage (freshwater.ocean) by return year for winter steelhead originating in the Toutle River. The + indicates less than a full year ocean residence, while the "s" indicates a previous spawning. Thus a 2.1+s+ fish would be 5 years old.

Age Composition (%)

Return Year	N	1.1+	2.+	2.1+	2.1+s+	2.1+s+s+	2.2+	3.+	3.1+	3.1+s+s+
1980-81	35	5.7	2.9	68.6	5.7	2.9	11.4	5.7	5.7	2.9
1988-89	12	16.7	25.0	33.3	0	0	0	0	25.0	0
1989-90	23	0	0	73.9	0	0	17.4	0	8.7	0
Average		7.5	9.3	58.6	1.9	1.0	9.6	1.9	13.1	1.0

Sources: Loch, J. and P. Downing. 1990. 1989 Toutle River fish collection facility operation and salmonid investigations. Wash. Dept. Wildlife. # 89-13. Loch, J. 1991. 1990 Toutle River fish collection facility operation and salmonid investigations. Wash. Dept. Wildlife. #91-13. Schuck, M.L. and H.T. Kurose. 1982. South Fork Toutle fish trap operation and salmonid investigations, 1981-82. Scale analysis of fish returning to collection facilities.

Table 15 (AS-a). Percent females by age class (freshwater.ocean) for wild winter steelhead originating in the Cowlitz River. The + indicates less than a full year of ocean residence. In this nomenclature, the freshwater and ocean ages sum to the total age of the fish.

% Female

Return Year	N (M+F)	2.1+	2.2+	2.1+s+	2.3+	3.1+	Total % Female
1977-78	14	28.5	33.3			100	35.7
1978-79	25	41.6	33.3			33.3	36.0
1983-84	17	54.5	0.0	100	0.0	0.0	41.1

Note: Scale analysis used for aging fish which were sampled in the sport fishery or barrier dam.

Sources: Tipping et al. 1979. Cowlitz River steelhead spawning, fry emergence and stranding 1977-79 and adult life history study 1977-79, Washington Department of Wildlife. Data for years 1983-84, 1985-86 and 1986-87 from unpublished WDW data (Tipping).

Table 16 (AS-b). Percent females by age class (freshwater.ocean) for wild winter steelhead originating in the Toutle River.The + indicates less than a full year ocean residence, while the "s" indicates a previous spawning. Thus a 2.1+s+ fish would be 5 years old. All fish are wild origin.

% Female

Return Year	N (M+F)	1.1+	2.+	2.1+	2.1+s+	2.2+	3.+	3.1+	3.1+s+s+	Total % Female
1980-81	48	50.0	0.0	58.3	33.3	100	0.0	50.0	100	50.0
1988-89	17	100	0.0	75.0	-	-	-	33.3	-	64.7
1989-90	32	-	-	94.1	-	75.0	-	100	-	90.6

Sources: Loch, J. and P. Downing. 1990. 1989 Toutle River fish collection facility operation and salmonid investigations, Wash. Dept. Wildlife. # 89-13. Loch, J. 1991. 1990 Toutle River fish collection facility operation and salmonid investigations, Wash. Dept. Wildlife. #91-13. Schuck, M.L. and H.T. Kurose. 1982. South Fork Toutle fish trap operation and investigations, 1981. Scale analysis of fish returning to collection facilities.

Table 17 (AL-a). Mean fork length (cm) by return year and age class (freshwater.ocean) for wild winter steelhead originating in the Cowlitz River. The + indicates less than a full year of ocean residence while an "s" indicates a previous spawning. Thus, a 1.2+s+ indicates a fish that spent three summers in the ocean then spawned in freshwater prior to returning in the year sampled, making the fish a total of 5 years old.

Mean Fork Length (cm)

Return Year	N	2.1+	2.1+s+	2.2+	2.2+s+	3.1+
1977-78	14	69.5	-	78.8	--	72
1978-79	25	69.3	-	83.9	83.0	73.3
1983-84	17	67.0	66.0	78.3	86.0	71.0

Source: Age analysis was done from scales, fish were sampled in the sport fishery or at the barrier dam.
Source: Tipping et al. 1979. Cowlitz River steelhead spawning, fry emergence and stranding 1977-79 and adult life history study 1977-79, Wash. Dept. Wildlife. Data for years 1983-84 from WDW unpublished data (Tipping).

Table 18 (AL-b). Mean fork length (cm) by return year and age class (freshwater.ocean) for wild winter steelhead originating in the Toutle River. The + indicates less than a full year of ocean residence while an "s" indicates a previous spawning. Thus, a 1.2+s+ indicates a fish that spent three summers in the ocean then spawned in freshwater prior to returning in the year sampled, making the fish a total of 5 years old.

Mean Fork Length (cm)

Return Year	N	1.1+	2.+	2.1+	2.1+s+	2.1+s+s+	2.2+	3.+	3.1+	3.1+s+s+
1980-81	48	69.9	47.2	68.8	83.7	81.0	81.4	43.4	71.3	79.8
1988-89	17	64.1	47.8	61.7	-	-	-	3	67.1	-
1989-90	32	-	-	66.0	-	-	78.8		66.1	-

Source: Age determined from scale analysis, fish were sampled at collection facilities.

Source: Loch, J. and P. Downing. 1990. 1989 Toutle River fish collection facility operation and salmonid investigations. Wash. Dept. Wildlife. # 89-13. Loch, J. 1991. 1990 Toutle River fish collection facility operation and salmonid investigations. Wash. Dept. Wildlife. #91-13. Schuck, M.L. and H.T. Kurose. 1982. South Fork Toutle fish trap operation and salmonid investigations, 1981-82.

COWLITZ RIVER SUBBASIN

Hatchery Produced Winter Steelhead

GEOGRAPHIC LOCATION

The Cowlitz River is located in southwest Washington, within Lewis and Cowlitz Counties. From its headwaters in the Cascade Mountains the Cowlitz River flows southwesterly, joining the Columbia River at river mile (RM) 68. Total drainage encompasses approximately 2,480 square miles and includes the Toutle River, with a drainage of 512 square miles entering the Cowlitz at RM 20, and the Coweeman River, with a drainage of 127 square miles entering the Cowlitz at RM 1.7.

ORIGIN

The Cowlitz winter stock was developed in the late 1960's at the Cowlitz Hatchery. Original broodstock were native Cowlitz River winter steelhead and Chambers Creek hatchery stock steelhead.

DISTRIBUTION

Cowlitz River steelhead are primarily released into the Cowlitz Subbasin. Since 1970 the following streams, all tributaries of the Lower Columbia, have received occasional plants of Cowlitz stock winter steelhead: Grays River (RM 20.8); Elokomin River (RM 39.1); Kalama River (RM 73.1); Washougal River (RM 120.7); Lewis River (RM 87.0); Skamokawa Creek (RM 33.2); Abernathy Creek (RM 54.3); Germany Creek (RM 56.2); Salmon Creek (RM 87.5), and the mainstem Lower Columbia River.

PRODUCTION

Production Facilities

The Cowlitz Trout Hatchery, located on the Cowlitz River at RM 42, is the only facility producing steelhead (summer and winter) in the subbasin. The hatchery consists of 104 hatching troughs, eight 10 ft x 100 ft raceways, twenty-four 20 ft x 90 ft raceways, and four five acre rearing ponds. Water is supplied by nine wells and pumped river water (river water supplys over 90 percent of the total water used). Well water is used for egg incubation and fry rearing. Ceratomyxa Shasta, a prevalent fish pathogen which has caused severe fish losses at Cowlitz Hatchery, has resulted in the installation of an ozone water treatment system to disinfect up to 20 cfs of the hatchery water supply.

Production Summary

Cowlitz Hatchery annually produces approximately 1 million steelhead smolts (summer and winter) with a winter steelhead production goal of 750,000 fish. Production from 1980-1986 averaged 485,159 smolts while production in 1989, 1990 and 1991 was 815,224 and 823,176 and 769,415, respectively. The fish pathogen C. Shasta, transmitted in river water, but not infective directly from fish to fish, has limited fish production so severely that an ozone water treatment system was installed at the hatchery to eradicate this parasite.

Three problems limit hatchery production: poor water quality, (water is supplied mainly from the Cowlitz River which tends to carry a high number of pathogens, has low winter water temperatures and high sediment load); disease, (numerous pathogens infect Cowlitz fish with Ceratomyxa shasta and Infectious Hematopoietic Necrosis (IHN) responsible for the greatest mortality); and bird

predation, large numbers and species of birds which continually prey upon hatchery fish (Jansen 1991).

ADULT LIFE HISTORY

Run Size and Escapement

Steelhead run size, based on sport catch, escapement, and hatchery returns, from 1979 through 1989 ranged 4,004 steelhead in 1983-1984 to 25,904 fish in 1986-1987 (Tables 1 and 3). Winter steelhead returning to the Cowlitz River are predominately hatchery fish with Cowlitz hatchery-stock steelhead estimated to be 98.3 percent of the returns for 1977-1979 and 1985-1989. With average returns for these periods estimated at 18,214 fish, hatchery fish totaled 17,904 steelhead (Subbasin Plan 1990).
Returns to the Coweeman River from 1986 through 1990 ranged from 1,795 fish in 1988-1989 to 2,227 fish in 1986-1987 (Table 5).

Time of migration

Entry time into the Cowlitz River for returning adults is generally from late November through early May, peaking in December and January.

Harvest

Ocean catch of Cowlitz River steelhead is unknown.

The Columbia River sport fishery catch large numbers of steelhead. An estimated 6.2 percent of returning Cowlitz steelhead are harvested in the Columbia River.

Sport harvest of winter steelhead from 1977 through 1979 within the Cowlitz Subbasin averaged 18,518 fish with 75.1 percent of the catch occurring in the Cowlitz River, 21.3 percent in the Toutle River, and 3.6 percent in the Coweeman River. For 1985 through 1989, Cowlitz Subbasin harvest averaged 13,942 fish with 92.9 percent occurring in the Cowlitz River, 1.8 percent in the Toutle River[A] and 5.2 percent in the Coweeman River (Tables 2 and 4). The Cowlitz River is open year around with a two-fish catch limit. Fish entering the Cowlitz Trout Hatchery or the barrier dam separator are recycled back to the river to increase sport harvest opportunity. After the eruption of Mount St. Helens in 1980 the Toutle River was closed until 1983 when only the South Fork was open with a one-fish catch limit. The Coweeman River has recently (1989) been restricted to a wild steelhead release stream so that only fin-clipped hatchery fish may be retained by anglers.

Spawning period

Winter steelhead spawning at Cowlitz Trout Hatchery occurs primarily from mid-December through February although spawning has taken place as late as May.

[A]Toutle River harvest closed 1980 through 1983 due to eruption of Mount St. Helens.

Spawning area

Spawning occurs at the Cowlitz Hatchery, the mainstem Cowlitz River and most tributary streams.

Fecundity

Fecundity for Cowlitz hatchery-stock ranged from a low of 3,865 eggs per female based on 40 females spawned in 1981-1982, to a high of 6,718 eggs per female based on 21 females spawned in

1984-1985 (Table 6 and 11).

Age Composition

Age composition of hatchery winter steelhead returning to the Cowlitz River in 1977-1978, 1978-1979 and 1983-1984 were 0.3 percent l-ocean jacks, 63.5 percent 2-ocean fish, 32.8 percent 3-ocean fish, 0.5 percent 4-ocean fish, and 2.9 percent repeat spawners (Table 7).

Fork Lengths

Fork lengths from returning Cowlitz winter steelhead in 1977-1978, 1978-1979 and 1983-1984 ranged from 48.0 cm for a l-ocean jack males to 99.0 cm for a five year old repeat spawner. Individual lengths by age class is presented in Table 9 and 10.

Sex ratio

Data obtained from Cowlitz winter steelhead hatchery returns showed male:female sex ratios in 1977-1978, 1978-1979 and 1983-1984 were 1.04, 1.07 and 1.78, respectively (Tipping 1984; 1991) (Table 8).

Survival Rate

Based on five return years, 1975 through 1980, the smolt-adult return rate for planted smolts returning to the Cowlitz Hatchery ranged from 2.1 percent return in 1978-1979 to 4.8 percent in 1977-1978 (Table 12).

JUVENILE LIFE HISTORY

Egg

Two years of data from release years 1988 and 1989 showed egg to smolt survival of 38.2 percent and 37.0 percent, respectively. These low survival rates are due in large part to the fish pathogen Ceratomyxa shasta.

Juvenile rearing

Cowlitz smolts are reared approximately one year to a size between 65-114 grams each (4-7 fish per pound) at time of release.

Juvenile steelhead are released in April and May.

Hatchery Releases

Winter steelhead were introduced into the Cowlitz Subbasin in 1933.. Various stocks have been released into the Cowlitz River (Chambers Creek and Beaver Creek), but in 1967 fish planted in the Cowlitz were almost exclusively Cowlitz Stock (Tables 13 and 14). Under a mitigation agreement between Washington Department of Wildlife and Tacoma City Light, the goal of hatchery production is the annual release of 750,000 winter steelhead smolts, which would provide an adult return of approximately 22,000 fish and a sport catch of 15,400 fish.

In addition to steelhead released into the Cowlitz River, winter steelhead are also released into the Toutle and Coweeman rivers in an attempt to increase sport catch. Since 1970, several stocks have been released into these rivers, (Chambers Creek, Elokomin and Cowlitz), with plants exceeding 100,000 fish in the Toutle in the 1970's. Toutle River smolt and fingerling releases were reduced to

under 35,000 from 1981 through 1987. Current plans do not call for hatchery plants in the Toutle River. The objective of fishery managers is to protect and increase wild Toutle River steelhead. From 1970 through 1988, the Coweeman River averaged 49,500 smolts released annually. Current releases are anticipated to be approximately 40,000 fish.

Straying

No data are available on Cowlitz steelhead.

BIOCHEMICAL-GENETIC CHARACTERISTICS

Milner et al. (1980) did an electrophoretic profile of Cowlitz winter steelhead along with other Columbia River stocks to examine the feasibility of using biochemical genetic variation for estimating composition of mixed-stock fisheries. They concluded that sufficient genetic differentiation existed to do so. Schreck et al. (1986) looked at stock identification of various Columbia River steelhead, including Cowlitz fish, using cluster analysis of meristic and electrophoretic features and concluded geographical proximal stocks tend to be similar to each other (Subbasin Plan 1990). Thorgaard (1977) estimated 34.5 percent of Cowlitz winter steelhead have 58 chromosomes, 55.2 percent have 59 chromosomes, and 10.3 percent have 60 chromosomes. These results were expected since the hatchery-stock was derived from native Cowlitz stock, which is believed to have 58 chromosomes, and Chambers Creek hatchery -stock with 45.5 percent having 59 chromosomes and 54.5 percent having 60 chromosomes.

DISEASES

Cowlitz winter steelhead have suffered repeated infestations of the myxosporidian Ceratomyxa Shasta. effort to control and eradicate this parasite, an ozone water treatment system was installed in 1991. Disease history for the Cowlitz Hatchery is presented in Table 17.

Table 1 (Rb-a). Returns (sport catch and escapement) of hatchery winter steelhead in the Cowlitz River by return year and total age. This table sums tables 2 and 3.

Return Year	2	3	4	5	3^	4^	5^	Adult Total
1977-78	25	17,790	6,847	51	25	279	102	25,030
1978-79	110	11,828	5,204	92	18	626	128	18,119
1979-80								25,904
1980-81								4,914
1981-82								8,384
1982-83								4,004
1983-84	75	6,129	2,962	52	3	142	72	9,457
1984-85								2,647
1985-86								15,456
1986-87								24,290
1987-88								16,532
1988-89								12,167
1989-90								9,765

^Fish in these age classes were repeat spawners.

Source: 1977-78, 1978-79, 1983-84 from scale analysis of sport catch and barrier dam returning fish. Sport catch determined from permit-card harvest estimates.

Table 2 (RS-a). Sport catch of hatchery winter steelhead in the Cowlitz River by return year and age (freshwater. ocean). The + indicates less than a full year of ocean residence. In this nomenclature, the freshwater and ocean ages sum to the total age of the fish.

Number of Fish Per Age Class

Return Year	1.+	1.+s+	1.1+	1.1+s+	1.1+s+s+	1.2+	1.2+s+	1.3+	Adult Total
1977-78	18	18	12,667	198	36	4,875	36	36	17,796
1978-79	78	13	8,407	445	13	3,700	78	65	12,917
1979-80									18,418
1980-81									3,494
1981-82									5,961
1982-83									2,847
1983-84	61	0	4,305	89	7	2,159	48	41	6,731
1984-85									16,102
1985-86									10,989
1986-87									17,270
1987-88									11,724
1988-89									8,651
1989-90									6,943

Source: 1977-78, 1978-79, 1983-84 from scale analysis of sport catch and barrier dam returning fish. An additional 7 fish of age 2.1+s+ are included in the 1983-84 return only. An additional 7 fish of age 2.2+s+ are included in the 1983-84 return only. Sport catch from permit-card harvest estimates.

Table 3 (RH-a). Escapement of hatchery winter steelhead in the Cowlitz River by return year and age (freshwater. ocean). The + indicates less than a full year of ocean residence. In this nomenclature, the freshwater and ocean ages sum to the total age of he fish.

Number of Fish Per Age Class

Return Year	1.+	1.+s+	1.1+	1.1+s+	1.1+s+s+	1.2+	1.2+s	1.3+	Adult Total
1977-78	7	7	5,123	81	15	1,972	15	15	7,234
1978-79	32	5	3,417	181	5	1,504	32	27	5,202
1979-80									7,486
1980-81									1,420
1981-82									2,423
1982-83									1,157
1983-84	14	3	1,824	53	3	803	14	11	2,726
1984-85									6,545
1985-86									4,467
1986-87									7,020
1987-88									4,808
1988-89									3,516
1989-90									2,822

Source: 1977-78, 1978-79, 1983-84 from scale analysis of sport catch and barrier dam returning fish. An additional 3 fish of age 2.1+s+ are included in the 1983-84 return only. An additional 3 fish of age 2.2+s+ are included in the 1983-84 return only.

Table 4 (RS-b). Sport catch of winter steelhead (hatchery and wild) within Cowlitz Subbasin.

Catch Year	Cowlitz River	Toutle River	Coweeman River
1976-77	10,542	2,919	546
1977-78	18,122	4,779	1,069
1978-79	13,086	4,075	415
1984-85	16,124	0	1,035
1985-86	11,004	0	735
1986-87	17,286	285	727
1987-88	11,724	288	479
1988-89	8,651	195	663

Source: Cowlitz **Subbasin** Plan 1990.

Table 5 (ET). Percent of Cowlitz winter hatchery-stock egg-take by month at Cowlitz Trout Hatchery.

% Egg Take

Return Year	December	January	February	March	April	May
1970-71	0.0	5.7	20.7	34.9	36.9	0.0
1971-72	0.0	25.7	44.6	13.6	10.6	5.5
1972-73	0.0	54.3	18.2	14.2	13.3	0.0
1973-74	1.8	29.1	64.5	0.0	0.0	4.5
1974-75	2.5	58.4	37.0	0.0	2.2	0.0
1975-76	2.1	61.2	23.7	0.0	0.0	12.9
1976-77	6.6	71.1	15.5	0.0	0.0	6.8
1977-78	14.2	71.6	12.0	0.0	0.0	0.0
1978-79	6.3	37.9	40.9	0.0	0.0	14.9
1979-80	46.5	39.2	0.0	9.2	0.0	5.1
1980-81	12.1	71.1	0.0	10.2	0.0	6.5
1981-82	15.7	38.0	34.8	7.1	4.3	0.0
1982-83	41.5	51.4	3.6	0.0	1.7	1.7

Source: Tipping, J. 1984 Profile of Cowlitz River Winter Steelhead Before and After Hatchery Propagation, WDW report 84-11.

Table 6 (RB-b). Returns (sport catch and escapement) of winter steelhead (hatchery and wild) in the Coweeman River by return year.

	Wild Fish		Hatchery Fish		Totals		
Return Year	Sport Catch	Escapement	Sport Catch	Escapement	Total Escapement	Total Harvest	Total Return
1986-87	281	889	446	811	1700	727	2,427
1987-88	185	1,088	294	535	1623	479	2,102
1988-89	256	392	407	740	1132	996	1,795
1989-90	0	522	474	862	1424	862	1,858

Source: Wild fish harvest obtained from 1989 permit-card data which showed 61.4% hatchery fish. Harvest rate of hatchery fish assumed at 55% (R. Lucas, WDW). Wild fish escapements from: Lucas, R. and K. Pointer. Wild steelhead spawning escapement estimates for southwest Washington streams, 1987. WDW, Report # 87-6. R. Lucas, Washington Department of Wildlife, personal communication.

Table 7 (AC-a). Age composition percentage (freshwater.ocean) by return year for winter steelhead originating in the Cowlitz River. The + indicates less than a full year ocean residence. In this nomenclature, the freshwater and ocean ages sum to the total age of the fish.

Age Composition (%)

Return Year	N	1.+	1.+s+	1.1+	1.1+s+	1.1+s+s+	1.2+	1.2+s+	1.3+
1977-78	1,057	0.1	0.1	71.0	1.1	0.0	27.3	0.2	0.2
1978-79	966	0.4	0.0	59.7	4.2	0.0	34.6	0.6	0.5
1983-84	1,093	0.5	0.0	59.8	1.5	0.1	36.5	0.8	0.7

Source: Scale analysis of sport caught and barrier dam returning fish. Tipping, J., S. Springer, P. Buckley, and J. Danielson. 1979. Cowlitz River steelhead spawning, fry emergence and stranding, 1977-79 and adult life history study 1977-79. 1983-84 from WDW unpublished data (Tipping).

Table 8 (AS-a). Percent adult females for winter steelhead originating in the Cowlitz River.

Return Year	Number*	% Female Total % Female
1971-72	635	34.4
1972-73	786	45.4
1973-74	389	47.5
1977-78	1,073	49.1
1978-79	1,159	45.4
1983-84	1,148	35.2
1985-86	4,602	49.3
1986-87	11,024	53.7

*Fish were sampled in the sport fishery or barrier dam.

Sources: Tipping et al. 1979. Cowlitz River steelhead spawning, fry emergence and stranding 1977-79 and adult life history study 1977-79, Washington Department of Wildlife. Data for years 1983 84, 1985-86 and 1986-87 from unpublished WDW data (Tipping).

Table 9 (AL-a). Mean fork length (cm) by return year and age class (freshwater.ocean) for hatchery winter steelhead originating in the Cowlitz River. The + indicates less than a full year of ocean residence while an "s" indicates a previous spawning. Thus, a 1.2+s+ indicates a fish that spent three summers in the ocean then spawned in freshwater prior to returning in the year sampled, making the fish a total of 5 years old.

Mean Fork Length (cm)

Return Year	N^	1.+	1.+s+	1.1+	1.1+s+	1.1+s+s+	1.2+	1.2+s+	1.3+
1977-78	1,059	48.3	53.3	70.4	73.8	78.1	81.4	76.3	89.5
1978-79	1,133	48.1	-	70.1	78.2	76.0	83.2	85.7	92.3
1983-84	1,132	46.6	-	66.6	79.8	73.7	81.0	83.5	93.0

^Age analysis was done from scales, fish were sampled in the sport fishery or at the barrier dam.

Source: Tipping et al. 1979. Cowlitz River steelhead spawning, fry emergence and stranding 1977-79 and adult life history study 1977-79, WDW. Data for years 1983-84 from WDW unpublished data (Tipping).

Table 10 (AL-b). Length frequency of adult female winter hatchery steelhead spawned at the Cowlitz Trout Hatchery in 1988 and 1989.

Length (centimeters)	Number Fish 1988	Number Fish 1989
53	1	0
54	0	0
55	0	0
56	0	0
57	1	1
58	1	0
59	2	1
60	0	2
61	5	6
62	4	7
63	9	12
64	10	11
65	14	22
66	12	15
67	10	15
68	13	10
69	6	3
70	3	4
71	15	8
72	14	22
73	27	15
74	32	29
75	52	27
76	69	41
77	54	48
78	38	30
79	26	32
80	24	25
81	7	12

Table 10 (cont.). Length frequency of adult female winter hatchery steelhead spawned at the Cowlitz Trout Hatchery in 1988 and 1989.

82	16	14
83	5	8
84	6	4
85	6	2
86	2	2
87	2	1
88	0	1
89	0	1
90	1	1

Source: 1991 Cowlitz Hatchery Production Report, WDW report 91-15.

Table 11 (AF-a). Mean fecundity by brood year for winter steelhead (hatchery) originating in the Cowlitz River.

Brood Year	N	Mean Length	Ave. Number of Eggs
1981-82	87	78.6	4,967
	50	84.4	5,374
	116	78.0	5,080
	180	66.3	3,832
	49	81.3	5,769
	40	64.5	3,865
	44	72.7	4,723
1982-83	184	79.3	5,854
	45	66.8	4,301
	22	82.1	5,751
	48	67.4	4,415
	30	78.4	5,244
	16	80.4	5,272
1984-85	231	77.2	5,747
	42	78.0	6,248
	50	66.4	4,824
	21	80.8	6,718
1985-86	31	76.0	6,625
	33	73.1	6,015
	168	74.0	4,961
	127	72.5	5,236
1986-87	240	78.4	5,912
	37	74.1	4,709
	8	79.8	4,937

Source: Cowlitz Hatchery spawning records. No age data was available.
Each line represents one or more egg takes. Ages were mixed although selection by size occurred in some takes. Average fecundity determined by dividing total eggs by total females spawned.

Table 12 (TS-a). Percent return (plant to adult survival) of Cowlitz hatchery stock winter steelhead.

Return Year	Cowlitz River sport Catch[A]	Cowlitz Hatchery-Stock Sport Catch[B]	Cowlitz Hatchery Run Size[C]	Juveniles Released[D]	Percent Return[E]
1975-76	9,079	8,897	14,828	622,933	2.4
1976-77	10,103	9,901	16,502	557,556	3.0
1977-78	18,146	17,783	29,638	623,556	4.8
1978-79	12,781	12,525	20,875	1,015,910	2.1
1979-80	18,249	17,884	29,807	769,361	3.9

[A]Sport catch from Cowlitz River only, based on punchcard estimates.
[B]Majority of winter run (estimated that 98 %) is Cowlitz hatchery-stock (Tipping WDW).
[C]Run size calculated using sport fishery exploitation rate of 60% (Tipping WDW).
[D]Fish planted approximately 1 1/2 years earlier.
[E]Percent return = run size divided by juveniles planted.

Source: Howell et al. 1985. Stock Assessment of Columbia River Anadromous Salmonids.

Table 13 (TR-1). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1981	Cowlitz	Cowlitz	Non-Smolt	01-13-81		46.2	8,676	Cowlitz	
1981	Cowlitz	Cowlitz	Non-Smolt	01-13-81		39.0	25,388	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-01-82		5.1	2,984	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-01-82		4.7	461	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-02-82		5.3	5,313	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	05-02-82		5.1	745	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	05-03-83		5.2	3,349	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-03-83		5.3	4,542	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-03-83		5.3	3,593	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-04-83		6.1	5,502	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-04-83		6.1	5,716	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-04-83		5.6	4,973	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-04-83		7.9	31,410	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-04-83		8.0	11,424	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-04-83		8.0	7,056	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-04-83		7.9	11,636	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-04-83		5.4	1,285	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-06-82		6.9	5,313	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-07-82		5.9	19,618	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-10-82		5.8	8,758	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1981	Cowlitz	Cowlitz	Smolt	05-11-82		5.4	5,265	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-12-82		6.2	12,400	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-12-82		6.6	6,402	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-13-82		6.2	9,238	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-13-82		6.2	11,036	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-13-82		6.4	6,784	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-13-82		6.6	3,102	Cowlitz	
1981	Cowlitz	Cowlitz	Non-Smolt	05-14-82		10.0	12,000	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-17-82		5.4	8,154	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-17-82		5.5	3,135	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-17-82		5.3	7,102	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-17-82		5.3	10,971	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-17-82		5.5	5,885	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-18-82		6.2	19,158	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-18-82		5.8	17,864	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-18-82		6.6	25,080	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-20-82		6.0	31,380	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-21-82		5.7	15,275	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-22-82		5.8	31,291	Cowlitz	
1981	Cowlitz	Cowlitz	Smolt	05-23-82		7.5	18,563	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1981	Cowlitz	Cowlitz	Smolt	05-24-82		6.0	14,160	Cowlitz	
1981	Cowlitz	Cowlitz	Non-Smolt	05-14-82		12.5	17,188	Cowlitz	
1981	Cowlitz	Cowlitz	Non-Smolt	09-03-82		540.0	6,750	Cowlitz	
1981	Cowlitz	Cowlitz	Non-Smolt	09-09-82		66.0	4,686	Cowlitz	
1981	Cowlitz	Cowlitz	Non-Smolt	09-09-82		62.0	25,420	Cowlitz	
1981	Cowlitz	Cowlitz	Non-Smolt	10-01-82		68.0	48,824	Cowlitz	
1981	Cowlitz	Cowlitz	Non-Smolt	10-01-82		61.0	87,414	Cowlitz	
1981	Cowlitz	Cowlitz	Non-Smolt	10-12-82		72.0	20,880	Cowlitz	
1981	Cowlitz	Cowlitz	Non-Smolt	10-12-82		54.0	112,212	Cowlitz	
1981	Cowlitz	Cowlitz	Non-Smolt	10-26-82		94.0	39,010	Cowlitz	
1981	Cowlitz	Cowlitz	Non-Smolt	08-12-82		700.0	68,600	Cowlitz	
1981	Cowlitz	Cowlitz	Non-Smolt	10-26-82		113.0	55,257	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	04-19-83		6.2	11,563	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	04-19-83		6.5	11,798	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	04-19-83		6.4	5,888	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	04-20-83		6.5	5,590	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	04-28-83		9.2	13,938	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	04-29-83		8.9	13,261	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	05-02-83		8.8	13,596	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	05-02-83		9.2	14,720	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1982	Cowlitz	Cowlitz	Smolt	05-02-83		6.5	14,300	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	05-02-83		7.4	15,392	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	05-03-83		9.9	30,690	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	05-04-83		8.1	12,514	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	05-04-83		8.7	13,137	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	05-05-83		8.1	24,422	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	05-06-83		6.8	9.894	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	05-06-83		8.5	11,900	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	05-06-83		7.3	13,542	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	05-06-83		6.6	14,883	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	04-12-83		855.0	8,550	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	04-12-83		855.0	8,550	Cowlitz	
1982	Cowlitz	Cowlitz	Smolt	05-04-83		10.5	16,328	Cowlitz	
1982	Cowlitz	Cowlitz	Non smolt	05-16-83		369.0	4,797	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	05-16-83		369.0	4,797	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	08-02-83		101.0	6,969	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	08-08-83		558.0	74,772	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	08-08-83		450.0	23,400	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	09-26-83		50.0	10,500	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	09-26-83		45.5	8,782	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1982	Cowlitz	Cowlitz	Non-Smolt	09-26-83		55.0	10,340	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	09-27-83		130.0	47,850	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	09-27-83		50.0	4,000	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	09-27-83		30.0	2,100	Cowlitz	
1982	Cowlitz	Cowlitz	Non-Smolt	09-27-83		64.0	5,568	Cowlitz	
1983	Cowlitz	Cowlitz	Non-Smolt	07-09-84		107.0	19,688	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	04-22-84		6.0	17,100	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	04-24-84		5.7	10,908	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	04-26-84		5.5	6,122	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	04-27-84		5.8	11,629	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	04-28-84		7.1	20,129	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	04-30-84		6.5	6,988	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-01-84		6.6	86,427	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-02-84		5.6	9,632	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-02-84		5.7	26,961	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-03-84		6.6	50,160	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-04-84		7.3	39,992	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-09-84		6.0	26,880	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-09-84		6.4	15,104	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-10-84		6.0	14,700	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1983	Cowlitz	Cowlitz	Smolt	05-10-84		4.8	9,072	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-11-84		5.4	61,560	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-11-84		5.3	7,950	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-12-84		5.2	33,670	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-14-84		5.1	64,260	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-14-84		5.1	37,536	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-15-84		5.6	15,176	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-15-84		6.1	9,211	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-20-84		6.9	4,561	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-21-84		5.7	14,250	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-21-84		6.3	15,498	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-22-84		6.1	12,535	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-24-84		6.5	14,560	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-25-84		7.1	7,242	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-27-84		8.4	2,974	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	05-30-84		8.1	47,304	Cowlitz	
1983	Cowlitz	Cowlitz	Smolt	01-25-84		17.1	1,796	Cowlitz	
1983	Cowlitz	Cowlitz	Non-Smolt	01-25-84		26.3	2,236	Cowlitz	
1983	Cowlitz	Cowlitz	Non-Smolt	01-25-84		22.7	3,382	Cowlitz	
1983	Cowlitz	Cowlitz	Non-Smolt	08-23-84		531.0	14,868	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1983	Cowlitz	Cowlitz	Non-Smolt	08-28-84		80.0	14,800	Cowlitz	
1983	Cowlitz	Cowlitz	Non-Smolt	09-24-84		74.0	8,288	Cowlitz	
1983	Cowlitz	Cowlitz	Non-Smolt	09-25-84		63.5	14,351	Cowlitz	
1983	Cowlitz	Cowlitz	Non-Smolt	09-26-84		68.0	5,848	Cowlitz	
1983	Cowlitz	Cowlitz	Non-Smolt	10-29-84		93.0	23,901	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	04-15-85		5.5	40,453	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	04-16-85		5.6	36,484	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	04-17-85		5.8	45,433	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	04-17-85		5.8	26,738	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	04-18-85		6.3	110,439	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	04-18-85		6.2	18,730	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	04-19-85		6.3	49,140	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	04-23-85		5.6	13,552	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	04-24-85		4.8	13,680	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	04-26-85		6.1	9,455	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	04-26-85		5.7	10,659	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	04-30-85		5.8	31,320	Cowlitz	LV
1984	Cowlitz	Cowlitz	Smolt	05-01-85		6.2	21,328	Cowlitz	LV
1984	Cowlitz	Cowlitz	Smolt	05-02-85		6.2	21,110	Cowlitz	RV
1984	Cowlitz	Cowlitz	Smolt	05-02-85		5.8	23,867	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1984	Cowlitz	Cowlitz	Smolt	05-03-85		6.7	33,936	Cowlitz	RV
1984	Cowlitz	Cowlitz	Smolt	05-03-85		5.1	45,288	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-06-85		6.1	12,066	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-06-85		6.2	9,207	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-07-85		5.7	8,493	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-07-85		5.7	8,493	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-08-85		5.7	40,726	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-08-85		5.5	41,470	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-09-85		6.1	49,539	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-09-85		6.1	9,303	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-10-85		4.7	23,025	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-14-85		7.1	6,000	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-16-86		7.4	3,034	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-16-86		7.4	11,317	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-17-85		6.2	29,822	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-17-85		5.7	34,514	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-28-85		6.0	19,410	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-28-85		6.2	19,716	Cowlitz	
1984	Cowlitz	Cowlitz	Smolt	05-29-85		6.2	20,553	Cowlitz	
1984	Cowlitz	Cowlitz	Non-Smolt	04-22-85		650.0	19,500	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1984	Cowlitz	Cowlitz	Non-Smolt	06-03-85		643.0	4,501	Cowlitz	
1984	Cowlitz	Cowlitz	Non-Smolt	09-13-85		92.0	38,088	Cowlitz	
1984	Cowlitz	Cowlitz	Non-Smolt	12-10-85		48.0	24,960	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	04-17-86		6.3	8,433	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	04-18-86		6.0	3,708	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	04-21-86		6.1	27,707	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	04-22-86		6.1	13,586	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	04-23-86		6.4	4,482	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	04-24-86		5.6	6,578	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	04-25-86		6.5	95,576	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	04-28-86		7.0	13,326	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-06-86		6.2	36,166	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-07-86		6.2	30,264	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-08-86		6.8	26,151	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-09-86		6.0	26,870	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-10-86		5.8	10,879	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-11-86		5.8	7,161	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-12-86		6.0	6,838	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-13-86		6.3	11,053	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-14-86		6.3	22,173	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1985	Cowlitz	Cowlitz	Smolt	05-15-86		4.9	51,415	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-15-86		6.0	33,949	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-16-86		6.0	10,948	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-17-86		6.1	13,048	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-18-86		6.1	14,350	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-19-86		6.1	10,539	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-20-86		6.1	6,958	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-21-86		6.1	8,865	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-22-86		7.2	3,395	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-23-86		8.0	6,800	Cowlitz	
1985	Cowlitz	Cowlitz	Smolt	05-24-86		8.0	6,800	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	05-27-86		9.0	9,000	Cowlitz	
1985	Cowlitz	Cowlitz	Non-Smolt	05-31-86		10.0	4,000	Cowlitz	
1985	Cowlitz	Cowlitz	Non-Smolt	05-23-86		11.7	23,400	Cowlitz	
1985	Cowlitz	Cowlitz	Non-Smolt	12-19-86		44.0	68,156	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	04-14-87		8.5	846	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	04-14-87		5.2	4,279	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	04-15-87		5.0	4,960	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	04-16-87		4.9	2,082	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	04-17-87		5.1	3,192	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1986	Cowlitz	Cowlitz	Smolt	04-18-87		5.0	1,540	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	04-19-87		5.1	428	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	04-20-87		5.0	645	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	04-21-87		4.8	3,177	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	04-22-87		4.7	13,289	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	04-23-87		5.4	26,401	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	04-24-87		10.0	892	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	04-24-87		4.7	34,964	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	04-25-87		10.0	2,625	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	04-25-87		5.0	21,237	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	04-26-87		10.0	4,066	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	04-26-87		5.0	32,895	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	04-27-86		4.5	25,487	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	04-28-87		10.0	9,125	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	04-28-87		3.8	45,809	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	04-29-87		3.8	31,813	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	04-30-87		4.9	31,996	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	05-01-87		4.2	37,342	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	05-04-87		4.8	83,094	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	05-05-87		5.1	26,927	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1986	Cowlitz	Cowlitz	Smolt	05-06-87		5.2	7,951	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	05-06-87		5.2	16,739	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	05-08-87		3.4	30,489	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	05-11-87		3.5	41,957	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	05-12-87		4.4	19,735	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	05-13-87		4.4	7,234	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	05-14-87		4.4	3,275	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	05-15-87		4.3	2,638	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	05-18-87		4.4	8,863	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	05-19-87		10.0	700	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	05-19-87		4.8	3,246	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	05-19-87		4.5	4,185	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	05-20-87		9.6	11,664	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	05-20-87		5.2	51,142	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	05-21-87		4.3	21,156	Cowlitz	
1986	Cowlitz	Cowlitz	Smolt	05-22-87		4.2	160,000	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	04-15-87		19.2	940	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	04-16-87		24.4	415	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	04-17-87		15.0	563	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	04-18-87		15.0	272	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1986	Cowlitz	Cowlitz	Non-Smolt	04-19-87		15.0	76	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	04-20-87		16.0	180	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	04-21-87		16.0	794	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	04-22-87		11.0	1,206	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	04-23-87		11.0	2,358	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	04-27-87		10.6	9,911	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	04-29-87		13.0	7,666	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	04-30-87		11.5	7,770	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	05-01-87		12.3	8,759	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	05-04-87		10.9	15,859	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	05-05-87		10.2	2,501	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	05-05-87		10.2	4,383	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	05-06-87		10.2	1,188	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	05-08-87		24.0	7,152	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	05-11-87		21.9	10,297	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	05-12-87		11.4	5,566	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	05-13-87		11.4	2,041	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	05-14-87		11.4	924	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	05-15-87		13.6	1,147	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	05-18-87		11.0	1,446	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1986	Cowlitz	Cowlitz	Non-Smolt	05-19-87		12.6	2,142	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	05-21-87		13.7	16,851	Cowlitz	
1986	Cowlitz	Cowlitz	Non-Smolt	05-22-87		12.5	40,000	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	04-25-88		5.2	2,201	Cowlitz	
1987	Cowlitz	Cowlitz	Non-Smolt	04-25-88		10.0	668	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	04-26-88		4.8	5,683	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	04-28-88		4.5	29,607	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	04-30-88		4.7	10,021	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-01-88		4.7	338	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-02-88		5.3	6,360	Cowlitz	AD
1987	Cowlitz	Cowlitz	Smolt	05-02-88		5.3	11,395	Cowlitz	AD
1987	Cowlitz	Cowlitz	Smolt	05-03-88		6.4	14,520	Cowlitz	AD
1987	Cowlitz	Cowlitz	Smolt	05-03-88		6.4	5,016	Cowlitz	AD
1987	Cowlitz	Cowlitz	Smolt	05-03-88		7.4	3,630	Cowlitz	AD
1987	Cowlitz	Cowlitz	Smolt	05-03-88		7.4	1,254	Cowlitz	AD
1987	Cowlitz	Cowlitz	Smolt	05-05-88		4.9	8,964	Cowlitz	LM
1987	Cowlitz	Cowlitz	Smolt	05-05-88		4.4	4,781	Cowlitz	RM
1987	Cowlitz	Cowlitz	Smolt	05-07-88		4.4	9,960	Cowlitz	RM
1987	Cowlitz	Cowlitz	Smolt	05-07-88		4.9	5,378	Cowlitz	LM
1987	Cowlitz	Cowlitz	Smolt	05-07-88		8.7	2,040	Cowlitz	RM

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1987	Cowlitz	Cowlitz	Smolt	05-07-88		8.7	2,040	Cowlitz	RM
1987	Cowlitz	Cowlitz	Smolt	05-10-88		4.6	30,752	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-11-88		4.6	25,474	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-11-88		4.6	43,214	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-12-88		4.6	11,378	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-12-88		4.6	17,454	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-13-88		4.4	37,353	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-13-88		4.4	1,776	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-13-88		4.4	638	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-13-88		4.4	16,933	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-15-88		4.4	40,835	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-16-88		4.2	635	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-16-88		4.4	10,299	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-17-88		5.1	16,830	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-17-88		5.1	28,874	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-18-88		4.8	959	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-18-88		4.8	5,353	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-19-88		4.6	9,265	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-19-88		4.6	10,987	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-20-88		4.8	22,046	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1987	Cowlitz	Cowlitz	Smolt	05-21-88		4.8	8,742	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-21-88		4.5	786	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-22-88		4.4	5,379	Cowlitz	
1987	Cowlitz	Cowlitz	Smolt	05-23-88		4.4	63,501	Cowlitz	
1987	Cowlitz	Cowlitz	Non-Smolt	04-26-88		10.8	1,011	Cowlitz	
1987	Cowlitz	Cowlitz	Non-Smolt	04-28-88		10.3	3,474	Cowlitz	
1987	Cowlitz	Cowlitz	Non-Smolt	04-30-88		10.3	1,981	Cowlitz	
1987	Cowlitz	Cowlitz	Non-Smolt	05-05-88		10.8	1,836	Cowlitz	
1987	Cowlitz	Cowlitz	Non-Smolt	05-05-88		10.8	1,836	Cowlitz	LM
1987	Cowlitz	Cowlitz	Non-Smolt	05-15-88		12.9	81,902	Cowlitz	LM
1987	Cowlitz	Cowlitz	Non-Smolt	05-15-88		11.9	11,040	Cowlitz	
1987	Cowlitz	Cowlitz	Non-Smolt	10-25-88		197.0	14,381	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	04-29-89		5.4	8,985	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	04-30-89		5.4	30,673	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	04-30-89		5.3	36,494	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-01-89		5.0	35,079	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-01-89		5.1	7,994	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-01-89		5.1	29,101	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-02-89		5.2	27,674	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-02-89		5.2	3,131	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1988	Cowlitz	Cowlitz	Smolt	05-02-89		5.2	4,211	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-02-89		5.2	5,799	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-03-89		4.8	13,925	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-04-89		4.8	4,274	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-04-89		8.7	475	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-08-89		6.2	20,234	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-08-89		8.0	3,999	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-09-89		5.0	26,563	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-09-89		5.0	52,463	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-09-89		8.5	3,830	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-09-89		8.8	7,564	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-09-89		6.2	19,425	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-09-89		8.0	3,838	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-10-89		4.6	11,572	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-10-89		4.7	51,956	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-11-89		6.0	37,406	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-11-89		4.5	27,623	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-11-89		4.5	40,614	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-11-89		10.0	10,550	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-12-89		4.6	24,815	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1988	Cowlitz	Cowlitz	Smolt	05-12-89		4.6	21,305	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-13-89		4.6	15,051	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-15-89		4.7	28,103	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-15-89		5.9	17,010	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-15-89		9.5	4,461	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-16-89		4.9	30,855	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-16-89		5.9	9,620	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-17-89		4.9	1,908	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-17-89		7.5	17,997	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-17-89		4.9	9,933	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-17-89		6.7	8,073	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-17-89		8.9	12,009	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-18-89		6.7	8,000	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-18-89		6.7	22,756	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-18-89		8.9	11,904	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-18-89		8.6	13,364	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-19-89		5.0	15,933	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-19-89		5.0	30,134	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-19-89		6.7	11,019	Cowlitz	AD
1988	Cowlitz	Cowlitz	Smolt	05-19-89		8.6	6,472	Cowlitz	AD

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1988	Cowlitz	Cowlitz	Smolt	05-23-89		4.7	9,836	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-23-89		4.7	25,526	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-24-89		4.7	9,912	Cowlitz	
1988	Cowlitz	Cowlitz	Smolt	05-24-89		4.7	4,242	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	04-29-89		12.4	4,445	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	04-30-89		10.2	14,836	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	04-30-89		11.4	7,475	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-01-89		11.2	6,781	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-01-89		11.0	1,466	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-01-89		11.0	5,338	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-02-89		11.5	6,365	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-02-89		11.5	720	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-02-89		11.5	968	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-02-89		11.5	1,335	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-03-89		13.8	2,173	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-10-89		13.0	1,047	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-10-89		12.2	6,031	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-11-89		11.1	2,765	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-11-89		11.1	4,066	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-12-89		11.0	2,696	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1988	Cowlitz	Cowlitz	Non-Smolt	05-12-89		11.0	2,315	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-13-89		11.0	1,615	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-15-89		11.1	10,071	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-16-89		11.9	7,762	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-16-89		11.1	5,698	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-17-89		12.0	706	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-17-89		11.2	43,850	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-17-89		12.0	3,674	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-19-89		13.9	8,884	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-19-89		13.9	16,803	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-23-89		12.1	5,902	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-23-89		12.1	15,315	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-24-89		13.8	6,581	Cowlitz	
1988	Cowlitz	Cowlitz	Non-Smolt	05-24-89		13.5	2,817	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	04-23-90		5.0	11,705	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	04-24-90		5.3	16,467	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	04-25-90		5.1	22,761	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	04-25-90		5.0	8,475	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	04-25-90		5.0	3,755	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	04-26-90		4.8	19,609	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1989	Cowlitz	Cowlitz	Smolt	04-27-90		4.7	37,365	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	04-28-90		5.0	5,940	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	04-28-90		5.2	5,106	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	04-29-90		4.8	2,736	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	04-30-90		4.8	6,029	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	04-30-90		6.6	10,276	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-01-90		6.8	6,909	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-02-90		6.8	9,336	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-07-90		5.2	26,274	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-07-90		6.0	25,044	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-07-90		9.1	7,526	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-08-90		5.5	4,604	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-08-90		5.1	11,888	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-08-90		5.4	10,417	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-08-90		6.4	25,005	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-08-90		7.1	12,361	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-08-90		9.5	10,925	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-08-90		9.1	17,208	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-09-90		4.9	12,970	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-09-90		5.1	12,730	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1989	Cowlitz	Cowlitz	Smolt	05-09-90		4.6	30,102	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-09-90		4.4	30,188	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-10-90		4.6	63,954	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-10-90		4.4	10,199	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-10-90		4.5	57,956	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-11-90		4.4	26,026	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-11-90		4.6	32,246	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-12-90		4.6	8,082	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-12-90		4.6	6,348	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-12-90		4.5	35,154	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-12-90		4.8	9,245	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-13-90		4.7	5,649	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-13-90		4.7	30,856	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-13-90		4.5	2,039	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-14-90		4.8	20,549	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-14-90		4.8	3,907	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-14-90		6.0	20,460	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-14-90		6.2	11,650	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-14-90		9.8	13,475	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-15-90		4.7	26,231	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1989	Cowlitz	Cowlitz	Smolt	05-15-90		4.3	40,360	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-17-90		3.9	35,615	Cowlitz	
1989	Cowlitz	Cowlitz	Smolt	05-18-90		3.9	8,108	Cowlitz	
1989	Cowlitz	Cowlitz	Non-Smolt	04-23-90		11.0	2,398	Cowlitz	
1989	Cowlitz	Cowlitz	Non-Smolt	04-24-90		11.4	3,967	Cowlitz	
1989	Cowlitz	Cowlitz	Non-Smolt	04-25-90		11.3	5,797	Cowlitz	
1989	Cowlitz	Cowlitz	Non-Smolt	04-25-90		11.3	2,294	Cowlitz	
1989	Cowlitz	Cowlitz	Non-Smolt	04-25-90		11.3	1,017	Cowlitz	
1989	Cowlitz	Cowlitz	Non-Smolt	04-26-90		11.4	4,845	Cowlitz	
1989	Cowlitz	Cowlitz	Non-Smolt	04-27-90		11.5	8,372	Cowlitz	
1989	Cowlitz	Cowlitz	Non-Smolt	04-28-90		12.7	1,854	Cowlitz	
1989	Cowlitz	Cowlitz	Non-Smolt	04-28-90		14.0	2,128	Cowlitz	
1989	Cowlitz	Cowlitz	Non-Smolt	04-29-90		11.7	1,217	Cowlitz	
1989	Cowlitz	Cowlitz	Non-Smolt	04-30-90		11.7	2,668	Cowlitz	
1990	Cowlitz	Cowlitz	Smolt	04-18-91		6.1	26,698	Cowlitz	
1990	Cowlitz	Cowlitz	Smolt	04-18-91		0.9	26,592	Cowlitz	
1990	Cowlitz	Cowlitz	Smolt	05-05-91		5.1	18,722	Cowlitz	
1990	Cowlitz	Cowlitz	Smolt	05-06-91		5.1	91,193	Cowlitz	
1990	Cowlitz	Cowlitz	Smolt	05-07-91		4.9	31,698	Cowlitz	
1990	Cowlitz	Cowlitz	Smolt	05-07-91		6.6	25,852	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1990	Cowlitz	Cowlitz	Smolt	05-08-91		4.6	150,420	Cowlitz	
1990	Cowlitz	Cowlitz	Smolt	05-09-91		4.8	163,358	Cowlitz	
1990	Cowlitz	Cowlitz	Smolt	05-09-91		6.6	2,402	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	05-09-91		9.0	26,028	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	05-10-91		4.9	68,188	Cowlitz	
1990	Cowlitz	Cowlitz	Smolt	05-10-91		6.1	20,057	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	05-10-91		6.2	15,717	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	05-10-91		9.2	16,634	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	05-10-91		8.8	22,062	Cowlitz	AD
1990	Cowlitz	Cowlitz	Smolt	05-11-91		4.8	50,314	Cowlitz	
1990	Cowlitz	Cowlitz	Smolt	05-12-91		5.0	29,270	Cowlitz	
1990	Cowlitz	Cowlitz	Smolt	05-13-91		4.5	62,775	Cowlitz	
1990	Cowlitz	Cowlitz	Smolt	05-19-91		6.6	12,751	Cowlitz	AD
1990	Cowlitz	Cowlitz	Non-Smolt	09-10-90		375.0	17,250	Cowlitz	
1990	Cowlitz	Cowlitz	Non-Smolt	10-29-90		152.5	34,312	Cowlitz	
1990	Cowlitz	Cowlitz	Non-Smolt	05-05-91		12.2	4,624	Cowlitz	
1990	Cowlitz	Cowlitz	Non-Smolt	05-06-91		11.3	24,509	Cowlitz	
1990	Cowlitz	Cowlitz	Non-Smolt	05-07-91		11.1	6,438	Cowlitz	
1990	Cowlitz	Cowlitz	Non-Smolt	05-07-91		10.7	46,288	Cowlitz	
1990	Cowlitz	Cowlitz	Non-Smolt	05-08-91		11.4	13,680	Cowlitz	

Table 13 (cont.). Hatchery releases of winter steelhead into the Cowlitz River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clips
1990	Cowlitz	Cowlitz	Non-Smolt	05-09-91		11.7	30,291	Cowlitz	
1990	Cowlitz	Cowlitz	Non-Smolt	05-10-91		11.8	14,349	Cowlitz	
1990	Cowlitz	Cowlitz	Non-Smolt	05-11-91		11.3	14,362	Cowlitz	
1990	Cowlitz	Cowlitz	Non-Smolt	05-12-91		11.0	10,340	Cowlitz	
1990	Cowlitz	Cowlitz	Non-Smolt	05-13-91		11.1	43,201	Cowlitz	

Source: Terry Lovgren, WDW Hatchery Stocking Database, 1991.

AD = Adipose clip, LV = Left ventral clip, RV = right ventral clip,
RM = right maxillary clip, LM = left maxillary clip.

Table 14 (TR-2). Hatchery releases of winter steelhead into the Toutle and Coweeman rivers by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clip
1981	Bogachiel R	Beaver Creek H	Smolt	05/07/82		7.0	7,875	Unknown	
1981	Chambers Cr	Alder Creek Pond	Smolt	05/08/82		5.0	79,650	Alder Cr	
1981	Chambers Cr	Beaver Creek H	Smolt	04/25/83		4.5	6,840	Unknown	
1981	Chambers Cr	Beaver Creek H	Smolt	04/26/82		5.4	7,776	Unknown	
1981	Chambers Cr	Beaver Creek H	Smolt	04/29/82		5.4	7,371	Unknown	
1981	Chambers Cr	Beaver Creek H	Smolt	04/29/82		5.4	7,074	Unknown	
1981	Chambers Cr	Beaver Creek H	Smolt	05/03/82		6.2	6,820	Unknown	
1981	Chambers Cr	Beaver Creek H	Smolt	05/03/82		5.2	1,092	Unknown	
1981	Chambers Cr	Beaver Creek H	Smolt	05/06/82		5.9	7,847	Unknown	
1981	Chambers Cr	Beaver Creek H	Smolt	05/10/83		4.4	26,646	Unknown	
1981	Toutle R- South Fk	Klineline Net Pen	Non-Smolt	04/12/82		28.5	3,420	Toutle R- South Fk	
1981	Toutle R- South Fk	Klineline Net Pen	Non-Smolt	04/12/82		28.5	1,140	Toutle R- South Fk	

Table 14 (cont.). Hatchery releases of winter steelhead into the Toutle And Coweeman rivers by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clip
1981	Toutle R- South Fk	Klineline Net Pen	Non-Smolt	04/12/82		27.9	975	Toutle R-South Fk	
1981	Toutle R- South Fk	Klineline Net Pen	Non-Smolt	04/12/82		28.5	6,555	Toutle R-South Fk	
1981	Toutle R- South Fk	Klineline Net Pen	Non-Smolt	04/12/82		28.5	9,120	Toutle R-South Fk	
1981	Toutle R- South Fk	Vancouver H	Non-Smolt	10/28/81		105.0	3,675	Toutle R-South Fk	
1983	Elokomin R	Coweeman River Pond	Smolt	05/01/84		6.0	12,300	Unknown	
1983	Unknown	Beaver Creek H	Smolt	04/19/84		4.5	6,075	Unknown	
1983	Unknown	Beaver Creek H	Smolt	04/27/84		4.2	5,880	Unknown	
1983	Unknown	Beaver Creek H	Smolt	05/01/84		4.6	6,670	Unknown	
1983	Unknown	Beaver Creek H	Smolt	05/09/84		6.0	9,300	Unknown	
1984	Elokomin R	Alder Creek Pond	Smolt	05/03/85		4.7	2,115	Toutle R-North Fk	AD
1984	Elokomin R	Alder Creek Pond	Smolt	05/03/85		4.7	4,230	Toutle R North Fk	AD
1984	Elokomin R	Alder Creek Pond	Smolt	05/03/85		4.7	7,050	Coweeman R	AD

Table 14 (cont.). Hatchery releases of winter steelhead into the Toutle And Coweeman rivers by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clip
1984	Elokomin R	Alder Creek Pond	Smolt	05/03/85		4.7	7,285	Coweeman R	AD
1984	Elokomin R	Beaver Creek H	Smolt	04/26/85		5.0	7,000	Coweeman R	AD
1984	Elokomin R	Beaver Creek H	Smolt	05/17/85		6.6	4,620	Coweeman R	AD
1984	Elokomin R	Coweeman River Pond	Smolt	04/29/85		5.9	17,995	Toutle South Fk	DO
1984	Elokomin R	Coweeman River Pond	Smolt	04/18/85		5.2	10,462	Coweeman R	AD
1984	Elokomin R	Coweeman River Pond	Smolt	04/18/85		5.2	7,800	Coweeman R	AD
1985	Elokomin R	Beaver Creek H	Smolt	04/15/86		4.9	54,550	Unknown	AD
1986	Elokomin R	Beaver Creek H	Smolt	05/05/87		5.0	7,250	Coweeman R	AD
1986	Elokomin R	Beaver Creek H	Smolt	05/09/87		4.8	5,760	Coweeman R	AD
1986	Elokomin R	Beaver Creek H	Smolt	05/11/87		4.6	5,520	Coweeman R	AD
1986	Elokomin R	Beaver Creek H	Smolt	05/11/87		5.7	8,640	Coweeman R	AD
1986	Elokomin R	Beaver Creek H	Smolt	05/11/87		4.6	6,900	Coweeman R	AD

Table 14 (cont.). Hatchery releases of winter steelhead into the Toutle And Coweeman rivers by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clip
1986	Elokomin R	Beaver Creek H	Smolt	05/11/87		5.7	8,550	Unknown	
1986	Elokomin R	Beaver Creek H	Smolt	05/18/87		4.5	5,400	Unknown	
1986	Elokomin R	Coweeman River Pond	Smolt	05/02/87		4.8	6,840	Unknown	
1987	Elokomin R	Beaver Creek H	Smolt	04/22/88		5.0	7,500	Coweeman R	AD
1987	Elokomin R	Beaver Creek H	Smolt	04/22/88		5.0	5,000	Coweeman R	AD
1987	Elokomin R	Beaver Creek H	Smolt	04/22/88		5.0	7,500	Coweeman R	AD
1987	Elokomin R	Beaver Creek H	Smolt	04/22/88		5.0	7,000	Coweeman R	AD
1987	Elokomin R	Coweeman River Pond	Smolt	04/30/88		4.3	10,105	Coweeman R	AD
1988	Elokomin R	Beaver Creek H	Smolt	04/21/89		4.8	6,240	Coweeman R	AD
1988	Elokomin R	Beaver Creek H	Smolt	04/25/89		4.4	6,600	Coweeman R	AD
1988	Elokomin R	Beaver Creek H	Smolt	04/25/89		4.4	5,500	Coweeman R	AD
1988	Elokomin R	Beaver Creek H	Smolt	04/27/89		5.5	8,250	Coweeman R	AD

Table 14 (cont.). Hatchery releases of winter steelhead into the Toutle And Coweeman rivers by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clip
1988	Elokomin R	Beaver Creek H	Smolt	05/04/89		5.0	8,250	Coweeman R	AD
1988	Elokomin R	Coweeman River Pond	Smolt	04/29/89		3.9	7,527	Coweeman R	AD
1989	Elokomin R	Beaver Creek H	Smolt	04/27/90		4.5	6,750	Coweeman R	AD
1989	Elokomin R	Beaver Creek H	Smolt	04/30/90		4.5	14,850	Coweeman R	AD
1989	Elokomin R	Beaver Creek H	Smolt	05/03/90		4.9	7,350	Coweeman R	AD
1989	Elokomin R	Beaver Creek H	Smolt	05/04/90		4.9	6,125	Coweeman R	AD
1989	Elokomin R	Coweeman River Pond	Smolt	04/28/90		4.9	4,508	Coweeman R	AD
1989	Elokomin R	Coweeman River Pond	Smolt	04/28/90		5.3	4,505	Coweeman R	AD
1990	Elokomin R	Beaver Creek H	Smolt	04/16/91		4.0	6,400	Coweeman R	AD
1990	Elokomin R	Beaver Creek H	Smolt	04/19/91		4.0	5,000	Coweeman R	AD
1990	Elokomin R	Beaver Creek H	Smolt	04/19/91		4.0	6,400	Coweeman R	AD
1990	Elokomin R	Beaver Creek H	Smolt	04/19/91		4.0	3,200	Coweeman R	AD

Table 14 (cont.). Hatchery releases of winter steelhead into the Toutle And Coweeman rivers by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code /Fin Clip
1990	Elokomin R	Beaver Creek H	Smolt	04/19/91		4.2	2,730	Coweeman R	AD
1990	Elokomin R	Beaver Creek H	Smolt	04/19/91		4.2	6,720	Coweeman R	AD
1990	Elokomin R	Beaver Creek H	Smolt	04/19/91		4.2	4,305	Coweeman R	AD
1990	Elokomin R	Beaver Creek H	Smolt	04/25/91		4.2	6,720	Coweeman R	AD
1990	Elokomin R	Beaver Creek H	Smolt	5/07/91		4.7	6,463	Coweeman R	AD
1990	Elokomin R	Coweeman River Pond	Smolt	04/19/91		4.0	1,720	Coweeman R	AD
1990	Elokomin R	Coweeman River Pond	Smolt	04/27/91		3.8	3,040	Coweeman R	AD

Source: Terry Lovgren, WDW Hatchery Planting Database, 1991.

AD = Adipose clip.

Table AE Emig coded wire tagged d w te ee ead from Cowlitz bba

Hatchery/Release Site	Recovery Site	Recovery Method	Number Recovered	Total Number Estimated, (PSMFC)
			No rec red	

Table 16 (AI). Immigration of coded wire tagged adult winter steelhead in the Cowlitz subbasin.

Hatchery/Release Site	Recovery Site	Recovery Method	Number Recovered	Total Number Estimated, (PSMFC)
			None recovered	

Table 17 (TD). Parasites and diseases isolated at the Cowlitz Hatchery located on the Cowlitz River.

Disease Type	Hatchery	Specific Pathogen
Parasite	Cowlitz	*Ceratomyxa shasta.*
Viral	Cowlitz	Infectious hematopoietic necrosis (IHN)
Parasite	Cowlitz	*Gyrodactylus sp.*
Parasite	Cowlitz	*Hexamita sp.*
Parasite	Cowlitz	*Trichodina sp.*

S rce: WDW patholog Ste Ro

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KALAMA SUBBASIN

Spring Chinook

GEOGRAPHIC LOCATION

The Kalama subbasin begins on the southwest slope of Mount St. Helens and flows 44.5 miles west-southwest to enter the Columbia River at River Mile (RM) 73. Drainage is about 205 square miles and although the headwaters begin in Skamania County, the majority of the subbasin is in Cowlitz County. There are three facilities that have reared chinook including Gobar Pond, located about four miles up the Kalama tributary of Gobar Creek. The Lower Kalama Hatchery at RM 4 and Kalama Falls Hatchery at RM 10 also rear spring chinook.

ORIGIN

Historically, few spring chinook were found in the subbasin (WDF 1951). Spring chinook were established at Kalama Falls Hatchery after its completion in 1959. Brood stock for the Kalama hatchery programs originated from a variety of sources including Eagle Creek, Willamette, Cowlitz and Little White Salmon (Howell et al. 1985). Current brood stock source is from rack returns.

DISTRIBUTION

Spring chinook are distributed primarily below Kalama Falls Hatchery although some have been passed upstream in large return years. Most of the spawning in the Kalama River occurs between the upper Kalama Falls (RM 36.8) and the Kalama Falls Hatchery (RM 10.5).

PRODUCTION

By the 1950's only remnant populations (escapements fewer than 100 fish) existed in the Kalama River. Natural spawning population estimates of spring chinook in the Kalama River between 1975 through 1983 averaged 757 fish (Howell et al. 1985). Hatchery production is the dominant component in the Kalama River although some natural production also occurs.

Tables 1 and 2 describe the amount of spawning and rearing habitat by quality, available in the Kalama River. This data was derived from the Presence/Absence database of Northwest Power Planning Council (199 1).

The Northwest Power Planning Council's model estimated a subbasin capacity of 111,192 smolts below Kalama Falls plus another 465,160 smolts above Kalama Falls. However, the small historic run sizes might suggest a habitat constraint or degradation.

The Kalama River spring chinook natural spawn escapement from 1977-1984 brood years averaged 826 with a low return of 30 for the 1981 brood and a peak of 2,595 for the 1978 brood. Kalama River natural spawn escapement by age and brood year are presented in Table 3.

Kalama hatchery spring chinook returns from 1977-1984 brood years averaged 1,423 with a low return of 149 for the 1981 brood and a peak of 3,616 for the 1978 brood. Kalama hatchery returns by age and brood are presented in Table 4.

Kalama River tributary sport catch estimates from 1977-1984 brood years averaged 1,149 with a low of 279 for the 1981 brood and a peak of 2,587 for the 1978 brood. Kalama River tributary sport catches by age and brood year are presented in Table 5.

The Kalama River spring chinook total returns from 1977-1984 brood years averaged 3,397 with a low of 458 for the 1981 brood and a peak of 8,798 for the 1978 brood. Kalama River total returns by age and brood year are presented in Table 6.

ADULT LIFE HISTORY

Run size. catch and escapement

Ocean commercial and recreational fisheries from Alaska to Washington, in addition to Columbia River gill net and sport fisheries, all harvest a portion of the Kalama River origin spring chinook. Ocean and Columbia River fisheries on Kalama spring chinook were estimated to account for 45 percent of production in the System Planning Model. Relatively little harvest occurs in the ocean while Columbia River commercial and sport fisheries comprise most of the harvest. Subbasin sport harvest rate on adults was 33 percent and 37 percent on jacks (WDW, 1990). Columbia River sport and commercial fisheries are managed to insure attainment of hatchery egg-take requirements.

Strays from other lower river hatcheries to the Kalama River are relatively uncommon. Table 7 lists the coded wire tags recovered within the Kalama subbasin which originated outside the Kalama subbasin. Kalama River hatchery spring chinook releases have been generally untagged.

Time of Migration

Adult time of return generally ranges from March through July.

Spawning Period

Spawning extends from late August to early October with peak activity in September.

Snawnine Areas

Most of the spawning is spread out in the area between the upper Kalama falls and the Kalama Falls Hatchery, a distance of approximately 26 miles.

Age Composition

Age ranges from two-year-old mini-jacks to six-year-old adults. Four-year-old's and five-year-old's usually the dominate the age classes. Total age composition data is summarized in Tables 3 and 4. Table 8 lists the age composition percentages by brood year for spring chinook returning to the Kalama River spawning grounds. Table 9 lists the age composition percentages by brood year for spring chinook returning to the Kalama River hatcheries. Table 10 lists the age composition percentage by brood year for spring chinook caught in the Kalama River sport fishery.

Sex Ratio

The percent females by age class (freshwaterocean) for spring chinook returning to the Kalama Falls Hatchery is available in Table 11. Kalama River natural spawn percent females data is unavailable.

The mean fork length by brood year, sex, and freshwater.ocean rearing ages of Kalama Falls Hatchery returns from 1982-1987 brood years are available in Tables 12 and 13. Kalama River natural spawn mean fork length data is unavailable.

Fecundity

Fecundity of spring chinook spawned from 1977 through 1986 averaged 4,491 (WDW, 1990).

JUVENILE LIFE HISTORY

Time of Emergence

Emergence times were estimated to be November through March for naturally spawning fry, depending on time of egg deposition and water temperatures.

Time, age and size at migration

Hatchery release information for the Kalama subbasin by brood year is presented in Table 14. Length data of natural spring chinook smolts from the Kalama River is unavailable. The number of natural juvenile spring chinook salmon that migrate from the Kalama River is also unavailable.

Survival Rate

Smolt-to-adult survival averaged 3.05 percent for the 1971 and 1974 brood years and ranged from 0.02 percent to 5.16 percent. Smolt-to-adult returns to the Kalama for the 1975 through 1982 broods averaged 1.73 percent. Egg-to-fry survival averaged 90.6 percent for 1982 through 1986 broods while fry-to-smolt survival averaged 84.0 percent, resulting in an egg-to-smolt survival of 76.1 percent (WDW, 1990).

Seidel and Mathews (1977) found September released fingerlings (18 grams) had a minimum of 0.47 percent survival while yearlings (65 g) had a minimum of 2.70 percent survival.

BIOCHEMICAL-GENETIC CHARACTERISTICS

Milner et al. (1983) measured the genetic distances between Cowlitz and Kalama Falls spring chinook. The within group variation was one of the lowest for 17 different stock group comparisons, indicating a relatively high degree of genetic homogeneity. Schreck et al. (1986) compared their samples to those of Milner et al. (1983) in order to determine if there were any genetic changes in stock between sampling dates. The results indicated a statistically significant difference in isozyme frequencies for one enzyme system between the current and historical profiles for both the Cowlitz and Kalama Falls samples.

DISEASE

Bacteria and parasitic diseases found in the Kalama hatcheries are listed in Table 15 (WDF Salmon Culture, Olympia).

REFERENCES

The references for this section appear at the end of the following fall chinook section.

Table 1 (HB-1). Estimated amount of rearing and spawning habitat, by quality, of the Kalama River spring chinook production area.

Distance/Area	Excellent	Good	Fair[a]	Poor[a]	Unknown	Total	Confidence
Miles (%)	00	89	11	00		29.2	
Acres (%)	00	91	09	00		209.3	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 1991.

Table 2 (HB-2). Estimated amount of rearing habitat, by quality, of the Kalama River spring chinook production area.

Distance/Area	Excellent	Good	Fair"	Poor[a]	Unknown	Total	Confidence
Miles (%)	00	loo	00	00		7	
Acres (%)	00	loo	00	00		50.9	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 199 1.

Table 3 (RN). Total natural spawner escapement of spring chinook to the Kalama River subbasin by brood year.

	Total Age					
Brood Year	3	4	5	6	Total	Adult Total
1974				0		
1975			67	0		
1976		231	160	0		391
1977	42	561	581	0	1,184	1,142
1978	127	2131	337	0	2,595	2,468
1979	180	672	54	0	906	726
1980	141	79	0	0	220	79
1981	1	0	29	0	30	29
1982	0	136	130	0	266	266
1983	16	341	181	17	555	539
1984	56	294	502	0	852	796
1985	21	53	16			
1986	12	18				
1987	0					
1988						

Age based on scale reading analysis.

1985 return year - no fish spawning naturally.

Table 4 (RH). Total hatchery returns of spring chinook to the Kalama River hatcheries by brood year.

	Total Age					
Brood Year	3	4	5	6	Total	Adult Total
1974				0		
1975			409	0		
1976		1,421	357	0		1,778
1977	261	1,251	749	0	2,261	2,000
1978	284	2,747	585	0	3,616	3,332
1979	232	1,170	325	0	1,727	1,495
1980	246	478	34	0	758	512
1981	4	62	83	0	149	145
1982	11	391	285	0	687	676
1983	47	749	356	18	1,170	1,123
1984	124	568	315	7	1,014	890
1985	40	373	428			
1986	63	631				
1987	183					
1988						

Age based on scale reading analysis.

Table 5 (RS). Total sport catches of spring chinook in the Kalama River subbasin by brood year.

Total Age

Brood Year	3	4	5	6	Total	Adult Total
1974				0		
1975			78	0		
1976		271	208	0		479
1977	41	728	474	0	1,243	1,202
1978	151	1,738	698	0	2,587	2,436
1979	271	1,395	353	0	2,019	1,748
1980	116	518	86	0	720	604
1981	46	156	77	0	279	233
1982	37	361	253	0	651	614
1983	72	663	368	0	1,103	1,031
1984	92	170	326	0	588	496
1985	64	382	170			
1986	55	476				
1987	204					
1988						

Age based on scale reading analysis.

Table 6 (RB). Total returns of spring chinook to the Kalama River subbasin by brood year.

Total Age

Brood Year	3	4	5	6	Total	Adult Total
1974				0		
1975			554	0		
1976		1,923	725	0		2,648
1977	344	2,540	1,804	0	4,688	4,344
1978	562	6,616	1,620	0	8,798	8,236
1979	683	3,237	732	0	4,652	3,969
1980	503	1,075	120	0	1,698	1,195
1981	51	218	189	0	458	407
1982	48	888	668	0	1,604	1,556
1983	135	1,753	905	35	2,828	2,693
1984	272	1,032	1,143	7	2,454	2,182
1985	125	808	614			
1986	130	1,125				
1987	387					
1988						

Age based on scale reading analysis.

Table 7 (AI). Immigration of coded wire tagged spring chinook into the Kalama subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Cowlitz	Lower Kalama, 1987	Hatchery	2,407	1	1
Cowlitz	Kalama Falls, 1989	Hatchery	701	1	1

*Based on the following tag codes: 63-27-47, and 63-38-33.

Beginning with the 1978 brood.

Table 8 (AC-a). Age composition percentage by brood year for spring chinook spawning naturally in the Kalama River.

Age Composition (%)

Brood Year	N	3	4	5	6
1977		3.50	47.40	49.10	0
1978		4.90	82.10	13.00	0
1979		19.90	74.20	5.90	0
1980		64.10	35.90	0	0
1981		3.30	0	96.70	0
1982		0	51.10	48.90	0
1983		2.90	61.40	32.60	3.10
1984		6.60	34.50	58.90	0
1985					
1986					
1987					
1988					

Freshwater and ocean age data are currently unavailable.

Number of scale samples (N) are also currently unavailable.

Age based on scale reading analysis.

Table 9 (AC-b). Age composition percentage by brood year for spring chinook returning to the Kalama River hatcheries.

Age Composition (%)

Brood Year	N	3	4	5	6
1977		11.60	55.30	33.10	0
1978		7.80	76.00	16.20	0
1979		13.40	67.80	18.80	0
1980		32.40	63.10	4.50	0
1981		2.70	41.60	55.70	0
1982		1.60	56.90	41.50	0
1983		4.00	64.00	30.50	1.50
1984		12.20	56.00	31.10	0.70
1985					
1986					
1987					
1988					

Freshwater and ocean age data are currently unavailable.

Number of scale samples (N) are also currently unavailable.

Age based on scale reading analysis.

Table 10 (AC-c). Age composition percentage by brood year for spring chinook caught in the Kalama River sport fishery.

Age Composition (%)

Brood Year	N	3	4	5	6
1977		3.30	58.60	38.10	0
1978		5.80	67.20	27.00	0
1979		13.40	69.10	17.50	0
1980		16.10	72.00	11.90	0
1981		16.50	55.90	27.60	0
1982		5.70	55.40	38.90	0
1983		6.50	60.10	33.40	0
1984		15.70	28.90	55.40	0
1985					
1986					
1987					
1988					

Freshwater and ocean age data are currently unavailable.

Number of scale samples (N) are also currently unavailable.

Age by scale reading analysis.

Table 11 (AS). Percent females by brood year and age class (freshwater.ocean) for spring chinook returning to the Kalama Falls Hatchery.

Females (%)

Brood Year	N	1.2	1.3	1.4	2.1	2.2	2.3	2.4	Total % Female
1976									
1977									
1978									
1979									
1980									
1981									
1982								0.00	
1983	25			0.00			70.00	100.00	
1984	84		20.00	66.70		25.60	57.10	100.00	
1985	81	0.00	25.00	0.00	0.00	26.00	57.10		
1986	32	0.00	0.00		0.00	25.00			
1987		0.00			0.00				
1988									

Age based on scale reading analysis.

Table 12 (AL-a). Mean fork length by brood year and age class (freshwater.ocean) for female spring chinook returning to the Kalama Falls Hatchery.

Mean Fork Length (cm)

Brood Year	1.2	1.3	1.4	2.1	2.2	2.3	2.4
1982							
N							
St. Dev.							
1983						84	95
N						21	4
St. Dev.							
1984		81	95		76	86	88
N		1	4		10	68	1
St. Dev.							
1985		82			79	89	
N		1			32	48	
St. Dev.							
1986					79		
N					32		
St. Dev.							
1987							
N							
St. Dev.							

Standard deviation not compiled.

Age based on scale reading analysis.

Table 13 (AL-b). Mean fork length by brood year and age class (freshwater.ocean) for male spring chinook returning to the Kalama Falls Hatchery.

Mean Fork Length (cm)

Brood Year	1.2	1.3	1.4	2.1	2.2	2.3	2.4
1982							
N							
St. Dev.							
1983						90	
N						9	
St. Dev.							
1984		89	99		78	87	
N		4	2		29	51	
St. Dev.							
1985	83	89		51	80	94	
N	2	3		1	91	36	
St. Dev.							
1986		89		55	76		
N		3		8	96		
St. Dev.							
1987				54			
N				3			
St. Dev.							

Standard deviation not compiled.

Age based on scale reading analysis.

Table 14 (TR). Hatchery releases of spring chinook salmon into the Kalama River subbasin, sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site		CWT Code
1965	COWLITZ RIVER	KALAMA FALLS HATCHRY	Smolt	04/14/67	04/14/67	13	253409	KALAMA R	(27.0002)	UNTAGGED
1970	UNDETERMINED MIXED	KALAMA FALLS HATCHRY	EmFry	09/ /71	09/ /71	23	27945	KALAMA R	(27.0002)	150088
1970	UNDETERMINED MIXED	KALAMA FALLS HATCHRY	Smolt	03/ /72	03/ /72	6	71230	KALAMA R	(27.0002)	150090
1971	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	09/21/72	09/21/72	25	35142	KALAMA R	(27.0002)	150713
1971	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	09/21/72	09/21/72	25	37260	KALAMA R	(27.0002)	UNTAGGED
1971	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	04/09/73	04/09/73	7	28420	KALAMA R	(27.0002)	150608
1971	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	04/09/73	04/09/73	7	63411	KALAMA R	(27.0002)	UNTAGGED
1974	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	08/26/75	08/26/75	18	27999	KALAMA R	(27.0002)	130506
1974	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	08/26/75	08/26/75	18	307074	KALAMA R	(27.0002)	UNTAGGED
1974	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	02/26/76	02/26/76	10	16460	KALAMA R	(27.0002)	130204
1974	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	02/26/76	02/26/76	10	179480	KALAMA R	(27.0002)	UNTAGGED
1977	LTL WHITE SALMON-NFH	KALAMA FALLS HATCHRY	Fingr	05/24/78	05/24/78	158	136986	KALAMA R	(27.0002)	UNTAGGED
1979	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	02/18/81	02/18/81	21	497700	KALAMA R	(27.0002)	UNTAGGED
1979	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	03/31/81	03/31/81	10	103100	KALAMA R	(27.0002)	UNTAGGED
1980	KALAMA RIVER	KALAMA FALLS HATCHRY	EmFry	01/08/81	01/08/81	1106	470000	WILDHORSE CR	27.0065	UNTAGGED
1980	COWLITZ RIVER	SEA RESOURC NET PENS	Fingr	01/30/81	01/30/81	547	272500	WOLF CR	(27.0117)	UNTAGGED
1983	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	02/21/85	02/21/85	13	569300	GOBAR CR	(27.0073)	UNTAGGED
1984	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	09/27/85	09/27/85	25	25000	KALAMA R	(27.0002)	UNTAGGED
1984	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	02/20/86	02/20/86	14	404000	GOBAR CR	(27.0073)	UNTAGGED
1985	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	02/11/87	02/11/87	7	176000	GOBAR CR	(27.0073)	UNTAGGED
1986	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	02/16/88	02/16/88	9	300200	GOBAR CR	(27.0073)	UNTAGGED
1987	KALAMA RIVER	LOWER KALAMA HATCHRY	Smolt	04/17/89	04/17/89	10	537200	KALAMA R	(27.0002)	UNTAGGED

Table 15 **(TD).** Parasites and diseases of spring chinook at the Kalama River hatcheries.

Disease type	Hatchery	Specific Pathogen
Bacteria	Lower Kalama	*Aeronwnas salmonicida* (Furunculosis)
Bacteria	Lower Kalama	*Yersinia ruckeri* (Enteric Redmouth)
Bacteria	Lower Kalama	*Renibacterium salmoninarium* (Bacterial Kidney Disease)
Bacteria	Lower Kalama	Various Ectoparasites and Myxosporidians
Parasite	Lower Kalama	*Ichthyophthirius multifilis* (Ichthyophthirius)
Bacteria	Kalama Falls	*Aeronwnas salmonicida* (Furunculosis)
Bacteria	Kalama Falls	*Yersinia ruckeri* (Enteric Redmouth)
Bacteria	Kalama Falls	*Renibacterium salmoninarium* (Bacterial Kidney Disease)
Parasite	Kalama Falls	Various Ectoparasites, Endoparasites and Myxosporidians
Parasite	Kalama Falls	*Ichthyophthirius multijilis* (Ichthyophthirius)

Disease history only represents pathogens isolated at the hatchery, and not necessarily a disease outbreak.

KALAMA SUBBASIN

Fall Chinook

GEOGRAPHIC LOCATION

The Kalama subbasin begins on the southwest slope of Mount St. Helens and flows 44.5 miles west-southwest to enter the Columbia River at River Mile (RM) 73. Drainage is about 205 square miles and headwaters begin in Skamania County, although the majority of the basin is in Cowlitz County. There are two hatcheries in the subbasin that produce fall chinook: the Lower Kalama Hatchery at RM 4; and Kalama Falls Hatchery at RM 10.

ORIGIN

Fall chinook have been planted into the Kalama subbasin since 1895 when the Lower Kalama Hatchery was completed. Kalama Falls Hatchery was completed in 1959. Brood stock for the two hatcheries are taken from rack returns.

The two salmon hatcheries on the Kalama were used as an egg-bank temporarily from 1981 through 1986 for the Lyons Ferry upriver bright stock fall chinook. That program and its returns will not be addressed herein due to its temporary status.

DISTRIBUTION

The Washington Department of Fisheries (1951) estimated three-quarters of the fall chinook spawned in the lower three miles of the river below hatchery racks but upstream from tidewater. Both hatcheries primarily collect brood stock by installing a temporary rack upstream from tidewater near the Modrow Bridge at RM 3. Surplus fall chinook are passed upstream from the rack to spawn naturally. Fall chinook upstream migration is terminated at Kalama Falls Salmon Hatchery unless surplus fish are released upstream from the hatchery. Currently, Kalama River fall chinook spawning ground index counts are conducted annually from Italian Creek downstream to the I-5 Bridge, a distance of about 9 miles.

PRODUCTION

Historically, fall chinook in the subbasin were abundant. Run size prior to the hatchery plants is difficult to determine because hatchery plants began in 1895. The Lower Kalama Salmon Hatchery began operation in 1895 when 4 million eggs were taken from a fish rack about one mile upstream from the confluence with the Columbia River. The Washington Department of Fisheries (195 1) estimated Kalama fall chinook escapement of 20,000 fish. Hatchery production is currently the dominant component in the Kalama River although some natural production also occurs.

Table 1 describes the amount of spawning and rearing habitat, by quality, available in the Kalama River. This data was derived from the Presence/Absence database of Northwest Power Planning Council, 1991.

Fall chinook natural production of juveniles using the Northwest Power Planning Council's model was estimated at 162,200 and 428,670 fingerlings above and below Kalama Falls Hatchery, respectively.

The Kalama River tule fall chinook natural spawn escapement from 1978-1984 brood years averaged 8,349 with a low return of 971 for the 1981 brood and a peak of 40,831 for the 1984 brood. Kalama River tule fall chinook natural spawn escapement by age and brood year are presented in Table 2.

Lower Kalama and Kalama Falls Hatcheries combined tule fall chinook returns from 1979-1984 brood years averaged 5,931 with a low return of 3,554 for the 1982 brood and a peak of 8,738 for the 1984 brood. Kalama River hatcheries tule fall chinook return by age and brood year are presented in Table 3.

Kalama River tributary sport catch estimates between 1977 through 1986 averaged 641 adults and 224 jacks for a combined harvest rate of 9.5 percent (WDW, 1990). However, specific age and brood year analysis for Kalama River sport catch is unavailable.

ADULT LIFE HISTORY

Run size. catch and escapement

Ocean commercial and recreational fisheries from Alaska to Washington, in addition to Columbia River gill net and sport fisheries all harvest a portion of the Kalama River origin fall chinook. During 1983 through 1987, the overall harvest rate was 81 percent (WDW, 1990). Columbia River sport and commercial fisheries are managed to insure attainment of hatchery egg-take requirements.

Strays from other lower river hatcheries and natural production are not unusual. Table 4 lists Kalama Hatchery origin fall chinook stray coded wire tag recoveries beginning with the 1978 brood through to the 1988 brood and Table 5 lists the coded wire tags recovered within the Kalama subbasin which originated outside the Kalama subbasin.

Time of Migration

Upstream migration begins in early August and continues through September. Depending partly on early fall rains and tributary migration distances, recruitment to most hatchery collection sites is usually greatest during the middle of September.

Spawning Period

Spawning at the Kalama facilities occurs from late September into November and peaks in early to mid-October. Natural spawning generally occurs concurrently with the spawning of the hatchery run.

Spawning Areas

Kalama River tule fall chinook spawning ground peak index counts are conducted annually between Italian Creek and the I-5 Bridge. Fall chinook are not found upstream from Kalama Falls Hatchery unless they are put upstream.

Age Comnosition

Age ranges from two-year-old jacks to six-year-old adults with three-year-olds or four-year-olds usually the dominate age classes. Total age composition data is summarized in Tables 2 and 3. Table 6 lists the age composition percentages by brood year and freshwaterocean rearing for tule fall chinook returning to the Kalama River spawning grounds. Table 7 lists the age composition percentages by brood year and freshwaterocean rearing for tule fall chinook returning to the Lower Kalama and Kalama Falls Hatcheries.

Sex Ratio

Female tule fall chinook comprised 47-63 percent of the natural spawners in the Kalama River between 1981-1984 brood years. The percent females by brood year and freshwaterocean rearing ages for Kalama River natural spawners are presented in Table 8.

Female tule fall chinook comprised 36-53 percent of the fall chinook returning to the Kalama River hatcheries between 1981-1984 brood years. The percent females by brood year and freshwaterocean rearing ages for Kalama River hatcheries return are presented in Table 9.

The mean fork length by brood year, sex, and freshwater.ocean rearing ages of Kalama River tule natural spawners for 1977-1985 brood years are available in Tables 10 and 11.

The mean fork length by brood year, sex, and freshwater.rearing ages for Kalama River hatcheries tule returns for 1978-1984 brood years are available in Tables 12 and 13.

Fecundity

Fecundity at the Kalama facilities averaged 4,574 during 1978-1982 (Howell et al. 1985). Fecundity at the Lower Kalama Hatchery between 1983-1990 return years excluding 1988 averaged 4,315 and ranged from a low 3,892 in 1985 to a high 5,510 in 1986. Fecundity at the Kalama Falls Hatchery between 1983-1990 return years averaged 4,731 and ranged from a low of 3,872 in 1985 to a high of 5,561 in 1989. Kalama River natural spawn and hatchery fecundity data by age and brood year are unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

Emergence times were estimated to be early May for naturally spawning fry, depending on time of egg deposition and water temperatures (Reimers and Loeffel, 1965).

Time. age and size at mieration

Some tagged hatchery releases from Kalama Falls Hatchery were recovered in the Columbia estuary as sub-yearlings in October and November. Kalama Falls Hatchery coded wire tags were recovered at Jones Beach (Columbia River Mile 47) in the Columbia River estuary during seining operations in 1977-1981 (Howell et al. 1985). Juvenile emigration peaks in June through August although some emigration occurs through December (WDW, 1990).

The average fork length of 1978 brood natural fall chinook smolts from the Kalama River was 40 mm. Chinook average length and ranges are based on spring 1979 seining results from the Kalama River. Length data of 1978 brood natural fall chinook smolts from the Kalama River is available in Table 15.

The number of natural juvenile fall chinook salmon that migrated from the Kalama River in 1989 was estimated to be between 522,312 and 964,439 fish. Population estimates were based upon comparing catch per unit effort (CPUE) on fall chinook juvenile seining on the Kalama River in 1989 with 1983-1989 North Fork Lewis wild juvenile population estimates and CPUE. Table 14 lists the number of natural fall chinook that migrated from the Kalama River in 1989.

Hatchery release information for the Kalama River subbasin by brood year is presented in Table 16.

Survival Rate

Results of the 1961-1963 brood fall chinook hatchery evaluation study included specific analysis of the Kalama Falls Hatchery production. The overall catch:escapement ratio was an average of 12.1: 1 for the three brood years and a high of 16.0:1 for the 1962 brood. In general, the 1961-1963 brood catch:escapement ratio was generally higher than other hatchery fall chinook (WDF, 1973). Based on a 1976 brood Kalama Falls Hatchery fall chinook coded wire tags (63-16-39), smolt-to-ail adult survival was 1.2 percent, smolt-to-fisheries 0.9 percent, and smolt-to-Columbia River 0.4 percent (Howell et al. 1985). Performance of plants (catch plus escapement), based on marked 1978 through 1981 brood production fish averaged 0.17 percent with a range of 0.08 percent to 0.32 percent. Marked production fish had 0.26 percent and 0.21 percent fingerling-to-adult survival for 1977 through 1981 broods at the Lower Kalama and Kalama Falls, respectively. Fingerlings released to adult returns to the river averaged 0.19 percent for the 1975 through 1981 broods (WDW, 1990).

Seidel and Mathews (1977) found survival at Lower Kalama Hatchery was a minimum of 2.25 percent versus 0.74 percent for early July released large (24 grams) and small (7 g) fingerlings, respectively. September releases of large (65 g) and small (19 g) fingerlings survived at a minimum of 6.52 percent and 0.99 percent, respectively. April released yearlings (78 g) survived at a minimum of 7.95 percent. At Kalama Falls Hatchery, Seidel and Mathews (1977) found two groups of 3-gram fingerlings survived at a minimum of 0.23 percent and 0.09 percent.

Lower Kalama Hatchery egg-to-fry survival averaged 91.1 percent for 1985 through 1988 while fry-to-fingerling survival averaged 99.1 percent, resulting in an egg-to-fingerling released survival of 90.3 percent (WDW, 1990).

Kalama Falls Hatchery egg-to-fry survival for 1983 through 1987 broods averaged 93 percent while fry-to-planted fish survival was 94.8 percent, resulting in an egg-to-planted fish survival of 88.1 percent (WDW, 1990).

No survival information is available for natural fall chinook in the Kalama River.

BIOCHEMICAL-GENETIC CHARACTERISTICS

Milner et al. (1980) did an electrophoretic profile of Kalama fall chinook along with other Columbia River stocks to examine the feasibility of using biochemical genetic variation for estimating composition of mixed stock fisheries. They concluded sufficient genetic differentiation existed to do so. Schreck et al. (1986) looked at stock identification of various Columbia River fall chinook, including Kalama stock, using cluster analysis of meristic and electrophoretic features and concluded geographical proximal stocks tend to be similar.

DISEASE

Bacteria and parasitic diseases found in the Kalama River hatcheries are listed in Table 17 (WDF Salmon Culture, Olympia)

Table 1 **(HB-1).** Estimated amount of rearing and spawning habitat, by quality, of the Kalama River fall chinook production area.

Distance/Area	Excellent	Good	Fair[a]	Poor[a]	Unknown	Total	Confidence
Miles (%)	00	38	33	29		18.6	
Acres (%)	00	38	32	29		133.3	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 1991.

Table 2 (RN). Total age of natural spawner escapement of tule fall chinook to the Kalama River subbasin by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974							
1975				284	0		
1976			4,937	469	0		
1977		454	1,179	1,252	41		2,926
1978	175	192	2,295	41	0	2,703	2,528
1979	77	1,023	1,516	180	0	2,796	2,719
1980	25	1,083	2,416	136	0	3,660	3,635
1981	41	359	477	94	0	971	930
1982	88	442	497	212	0	1,239	1,151
1983	204	1,636	3,542	859	0	6,241	6,037
1984	374	5,878	23,101	11,272	206	40,831	40,457
1985	19	319	8,362	616			
1986	270	779	924				
1987	82	308					
1988	103						

Age based on scale reading analysis except:

1980 return year - Adult proportion based on combined result of Kalama Falls and Lower Kalama hatcheries sampling data.

1981 return year-Kalama Hatchery age composition used.

Does not include "eggbank" stock natural spawners.

1990 return year - Does not include 198 adult males and 92 jacks put upstream from Kalama Falls Hatchery.

Table 3 (RH). Total hatchery returns of tule fall chinook to the Kalama River subbasin by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974							
1975					13		
1976				1,400	0		
1977			3,601	133	0		
1978		586	919	415	0		1,920
1979	235	489	2,674	361	0	3,759	3,524
1980	170	1,462	4,544	1,010	33	7,219	7,049
1981	15	337	2,572	1,271	4	4,199	4,184
1982	43	1,189	2,002	320	0	3,554	3,511
1983	615	2,908	4,331	261	7	8,122	7,507
1984	295	2,071	3,576	2,484	312	8,738	8,443
1985	96	258	1,075	1,890			
1986	63	190	3,126				
1987	10	655					
1988	200						

Age based on scale reading analysis.

Kalama River tule fall chinook hatchery returns include Lower Kalama and Kalama Falls Hatcheries. Hatchery escapement does not include Snake River stock returns.

1987 return year - Includes 87 fish that returned to the Kalama River and spawned at Grays Hatchery.

1989 return year - Includes fall chinook that returned to the Kalama River and spawned at Lewis Hatchery.

1990 Kalama Falls return - Includes 198 adult males and 92 jacks put upstream to spawn naturally.

Table 4 (AE). Emigration of coded wire tagged fall chinook from the Kalama subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Kalama Falls H	Lewis, 1982	Hatchery	383	1	1
Kalama Falls H	Kalama River, 1982	Spawning Ground	1,263	9	28
Kalama Falls H	Lewis River, 1982	Spawning Ground	2,939	1	3
Kalama Falls H	Hanford Reach, 1982	Spawning Ground	2,439	1	10
Lower Kalama H	Kalama River, 1982	Spawning Ground	1,263	1	3
Kalama Falls H	Cowlitz River, 1982	Spawning Ground	398	1	1
Kalama Falls H	Kalama River, 1982	Spawning Ground	1,263	2	6
Kalama Falls H	Cowlitz, 1983	Hatchery	5,969	1	1
Kalama Falls H	Kalama River, 1983	Spawning Ground	321	2	17
Kalama Falls H	Lower Kalama, 1983	Hatchery	621	2	2
Kalama Falls H	Lewis River, 1983	Spawning Ground	2,635	2	11
Lower Kalama H	Cowlitz, 1983	Hatchery	5,969	1	1
Lower Kalama H	Kalama Falls, 1983	Hatchery	3,778	31	31
Lower Kalama H	Kalama River, 1983	Spawning Ground	321	1	8
Kalama Falls H	Cowlitz, 1984	Hatchery	5,117	1	1
Kalama Falls H	Cowlitz, 1985	Hatchery	6,434	1	1
Kalama Falls H	Cowlitz, 1986	Hatchery	10,757	1	1
Kalama Falls H	Cowlitz River, 1984	Spawning Ground	1,151	4	10
Kalama Falls H	Kalama River, 1984	Spawning Ground	592	4	22

Table 4 (cont.) Emigration of coded wire tagged fall chinook from the Kalama subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Kalama Falls H	Lower Kalama, 1984	Hatchery	1,347	10	10
Kalama Falls H	Lower Kalama, 1985	Hatchery	1,291	2	2
Kalama Falls H	Lower Kalama, 1986	Hatchery	2,495	5	5
Kalama Falls H	Lewis River, 1986	Spawning Ground	3,375	1	5
Lower Kalama H	Cowlitz, 1985	Hatchery	6,434	1	1
Lower Kalama H	Kalama Falls, 1984	Hatchery	3,780	9	9
Lower Kalama H	Kalama Falls, 1985	Hatchery	3,445	24	24
Lower Kalama H	Kalama Falls, 1986	Hatchery	3,672	1	1
Lower Kalama H	Kalama Falls, 1986	Hatchery	3,672	4	4
Lower Kalama H	Kalama River, 1984	Spawning Ground	592	1	5
Lower Kalama H	Kalama River, 1985	Spawning Ground	219	1	6

Based on the following tag codes: 63-19-57, 63-20-06, 63-21-05, 63-20-36, 63-24-60, 63-22-54, and 63-24-63.

Table 5 (AI). Immigration of coded wire tagged fall chinook into the Kalama subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Abernathy H	Kalama, 1981	Hatchery	5,987	3	3
Abernathy H	Kalama River, 1981	Spawning Ground	490	2	8
Abernathy H	Kalama, 1981	Hatchery	5,987	1	1
Abernathy H	Kalama River, 1982	Spawning Ground	1,263	1	1
Abernathy H	Kalama, 1982	Hatchery	1,711	3	3
Abernathy H	Kalama, 1982	Hatchery	1,711	1	1
Abernathy H	Kalama River, 1982	Spawning Ground	1,263	2	6
Abernathy H	Kalama, 1982	Hatchery	1,711	5	5
Big Creek H	Kalama, 1981	Hatchery	5,987	1	1
Washougal H	Kalama, 1981	Hatchery	5,987	1	1
Washougal H	Kalama, 1982	Hatchery	1,711	1	1
Washougal H	Kalama River, 1982	Spawning Ground	1,263	2	6
Washougal H	Kalama, 1982	Hatchery	1,711	8	8
Washougal H	Kalama River, 1982	Spawning Ground	1,263	2	6
Washougal H	Kalama River, 1982	Spawning Ground	1,263	1	3
Lewis wild, reared at Speelyai H	Kalama, 1980	Hatchery	---	1	2
Lewis wild, reared at Speelyai H	Kalama, 1981	Hatchery	5,987	2	2

Table 5 (cont.) Immigration of coded wire tagged fall chinook into the Kalama subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Lewis wild, reared at Speelyai H	Kalama, 1981	Hatchery	5,987	1	1
Lewis wild, reared at Speelyai H	Kalama, 1982	Hatchery	1,711	3	3
Lewis wild, reared at Speelyai H	Kalama, 1982	Hatchery	1,711	3	3
Lewis wild	Kalama, 1982	Hatchery	1,711	2	2
Lewis wild, reared at Lewis H	Kalama, 1982	Hatchery	1,711	1	1
Lewis wild, reared at Lewis H	Kalama River, 1982	Spawning Ground	1,263	1	3
Toutle H	Kalama, 1980	Hatchery	---	2	5
Toutle H	Kalama, 1981	Hatchery	5,987	1	1
Toutle H	Kalama, 1982	Hatchery	1,711	11	11
Toutle H	Kalama River, 1982	Spawning Ground	1,263	4	12
Kalama Falls H	Kalama River, 1982	Spawning Ground	1,263	9	28
Lower Kalama H	Kalama River, 1982	Spawning Ground	1,263	1	3
Kalama Falls H	Kalama River, 1982	Spawning Ground	1,263	2	6
Cowlitz H	Kalama, 1980	Hatchery	---	2	5
Cowlitz H, released at Lower Columbia Streams	Kalama River, 1982	Spawning Ground	1,263	1	3

Table 5 (cont.) Immigration of coded wire tagged fall chinook into the Kalama subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Elochoman H	Kalama, 1982	Hatchery	1,711	1	1
Spring Creek H, released Hammond	Kalama, 1981	Hatchery	5,987	2	2
Spring Creek H, released Staveboldt Creek	Kalama River, 1981	Spawning Ground	490	1	4
Spring Creek H, released Hammond	Kalama, 1981	Hatchery	5,987	1	1
Spring Creek H	Kalama River, 1982	Spawning Ground	1,263	1	3
Lewis River H	Kalama Falls, 1988	Hatchery	3,438	1	1
Lewis River H	Kalama Falls, 1989	Hatchery	2,432	1	1
Lewis River H	Kalama River, 1989	Spawning Ground	3,957	2	11
Lewis River H	Kalama River, 1989	Spawning Ground	3,957	1	5
Cowlitz H	Kalama Falls, 1986	Hatchery	3,672	3	3
Cowlitz H	Kalama Falls, 1987	Hatchery	4,307	1	1
Cowlitz H	Kalama Falls, 1986	Hatchery	3,672	1	1
Cowlitz H	Kalama Falls, 1988	Hatchery	3,438	1	1
Cowlitz H	Kalama Falls, 1989	Hatchery	2,432	1	1
Cowlitz H	Kalama River, 1988	Spawning Ground	3,814	1	8
Cowlitz H	Kalama River, 1989	Spawning Ground	3,957	1	5
Cowlitz H	Lower Kalama, 1986	Hatchery	2,495	1	1

Table 5 (cont.) Immigration of coded wire tagged fall chinook into the Kalama subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Cowlitz H	Lower Kalama, 1986	Hatchery	2,495	1	1
Elochoman H	Kalama Falls, 1985	Hatchery	3,445	2	2
Elochoman H	Kalama Falls, 1988	Hatchery	3,438	1	1
Elochoman H	Kalama Falls, 1989	Hatchery	2,432	1	1
Elochoman H	Kalama River, 1989	Spawning Ground	3,957	1	5
Elochoman H	Kalama River, 1989	Spawning Ground	3,957	2	11
Elochoman H	Lower Kalama, 1989	Hatchery	1,307	1	1
Grays H	Kalama River, 1989	Spawning Ground	3,957	1	5
Grays H	Kalama River, 1989	Spawning Ground	3,957	1	5
Kalama Falls H	Kalama River, 1984	Spawning Ground	592	4	22
Kalama Falls H	Lower Kalama, 1984	Hatchery	1,347	10	10
Kalama Falls H	Lower Kalama, 1985	Hatchery	1,291	2	2
Kalama Falls H	Lower Kalama, 1986	Hatchery	2,495	5	5
Lewis River H	Kalama Falls, 1988	Hatchery	3,438	1	1
Lewis River H	Kalama River, 1988	Spawning Ground	3,814	4	31
Lower Kalama H	Kalama Falls, 1984	Hatchery	3,780	9	9
Lower Kalama H	Kalama Falls, 1985	Hatchery	3,445	24	24
Lower Kalama H	Kalama Falls, 1986	Hatchery	3,672	1	1
Lower Kalama H	Kalama Falls, 1986	Hatchery	3,672	4	4

Table 5 (cont.) Immigration of coded wire tagged fall chinook into the Kalama subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Lower Kalama H	Kalama River, 1984	Spawning Ground	592	1	5
Lower Kalama H	Kalama River, 1985	Spawning Ground	219	1	6
Washougal H	Kalama Falls, 1985	Hatchery	3,445	1	1
Washougal H	Kalama Falls, 1986	Hatchery	3,672	1	1
Washougal H	Kalama Falls, 1985	Hatchery	3,445	5	5
Washougal H	Kalama Falls, 1986	Hatchery	3,672	9	9
Washougal H	Kalama Falls, 1989	Hatchery	2,432	1	1
Washougal H	Kalama Falls, 1988	Hatchery	3,438	1	1
Washougal H	Kalama Falls, 1988	Hatchery	3,438	1	1
Washougal H	Kalama Falls, 1989	Hatchery	2,432	1	1
Washougal H	Kalama Falls, 1988	Hatchery	3,438	4	4
Washougal H	Kalama Falls, 1989	Hatchery	2,432	3	3
Washougal H	Kalama Falls, 1988	Hatchery	3,438	4	4
Washougal H	Kalama Falls, 1988	Hatchery	3,438	1	1
Washougal H	Kalama Falls, 1988	Hatchery	3,438	3	3
Washougal H	Kalama Falls, 1988	Hatchery	3,438	2	2
Washougal H	Kalama Falls, 1988	Hatchery	3,438	4	4
Washougal H	Kalama Falls, 1988	Hatchery	3,438	2	2
Washougal H	Kalama Falls, 1989	Hatchery	2,432	2	2

Table 5 (cont.) Immigration of coded wire tagged fall chinook into the Kalama subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Washougal H	Kalama Falls, 1989	Hatchery	2,432	4	4
Washougal H	Kalama Falls, 1989	Hatchery	2,432	1	1
Washougal H	Kalama Falls, 1988	Hatchery	3,438	1	1
Washougal H	Lower Kalama, 1989	Hatchery	1,307	2	2
Washougal H	Lower Kalama, 1988	Hatchery	658	1	1
Washougal H	Lower Kalama, 1989	Hatchery	1,307	1	1
Washougal H	Lower Kalama, 1988	Hatchery	658	2	2
Washougal H	Lower Kalama, 1989	Hatchery	1,307	5	5
Washougal H	Lower Kalama, 1989	Hatchery	1,307	1	1
Lewis River wild	Kalama Falls, 1983	Hatchery	3,778	1	1
Kalama Falls H	Kalama River, 1983	Spawning Ground	321	2	17
Lewis H	Kalama River, 1983	Spawning Ground	321	1	8
Lower Kalama H	Kalama Falls, 1983	Hatchery	3,778	31	31
Lower Kalama H	Kalama River, 1983	Spawning Ground	321	1	8
Kalama Falls H	Lower Kalama, 1983	Hatchery	621	2	2
Washougal H	Kalama River, 1989	Spawning Ground	3,957	5	27
Washougal H	Kalama River, 1989	Spawning Ground	3,957	4	22
Washougal H	Kalama River, 1989	Spawning Ground	3,957	2	11
Washougal H	Kalama River, 1988	Spawning Ground	3,814	2	15

Table 5 (cont.) Immigration of coded wire tagged fall chinook into the Kalama subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Washougal H	Kalama River, 1989	Spawning Ground	3,957	8	43
Washougal H	Lower Kalama, 1986	Hatchery	2,495	1	1
Washougal H	Lower Kalama, 1986	Hatchery	2,495	7	7
Washougal H	Lower Kalama, 1986	Hatchery	2,495	1	1
Washougal H	Lower Kalama, 1988	Hatchery	658	1	1
Washougal H	Lower Kalama, 1989	Hatchery	1,307	1	1
Washougal H	Lower Kalama, 1989	Hatchery	1,307	2	2
Washougal H	Lower Kalama, 1988	Hatchery	658	1	1
Washougal H	Lower Kalama, 1988	Hatchery	658	1	1
Washougal H	Lower Kalama, 1989	Hatchery	1,307	2	2
Washougal H	Lower Kalama, 1988	Hatchery	658	2	2
Washougal H	Lower Kalama, 1989	Hatchery	1,307	3	3
Washougal H	Lower Kalama, 1989	Hatchery	1,307	1	1
Washougal H	Lower Kalama, 1989	Hatchery	1,307	1	1
Washougal H	Lower Kalama, 1988	Hatchery	658	1	1
Washougal H	Lower Kalama, 1988	Hatchery	658	1	1
Washougal H	Lower Kalama, 1988	Hatchery	658	1	1
Washougal H	Lower Kalama, 1988	Hatchery	658	1	1
Washougal H	Kalama Falls, 1989	Hatchery	2,432	1	1

Table 5 (cont.) Immigration of coded wire tagged fall chinook into the Kalama subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Washougal H	Kalama Falls, 1989	Hatchery	2,432	1	1
Washougal H	Kalama Falls, 1989	Hatchery	2,432	1	1
Washougal H	Kalama River, 1986	Spawning Ground	936	1	3
Washougal H	Kalama River, 1986	Spawning Ground	936	2	6
Washougal H	Kalama River, 1988	Spawning Ground	3,814	1	8
Washougal H	Kalama River, 1988	Spawning Ground	3,814	1	8
Washougal H	Kalama River, 1989	Spawning Ground	3,957	1	5
Washougal H	Kalama River, 1989	Spawning Ground	3,957	4	22
Washougal H	Kalama River, 1988	Spawning Ground	3,814	2	15
Washougal H	Kalama River, 1989	Spawning Ground	3,957	1	5
Washougal H	Kalama River, 1988	Spawning Ground	3,814	1	8
Washougal H	Kalama River, 1989	Spawning Ground	3,957	1	5
Washougal H	Kalama River, 1988	Spawning Ground	3,814	2	15
Washougal H	Kalama River, 1989	Spawning Ground	3,957	4	22
Washougal H	Kalama River, 1988	Spawning Ground	3,814	1	8
Washougal H	Kalama River, 1989	Spawning Ground	3,957	3	16
Washougal H	Kalama River, 1988	Spawning Ground	3,814	1	8
Washougal H	Kalama River, 1989	Spawning Ground	3,957	2	11
Washougal H	Kalama River, 1989	Spawning Ground	3,957	1	5

Table 5 (cont.) Immigration of coded wire tagged fall chinook into the Kalama subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Washougal H	Kalama River, 1989	Spawning Ground	3,957	2	11
Washougal H	Kalama River, 1989	Spawning Ground	3,957	1	5

*Based on the following tag codes: 05-04-50, 05-04-51, 05-06-44, 05-06-46, 05-07-45, 07-18-44, 63-19-46, 63-21-53, 63-22-51, 63-19-50, 63-19-20, 63-21-23, 63-21-60, 63-19-41, 63-19-57, 63-20-06, 63-21-05, 63-19-42, 63-21-54, 63-22-34, 03-48-01, 03-49-01, 03-54-01, 05-06-41, 63-18-59, 63-20-36, 63-18-13, 63-38-29, 63-38-30, 63-31-19, 63-34-33, 63-38-32, 63-41-13, 63-41-50, 63-24-61, 63-31-16, 63-33-34, 63-33-35, 63-34-07, 63-34-08, 63-34-14, 63-34-15, 63-34-28, 63-34-31, 63-34-32, 63-34-34, 63-38-27, 63-38-28, 63-22-54, 63-21-48, 63-22-39, 63-22-51, 63-34-16, 63-38-31, 63-34-58, 63-34-59, 63-32-42, 63-33-21, 63-24-60, 63-34-09, 63-24-63, 63-31-27, 63-34-12, 63-38-21, 63-38-22, 63-25-03, 63-30-19, 63-31-25, 63-32-36, 63-34-51, 63-31-24, 63-32-38, and 63-34-59.

Beginning with the 1978 brood.

Table 6 (AC-1). Age composition percentage (freshwater.ocean) by brood year for tule fall chinook spawning naturally in the Kalama River.

Age Composition (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1978										
1979										
1980										
1981	48	2.08	45.83	22.92	16.67	0	0	12.50	0	0
1982	56	5.36	19.64	57.14	10.72	0	3.57	0	3.57	0
1983	280	1.79	37.86	53.57	5.00	0	0	1.78	0	0
1984	971	2.47	28.63	35.84	32.55	0.10	0	0.21	0.10	0.10
1985										
1986										
1987										
1988										

Age based on scale reading anal

Table 7 (AC-2). Age composition percentage (freshwater.ocean) by brood year for tule fall chinook returning to the Kalama River hatcheries.

Age Composition (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1978										
1979										
1980										
1981	1,164	0.26	9.36	69.67	14.69	0.09	0	0	5.93	0
1982	1,160	1.33	33.27	51.24	5.31	0	0.18	8.67	0	0
1983	1,539	8.90	44.44	41.52	4.94	0	0	0.07	0.13	0
1984	2,257	2.75	18.65	49.18	27.60	1.51	0	0.22	0.09	0
1985										
1986										
1987										
1988										

Age based on scale reading analysis.

Lower Kalama and Kalama Falls Hatcheries are both included in Kalama River hatchery returns.

Table 8 (AS-1). Percent females by brood year and age class (freshwater.ocean) for tule fall chinook spawning naturally in the Kalama River.

Females (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4	Total % Female
1976											
1977											
1978					100.00						
1979				52.94	66.67						
1980			42.86	46.84	50.00			100.00	100.00		
1981	29	0	63.64	45.45	50.00	0	0	100.00	0	0	60.42
1982	35	0	63.64	71.88	50.00	0	0	0	100.00	0	62.50
1983	141	0	33.96	59.33	78.57	0	0	100.00	0	0	51.28
1984	451	0	26.26	52.30	61.39	0	0	50.00	100.00	0	46.56
1985											
1986											
1987											
1988											

Age based on scale reading analysis.

Table 9 (AS-2). Percent females by brood year and age class (freshwater.ocean) for tule fall chinook returning to the Kalama River hatcheries.

Females (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4	Total % Female
1976											
1977						0					
1978					64.00	0					
1979				58.01	71.88	0					
1980			31.13	56.97	72.65	33.33				60.00	
1981	619	0	20.18	54.87	64.33	1.00	0	0	59.42	0	53.18
1982	519	0	23.14	56.30	68.33	0	0	66.32	0	0	45.93
1983	548	0	16.37	59.62	71.05	0	0	0	50.00	0	35.60
1984	994	0	19.00	44.59	62.28	79.41	0	40.00	100.00	0	44.04
1985											
1986											
1987											
1988											

Age based on scale reading analysis.

Lower Kalama and Kalama Falls Hatcheries are both included in Kalama River hatchery returns.

Table 10 (AL-a). Mean fork length by brood year and age class (freshwater.ocean) for female tule fall chinook spawning naturally in Kalama River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1978				96					
N				2					
St. Dev.				5.66					
1979			87	92				82	
N			18	4				1	
St. Dev.			5.03	1.26				---	
1980		73	83	91			74		
N		9	37	1			1		
St. Dev.		4.97	6.6	---			---		
1981		77	87	85			78		
N		4	5	4			6		
St. Dev.		2.5	4.16	5.2			4.04		
1982		77	83	98				83	
N		7	23	3				2	
St. Dev.		3.95	7.11	2.65				2.83	
1983		74	85				82		
N		36	89				5		
St. Dev.		5.19	6.72				5.59		
1984		76							
N		73							
St. Dev.		5.71							

Age based on scale reading analysis.

Table 11 (AL-b). Mean fork length by brood year and age class (freshwater.ocean) for male fall chinook spawning naturally in Kalama River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1
1977					127	
N					1	
St. Dev.					---	
1978						
N						
St. Dev.						
1979			95	96		
N			16	2		
St. Dev.			10.77	2.12		
1980		73	88	111		
N		12	42	1		
St. Dev.		7.44	8.21	---		
1981	51	76	96	103		
N	1	8	6	4		
St. Dev.	---	5.45	8.8	9		
1982	47	82	90	106		62
N	3	4	9	3		2
St. Dev.	6.66	6.68	8	4.36		3.54
1983	54	76	91			
N	5	70	61			
St. Dev.	3.67	5.97	7.58			
1984	52	74				
N	24	205				
St. Dev.	7.1	7.46				

Table 11 (cont.) Mean fork length by brood year and age class (freshwater.ocean) for male tule fall chinook spawning naturally in the Kalama River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1
1985	40					
N	1					
St. Dev.	---					

Age based on scale reading analysis.

Table 12 (AL-c). Mean fork length by brood year and age class (freshwater.ocean) for female tule fall chin&k returning to the K&ma River hatcheries.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1978				92					
N				64					
St. Dev.				6.5					
1979			87	94					
N			493	69					
St. Dev.			5.76	6.05					
1980		77	86	93					93
N		146	703	170					6
St. Dev.		6.67	4.99	5.59					6.25
1981		77	87	93				90	
N		22	445	110				41	
St. Dev.		5.57	5.34	6.06				4.66	
1982		80	89	93			83		
N		87	326	18			65		
St. Dev.		4.61	5.31	4.54			5.57		
1983		77	89					84	
N		112	252					1	
St. Dev.		5.33	5.02					---	
1984		80					87		
N		49					2		
St. Dev.		4.82					1.41		

Age based on scale reading analysis.

Table 13 (AL-d). Mean fork length by brood year and age class (freshwater.ocean) for male tule fall chinook returning to the Kalama River hatcheries.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1978				97					
N				36					
St. Dev.				8.49					
1979			91	98					
N			356	27					
St. Dev.			8.03	6.62					
1980		73	90	97					101
N		323	531	64					4
St. Dev.		7.76	7.27	9.24					10.11
1981	41	74	89	98				98	
N	3	87	366	61				28	
St. Dev.	6.08	6.57	7.6	8.47				5.38	
1982	48	74	90			60	79		
N	15	289	253			2	33		
St. Dev.	7.31	7.77	7.24			3.54	11.54		
1983	51	77						102	
N	136	572						1	
St. Dev.	4.61	6.64						---	
1984	52						86		
N	61						3		
St. Dev.	6.88						3.51		

Age based on scale reading analysis.

Table 14 (JM). Number of natural juvenile fall chinook that migrated from the Kalama River, 1989.

Brood Year	Time of Migration		
	Fall (subyearling)	Spring	Total
1988	522,312 - 964,439		522,312 - 964,439

Source: Pettit, R. 1990. Fall chinook juvenile test seining on the Kalama River, 1989. Columbia River Lab Progress Report, # 90-21.

Estimates based upon comparing catch per unit effort (CPUE) data collected on fall chinook juvenile seining on the Kalama River in 1989 with 1983-88 North Fork Lewis River wild juvenile fall chinook population estimates and CPUE.

Table 15 (SL). Lengths of fall chinook smolts from the Kalama River, 1979.

Location and year	No. Fish	Length ave. (mm)	Length range (mm)	Reference
Lower Kalama 1979	228	40.3	33-57	"Spring seining of 1978 brood wild fall chinook juveniles on the Kalama River, Grays River, and Skamokawa Creek". WDF memorandum from Nancy Bluestein to Don McIssac December 11, 1979.

Seven stick and/or beach seining trips were made on the Kalama River between March 28-May 17, 1979. Chinook average length and range are based on those seining results and may reflect rearing and/or outmigration size patterns.

Table 16 (TR). Hatchery releases of fall chinook salmon into the Kalama River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site		CWT Code
1966	KALAMA RIVER	KALAMA FALLS HATCHRY	EmFry	01/20/67	01/20/67	1334	5392	KALAMA R	(27.0002)	UNTAGGED
1966	SPRING CREEK	KALAMA FALLS HATCHRY	EmFry	01/27/67	01/27/67	1080	322344	KALAMA R	(27.0002)	UNTAGGED
1966	KALAMA RIVER	KALAMA FALLS HATCHRY	EmFry	02/06/67	02/06/67	1334	12132	KALAMA R	(27.0002)	UNTAGGED
1966	KALAMA RIVER	KALAMA FALLS HATCHRY	EmFry	02/06/67	02/06/67	1031	429660	KALAMA R	(27.0002)	UNTAGGED
1966	KALAMA RIVER	KALAMA FALLS HATCHRY	EmFry	02/17/67	02/17/67	1680	24900	KALAMA R	(27.0002)	UNTAGGED
1966	KALAMA RIVER	KALAMA FALLS HATCHRY	EmFry	02/17/67	02/17/67	926	627181	KALAMA R	(27.0002)	UNTAGGED
1966	KALAMA RIVER	KALAMA FALLS HATCHRY	EmFry	02/17/67	02/17/67	926	627181	KALAMA R	(27.0002)	UNTAGGED
1966	KALAMA RIVER	KALAMA FALLS HATCHRY	EmFry	02/20/67	02/20/67	926	342778	KALAMA R	(27.0002)	UNTAGGED
1966	KALAMA RIVER	KALAMA FALLS HATCHRY	EmFry	03/06/67	03/06/67	1680	4980	KALAMA R	(27.0002)	UNTAGGED
1966	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/21/67	06/21/67	73	837626	KALAMA R	(27.0002)	UNTAGGED
1966	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/21/67	06/21/67	73	837626	KALAMA R	(27.0002)	UNTAGGED
1966	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/21/67	06/21/67	73	837627	KALAMA R	(27.0002)	UNTAGGED
1966	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/22/67	05/22/67	134	626852	KALAMA R	(27.0002)	UNTAGGED
1966	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	06/08/67	06/08/67	141	133527	KALAMA R	(27.0002)	UNTAGGED
1966	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	06/13/67	06/13/67	127	455930	KALAMA R	(27.0002)	UNTAGGED
1967	KALAMA RIVER	KALAMA FALLS HATCHRY	EmFry	01/29/68	01/29/68	986	216801	KALAMA R	(27.0002)	UNTAGGED
1967	KALAMA RIVER	KALAMA FALLS HATCHRY	EmFry	03/22/68	03/22/68	986	184428	KALAMA R	(27.0002)	UNTAGGED
1967	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/31/68	05/31/68	126	223398	KALAMA R	(27.0002)	UNTAGGED
1967	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/12/68	06/12/68	53	77804	KALAMA R	(27.0002)	UNTAGGED
1967	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/12/68	06/12/68	53	764419	KALAMA R	(27.0002)	UNTAGGED
1967	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/17/68	06/17/68	83	78850	KALAMA R	(27.0002)	UNTAGGED
1967	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/17/68	06/17/68	83	938979	KALAMA R	(27.0002)	UNTAGGED
1967	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/28/68	06/28/68	71	874507	KALAMA R	(27.0002)	UNTAGGED
1967	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	04/24/69	04/24/69	12	125280	KALAMA R	(27.0002)	UNTAGGED
1967	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/20/68	05/20/68	104	1680825	KALAMA R	(27.0002)	UNTAGGED
1968	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/13/69	06/13/69	147	317961	KALAMA R	(27.0002)	UNTAGGED
1968	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/13/69	06/13/69	130	350090	KALAMA R	(27.0002)	UNTAGGED
1968	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/13/69	06/13/69	128	335744	KALAMA R	(27.0002)	UNTAGGED
1968	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/13/69	06/13/69	119	321062	KALAMA R	(27.0002)	UNTAGGED
1968	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/13/69	06/13/69	115	337065	KALAMA R	(27.0002)	UNTAGGED
1968	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/27/69	06/27/69	103	244419	KALAMA R	(27.0002)	UNTAGGED
1968	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/27/69	06/27/69	102	234804	KALAMA R	(27.0002)	UNTAGGED
1968	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/27/69	06/27/69	88	241032	KALAMA R	(27.0002)	UNTAGGED
1968	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/27/69	06/27/69	77	230461	KALAMA R	(27.0002)	UNTAGGED
1968	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/27/69	06/27/69	74	233988	KALAMA R	(27.0002)	UNTAGGED
1968	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	03/23/70	03/23/70	21	184254	KALAMA R	(27.0002)	UNTAGGED
1968	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/14/69	05/14/69	181	869037	FALLERT CR	(27.0017)	UNTAGGED
1968	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/26/69	05/26/69	152	670196	FALLERT CR	(27.0017)	UNTAGGED
1968	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	06/04/69	06/04/69	141	289110	FALLERT CR	(27.0017)	UNTAGGED
1969	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	03/23/70	03/23/70	613	1230000	KALAMA R	(27.0002)	UNTAGGED
1969	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	04/21/70	04/21/70	346	503010	KALAMA R	(27.0002)	UNTAGGED
1969	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	04/21/70	04/21/70	282	429649	KALAMA R	(27.0002)	UNTAGGED
1969	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	04/23/70	04/23/70	319	188210	KALAMA R	(27.0002)	UNTAGGED
1969	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	04/29/70	04/29/70	287	414141	KALAMA R	(27.0002)	UNTAGGED
1969	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/13/70	05/13/70	334	617049	KALAMA R	(27.0002)	UNTAGGED
1969	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/27/70	05/27/70	202	144430	KALAMA R	(27.0002)	UNTAGGED
1969	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/27/70	05/27/70	114	948822	KALAMA R	(27.0002)	UNTAGGED
1969	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/19/70	06/19/70	62	235786	KALAMA R	(27.0002)	UNTAGGED
1969	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/23/70	06/23/70	61	1173823	KALAMA R	(27.0002)	UNTAGGED
1969	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/29/70	06/29/70	69	320712	KALAMA R	(27.0002)	UNTAGGED
1969	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	09/16/70	09/16/70	17	92922	KALAMA R	(27.0002)	UNTAGGED
1969	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	02/25/71	02/25/71	6	90774	KALAMA R	(27.0002)	UNTAGGED
1969	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/22/70	05/22/70	120	3578777	FALLERT CR	(27.0017)	UNTAGGED
1970	KALAMA RIVER	KALAMA FALLS HATCHRY	EmFry	04/19/71	04/19/71	1008	114000	KALAMA R	(27.0002)	UNTAGGED
1970	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	04/28/71	04/28/71	319	751883	KALAMA R	(27.0002)	UNTAGGED

Table 16 (cont.). Hatchery releases of fall chinook salmon into the Kalama River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site		CWT Code
1970	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/24/71	05/24/71	198	2610234	KALAMA R	(27.0F02)	UNTAGGED
1970	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/25/71	05/25/71	189	1101114	KALAMA R	(27.0F02)	UNTAGGED
1970	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/09/71	06/09/71	344	19264	KALAMA R	(27.0F02)	UNTAGGED
1970	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	08/31/71	08/31/71	17	520370	KALAMA R	(27.0F02)	UNTAGGED
1970	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	09/01/71	09/01/71	17	29852	KALAMA R	(27.0F02)	UNTAGGED
1970	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	09/03/71	09/03/71	23	27945	KALAMA R	(27.0F02)	UNTAGGED
1970	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	09/10/71	09/10/71	17	1224	KALAMA R	(27.0F02)	UNTAGGED
1970	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	01/27/72	01/27/72	7	27902	KALAMA R	(27.0F02)	UNTAGGED
1970	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/19/71	05/19/71	191	451849	FALLERT CR	(27.0F17)	UNTAGGED
1970	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/24/71	05/24/71	204	1566188	FALLERT CR	(27.0F17)	UNTAGGED
1970	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	07/06/71	07/06/71	213	177602	FALLERT CR	(27.0F17)	UNTAGGED
1970	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	04/28/71	04/28/71	381	764725	KALAMA R	(27.0F02)	UNTAGGED
1970	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	PreSm	10/20/71	10/20/71	15	205993	FALLERT CR	(27.0F17)	UNTAGGED
1971	KALAMA RIVER	KALAMA FALLS HATCHRY	EmFry	02/15/72	02/15/72	1008	933000	KALAMA R	(27.0F02)	UNTAGGED
1971	KALAMA RIVER	KALAMA FALLS HATCHRY	EmFry	02/24/72	02/24/72	1008	359000	KALAMA R	(27.0F02)	UNTAGGED
1971	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	02/22/72	02/22/72	926	1327375	KALAMA R	(27.0F02)	UNTAGGED
1971	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	02/24/72	02/24/72	907	322848	KALAMA R	(27.0F02)	UNTAGGED
1971	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	03/21/72	03/21/72	630	189000	KALAMA R	(27.0F02)	UNTAGGED
1971	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/26/72	05/26/72	157	4034272	KALAMA R	(27.0F02)	UNTAGGED
1971	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/21/72	06/21/72	291	62350	KALAMA R	(27.0F02)	UNTAGGED
1971	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	08/02/72	08/02/72	39	732782	KALAMA R	(27.0F02)	UNTAGGED
1971	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	08/25/72	08/25/72	17	596952	KALAMA R	(27.0F02)	UNTAGGED
1971	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	09/21/72	09/21/72	25	32774	KALAMA R	(27.0F02)	UNTAGGED
1971	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	04/09/73	04/09/73	7	4547	KALAMA R	(27.0F02)	UNTAGGED
1971	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	04/09/73	04/09/73	7	63411	KALAMA R	(27.0F02)	UNTAGGED
1971	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	05/16/72	05/16/72	161	300104	FALLERT CR	(27.0F17)	UNTAGGED
1971	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	05/26/72	05/26/72	118	2402774	FALLERT CR	(27.0F17)	UNTAGGED
1971	RINGOLD HATCHERY	LOWER KALAMA HATCHRY	Fingr	06/26/72	06/26/72	19	90781	FALLERT CR	(27.0F17)	UNTAGGED
1971	RINGOLD HATCHERY	LOWER KALAMA HATCHRY	Fingr	06/30/72	06/30/72	19	38198	FALLERT CR	(27.0F17)	150507*1
1971	RINGOLD HATCHERY	LOWER KALAMA HATCHRY	Fingr	06/30/72	06/30/72	19	96531	FALLERT CR	(27.0F17)	UNTAGGED
1971	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	06/30/72	06/30/72	65	73180	FALLERT CR	(27.0F17)	UNTAGGED
1971	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	07/07/72	07/07/72	65	68030	FALLERT CR	(27.0F17)	150506
1971	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	07/07/72	07/07/72	65	78850	FALLERT CR	(27.0F17)	UNTAGGED
1971	RINGOLD HATCHERY	LOWER KALAMA HATCHRY	Fingr	07/10/72	07/10/72	17	37968	FALLERT CR	(27.0F17)	UNTAGGED
1971	KALAMA RIVER	LOWER KALAMA HATCHRY	PreSm	09/21/72	09/21/72	24	39762	FALLERT CR	(27.0F17)	150600
1971	KALAMA RIVER	LOWER KALAMA HATCHRY	PreSm	09/21/72	09/21/72	24	3980	FALLERT CR	(27.0F17)	UNTAGGED
1971	RINGOLD HATCHERY	LOWER KALAMA HATCHRY	PreSm	09/21/72	09/21/72	7	17566	FALLERT CR	(27.0F17)	150607
1971	RINGOLD HATCHERY	LOWER KALAMA HATCHRY	PreSm	09/21/72	09/21/72	7	53	FALLERT CR	(27.0F17)	UNTAGGED
1971	KALAMA RIVER	LOWER KALAMA HATCHRY	PreSm	09/21/72	09/21/72	24	2098	FALLERT CR	(27.0F17)	UNTAGGED
1971	KALAMA RIVER	LOWER KALAMA HATCHRY	PreSm	12/04/72	12/04/72	14	20190	FALLERT CR	(27.0F17)	150501
1971	KALAMA RIVER	LOWER KALAMA HATCHRY	PreSm	12/04/72	12/04/72	14	61	FALLERT CR	(27.0F17)	UNTAGGED
1971	KALAMA RIVER	LOWER KALAMA HATCHRY	Smolt	04/01/73	04/01/73	6	20088	FALLERT CR	(27.0F17)	150712
1972	KALAMA RIVER	KALAMA FALLS HATCHRY	EmFry	03/23/73	03/23/73	1008	1150000	KALAMA R	(27.0F02)	UNTAGGED
1972	KALAMA RIVER	KALAMA FALLS HATCHRY	EmFry	03/30/73	03/30/73	1008	1248000	KALAMA R	(27.0F02)	UNTAGGED
1972	KALAMA RIVER	KALAMA FALLS HATCHRY	EmFry	04/04/73	04/04/73	1008	357000	KALAMA R	(27.0F02)	UNTAGGED
1972	KALAMA RIVER	KALAMA FALLS HATCHRY	EmFry	04/16/73	04/16/73	1008	279000	KALAMA R	(27.0F02)	UNTAGGED
1972	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/07/73	05/07/73	527	274204	KALAMA R	(27.0F02)	UNTAGGED
1972	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/25/73	05/25/73	231	2217916	KALAMA R	(27.0F02)	UNTAGGED
1972	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/04/73	06/04/73	147	307697	KALAMA R	(27.0F02)	UNTAGGED
1972	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/20/73	06/20/73	129	65790	KALAMA R	(27.0F02)	151207
1972	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/20/73	06/20/73	129	4515	KALAMA R	(27.0F02)	UNTAGGED
1972	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/20/73	06/20/73	132	250800	KALAMA R	(27.0F02)	UNTAGGED
1972	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/20/73	06/20/73	104	1717560	KALAMA R	(27.0F02)	UNTAGGED
1972	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	07/16/73	07/16/73	60	64320	KALAMA R	(27.0F02)	151210
1972	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	07/16/73	07/16/73	60	5640	KALAMA R	(27.0 02)	UNTAGGED

Table 16 (cont.). Hatchery releases of fall chinook salmon into the Kalama River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1972	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	09/04/73	09/04/73	18	16765	KALAMA R (27.00 2)	UNTAGGED
1972	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	09/06/73	09/06/73	23	13616	KALAMA R (27.00 2)	UNTAGGED
1972	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	09/12/73	09/12/73	27	76209	KALAMA R (27.00 2)	UNTAGGED
1972	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	03/06/74	03/06/74	10	131299	KALAMA R (27.00 2)	UNTAGGED
1972	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	EmFry	03/03/73	03/03/73	1008	162000	FALLERT CR (27.00 17)	UNTAGGED
1972	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	05/15/73	05/15/73	101	196344	FALLERT CR (27.00 17)	UNTAGGED
1972	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	05/21/73	05/21/73	140	587503	FALLERT CR (27.00 17)	UNTAGGED
1972	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	05/23/73	05/23/73	125	1477904	FALLERT CR (27.00 17)	UNTAGGED
1972	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	05/30/73	05/30/73	82	298899	FALLERT CR (27.00 17)	UNTAGGED
1972	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	06/02/73	06/02/73	82	69592	FALLERT CR (27.00 17)	151114
1972	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	06/02/73	06/02/73	82	301323	FALLERT CR (27.00 17)	UNTAGGED
1972	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	06/02/73	06/02/73	114	100445	FALLERT CR (27.00 17)	151203
1972	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	06/02/73	06/02/73	114	14155	FALLERT CR (27.00 17)	UNTAGGED
1972	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	06/05/73	06/05/73	114	12125	FALLERT CR (27.00 17)	UNTAGGED
1972	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	07/06/73	07/06/73	73	46523	FALLERT CR (27.00 17)	151201
1972	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	07/06/73	07/06/73	73	3772	FALLERT CR (27.00 17)	UNTAGGED
1972	KALAMA RIVER	LOWER KALAMA HATCHRY	PreSm	09/04/73	09/04/73	30	50100	FALLERT CR (27.00 17)	UNTAGGED
1972	KALAMA RIVER	LOWER KALAMA HATCHRY	PreSm	09/28/73	09/28/73	22	30202	FALLERT CR (27.00 17)	151412
1972	KALAMA RIVER	LOWER KALAMA HATCHRY	PreSm	09/28/73	09/28/73	22	26224	FALLERT CR (27.00 17)	UNTAGGED
1972	KALAMA RIVER	LOWER KALAMA HATCHRY	PreSm	09/28/73	09/28/73	22	26224	FALLERT CR (27.00 17)	UNTAGGED
1973	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	04/04/74	04/04/74	648	574811	KALAMA R (27.00 02)	UNTAGGED
1973	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/14/74	05/14/74	217	2209982	KALAMA R (27.00 02)	UNTAGGED
1973	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/14/74	05/14/74	186	174200	KALAMA R (27.00 02)	UNTAGGED
1973	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	07/09/74	07/09/74	70	66168	KALAMA R (27.00 02)	151301
1973	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	07/09/74	07/09/74	70	879089	KALAMA R (27.00 02)	UNTAGGED
1973	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	07/09/74	07/09/74	57	62268	KALAMA R (27.00 02)	151306
1973	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	07/09/74	07/09/74	73	874344	KALAMA R (27.00 02)	UNTAGGED
1973	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	10/28/74	10/28/74	12	44275	KALAMA R (27.00 02)	UNTAGGED
1973	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	10/28/74	10/28/74	9	24947	KALAMA R (27.00 02)	UNTAGGED
1973	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	04/01/75	04/01/75	5	20034	KALAMA R (27.00 02)	011515
1973	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	04/01/75	04/01/75	5	8710	KALAMA R (27.00 02)	UNTAGGED
1973	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	04/01/75	04/01/75	5	19396	KALAMA R (27.00 02)	130101
1973	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	04/01/75	04/01/75	5	12792	KALAMA R (27.00 02)	UNTAGGED
1973	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	04/01/75	04/01/75	5	8710	KALAMA R (27.00 02)	UNTAGGED
1973	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	04/01/75	04/01/75	5	12792	KALAMA R (27.00 02)	UNTAGGED
1973	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	04/01/75	04/01/75	4	44118	KALAMA R (27.00 02)	UNTAGGED
1973	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	03/29/74	03/29/74	133	383040	FALLERT CR (27.00 17)	UNTAGGED
1973	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	04/14/74	04/14/74	118	249806	FALLERT CR (27.00 17)	UNTAGGED
1973	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	04/30/74	04/30/74	71	350385	FALLERT CR (27.00 17)	UNTAGGED
1973	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	05/30/74	05/30/74	44	201652	FALLERT CR (27.00 17)	UNTAGGED
1973	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	05/31/74	05/31/74	96	603360	FALLERT CR (27.00 17)	UNTAGGED
1973	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	05/31/74	05/31/74	48	725856	FALLERT CR (27.00 17)	UNTAGGED
1973	KALAMA RIVER	LOWER KALAMA HATCHRY	PreSm	09/22/74	09/22/74	15	92925	FALLERT CR (27.00 17)	UNTAGGED
1973	KALAMA RIVER	LOWER KALAMA HATCHRY	Smolt	02/12/75	02/12/75	6	52440	FALLERT CR (27.00 17)	UNTAGGED
1974	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/02/75	06/02/75	109	345203	KALAMA R (27.00 02)	UNTAGGED
1974	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/07/75	06/07/75	148	268916	KALAMA R (27.00 02)	UNTAGGED
1974	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/07/75	06/07/75	106	306870	KALAMA R (27.00 02)	UNTAGGED
1974	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/11/75	06/11/75	115	468395	KALAMA R (27.00 02)	UNTAGGED
1974	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/13/75	06/13/75	123	707865	KALAMA R (27.00 02)	UNTAGGED
1974	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	08/26/75	08/26/75	18	307074	KALAMA R (27.00 02)	UNTAGGED
1974	PRIEST RAPIDS	KALAMA FALLS HATCHRY	Smolt	02/26/76	02/26/76	10	30060	KALAMA R (27.00 02)	130505
1974	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	02/26/76	02/26/76	10	179480	KALAMA R (27.00 02)	UNTAGGED
1974	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	04/04/75	04/04/75	184	312248	FALLERT CR (27.00 17)	UNTAGGED
1974	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/12/75	05/12/75	102	196146	FALLERT CR (27.00 17)	UNTAGGED
1974	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/12/75	05/12/75	93	537354	FALLERT CR (27. 17)	UNTAGGED

Table 16 (cont.). Hatchery releases of fall chinook salmon into the Kalama River subbasin sorted by brood year, hatchery and ife stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1974	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/12/75	05/12/75	91	196014	FALLERT =R (27.0017)	UNTAGGED
1974	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/21/75	05/21/75	79	200344	FALLERT =R (27.0017)	UNTAGGED
1974	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/21/75	05/21/75	70	200620	FALLERT =R (27.0017)	UNTAGGED
1974	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/23/75	05/23/75	57	796062	FALLERT =R (27.0017)	UNTAGGED
1974	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	06/08/75	06/08/75	82	587202	FALLERT =R (27.0017)	UNTAGGED
1974	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	PreSm	08/11/75	08/11/75	28	60000	FALLERT =R (27.0017)	UNTAGGED
1974	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	PreSm	09/04/75	09/04/75	16	54153	FALLERT =R (27.0017)	UNTAGGED
1974	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	PreSm	09/24/75	09/24/75	13	80093	FALLERT =R (27.0017)	UNTAGGED
1975	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	08/25/76	08/25/76	17	162622	KALAMA R (27.0002)	UNTAGGED
1975	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	09/13/76	09/13/76	15	57420	KALAMA R (27.0002)	UNTAGGED
1975	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	03/23/77	03/23/77	8	283704	KALAMA R (27.0002)	UNTAGGED
1975	PRIEST RAPIDS	KALAMA FALLS HATCHRY	Smolt	03/29/77	03/29/77	7	60162	KALAMA R (27.0002)	131105
1975	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	EmFry	01/26/76	01/26/76	106	88000	FALLERT CR (27.0017)	UNTAGGED
1975	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	03/20/76	03/20/76	169	977834	FALLERT CR (27.0017)	UNTAGGED
1975	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/18/76	05/18/76	58	458722	FALLERT CR (27.0017)	UNTAGGED
1975	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/31/76	05/31/76	51	907698	FALLERT CR (27.0017)	UNTAGGED
1975	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	06/29/76	06/29/76	65	652600	FALLERT CR (27.0017)	UNTAGGED
1975	KALAMA RIVER	WASHOUGAL HATCHERY	Fingr	03/31/76	03/31/76	597	1632085	KALAMA R (27.0002)	UNTAGGED
1976	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	04/27/77	04/27/77	293	116800	FOSSIL CR (27.0127)	UNTAGGED
1976	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/22/77	06/22/77	103	145749	KALAMA R (27.0002)	631639
1976	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/22/77	06/22/77	103	2327654	KALAMA R (27.0002)	UNTAGGED
1976	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/22/77	06/22/77	103	2315508	KALAMA R (27.0002)	UNTAGGED
1976	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/23/77	06/23/77	85	117594	KALAMA R (27.0002)	UNTAGGED
1976	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/23/77	06/23/77	68	93024	KALAMA R (27.0002)	UNTAGGED
1976	COLUMBIA (N BONNEVL)	KALAMA FALLS HATCHRY	PreSm	10/28/77	10/28/77	19	89074	KALAMA R (27.0002)	631719
1976	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	02/21/78	02/21/78	9	100320	KALAMA R (27.0002)	UNTAGGED
1976	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	03/23/78	03/23/78	5	156162	KALAMA R (27.0002)	UNTAGGED
1976	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	04/07/78	04/07/78	5	19686	KALAMA R (27.0002)	UNTAGGED
1976	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	03/31/77	03/31/77	203	665637	FALLERT CR (27.0017)	UNTAGGED
1976	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	04/04/77	04/04/77	186	268026	FALLERT CR (27.0017)	UNTAGGED
1976	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/26/77	05/26/77	59	179419	FALLERT CR (27.0017)	UNTAGGED
1976	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/26/77	05/26/77	54	667872	FALLERT CR (27.0017)	UNTAGGED
1976	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/26/77	05/26/77	49	565362	FALLERT CR (27.0017)	UNTAGGED
1976	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	06/29/77	06/29/77	64	340992	FALLERT CR (27.0017)	UNTAGGED
1977	OREGON - BIG CREEK	KALAMA FALLS HATCHRY	Fingr	05/14/78	05/14/78	218	888568	KALAMA R (27.0002)	UNTAGGED
1977	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/25/78	05/25/78	151	150094	KALAMA R (27.0002)	UNTAGGED
1977	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/26/78	05/26/78	184	187680	KALAMA R (27.0002)	UNTAGGED
1977	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	07/12/78	07/12/78	108	150517	KALAMA R (27.0002)	631746
1977	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	07/12/78	07/12/78	108	951931	KALAMA R (27.0002)	UNTAGGED
1977	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	07/12/78	07/12/78	108	947564	KALAMA R (27.0002)	UNTAGGED
1977	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	09/15/78	09/15/78	34	140899	KALAMA R (27.0002)	631747
1977	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	09/15/78	09/15/78	34	4507	KALAMA R (27.0002)	UNTAGGED
1977	SNAKE RIVER (LOWER)	KALAMA FALLS HATCHRY	PreSm	10/30/78	10/30/78	20	210800	KALAMA R (27.0002)	UNTAGGED
1977	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	02/22/79	02/22/79	21	10500	GOBAR CR (27.0073)	UNTAGGED
1977	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	03/12/79	03/12/79	20	131240	KALAMA R (27.0002)	UNTAGGED
1977	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	03/21/79	03/21/79	19	10697	KALAMA R (27.0002)	UNTAGGED
1977	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	03/21/79	03/21/79	19	157301	KALAMA R (27.0002)	UNTAGGED
1977	SNAKE RIVER (LOWER)	KALAMA FALLS HATCHRY	Smolt	05/07/79	05/07/79	11	77958	KALAMA R (27.0002)	UNTAGGED
1977	SNAKE RIVER (LOWER)	KALAMA FALLS HATCHRY	Smolt	05/08/79	05/08/79	10	77971	KALAMA R (27.0002)	UNTAGGED
1977	SNAKE RIVER (LOWER)	KALAMA FALLS HATCHRY	Smolt	05/09/79	05/09/79	11	80160	KALAMA R (27.0002)	UNTAGGED
1977	TOUTLE (GREEN RIVER)	LOWER KALAMA HATCHRY	Fingr	05/07/78	05/07/78	118	246030	FALLER° CR (27.0017)	UNTAGGED
1977	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/07/78	05/07/78	110	217030	FALLER° CR (27.0017)	UNTAGGED
1977	TOUTLE (GREEN RIVER)	LOWER KALAMA HATCHRY	Fingr	05/09/78	05/09/78	110	953260	FALLER CR (27.0017)	UNTAGGED
1977	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/30/78	05/30/78	61	129737	FALLER◦ CR (27.0017)	631742
1977	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/30/78	05/30/78	61	1265652	FALLER◦ CR (27.0017)	UNTAGGED

Table 16 (cont.). Hatchery releases of fall chinook salmon into the Kalama River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	WT Code
1977	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/30/78	05/30/78	61	1260359	FALLERT CR (27. 17)	UNTAGGED
1977	TOUTLE (GREEN RIVER)	LOWER KALAMA HATCHRY	Fingr	06/13/78	06/13/78	90	199800	FALLERT CR (27. 17)	UNTAGGED
1977	TOUTLE (GREEN RIVER)	LOWER KALAMA HATCHRY	Fingr	06/13/78	06/13/78	82	200654	FALLERT CR (27. 17)	UNTAGGED
1977	TOUTLE (GREEN RIVER)	LOWER KALAMA HATCHRY	Fingr	06/13/78	06/13/78	68	339184	FALLERT CR (27. 17)	UNTAGGED
1978	TOUTLE (GREEN RIVER)	KALAMA FALLS HATCHRY	Fingr	06/15/79	06/15/79	204	1236278	KALAMA R (27. 02)	UNTAGGED
1978	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/22/79	07/13/79	177	214503	KALAMA R (27. 02)	631957
1978	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/22/79	07/13/79	177	5179815	KALAMA R (27. 02)	UNTAGGED
1978	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/22/79	06/22/79	160	874806	KALAMA R (27. 02)	UNTAGGED
1978	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	07/13/79	07/13/79	194	1953996	KALAMA R (27. 02)	UNTAGGED
1978	TOUTLE (GREEN RIVER)	KALAMA FALLS HATCHRY	Fingr	07/13/79	07/13/79	165	1111478	KALAMA R (27. 02)	UNTAGGED
1978	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	02/14/80	02/14/80	28	116506	KALAMA R (27. 02)	UNTAGGED
1978	TUCANNON	KALAMA FALLS HATCHRY	Smolt	04/09/80	04/09/80	8	33634	KALAMA R (27. 02)	UNTAGGED
1978	TUCANNON	KALAMA FALLS HATCHRY	Smolt	05/06/80	05/06/80	7	149400	KALAMA R (27. 02)	UNTAGGED
1978	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/19/79	05/19/79	349	473550	FALLERT CR (27. 17)	UNTAGGED
1978	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	05/29/79	05/29/79	202	517120	FALLERT CR (27. 17)	UNTAGGED
1978	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	06/01/79	06/01/79	210	26460	FALLERT CR (27. 17)	UNTAGGED
1978	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	06/01/79	06/01/79	167	2102697	FALLERT CR (27. 17)	UNTAGGED
1979	COWLITZ RIVER	KALAMA FALLS HATCHRY	EmFry	03/26/80	03/26/80	1008	870000	KALAMA R (27. 02)	UNTAGGED
1979	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	03/25/80	03/25/80	449	259159	KALAMA R (27. 02)	UNTAGGED
1979	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	04/03/80	04/03/80	445	817773	KALAMA R (27. 02)	UNTAGGED
1979	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	04/23/80	04/23/80	336	486591	KALAMA R (27. 02)	UNTAGGED
1979	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/13/80	06/24/80	157	100355	KALAMA R (27. 02)	632105
1979	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/13/80	06/24/80	157	2300589	KALAMA R (27. 02)	UNTAGGED
1979	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/13/80	06/13/80	157	648187	KALAMA R (27. 02)	UNTAGGED
1979	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/22/80	06/22/80	115	546406	KALAMA R (27. 02)	UNTAGGED
1979	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/23/80	06/23/80	115	644906	KALAMA R (27. 02)	UNTAGGED
1979	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/24/80	06/24/80	115	459460	KALAMA R (27. 02)	UNTAGGED
1979	PRIEST RAPIDS	KALAMA FALLS HATCHRY	Smolt	03/31/81	03/31/81	10	189987	KALAMA R (27. 02)	UNTAGGED
1979	SNAKE RIVER (LOWER)	KALAMA FALLS HATCHRY	Smolt	03/31/81	03/31/81	10	267813	KALAMA R (27. 02)	UNTAGGED
1979	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	06/10/80	06/10/80	150	144535	FALLERT CR (27. 17)	632006
1979	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	06/10/80	06/10/80	150	3135285	FALLERT CR (27. 17)	UNTAGGED
1979	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	06/10/80	06/10/80	150	3129514	FALLERT CR (27. 17)	UNTAGGED
1980	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/22/81	05/28/81	119	175370	KALAMA R (27. 02)	632036
1980	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/22/81	05/28/81	119	3611241	KALAMA R (27. 02)	UNTAGGED
1980	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/22/81	05/22/81	119	757124	KALAMA R (27. 02)	UNTAGGED
1980	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/28/81	05/28/81	100	2675644	KALAMA R (27. 02)	UNTAGGED
1980	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	04/15/82	04/15/82	10	160000	KALAMA R (27. 02)	UNTAGGED
1980	SNAKE RIVER (LOWER)	KALAMA FALLS HATCHRY	Smolt	04/15/82	04/15/82	10	480000	KALAMA R (27. 02)	UNTAGGED
1980	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	06/01/81	06/10/81	96	155331	FALLERT CR (27. 17)	632254
1980	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	06/01/81	06/10/81	96	2843369	FALLERT CR (27. 17)	UNTAGGED
1980	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	06/01/81	06/01/81	96	1324392	FALLERT CR (27. 17)	UNTAGGED
1980	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	06/10/81	06/10/81	98	1512505	FALLERT CR (27. 17)	UNTAGGED
1981	KALAMA RIVER	KALAMA FALLS HATCHRY	EmFry	12/28/81	12/28/81	1031	29000	KALAMA R (27. 02)	UNTAGGED
1981	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	03/11/82	03/11/82	825	134000	KALAMA R (27. 02)	UNTAGGED
1981	COLUMBIA (N BONNEVL)	KALAMA FALLS HATCHRY	Fingr	03/11/82	03/11/82	825	645000	KALAMA R (27. 02)	UNTAGGED
1981	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/10/82	07/02/82	130	177112	KALAMA R (27. 02)	632460
1981	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/10/82	07/02/82	130	3375776	KALAMA R (27. 02)	UNTAGGED
1981	SNAKE RIVER (LOWER)	KALAMA FALLS HATCHRY	Smolt	05/02/83	05/02/83	8	664600	KALAMA R (27. 02)	UNTAGGED
1981	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	03/27/82	03/27/82	756	1314500	FALLERT CR (27. 17)	UNTAGGED
1981	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	06/13/82	06/25/82	125	139420	FALLERT CR (27. 17)	632463
1981	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	06/13/82	06/25/82	125	3028580	FALLERT CR (27. 17)	UNTAGGED
1981	KALAMA RIVER	LOWER KALAMA HATCHRY	Smolt	03/09/83	03/09/83	14	228000	FALLERT CR (27. 17)	UNTAGGED
1982	KALAMA RIVER	KALAMA FALLS HATCHRY	Smolt	04/17/84	04/17/84	10	325900	KALAMA R (27. 02)	UNTAGGED
1982	SNAKE RIVER (LOWER)	KALAMA FALLS HATCHRY	Smolt	05/01/84	05/01/84	9	334700	KALAMA R (27. 02)	UNTAGGED
1982	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	06/07/83	06/07/83	108	1254700	FALLERT CR (27. 17)	UNTAGGED

Table 16 (cont.). Hatchery releases of fall chinook salmon into the Kalama River subbasin sorted by brood year, hatchery and ife stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1982	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	°6/21 83	°6/21/83	108	353500	FALLERT CR (27.°°17)	UNTAGGED
1983	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	°6/09 84	°6/09/84	87	2380000	FALLERT CR (27.°°17)	UNTAGGED
1983	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	°6/11 84	°6/11/84	89	592000	FALLERT CR (27.°°17)	UNTAGGED
1983	LOWER KALAMA(FALLERT	LOWER KALAMA HATCHRY	Fingr	°6/23 84	°6/23/84	85	538000	FALLERT CR (27.°°17)	UNTAGGED
1984	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°4/29 85	°4/29/85	265	125900	KALAMA R (27.°°02)	UNTAGGED
1984	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°5/22 85	°5/22/85	175	228600	KALAMA R (27.°°02)	UNTAGGED
1984	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/17 85	°6/17/85	85	3646800	KALAMA R (27.°°02)	UNTAGGED
1984	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	°9/27 85	? /27/85	25	30000	KALAMA R (27.°°02)	UNTAGGED
1984	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	°6/03 85	°6/03/85	180	976410	FALLERT CR (27.°°17)	UNTAGGED
1984	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	°6/14 85	°6/14/85	88	1481800	FALLERT CR (27.°°17)	UNTAGGED
1984	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	°6/29 85	°6/29/85	85	987000	FALLERT CR (27.°°17)	UNTAGGED
1985	KALAMA RIVER	KALAMA FALLS HATCHRY	EmFry	°3/31 86	°3/31/86	1260	15000	KALAMA R (27.°°02)	UNTAGGED
1985	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°4/22 86	°4/22/86	255	361700	KALAMA R (27.°°02)	UNTAGGED
1985	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°5/14 86	°5/14/86	152	150900	KALAMA R (27.°°02)	UNTAGGED
1985	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/05 86	°6/05/86	88	789600	KALAMA R (27.°°02)	UNTAGGED
1985	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/10 86	°6/10/86	87	1720000	KALAMA R (27.°°02)	UNTAGGED
1985	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/18 86	°6/18/86	81	457300	KALAMA R (27.°°02)	UNTAGGED
1985	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/20 86	°6/20/86	80	260100	KALAMA R (27.°°02)	UNTAGGED
1985	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/23 86	°6/23/86	80	256500	KALAMA R (27.°°02)	UNTAGGED
1985	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	°6/01 86	°6/01/86	89	1566000	FALLERT CR (27.°°17)	UNTAGGED
1985	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	°6/04 86	°6/04/86	78	1114000	FALLERT CR (27.°°17)	UNTAGGED
1985	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	°6/19 86	°6/19/86	96	200000	FALLERT CR (27.°°17)	UNTAGGED
1985	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	°6/24 86	°6/24/86	80	800000	FALLERT CR (27.°°17)	UNTAGGED
1986	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°5/05 87	°5/05/87	66	234100	KALAMA R (27.°°02)	UNTAGGED
1986	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°5/15 87	°5/15/87	66	243200	KALAMA R (27.°°02)	UNTAGGED
1986	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°5/20 87	°5/20/87	74	244500	KALAMA R (27.°°02)	UNTAGGED
1986	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°5/27 87	°5/27/87	70	243700	KALAMA R (27.°°02)	UNTAGGED
1986	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°5/28 87	°5/28/87	70	227800	KALAMA R (27.°°02)	UNTAGGED
1986	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/02 87	°6/02/87	70	730600	KALAMA R (27.°°02)	UNTAGGED
1986	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/08 87	°6/08/87	70	238800	KALAMA R (27.°°02)	UNTAGGED
1986	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/08 87	°6/08/87	63	240400	KALAMA R (27.°°02)	UNTAGGED
1986	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/10 87	°6/10/87	69	199100	KALAMA R (27.°°02)	UNTAGGED
1986	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/15 87	°6/15/87	81	235000	KALAMA R (27.°°02)	UNTAGGED
1986	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/15 87	°6/15/87	79	235600	KALAMA R (27.°°02)	UNTAGGED
1986	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/15 87	°6/15/87	70	237500	KALAMA R (27.°°02)	UNTAGGED
1986	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/15 87	°6/15/87	69	238100	KALAMA R (27.°°02)	UNTAGGED
1986	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	°5/20 87	°5/20/87	106	243500	FALLERT CR (27.°°17)	UNTAGGED
1986	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	°6/01 87	°6/01/87	64	1300000	FALLERT CR (27.°°17)	UNTAGGED
1986	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	°6/12 87	°6/12/87	63	1480000	FALLERT CR (27.°°17)	UNTAGGED
1986	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	°6/19 87	°6/19/87	70	497000	FALLERT CR (27.°°17)	UNTAGGED
1987	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°3/14 88	°3/14/88	945	853400	KALAMA R (27.°°02)	UNTAGGED
1987	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°4/04 88	°4/04/88	488	921000	KALAMA R (27.°°02)	UNTAGGED
1987	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°5/19 88	°5/19/88	99	254200	KALAMA R (27.°°02)	UNTAGGED
1987	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°5/31 88	°5/31/88	66	253700	KALAMA R (27.°°02)	UNTAGGED
1987	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/01 88	°6/01/88	74	253400	KALAMA R (27.°°02)	UNTAGGED
1987	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/08 88	°6/08/88	65	253800	KALAMA R (27.°°02)	UNTAGGED
1987	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/08 88	°6/08/88	62	223400	KALAMA R (27.°°02)	UNTAGGED
1987	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/08 88	°6/08/88	55	253100	KALAMA R (27.°°02)	UNTAGGED
1987	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/13 88	°6/13/88	68	257000	KALAMA R (27.°°02)	UNTAGGED
1987	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/13 88	°6/13/88	64	254100	KALAMA R (27.°°02)	UNTAGGED
1987	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/20 88	°6/20/88	58	248300	KALAMA R (27.°°02)	UNTAGGED
1987	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/20 88	°6/20/88	58	248700	KALAMA R (27.°°02)	UNTAGGED
1987	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/20 88	°6/20/88	57	253200	KALAMA R (27.°°02)	UNTAGGED
1987	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	°6/22 88	°6/22/88	66	258600	KALAMA R (27.°°02)	UNTAGGED
1987	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	6/24 88	6/24/88	71	257700	KALAMA R (27. 02)	UNTAGGED

Table 16 (cont.). Hatchery releases of fall chinook salmon into the Kalama River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1987	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/24/88	06/24/88	68	258100	KALAMA R (27.0002)	UNTAGGED
1987	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	05/02/88	05/02/88	291	1941000	FALLERT CR (27.0017)	UNTAGGED
1987	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	05/12/88	05/12/88	200	1146000	FALLERT CR (27.0017)	UNTAGGED
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	03/23/89	03/23/89	560	447800	KALAMA R (27.0002)	UNTAGGED
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/31/89	05/31/89	70	245600	KALAMA R (27.0002)	UNTAGGED
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/07/89	06/07/89	80	267700	KALAMA R (27.0002)	UNTAGGED
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/07/89	06/07/89	73	267700	KALAMA R (27.0002)	UNTAGGED
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/07/89	06/07/89	73	268300	KALAMA R (27.0002)	UNTAGGED
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/07/89	06/07/89	63	267900	KALAMA R (27.0002)	UNTAGGED
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/08/89	06/08/89	74	245000	KALAMA R (27.0002)	UNTAGGED
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/13/89	06/13/89	72	244000	KALAMA R (27.0002)	UNTAGGED
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/13/89	06/13/89	67	245300	KALAMA R (27.0002)	UNTAGGED
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/14/89	06/14/89	75	77824	KALAMA R (27.0002)	630741
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/14/89	06/14/89	75	188676	KALAMA R (27.0002)	UNTAGGED
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/22/89	06/22/89	63	245300	KALAMA R (27.0002)	UNTAGGED
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/22/89	06/22/89	44	266800	KALAMA R (27.0002)	UNTAGGED
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/28/89	06/28/89	77	236200	KALAMA R (27.0002)	UNTAGGED
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/28/89	06/28/89	71	229500	KALAMA R (27.0002)	UNTAGGED
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	07/15/89	07/15/89	73	76880	KALAMA R (27.0002)	630742
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	07/15/89	07/15/89	73	32620	KALAMA R (27.0002)	UNTAGGED
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	08/15/89	08/15/89	78	77331	KALAMA R (27.0002)	630744
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	08/15/89	08/15/89	78	55379	KALAMA R (27.0002)	UNTAGGED
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	10/20/89	10/20/89	30	80100	KALAMA R (27.0002)	UNTAGGED
1988	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	10/20/89	10/20/89	21	80300	KALAMA R (27.0002)	UNTAGGED
1988	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	06/09/89	06/09/89	69	1398700	KALAMA R (27.0002)	UNTAGGED
1988	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	06/30/89	06/30/89	72	775100	KALAMA R (27.0002)	UNTAGGED
1988	KALAMA RIVER	LOWER KALAMA HATCHRY	Smolt	04/20/90	04/20/90	9	528660	FALLERT CR (27.0017)	UNTAGGED
1989	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/18/90	05/18/90	162	111900	KALAMA R (27.0002)	UNTAGGED
1989	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/24/90	05/24/90	71	271300	KALAMA R (27.0002)	UNTAGGED
1989	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/29/90	05/29/90	72	246200	KALAMA R (27.0002)	UNTAGGED
1989	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	05/29/90	05/29/90	63	246000	KALAMA R (27.0002)	UNTAGGED
1989	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/07/90	06/07/90	69	245400	KALAMA R (27.0002)	UNTAGGED
1989	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/07/90	06/07/90	68	246600	KALAMA R (27.0002)	UNTAGGED
1989	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/07/90	06/07/90	67	271100	KALAMA R (27.0002)	UNTAGGED
1989	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/13/90	06/13/90	82	246200	KALAMA R (27.0002)	UNTAGGED
1989	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/13/90	06/13/90	74	266900	KALAMA R (27.0002)	UNTAGGED
1989	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/13/90	06/13/90	70	245600	KALAMA R (27.0002)	UNTAGGED
1989	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/14/90	06/14/90	66	244100	KALAMA R (27.0002)	UNTAGGED
1989	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/14/90	06/14/90	59	271400	KALAMA R (27.0002)	UNTAGGED
1989	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/18/90	06/18/90	76	271300	KALAMA R (27.0002)	UNTAGGED
1989	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/25/90	06/25/90	111	83300	KALAMA R (27.0002)	UNTAGGED
1989	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	06/25/90	06/25/90	69	245100	KALAMA R (27.0002)	UNTAGGED
1989	KALAMA RIVER	KALAMA FALLS HATCHRY	Fingr	07/16/90	07/16/90	72	80500	KALAMA R (27.0002)	UNTAGGED
1989	KALAMA RIVER	KALAMA FALLS HATCHRY	PreSm	08/15/90	08/15/90	74	78200	KALAMA R (27.0002)	UNTAGGED
1989	KALAMA RIVER	LOWER KALAMA HATCHRY	Fingr	06/06/90	06/06/90	73	2040803	FALLERT CR (27.0017)	UNTAGGED

Table 17 (TD-1). Parasites and diseases of fall chinook at the Kalama River hatcheries.

Disease type	Hatchery	Specific Pathogen .
Bacteria	Lower Kalama	*Yersinia ruckeri* (Enteric Redmouth Disease)
Parasite	Lower Kalama	Various Ectoparasites, Endoparasites, and Myxosporidians
Bacteria	Kalama Falls	*Aeromonas salmonicida* (Furunculosis)
Bacteria	Kalama Falls	*Yersinia ruckeri* (Enteric Redmouth)
Bacteria	Kalama Falls	Bacterial Gill Disease
Parasite	Kalama Falls	Various Ectoparasites, Endoparasites and Myxosporidians
Virus	Kalama Falls	IHN - Infectious Hematopoietic Necrosis

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

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KALAMA SUBBASIN

Coho Salmon

GEOGRAPHIC LOCATION

The Kalama subbasin begins on the southwest slopes of Mount St. Helens and flows 44.5 miles west-southwest to enter the Columbia River at River Mile (RM) 73. Drainage is about 205 square miles in area. Although the majority of the basin is in Cowlitz County, the headwaters begin in Skamania County. There are two hatcheries in the subbasin that produce coho. The lower Kalama Hatchery at RM 4.3 and Kalama Falls Hatchery at RM 10.

ORIGIN

A native population of coho was noted to be in existence in the Kalama River in 1951 by the Washington Department of Fisheries. The native population was estimated to at about 3,000 fish.

Both early returning (Type-S) and late returning (Type-N) coho were present (WDW, 1990). Hatchery coho have been planted in the subbasin since 1942 from the Lower Kalama Salmon Hatchery. Most existing early coho, Type-S, hatchery programs are considered to be linked to native Toutle River stock coho. Washington stations either received Toutle stock eggs or utilized local native early run coho. Late stock coho, Type-N, are informally considered synonymous with Cowlitz River stock coho. Late stock hatchery programs were developed utilizing Cowlitz River stock, their derivatives, or native late runs. Late coho used in most of the current programs are presumably a blend of all of these, although egg transfers from Cowlitz Hatchery occur most frequently (Howell et al. 1985).

DISTRIBUTION

Natural spawning occurs in most areas accessible to coho. In 1936 a fish ladder was built at the Kalama Falls and by 1951 coho were observed above the falls but numbers are unknown and distribution is probably throughout the watershed.

PRODUCTION

Typically the Lower Kalama Hatchery produces Type-S coho and the Kalama Falls Hatchery produces Type-N coho. In Washington and Oregon adult production of early and late coho from natural spawners is unknown except for a few instances. A factor of 10 - 15 percent might be considered reasonable for the percent of the total Columbia River coho production originating from naturally spawning fish (Howell et al. 1985).

Tables 1 and 2 describe the amount of spawning and rearing habitat, by quality, available in the Elochoman River. This data was derived from the Presence/Absence database of the Northwest Power Planning Council, 1991.

The number of Kalama River coho natural spawn escapement is unavailable. Hatchery returns by age and brood year are presented in Table 3.

Kalama River tributary sport catch estimates between 1979 - 1986 return years averaged 1,272 adult coho, ranging from a low of 292 in 1985 to a high of 5,525 in 1980 based on catch records. Due to low harvest rates within the subbasin, most harvest is intended to occur in the ocean and the Columbia River. The Kalama is open most of the year to general rules and regulations with some exception to fly fishing only. However, specific age and brood year analysis for Kalama River sport catch is unavailable.

ADULT LIFE HISTORY

Run size. catch and escapement

Ocean commercial and recreational fisheries off the Oregon coast are the primary-harvesters of early coho. The Oregon troll fishery accounts for the highest percentage of the overall catch. Most of the freshwater recreational harvest occurs in the Washington tributaries (Howell et al. 1985).

Coho returns to the Kalama hatcheries for the 1978 - 1988 brood years averaged 6,962 with a low return of 2,943 for the 1981 brood and a peak of 13,399 for the 1983 brood (T-able 3). Subbasin harvest of coho averaged 441 jacks and 650 adults for 1977 through 1986. For 1981 through 1986, sport harvest rate averaged 12.5 percent (WDW, 1990).

Based on coded-wire tagged releases of 1976 - 1978 brood late coho, most of the harvest occurs in the Washington and Oregon ocean fisheries. Late coho have a more northerly migration pattern than early coho (WDF, 1990). This is reflected in the catch distribution where the Washington coastal catch comprised 40 percent of the total harvest compared to 20 percent for early coho during 1979 - 1981. Late coho also contribute significantly to the lower Columbia River commercial gill net fishery (Howell et al. 1985).

Strays from other lower river hatcheries are not unusual. Table 6 lists Elochoman Hatchery origin coho stray coded-wire tag recoveries beginning with the 1978 brood through to the 1988 brood. Table 7 lists the coded-wire tags recovered within the Elochoman subbasin which originated outside the Elochoman subbasin.

Harvest rates averaged 79 percent and 85 percent for Type-S and N stocks, respectively, between 1983 and 1987. Harvest of Type-S coho is occasionally constrained by one or more of the fall chinook stocks. Harvest of Type-N coho is generally not constrained by weak stocks, with hatchery escapement being the only management constraint (WDF, 1990).

Time of Migration

Early coho enter the Columbia River by mid-August and begin returning to the lower Columbia hatcheries in early September. In the mainstem Columbia River early coho predominate from August to mid-September. Stock composition shifts to late coho in late September and October. Typically, the late coho run begins entering freshwater in mid to late September with mid-October considered the main migratory period in the mainstem Columbia River (Howell et al. 1985).

Spawning Period

For Type-S coho, both hatchery and natural spawning occurs around late October, while for Type-N coho spawning will extend from late November through March, with the bulk being in December and early January (Howell et al. 1985)

Spawning Areas

Natural spawning occurs in most areas accessible to coho (Howell et al. 1985). Since 1936 the area above the falls was opened to spawning by construction of a fish ladder. Above the falls, Little Kalama River, Rock Creek, and Arnold Creek, along with other feeder streams, are utilized by coho (WDF, 1973).

Age composition

Coho return as two-year-old jacks and three-year-old adults based on hatchery personnel

designation. However, recoveries of marked production Type-N stocks indicate a 0.2 percent four-year-old adults (WDW, 1990). The age composition of the late coho run entering the Columbia River is not available because of incomplete escapement information and the differential trapping of adults and jacks at many collection facilities (Howell et al. 1985). Specific age composition percentage (freshwater.ocean) by brood year for coho spawning naturally and hatchery returns are unavailable.

Sex Ratio

Accounting for the differential harvest of adult males and females in the gill net fishery, the entire coho adult run entering the Columbia River was estimated to be 46 percent females in 1982 and 30 percent females in 1983. Hatchery adult returns were 33 percent females in 1982 and 34 percent females in 1983 (Howell et al. 1985). Specific percent females by brood year and age class (freshwaterocean) for coho spawning naturally and hatchery returns are unavailable.

Fecundity

Fecundity of Type-S and Type-N stock coho from 1977 through 1986 averaged 2,759 (n= 8,526) and 2,496 (n= 5,007) eggs per female, respectively (WDW, 1990).

Kalama River natural spawn and Kalama Hatchery fecundity by age class and brood year is unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

The juvenile life history for Kalama subbasin coho is similar to that of other stocks in the region with a spring emergence (WDW, 1990).

Time, age and size at migration

Freshwater rearing generally lasts for about 14 months. Hatchery release information for the Kalama subbasin by brood year is presented in Table 10. Based on coded-wire tag recovery studies by Dawley et al. (1982), arrival in the Columbia River estuary occurs soon after hatchery release (Howell et al. 1985). Length data of natural coho smolts from the Kalama River is unavailable. The number of natural juvenile coho salmon that migrate from the Kalama River is also unavailable.

Survival Rate

Smolt to adult survival rate of N stock fish averaged 4.67 percent (range: 0.56 percent to 7.71 percent) for the 1983 through 1985 brood releases while S stock survival ranged from 6.10 percent to 7.50 percent and averaged 6.80 percent for the 1973 brood year (WDW, 1990). A generalized recent year smolt to adult survival rate for coho was estimated to be 2.5 percent (TAC 1983, Howell et al. 1985).

BIOCHEMICAL-GENETIC CHARACTERISTICS

Data has not been compiled.

DISEASE

Bacteria and parasitic diseases found in the Kalama River Hatcheries are listed in Tables 11 and 12. (WDF Salmon Culture, Olympia).

Table 1 (HB-1). Estimated amount of rearing and spawning habitat, by quality, of the Kalama River coho production area.

Distance/Area	Excellent	Good	Fair[a]	Poor[a]	Unknown	Total	Confidence
Miles (%)	00	31	69	00		13.5	
Acres (%)	00	39	61	00		32.7	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 1991.

Table 2 (HB-2). Estimated amount of rearing habitat, by quality, of the Kalama River coho production area.

Distance/Area	Excellent	Good	Fair"	Poor[a]	Unknown	Total	Confidence
Miles (%)	04	49	47	00		36.2	
Acres (%)	04	48	49	00		382.4	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 199 1.

Table 3 (RH-1) Total coho returns to the Kalama Hatcheries, by brood year.

Total Age

Brood Year	2	3	4	Total	Adult Total
1978	2,145	6,583		8,728	6,583
1979	1,540	6,407		7,947	6,407
1980	2,253	3,892		6,145	3,892
1981	1,278	1,665		2,943	1,665
1982	1,232	2,114		3,346	2,114
1983	822	12,577		13,399	12,577
1984	350	1,669		2,019	1,669
1985	1,146	7,942		9,088	7,942
1986	1,443	5,092		6,535	5,092
1987	983	8,486		9,469	8,486
1988	1,278				
1989					

Includes returns to Lower Kalama and Kalama Falls Hatcheries.

Age composition based on hatchery personnel designation of adults and jacks, except Kalama Falls returns were adjusted to include small adults that were counted as jacks based on scale reading analysis for 1990 return year.

Table 4 (RH-2). Total hatchery returns of early coho to the Kalama River by brood year,

Brood Year	2	3	Total	Adult Total
1978	2,145	2,260	4,405	2,260
1979	493	767	1,260	767
1980	843	1,147	1,990	1,147
1981	117	185	302	185
1982	597	1,401	1,998	1,401
1983	191	5,616	5,807	5,616
1984	187	444	631	444
1985	687	6,020	6,707	6,020
1986	114	2,019	2,133	2,019
1987	323	5,237	5,560	5,237
1988	2,147		2,147	

Age composition based on hatchery personnel designation of adults and jacks.
Adults were assumed to be 2.1 and jacks 2.0.

Table 5 (RH-3). Total hatchery return of late coho to the Kalama River by brood year.

Brood Year	2	3	Total	Adult Total
1978		4,302	4,302	4,302
1979	1,047	5,640	6,687	5,640
1980	1,410	2,745	4,155	2,745
1981	1,161	1,480	2,641	1,480
1982	635	713	1,348	713
1983	631	6,961	7,592	6,961
1984	163	1,225	1,388	1,225
1985	459	1,922	2,381	1,922
1986	1,329	3,073	4,402	3,073
1987	660	2,634	3,294	2,634
1988	887		887	

Age composition based on hatchery personnel designation of adults and jacks.
Adults are assumed to be 2.1 and jacks 2.0.

Table 6 (AE). Emigration on coded wire tagged coho from the Kalama subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Kalama Falls Hatchery	Cowlitz, 1986	Hatchery	54,685	4	4

Based on the following tag codes: 63-31-57

Table 7 (AI). Immigration of coded wire tagged coho into the Kalama subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated (PSMFC)
Willard, released Clatskanie	Kalama, 1981	Spawning Ground	65	1	1
Speelyai	Kalama Falls, 1988	Hatchery	4877	1	1

*Based on the following tag codes: 05-06-52, and 63-37-02.

Beginning with the 1978 brood.

Table 8 (AC). Age composition percentage (freshwater.ocean) by brood year for early coho returning to the Kalama River Hatcheries.

Age Composition (%)

Brood Year	N	2.0	2.1
1978		48.69	51.31
1979		39.13	60.87
1980		42.36	57.64
1981		38.74	61.26
1982		29.88	70.12
1983		3.29	96.71
1984		29.64	70.36
1985		10.24	89.76
1986		5.34	94.66
1987		5.81	94.19
1988			

Age composition based on hatchery personnel designation of adults and jacks.
Adults assumed to be 2.1 and jacks 2.0.
N (number of scale samples) not applicable.

Table 9 (AC-2). Age composition percentage (freshwater.ocean) by brood year for late coho returning to the Kalama River Hatcheries.

Age Composition (%)

Brood Year	N	2.0	2.1
1978			
1979		15.66	84.34
1980		33.94	66.06
1981		43.96	56.04
1982		47.11	52.89
1983		8.31	91.69
1984		11.74	88.26
1985		19.28	80.72
1986		30.19	69.81
1987		20.04	79.96
1988			

Age composition based on hatchery personnel designation of adults and jacks.
Adults are assumed to be 2.1 and jacks 2.0.
N (number of scale samples) not applicable.

Table 10 (TR). Hatchery releases of coho salmon into the Kalama River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site		CWT Code
1965	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Smolt	04/17/67	04/17/67	17	77554	KALAMA R	(27.0002)	UNTAGGED
1965	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Smolt	04/17/67	04/17/67	17	750227	KALAMA R	(27.0002)	UNTAGGED
1965	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Smolt	05/01/67	05/01/67	18	577975	KALAMA R	(27.0002)	UNTAGGED
1965	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Smolt	05/01/67	05/01/67	18	59549	KALAMA R	(27.0002)	UNTAGGED
1965	TOUTLE RIVER TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/05/67	04/05/67	16	39778	KALAMA R	(27.0002)	UNTAGGED
1965	TOUTLE RIVER TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/05/67	04/05/67	16	4239	KALAMA R	(27.0002)	UNTAGGED
1965	TOUTLE RIVER TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/25/67	04/25/67	17	32499	KALAMA R	(27.0002)	UNTAGGED
1965	TOUTLE RIVER TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/25/67	04/25/67	17	276578	KALAMA R	(27.0002)	UNTAGGED
1966	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/23/67	02/23/67	1163	60164	KALAMA R	(27.0002)	UNTAGGED
1966	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	03/06/67	03/06/67	1163	335530	KALAMA R	(27.0002)	UNTAGGED
1966	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Smolt	04/08/68	04/08/68	16	74896	KALAMA R	(27.0002)	UNTAGGED
1966	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Smolt	04/08/68	04/08/68	16	695712	KALAMA R	(27.0002)	UNTAGGED
1966	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Smolt	05/03/68	05/03/68	17	13277	KALAMA R	(27.0002)	UNTAGGED
1966	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Smolt	05/03/68	05/03/68	17	123335	KALAMA R	(27.0002)	UNTAGGED
1966	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/04/68	04/04/68	17	40242	KALAMA R	(27.0002)	UNTAGGED
1966	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/04/68	04/04/68	17	370388	KALAMA R	(27.0002)	UNTAGGED
1967	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Smolt	04/09/69	04/09/69	16	1372800	KALAMA R	(27.0002)	UNTAGGED
1967	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	03/11/68	03/11/68	687	7546	FALLERT CR	(27.0017)	UNTAGGED
1967	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	02/05/68	02/05/68	1106	10035	KALAMA R	(27.0002)	UNTAGGED
1967	LTL WHITE SALM TYP-S	LOWER KALAMA HATCHRY	Smolt	03/27/69	03/27/69	15	450168	FALLERT CR	(27.0017)	UNTAGGED
1967	WASHOUGAL R TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/08/69	04/08/69	15	147952	FALLERT CR	(27.0017)	UNTAGGED
1968	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	03/24/69	03/24/69	1417	57280	ITALIAN CR	(27.0039)	UNTAGGED
1968	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	01/08/69	01/08/69	1194	44326	KALAMA R	(27.0002)	UNTAGGED
1968	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	03/24/69	03/24/69	1417	55848	LTL KALAMA R	27.0046	UNTAGGED
1968	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Smolt	04/03/70	04/03/70	16	1076480	KALAMA R	(27.0002)	UNTAGGED
1968	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	EmFry	01/06/69	01/06/69	1463	11728	FALLERT CR	(27.0017)	UNTAGGED
1968	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	EmFry	01/15/69	01/15/69	1463	177386	FALLERT CR	(27.0017)	UNTAGGED
1968	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/21/70	04/21/70	15	540529	FALLERT CR	(27.0017)	UNTAGGED
1969	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	03/27/70	03/27/70	1296	97875	WILDHORSE CR	27.0065	UNTAGGED
1969	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Fingr	06/09/70	06/09/70	158	70626	ELK CR	(27.0106)	UNTAGGED
1969	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Fingr	06/10/70	06/10/70	178	80100	GOBAR CR	(27.0073)	UNTAGGED
1969	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Fingr	06/10/70	06/10/70	167	100200	KALAMA R	(27.0002)	UNTAGGED
1969	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Fingr	06/08/70	06/08/70	144	50112	LTL KALAMA R	27.0046	UNTAGGED
1969	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Smolt	03/30/71	03/30/71	16	1417088	KALAMA R	(27.0002)	UNTAGGED
1969	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Smolt	03/31/71	03/31/71	15	1015106	FALLERT CR	(27.0017)	UNTAGGED
1970	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/22/71	02/22/71	1163	215280	ELK CR	(27.0106)	UNTAGGED
1970	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/23/71	02/23/71	1163	215280	WILDHORSE CR	27.0065	UNTAGGED
1970	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Fingr	06/23/71	06/23/71	150	131550	FOSSIL CR	(27.0127)	UNTAGGED
1970	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Fingr	05/13/71	05/13/71	349	209400	GOBAR CR	(27.0073)	UNTAGGED
1970	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Fingr	06/22/71	06/22/71	150	79950	KALAMA R	(27.0002)	UNTAGGED
1970	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Smolt	04/05/72	04/05/72	17	1238144	KALAMA R	(27.0002)	UNTAGGED
1970	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/13/71	04/13/71	357	83414	ARNOLD CR	(27.0084)	UNTAGGED
1970	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/22/71	04/22/71	401	130400	FALLERT CR	(27.0017)	UNTAGGED
1970	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/22/71	04/22/71	381	47500	FALLERT CR	(27.0017)	UNTAGGED
1970	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/26/71	04/26/71	354	151000	FALLERT CR	(27.0017)	UNTAGGED
1970	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/09/71	04/09/71	540	135000	ITALIAN CR	(27.0039)	UNTAGGED
1970	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/13/71	04/13/71	440	111132	KALAMA R	(27.0002)	UNTAGGED
1970	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/01/71	04/01/71	613	318331	LTL KALAMA R	27.0046	UNTAGGED
1970	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/13/71	04/13/71	540	132639	WOLF CR	(27.0117)	UNTAGGED
1970	ABERNATHY CR TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/03/72	04/03/72	18	20089	FALLERT CR	(27.0017)	UNTAGGED
1970	KALAMA RIVER TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/03/72	04/03/72	18	315184	FALLERT CR	(27.0017)	UNTAGGED
1970	KALAMA RIVER TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/03/72	04/03/72	16	958027	FALLERT CR	(27.0017)	UNTAGGED
1970	KALAMA RIVER TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/03/72	04/03/72	16	20472	FALLERT CR	(27.0017)	UNTAGGED
1971	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/03/72	02/03/72	1163	27025	KALAMA R	(27.0002)	UNTAGGED
1971	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/25/72	02/25/72	1417	182000	KALAMA R	(27.0002)	UNTAGGED

Table 10 (cont.). Hatchery releases of coho salmon into the Kalama River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1971	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/24/72	02/24/72	1417	200200	LTL KALAMA R 27.0046	UNTAGGED
1971	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/25/72	02/25/72	1417	155400	WILDHORSE CR 27.0065	UNTAGGED
1971	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/23/73	04/23/73	18	268998	KALAMA R (27.0002)	UNTAGGED
1971	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Smolt	04/23/73	04/23/73	15	714615	KALAMA R (27.0002)	UNTAGGED
1971	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	03/06/72	03/06/72	1564	1013448	FALLERT CR (27.0017)	UNTAGGED
1971	WASHOUGAL R TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/04/73	04/04/73	15	1019469	FALLERT CR (27.0017)	UNTAGGED
1971	WASHOUGAL R TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/13/73	04/13/73	15	3799	FALLERT CR (27.0017)	UNTAGGED
1972	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	03/02/73	03/02/73	1512	91500	ELK CR (27.0106)	UNTAGGED
1972	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/27/73	02/27/73	1512	100500	WILDHORSE CR 27.0065	UNTAGGED
1972	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Fingr	06/20/73	06/20/73	141	194721	KALAMA R (27.0002)	UNTAGGED
1972	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Smolt	04/01/74	04/01/74	15	310056	KALAMA R (27.0002)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/12/74	04/12/74	16	100986	KALAMA R (27.0002)	UNTAGGED
1972	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Smolt	04/12/74	04/12/74	15	314546	KALAMA R (27.0002)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/29/74	04/29/74	17	199600	KALAMA R (27.0002)	UNTAGGED
1972	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/10/73	04/10/73	621	99820	FOSSIL CR (27.0127)	UNTAGGED
1972	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/11/73	04/11/73	621	100440	KALAMA R (27.0002)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Smolt	04/27/74	04/27/74	15	231810	FALLERT CR (27.0017)	UNTAGGED
1972	KALAMA RIVER TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/27/74	04/27/74	15	852120	FALLERT CR (27.0017)	UNTAGGED
1973	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/25/74	02/25/74	1296	154800	ELK CR (27.0106)	UNTAGGED
1973	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/25/74	02/25/74	1296	160000	GOBAR CR (27.0073)	UNTAGGED
1973	TOUTLE (GREEN) TYP-S	KALAMA FALLS HATCHRY	Smolt	04/28/75	04/28/75	14	30254	KALAMA R (27.0002)	130105
1973	TOUTLE (GREEN) TYP-S	KALAMA FALLS HATCHRY	Smolt	04/28/75	04/28/75	14	402943	KALAMA R (27.0002)	UNTAGGED
1973	TOUTLE (GREEN) TYP-S	KALAMA FALLS HATCHRY	Smolt	04/28/75	04/28/75	14	29213	KALAMA R (27.0002)	130106
1973	TOUTLE (GREEN) TYP-S	KALAMA FALLS HATCHRY	Smolt	04/28/75	04/28/75	14	389191	KALAMA R (27.0002)	UNTAGGED
1973	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Smolt	04/28/75	04/28/75	14	791910	KALAMA R (27.0002)	UNTAGGED
1973	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Smolt	04/08/75	04/08/75	15	1257705	FALLERT CR (27.0017)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	EmFry	04/05/75	04/05/75	1296	299405	FALLERT CR (27.0017)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Smolt	04/30/76	04/30/76	15	51300	FALLERT CR (27.0017)	130510
1974	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Smolt	04/30/76	04/30/76	15	959748	FALLERT CR (27.0017)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Smolt	04/30/76	04/30/76	15	957690	FALLERT CR (27.0017)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/26/77	04/26/77	17	293916	KALAMA R (27.0002)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	05/01/77	05/01/77	18	296757	KALAMA R (27.0002)	UNTAGGED
1975	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	05/02/77	05/02/77	17	295409	KALAMA R (27.0002)	UNTAGGED
1975	WASHOUGAL R TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/19/77	04/19/77	14	1012508	FALLERT CR (27.0017)	UNTAGGED
1976	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Smolt	05/01/78	05/01/78	17	972840	KALAMA R (27.0002)	UNTAGGED
1976	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	Smolt	06/05/78	06/05/78	14	282348	KALAMA R (27.0002)	UNTAGGED
1976	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/08/77	04/08/77	687	118680	KALAMA R (27.0002)	UNTA***D
1976	LOWER KALAMA TYPE-S	LOWER KALAMA HATCHRY	Fingr	04/08/77	04/08/77	687	247020	LTL KALAMA R 27.0046	UNTA***D
1977	KALAMA RIVER TYPE-N	KALAMA FALLS HATCHRY	Smolt	04/30/79	04/30/79	20	163845	KALAMA R (27.0002)	UNTA***D
1977	KALAMA RIVER TYPE-N	KALAMA FALLS HATCHRY	Smolt	05/21/79	05/21/79	16	53772	KALAMA R (27.0002)	UNTA***D
1977	TOUTLE RIVER TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/10/79	04/10/79	17	1005941	FALLERT CR (27.0017)	UNTA***D
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/24/80	05/24/80	16	56000	KALAMA R (27.0002)	UNTA***D
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/29/80	05/29/80	16	246400	KALAMA R (27.0002)	UNTA***D
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/30/80	05/30/80	17	98600	KALAMA R (27.0002)	UNTA***D
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	05/30/80	05/30/80	16	188800	KALAMA R (27.0002)	UNTA***D
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/02/80	06/02/80	17	309400	KALAMA R (27.0002)	UNTA***D
1978	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Smolt	06/03/80	06/03/80	17	119000	KALAMA R (27.0002)	UNTA***D
1978	KALAMA RIVER TYPE-N	KALAMA FALLS HATCHRY	EmFry	05/02/79	05/02/79	1334	88641	ARNOLD CR (27.0084)	UNTA***D
1978	TOUTLE RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	03/26/79	03/26/79	1031	109782	LTL KALAMA R 27.0046	UNTA***D
1978	TOUTLE RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	03/27/79	03/27/79	1031	219564	LTL KALAMA R 27.0046	UNTA***D
1978	KALAMA RIVER TYPE-N	KALAMA FALLS HATCHRY	Smolt	05/08/80	05/08/80	24	395000	KALAMA R (27.0002)	UNTA***D
1978	KALAMA RIVER TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/18/80	04/18/80	13	958033	FALLERT CR (27.0017)	UNTA***D
1979	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/21/80	02/21/80	1008	159250	ELK CR (27.0106)	UNTA***D
1979	LOWER KALAMA TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/21/80	02/21/80	1008	280392	ELK CR (27.0106)	UNTA***D
1979	LOWER KALAMA TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/19/80	02/19/80	1008	200000	KALAMA R (27.0002)	UNTA***D

Table 10 (cont.). Hatchery releases of coho salmon into the Kalama River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1979	LOWER KALAMA TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/19/80	02/19/80	1008	200000	KALAMA R (27.0002)	UNTAGGED
1979	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	04/29/80	04/29/80	1296	200000	KALAMA R (27.0002)	UNTAGGED
1979	LOWER KALAMA TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/13/80	02/13/80	1008	130440	LTL KALAMA R 27.0046	UNTAGGED
1979	LOWER KALAMA TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/13/80	02/13/80	1008	330553	WILDHORSE CR 27.0065	UNTAGGED
1979	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/13/80	02/13/80	986	119447	WILDHORSE CR 27.0065	UNTAGGED
1979	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/07/80	02/07/80	1008	105000	WOLF CR (27.0117)	UNTAGGED
1979	LOWER KALAMA TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/11/80	02/11/80	1008	195600	WOLF CR (27.0117)	UNTAGGED
1979	COLUMBIA R - TYPE-S	KALAMA FALLS HATCHRY	Smolt	03/31/81	03/31/81	16	318800	KALAMA R (27.0002)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Smolt	04/08/81	04/08/81	11	326000	FALLERT CR (27.0017)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Smolt	05/01/81	05/01/81	14	1097000	FALLERT CR (27.0017)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	01/15/81	01/15/81	1296	550000	KALAMA R (27.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	EmFry	01/15/81	01/15/81	1296	550000	WILDHORSE CR 27.0065	UNTAGGED
1980	COLUMBIA R - TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/26/81	02/26/81	1296	47000	KALAMA R (27.0002)	UNTAGGED
1980	COLUMBIA R - TYPE-S	KALAMA FALLS HATCHRY	Smolt	03/02/82	03/02/82	17	290400	KALAMA R (27.0002)	UNTAGGED
1980	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	EmFry	01/13/81	01/13/81	1512	564213	FALLERT CR (27.0017)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Fingr	07/31/81	07/31/81	197	202000	FALLERT CR (27.0017)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Fingr	02/02/82	02/02/82	32	17000	FALLERT CR (27.0017)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Fingr	09/30/81	09/30/81	70	200000	KALAMA R (27.0002)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Fingr	11/02/81	11/02/81	50	50000	WILDHORSE CR 27.0065	UNTAGGED
1980	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Smolt	05/03/82	05/03/82	17	52788	FALLERT CR (27.0017)	632303
1980	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Smolt	05/03/82	05/03/82	17	496212	FALLERT CR (27.0017)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	EmFry	03/23/82	03/23/82	1620	216414	KALAMA R (27.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	EmFry	03/30/82	03/30/82	1620	77000	KALAMA R (27.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	EmFry	04/12/82	04/12/82	1620	50000	KALAMA R (27.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	EmFry	04/29/82	04/29/82	1620	310000	KALAMA R (27.0002)	UNTAGGED
1981	COLUMBIA R - TYPE-S	KALAMA FALLS HATCHRY	Fingr	03/11/82	03/11/82	1008	406000	KALAMA R (27.0002)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	EmFry	03/05/82	03/05/82	1296	71344	FALLERT CR (27.0017)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Smolt	05/04/83	05/04/83	17	52002	FALLERT CR (27.0017)	632605
1981	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Smolt	05/04/83	05/04/83	17	484798	FALLERT CR (27.0017)	UNTAGGED
1982	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Smolt	05/01/84	05/01/84	16	209000	FALLERT CR (27.0017)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Smolt	05/01/84	05/01/84	15	453000	FALLERT CR (27.0017)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/09/84	05/09/84	986	45200	ARNOLD CR (27.0084)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/09/84	05/09/84	986	29500	GOBAR CR (27.0073)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/09/84	05/09/84	986	76500	GOBAR CR (27.0073)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/07/84	05/07/84	926	55800	LTL KALAMA R 27.0046	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/07/84	05/07/84	926	69800	WILDHORSE CR 27.0065	UNTAGGED
1983	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	05/08/84	05/08/84	986	73600	WILDHORSE CR 27.0065	UNTAGGED
1983	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/19/85	05/20/85	17	51214	KALAMA R (27.0002)	633156
1983	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/19/85	05/20/85	17	33321	KALAMA R (27.0002)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/30/85	05/20/85	17	51340	KALAMA R (27.0002)	633157
1983	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/30/85	05/20/85	17	33325	KALAMA R (27.0002)	UNTAGGED
1983	COLUMBIA R - TYPE-S	KALAMA FALLS HATCHRY	Smolt	04/30/85	04/30/85	16	328400	KALAMA R (27.0002)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	05/09/85	05/09/85	17	50886	KALAMA R (27.0002)	633232
1983	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	05/09/85	05/09/85	17	115832	KALAMA R (27.0002)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	05/09/85	05/09/85	17	51014	KALAMA R (27.0002)	633233
1983	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	05/09/85	05/09/85	17	115968	KALAMA R (27.0002)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Smolt	04/30/85	04/30/85	16	533500	FALLERT CR (27.0017)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Fingr	02/20/86	02/20/86	11	78800	GOBAR CR (27.0073)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Fingr	05/10/85	05/10/85	810	50000	KALAMA R (27.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/14/86	04/14/86	15	171400	KALAMA R (27.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/24/86	04/24/86	15	177200	KALAMA R (27.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/29/86	04/29/86	13	325800	KALAMA R (27.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/30/86	05/05/86	13	46889	KALAMA R (27.0002)	633454
1984	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/30/86	05/05/86	13	20461	KALAMA R (27.0002)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/30/86	05/05/86	13	47358	KALAMA R (27.0002)	633455

Table 10 (cont.). Hatchery releases of coho salmon into the Kalama River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site		Code
1984	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/30/86	05/05/86	13	19992	KALAMA R	(27.0002)	AGGED
1984	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	05/09/86	05/09/86	13	52823	KALAMA R	(27.0002)	456
1984	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	05/09/86	05/09/86	13	21377	KALAMA R	(27.0002)	AGGED
1984	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	05/09/86	05/09/86	13	52544	KALAMA R	(27.0002)	457
1984	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	05/09/86	05/09/86	13	21656	KALAMA R	(27.0002)	AGGE
1984	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Fingr	04/30/85	04/30/85	515	20510	ARNOLD CR	(27.0084)	AGGE
1984	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Fingr	04/30/85	04/30/85	510	49980	DEE CREEK	(27.0051)	AGGE
1984	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Fingr	04/30/85	04/30/85	510	35700	GOBAR CR	(27.0073)	AGGE
1984	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Fingr	04/30/85	04/30/85	510	49980	LTL KALAMA R	27.0046	AGGE
1984	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Fingr	04/30/85	04/30/85	510	13770	WILDHORSE CR	27.0065	AGGE
1984	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/30/86	04/30/86	14	165500	FALLERT CR	(27.0017)	AGGE
1984	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/30/86	04/30/86	14	363000	FALLERT CR	(27.0017)	AGGE
1985	COLUMBIA R - TYPE-S	KALAMA FALLS HATCHRY	Fingr	04/15/86	04/15/86	424	15300	ARNOLD CR	(27.0084)	AGGE
1985	COLUMBIA R - TYPE-S	KALAMA FALLS HATCHRY	Fingr	04/15/86	04/15/86	≈28	524≈≈	DEE CREEK	(27.0051)	AGGE
1985	COLUMBIA R - TYPE-S	KALAMA FALLS HATCHRY	Fingr	04/15/86	04/15/86	≈24	235≈≈	GOBAR CR	(27.0073)	AGGE
1985	COLUMBIA R - TYPE-S	KALAMA FALLS HATCHRY	Fingr	04/15/86	04/15/86	≈24	528≈≈	LTL KALAMA R	27.0046	AGGE
1985	COLUMBIA R - TYPE-S	KALAMA FALLS HATCHRY	Fingr	04/15/86	04/15/86	≈24	153≈≈	WILDHORSE CR	27.0065	AGGE
1985	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/03/87	04/03/87	16	641≈≈	KALAMA R	(27.0002)	AGGE
1985	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/03/87	≈4/03/87	16	111100	KALAMA R	(27.0002)	AGGE
1985	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/09/87	≈4/09/87	14	113500	KALAMA R	(27.0002)	AGGE
1985	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/09/87	≈4/09/87	14	22900	KALAMA R	(27.0002)	AGGE
1985	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/10/87	≈4/10/87	14	105200	KALAMA R	(27.0002)	AGGE
1985	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/10/87	≈4/10/87	14	245500	KALAMA R	(27.0002)	AGGE
1985	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/14/87	≈6/10/87	14	38976	KALAMA R	(27.0002)	216
1985	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/14/87	≈6/10/87	14	30712	KALAMA R	(27.0002)	AGGD
1985	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/14/87	≈6/10/87	14	39194	KALAMA R	(27.0002)	219
1985	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/14/87	≈6/10/87	14	30718	KALAMA R	(27.0002)	AGGED
1985	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	05/04/87	≈5/04/87	15	38919	KALAMA R	(27.0002)	221
1985	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	05/04/87	≈5/04/87	15	35260	KALAMA R	(27.0002)	AGGED
1985	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	05/04/87	≈5/04/87	15	38964	KALAMA R	(27.0002)	222
1985	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	05/04/87	≈5/04/87	15	35257	KALAMA R	(27.0002)	AGGE
1985	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/30/87	≈4/30/87	16	556000	FALLERT CR	(27.0017)	AGGE
1986	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Fingr	05/05/87	≈5/05/87	527	80900	ARNOLD CR	(27.0084)	AGGE
1986	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Fingr	05/05/87	≈5/05/87	527	21000	GOBAR CR	(27.0073)	AGGE
1986	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Fingr	05/05/87	≈5/05/87	648	65000	LTL KALAMA R	27.0046	AGGE
1986	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Fingr	05/05/87	≈5/05/87	527	44100	LTL KALAMA R	27.0046	AGGE
1986	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Fingr	05/05/87	≈5/05/87	527	12600	WILDHORSE CR	27.0065	AGGE
1986	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/19/88	≈4/19/88	15	166600	KALAMA R	(27.0002)	AGGE
1986	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/25/88	≈4/25/88	15	166300	KALAMA R	(27.0002)	AGGE
1986	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/29/88	≈4/29/88	15	130100	KALAMA R	(27.0002)	AGGE
1986	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/29/88	≈4/29/88	15	166200	KALAMA R	(27.0002)	AGGE
1986	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	05/06/88	≈5/06/88	12	164700	KALAMA R	(27.0002)	AGGE
1986	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	05/06/88	≈5/≈/88	12	166100	KALAMA R	(27.0002)	AGGE
1986	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Smolt	04/25/88	≈4/25/88	16	517000	FALLERT CR	(27.0017)	AGGE
1987	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/10/89	≈4/10/89	16	163600	KALAMA R	(27.0002)	AGGE
1987	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/10/89	≈4/10/89	16	163600	KALAMA R	(27.0002)	AGGE
1987	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/17/89	≈4/17/89	16	163300	KALAMA R	(27.0002)	AGGE
1987	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/17/89	≈4/17/89	15	163600	KALAMA R	(27.0002)	AGGE
1987	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/24/89	≈4/24/89	17	163100	KALAMA R	(27.0002)	AGGE
1987	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/24/89	≈4/24/89	16	124300	KALAMA R	(27.0002)	AGGE
1987	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Smolt	05/15/89	≈5/15/89	14	54000	KALAMA R	(27.0002)	AGGE
1987	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Smolt	05/15/89	≈5/15/89	14	587840	KALAMA R	(27.0002)	AGGE
1988	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/14/90	≈5/04/90	14	29973	KALAMA R	(27.0002)	316
1988	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	Smolt	04/14/90	≈5/04/90	14	922327	KALAMA R	(27.0002)	AGGED
1988	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Fingr	03/21/89	≈3/21/89	409	18000	ARNOLD CR	(27.0084)	AGGED

Table 10 (cont). Hatchery releases of coho salmon into the Kalama River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1988	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Fingr	02 22/89	02/22/89	412	207000	KALAMA R (27.0002)	UNTAGGED
1988	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Fingr	03 21/89	03/21/89	412	88000	LTL KALAMA R 27.0046	UNTAGGED
1988	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	Fingr	03 21/89	03/21/89	412	12000	WILDHORSE CR 27.0065	UNTAGGED
1988	TOUTLE R TYPE-S	LOWER KALAMA HATCHRY	Smolt	05 01/90	05/01/90	13	30780	FALLERT CR (27.0017)	631319
1988	TOUTLE R TYPE-S	LOWER KALAMA HATCHRY	Smolt	05 01/90	05/01/90	13	517098	FALLERT CR (27.0017)	UNTAGGED
1989	COWLITZ TYPE-N STOCK	KALAMA FALLS HATCHRY	EmFry	03 28/90	03/28/90	1296	354900	KALAMA R (27.0002)	UNTAGGED
1989	COLUMBIA R - TYPE-S	LOWER KALAMA HATCHRY	EmFry	02 05/90	02/05/90	1163	699200	KALAMA R (27.0002)	UNTAGGED

Table 11 (TD-1). Parasites and diseases of coho at the Kalama Falls Hatchery located on the Kalama River.

Disease type	Hatchery	Specific Pathogen
Bacteria	Kalama Falls	*Aeromonas salmonicida* (Furunculosis)
Parasite	Kalama Falls	*Saprolegnia parasitica* (Fungus)
Parasite	Kalama Falls	Various Ectoparasites, Endoparasites and Myxosporidians
virus	Kalama Falls	IHNV - Infectious Hematopoietic Necrosis

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

Table 12 (TD-2). Parasites and diseases of coho at the Lower Kalama Hatchery located on the Kalama River.

Disease type	Hatchery	Specific Pathogen
Bacteria	Lower Kalama	*Aeromonas salmonicida* (Furunculosis)
Bacteria	Lower Kalama	*Cytophaga psychrophila* (Cold Water Disease)
Parasite	Lower Kalama	*Saprolegnia parasitica* (Fungus)
Parasite	Lower Kalama	Various Ectoparasites and Myxosporidia

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

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KALAMA RIVER SUBBASIN

Naturally Produced Summer Steelhead

GEOGRAPHIC LOCATION

The Kalama subbasin is located in southwest Washington and although the headwaters are located in Skamania County over 98 percent of the basin is in Cowlitz County. The Kalama River originates on the southwest slope of Mount St. Helens and flows 44.5 miles west-southwest where it enters the Columbia River, below Bonneville Dam, at river mile (RM) 73.1. The subbasin encompasses a drainage of approximately 205 square miles.

ORIGIN

The wild summer steelhead stock in the Kalama River is native, although interbreeding with introduced Skamania hatchery stocks has occurred. In addition, steelhead which abandoned the Cowlitz system following the eruption of Mount St. Helens in 1980, strayed into the Kalama River and spawned with native Kalama stock.

It should be noted that Chilcote et al. (1980) and Leider et al. (1984) observed known summer steelhead spawning with winter steelhead showing that Kalama River winter and summer steelhead are not entirely reproductively separate.

DISTRIBUTION

Table 1 lists rearing and spawning habitat for Kalama River steelhead based on estimates from the Northwest Power Planning Council. Department of Wildlife estimates based on gradient, area and flow methodology is presented in Table 2.

Summer steelhead are distributed throughout the mainstem Kalama and the North Fork, Gobar Creek and Wild Horse Creek. For steelhead to migrate into the upper Kalama River, fish must cross over a falls located at Kalama Falls Hatchery at RM 10. The falls has been laddered to allow fish passage, although tagging and visual observations indicate that steelhead are able to jump the falls in high numbers, typical jumper ratios are 1.6 fish which jump the falls to each fish using the ladder. A barrier which blocks all anadromous fish migration is a falls approximately 35 feet high at RM 36.8. Figure 1 illustrates the probable spawning areas of wild winter and summer steelhead in the Kalama, as cited by Howell et al. (1985).

PRODUCTION

Production Facilities

There are two hatcheries in the subbasin, the Lower Kalama Salmon Hatchery located at river mile 4.3 and Kalama Falls Salmon Hatchery located at river mile 10. Both hatcheries produce chinook and coho salmon. Steelhead are acclimated for l-2 months at Gobar Pond which is located approximately four miles up Gobar Creek, a major tributary of the Kalama River. Gobar Creek is located approximately 19.5 mile upstream from the mouth of the Kalama River. Gobar Pond operates as a 1.5 acre dirt bottom pond about 5 or 6 feet in depth with a flow of 2.5 CFS using Gobar Creek water. Gobar Pond was constructed as a short term rearing station which would acclimate steelhead prior to release, so returns and subsequent sport catch would be enhanced.

Production Summary

Limited data is available on wild smolt production. Smolts trapped at Kalama Falls Hatchery,

located 10 miles upstream from the mouth of the Kalama River, using a traversing fyke net from 1978 through 1984 averaged 28,259 smolts annually (Tables 7 and 8). Steelhead production as measured by number of fish per square meter is considered moderate by Washington Department of Wildlife smolt production model. WDW smolt production is listed in Table 2. Production constraints include tributaries which are short and have high gradients, habitat degradation, lack of quality spawning gravel, and stressful summer-time high water temperatures.

ADULT LIFE HISTORY

Run Size and Escapement

Estimates of run size and escapement (hatchery and wild fish) for 1980 through 1989 is presented in Tables 3, 4 and 5. Returns of summer steelhead were exceedingly high in 1980-81 due to excessive straying of Cowlitz River steelhead caused by the eruption of Mount St. Helens in 1980.

Time of migration

Adult return time to the Kalama Falls Hatchery rack for summer steelhead is generally from March through January with peak returns of both hatchery and wild fish occurring in July (Leider et al. 1991).

Harvest

Ocean catch of Kalama River steelhead are unknown.

Harvest of summer steelhead within the Columbia River is estimated at approximately 6 percent based on Columbia Basin System Planning Model.

Sport harvest (hatchery and wild) from 1980 through 1990 ranged 2,540 summer steelhead in 1983-84 of 8,987 fish in 1982-83 based on permit-card harvest estimates (Table 2). Sport fishing is open year around below Kalama Falls with a two fish limit. "Wild Release" regulations were imposed on the Kalama in April 1986, limiting legal harvest to hatchery fish only.

Treaty harvest does not occur in the Kalama Subbasin.

Spawning period

Spawning occurs from December through April with hatchery fish peaking in January and wild fish peaking in February (Leider et al. 1991).

Spawning area

Spawning occurs in the mainstem Kalama River, the North Fork and many tributaries including Gobar and Wild Horse creeks.

Fecundity

No data is available for wild steelhead.

Age Composition

Age composition for hatchery fish is presented in Table 11.
Age composition showing percentages of wild steelhead for each age class is presented in Table 12.

Size

Mean fork lengths from steelhead sampled from Kalama Falls ladder is presented in Tables 14 and 15.

Sex ratio

Sex ratio for summer wild/hatchery steelhead from 1979-1984 averaged 48.2% female for hatchery fish and 5 1.6% female for wild fish (Table 13).

Survival Rate

No data available for wild summer steelhead. Survival based on returns of hatchery releases ranged from 0.8 percent to 3.4 percent. Smolt to adult survival rates for hatchery steelhead from 1982 through 1989 is presented in Table 6.

JUVENILE LIFE HISTORY

Egg

No data is available on egg production or egg to smolt survival.

Emergence

Wild steelhead fry emerge March through May (Subbasin Production Plan, 1990).

Juvenile rearing

Juvenile rearing lasts approximately two years prior to ocean emigration, although some juveniles emigrate after one or three years (Loch et al. 1985; Table 9). Migration generally occurs from March through June with peak migration from mid-April to mid-May. Based on summer and winter smolts captured from both the Kalama River and Gobar Creek smolt lengths ranged from 137.1 mm to 167.8 mm (Table 10).

Table 3b outlines smolt age composition for years 1987-1984.

Hatchery releases

In February, summer steelhead are transferred as subsmolts to Gobar Pond from Beaver Creek and Skamania hatcheries. Fish are released as smolts in late April or early May. Until 1988, most smolts reared in Gobar Pond were trucked downstream and released directly into the Kalama River while some fish were released directly into Gobar Creek. In 1988 and 1989, all fish conditioned in Gobar Pond were released into Kalama River reaches. Since 1990, all fish held at Gobar Pond have been released directly into Gobar Creek. Fish are generally planted as yearlings. Table 16 outlines hatchery releases into the Kalama River from 1981 through 1990.

Straying

No data on Kalama River steelhead.

BIOCHEMICAL-GENETIC CHARACTERISTICS

Milner et al. (1980) did an electrophoretic profile of Kalama summer steelhead as part of overall study of Columbia River stocks and the feasibility of using biochemical genetic variation for

estimating composition of mixed-stock fisheries. The study concluded sufficient genetic differentiation existed to do so. Since 1975 The Washington Department of Wildlife's Kalama River Research Group has worked to determine &reproductive success of hatchery and wild summer steelhead in their natural environment. In 1990 the research group, using electrophoretic examination for a specific genetic marker, found the success of hatchery fish in producing adult offspring was 12 percent that of wild fish. Further, they found 42 percent of naturally produced adult summer steelhead were offspring of hatchery spawners due to hatchery spawners outnumbering wild spawners 4.5 to 1. Based on these findings the evidence shows that the genetic integrity of wild populations may be at risk due to interbreeding between hatchery and wild stocks.

DISEASES

Disease history for smolts planted in the Kalama River is presented in Table 17.

REFERENCES

The references for this section appear at the end of the following steelhead section.

Figure 1 (AD). Probable spawning areas of wild winter and summer steelhead trout in the Kalama River, Washington (B. Crawford, WDG, personal communication)., in Howell et al. (1985).

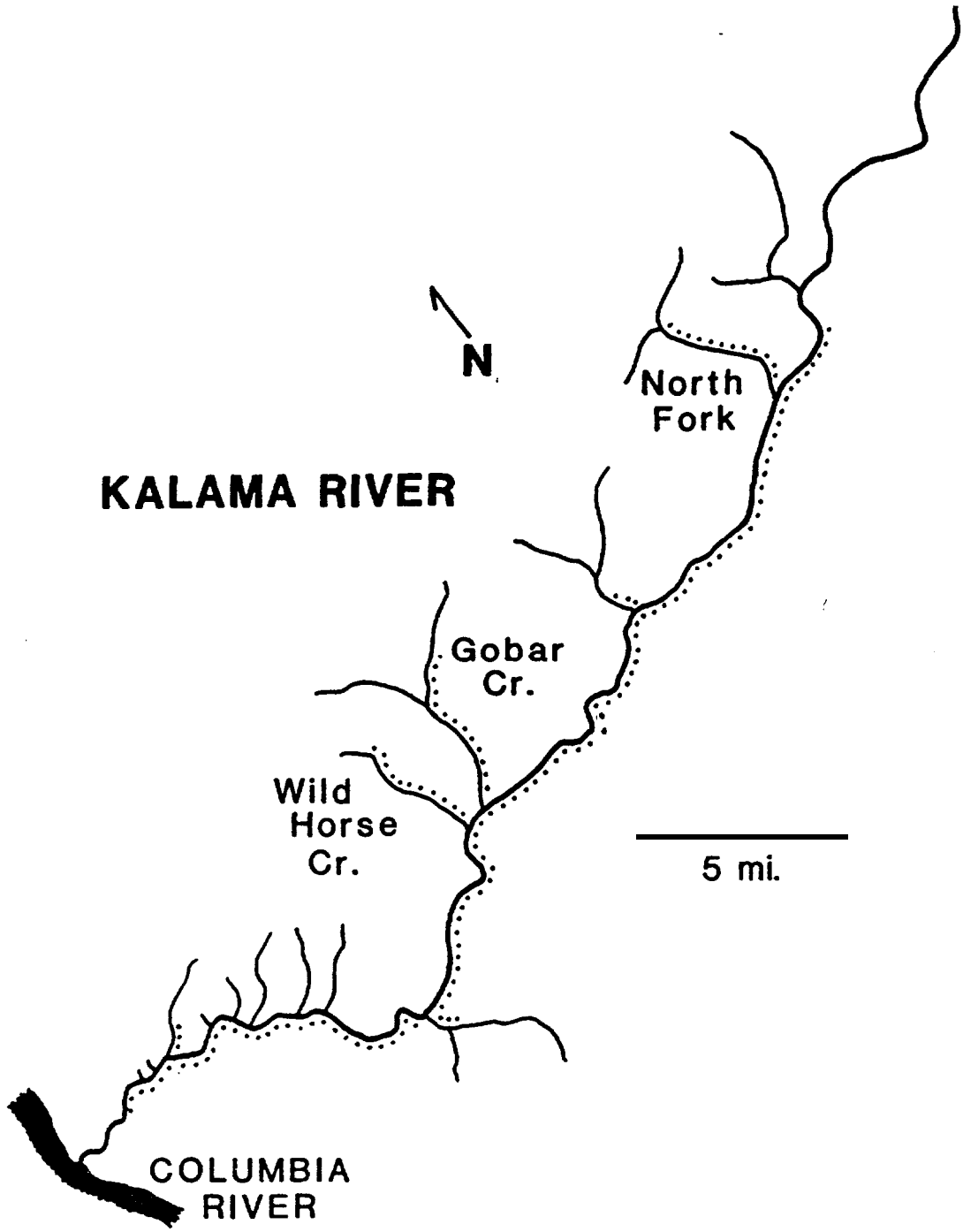
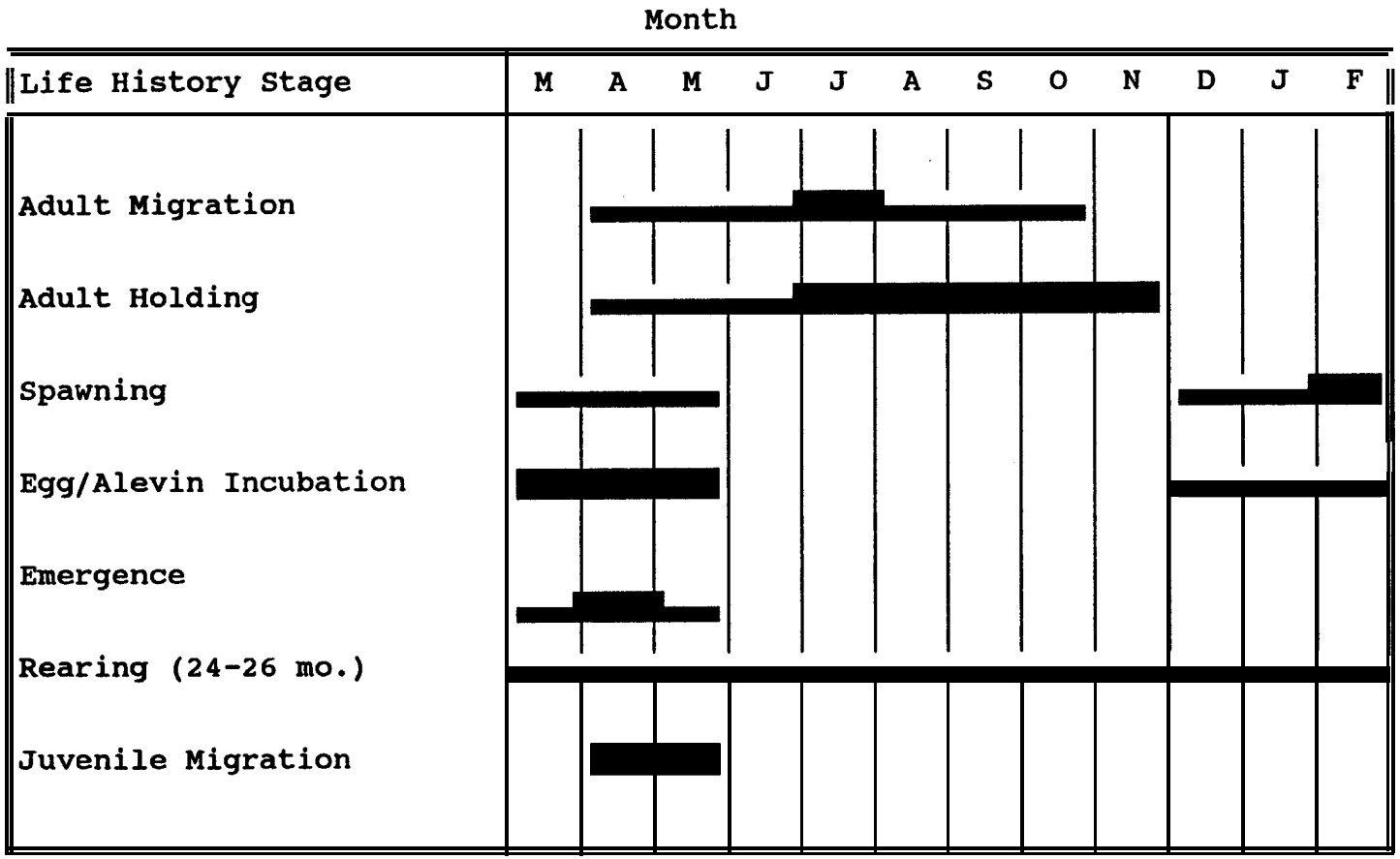


Figure 2 (TT). Freshwater life history of natural summer steelhead in the Kalama subbasin. The developmental stage timing represents basinwide averages, local conditions may cause some variability.



Based on the Kalama Subbasin Plan.

Table 1 (HB-1). Estimated* amount of rearing and spawning habitat, by quality, of Kalama River subbasin summer steelhead.

Area	Excellent	Good	Fair[B]	Poor[B]	Unknown	Total	. Confidence
Miles	6.0%	61.2%	32.9%	0.0%		48.4	Unknown
Acres	1.1%	67.4%	31.5%	0.0%		470.1	Unknown

*Northwest Power Planning Council estimates based on limited observations.

[B]Ratings of fair and poor habitat may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/absence database, NPPC , 199 1.

Table 2 (HB-2). Estimated amount of rearing/spawning habitat and potential summer and winter smolt production for the Kalama River. Based on the gradient, area, and flow methodology (GAFM).

Area	From	To	Length (miles)	Width (feet)	Area ($100m^2$)	Gradient	Smolt Potential
Kalama R	mouth	Hatchery Cr	4.3	126	2,659	0.09	575
Hatchery Cr	mouth	Dam	0.5	6	15	4.4	152
Kalama R	Hatchery Cr	Indian Cr	2.7	126	1,669	.35	1,355
Kalama R	Indian Cr	Little Kalama	5.9	126	3,648	0.24	2,058
Little Kalama	mouth	headwaters	2.8	20	275	3.0	2,324
Kalama R	Little Kalama	Wildhorse Cr	5.4	126	3,339	0.28	2,181
Wildhorse Cr	mouth	headwaters	2.5	15	184	2.16	1,264
Kalama R	Wildhorse Cr	Gobar Cr	0.5	126	309	.28	202
Gobar Cr	mouth	headwaters	4.24	25	520	1.14	2,187
Kalama R	Gobar Cr	Arnold Cr	1.3	126	804	.30	578
Arnold Cr	mouth	headwaters	2	12	118	1.52	626
Kalama R	Arnold Cr	Elk Cr	6.3	120	3,170	0.72	6,165
Elk Cr	mouth	headwaters	0.02	15	1	3.79	10
Kalama R	Elk Cr	NF Kalama	7.2	100	3,533	1.05	8,629
NF Kalama	mouth	headwaters	4	20	393	1.14	1,652
Kalama R	NF Kalama	Kalama Falls	2.6	50	638	1.17	1,832
Wolf Cr	mouth	headwaters	1	12	59	6.06	647
Langdon Cr	mouth	headwaters	2.4	12	141	5.02	1,489

Table 2 (cont.). Estimated amount of rearing/spawning habitat and potential summer and winter smolt production for the Kalama River. Based on the gradient, area, and flow methodology (GAFM).

Lakeview Cr	mouth	headwaters	1	12	59	7.58	650
Jacks Cr	mouth	headwaters	0.5	10	25	6.06	274

Source: Pat Hulett and Steve Leider, WDW, Kalama Research Station, 1991. Presence/Absence database, NPPC, 1991.

Table 3 (RR-a). Returns (escapement and sport harvest) of summer steelhead to the Kalama River subbasin.

Return Year	Hatchery Escapement[C]	Wild Escapement[C]	Sport Catch[A B]	Adult Total
1980	16,033	5,423	8,807	30,263
1981	16,125	1,662	7,055	24,842
1982	7,640	1,464	8,987	18,091
1983	1,778	398	2,540	4,716
1984	1,664	537	5,867	8,068
1985	3,837	639	4,371	8,847
1986	9,989	1,313	7,688	18,990
1987	4,594	1,677	4,132	10,403
1988	3,215	646	4,518	Unknown
1989			3,353	Unknown

[A]Sport catch assumes WDW cut-offs between summer run and winter run fish although some months catch overlaps.

[B]Catch within subbasin only.

[C]Escapement numbers currently being updated which may change numbers stated above.

Escapement based on several factors; 1) adjusted rack returns of hatchery and wild fish counted at Kalama Falls,
2) exploitation rate of fish handled at Kalama Falls, 3) ratio of fish that jumped the falls, 4) data generated from tagging studies.
Sport catch based on angler returns of punchcards to Washington Department of Wildlife.
Escapement numbers include strays, particularly in 1980-1981 due to the eruption of Mount St. Helens.

Source: WDW, Studies of Hatchery and Wild Steelhead in the Lower Columbia Region, reports # 90-14 and 91-7.

Table 4 (RN). Escapement of wild summer steelhead in the Kalama River by brood year and total age.

Total Age[A B]

Brood Year	3	4	5	6	7[C]	8[C]	9[C]	Adult Total
1975			1,550	22	22			
1976		3,498	367	13	29			
1977	163	1,146	302	11			3	1,622
1978	183	1,158	90	28	10	3		1,625
1979	35	227	48	29	3			342
1980	66	413	125	96	8			708
1981	48	373	271	48	2			742
1982	100	825	295	4				1,224
1983	114	1,211	169					
1984	117	436						
1985	38							

[A]Age determined by scale analysis from a subsample for each return year.
[B]Age data and sample size for wild steelhead derived from Table 5a.
[C]Fish in the 7, 8 and 9 year age class were all repeat spawners.
Fish captured at Kalama Falls Hatchery.

Sources: Columbia Basin System Planning, Kalama Subbasin Production Plan, 1990. Washington Department of Wildlife, Kalama River Progress Report #90-14.
Kalama River research station database and unpublished Washington Department of Wildlife data, 1991.

Table 5 (RH). Escapement of hatchery summer steelhead in the Kalama River by brood year and total age.

Total Age[A] [B]

Brood Year	2	3	4	5	6[C]	7[C]	Adult Totals
1975				289			
1976			1,299	194	70		
1977		1,398	3,870	15	63		
1978	385	11,755	1,566	36		42	13,784
1979	306	5,952	862	28			7,148
1980	31	807	166	31			1,035
1981	69	1,369	1,097	140			2,625
1982	37	2,348	2,248	78			4,711
1983	318	7,122	1,925				9,365
1984	479	2,504					
1985	87						

[A]Age determined by scale analysis from a subsample from each return year.
[B]Age data and sample size for hatchery fish derived from Table 5.
[C]Fish in 6 and 7 year age class represent repeat spawners.
Escapement based on fish captured at Kalama Falls.

Sources: Columbia Basin System Planning, Kalama River Production Plan, 1990.
Washington Department of Wildlife, Kalama River Progress Report #90-14.
Kalama River research station database and unpublished WDW data.

Table 6 (TS-a). Percent return from smolt to adult for hatchery summer steelhead passing the Kalama Falls Salmon Hatchery.

Return Year	Smolt to Adult Return (%)[A B]
1982	2.9
1983	0.8
1984	1.1
1985	2.4
1986	3.4
1987	1.9
1988	1.3
1989	1.1

*Based on adult summer steelhead collected at Kalama Falls Hatchery.
[B]Percentages are not exact, numbers do not include fish which spawn in the lower river, fish that are harvest and fish which may by-pass the hatchery rack by jumping the falls at Kalama Falls Hatchery.

Source: Studies of Hatchery and Wild Steelhead in the Lower Columbia Region, Report # 91-7.

Table 7 (JM-a). Number of natural steelhead smolts that migrated from the Kalama River subbasin.

Year	Number[A B]	Time of migration	Peak migration
1978	35,515	March-June	Mid April to late May
1979	34,927	March-June	Mid April to late May
1980	24,150	March-June	Mid April to late May
1981	37,398	March-June	Mid April to late May
1982	11,175	March-June	Mid April to late May
1983	46,659	March-June	Mid April to late May
1984	12,203	March-June	Mid April to late May

*Estimates are from production upstream of Kalama Falls Salmon Hatchery for migration period only.

[B]Number of smolts and migration period based on fish trapped in the Kalama River.

Source: Kalama River Studies, Report # 85-12.
Steve Leider and Pat Hulett, Kalama River Research Station database.

Table 8 (JM-b). Number of natural steelhead smolts that migrated from Gobar Creek.

Year	Number[A]	Time of Migration	Peak Migration
1978	349	March-June	Mid April to mid May
1979	571	March-June	Mid April to mid May
1980	301	March-June	Mid April to mid May
1981	316	March-June	Mid April to mid May
1982	222	March-June	Mid April to mid May
1983	465	March-June	Mid April to mid May
1984	90	March-June	Mid April to mid May

*Estimates for migration period only. Fish trapped in lower Gobar Creek.

Source: Kalama River Studies, report # 85-12.

Table 9 (SA). Age composition by percentage for steelhead smolts in the Kalama River subbasin.

	Age Composition (%)			
Year Captured	1yr[A]	2yr[A]	3yr[A]	Number?
1978	4.7	84.4	10.9	64
1979	5.7	68.0	26.3	122
1980	2.9	80.9	16.2	68
1981	5.6	88.0	6.4	108
1982	12.7	81.0	6.3	63
1983	6.8	81.8	11.4	89
1984	5.0	92.5	2.5	40

*Based on total age of smolts.

[B]Based on fish trapped in Kalama River.

Source: Kalama River Studies Final Report, Juvenile Downstream Migrant Studies, Report # 85-12.

Table 10 (SL). Fork lengths of wild/natural steelhead smolts from Kalama River and Gobar Creek.

Location and Year	Number Fish	Length[a] ave. (mm)	Length range (mm)	Reference
1978				Source for length data: WDW Kalama River Final Report May 1985 #85-12 No distinction between summer or winter fish.
Kalama River	64	164.0		
Gobar Creek	44	137.1		
1979				
Kalama River	122	158.8		
Gobar Creek	52	156.2		
1980				
Kalama River	68	158.3		
Gobar Creek	34	159.3		
1981				
Kalama River	108	161.0		
Gobar Creek	52	161.0		
1982				
Kalama River	63	160.8		
Gobar Creek	62	158.1		
1983				
Kalama River	89	167.8		
Gobar creek	118	162.2		
1984	40			
Kalama River	28	158.9		
Gobar Creek		142.0		
1985-90	No Data			

95 % confidence interval.

Table 11 (AC-1). Age composition percentage (freshwater. ocean) by brood year for adult hatchery summer steelhead originating in the Kalama River subbasin. The freshwater and ocean ages sum to the total age of the fish. The "s" indicates a spawning year, thus 1.1sl is a total of four years old.

Age composition (%)[A]

Brood Year	N[B]	1.1	1.2	1.3	1.4	1.1sl	1.1slsl	1.2sl	1.2slsl	1.3sl
1977	1,179		91.6	8.2		0.1		0.1		
1978	402	7.4	73.8	15.1		0.8		0.8	0.5	1.5
1979	337	2.4	71.8	24.6		0.3		0.9		
1980	108	11.1	72.2	15.7				0.9		
1981	204	3.4	67.1	27.9				1.4		
1982	175	2.2	64.5	30.8			0.6	1		
1983	259	5.8	65.6	26.2	1.1	1.1		1.1		
1984	176	6.2	50.5	42.3				1.1		
1985	254	1	72.4	26.3						

[A]Age determined by scale analysis of a subsample for each return year.
[B]Fish captured at Kalama Falls.

Source: Columbia Basin System Planning, Kalama River Subbasin Production Plan, 1990.
WDW Spawner Recruitment Database, 1976-1990 Kalama River research station.

Table 12 (AC-2). Age composition percentage (freshwater. ocean) by brood year for adult wild summer steelhead originating in the Kalama River Subbasin. The freshwater and ocean ages sum to the total ages of the fish. The "s" indicates a spawning year, thus 1.1sl is a total of four year old.

Age composition (%)[A]

Brood Year	N[B]	2.1	2.2	2.3	3.1	3.2	3.3	2.1sl	2.1slsl	2.2sl	2.2slsl	2.3sl	3.2sl	3.2sl sl
1976	407		82.8	11.0	1.2	3.1	1.0	0.2	0.2	0.2				
1977	321	4.9	53.5	7.4	5.9	2.5	0.3	1.5		0.9				
1978	220	13.6	60.9	15.0			1.8	2.0		3.6	.05	0.9	0.5	0.5
1979	131	3.0	70.2	9.1	5.3	5.3	1.5	3.0		3.0		0.7		
1980	264	10.9	72.3	6.8	1.1	2.6		0.7		4.9		0.3		
1981	142	16.1	53.5	23.9	2.1	1.4				2.8				
1982	168	12.5	65.4	19.6	0.5		0.5	0.5		0.5				
1983	201	7.4	67.6	15.4	1.5	0.5		2.5		5.0				
1984	185	7.5	50.8	30.8	0.5	6.4	1.0	2.7						

[A]Age determined by scale analysis of a subsample for each return year.
[B]Fish captured at Kalama Falls.

Source: Columbia Basin System Planning, Kalama River Subbasin Production Plan, 1990.
WDW, Kalama River research station, Spawner Recruitment Database 1976-1990.

Table 13 (AS-a). Percent females by brood year for hatchery and wild summer steelhead originating in the Kalama River subbasin.

	% Females*	
Brood Year	Hatchery	Wild
1976	41.4	46.6
1977	59.1	58.4
1978	42.2	45.7
1979	49.2	52.6
1980	45.9	45.5
1981	50.1	52.9
1982	49.4	55.4
1983	46.4	51.5

*Based on fish captured at Kalama Falls Hatchery.

Source: Leider, S., J. Lock and S. Hulett. 1987. Studies of Hatchery and Wild Steelhead in the Lower Columbia Region. Progress Report # 87-8.

Table 14 (AL-1). Mean fork length by brood year and age class[A] for adult wild summer steelhead originating in the Kalama River subbasin.

Mean Fork Length (cm)

Brood Year	N	2.1	2.2	2.3	3.1	3.2	3.3	2.1s1	2.2s1	2.3s1	2.1s1s1	2.2s1s1	3.2s1	3.2s1s1
1977	8			83.4		70.9		80.0[B]	78.4		63.0[B]			
1978	78		71.6	82.9		67.9	83.1		76.6	78.6			71.4[B]	
1979	66	56.0	67.8	80.9	54.7	67.7	84.2	55.5	77.4			83.7[B]		66.8[B]
1980	87	58.0	70.4	81.0	57.8	67.5			77.3	83.2				
1981	66	56.9	69.9	82.8	55.8	67.1			77.0					
1982	74	58.2	70.1	80.9										
1983	94	57.7	72.2	78.9	46.9	74.9		75.4	77.2			81.4[B]		
1984	51	57.9	70.1	82.3	55.2	69.6	80.0	66.9	77.6					
1985	61	53.9	70.2	84.7	58.3	75.6		69.6						
1986	73	54.9	71.6		55.1[B]									

[A]Age determined by scale analysis of a subsample for each return year.
[B]Only one fish sampled in this age class.

Source: Stock Assessment of Columbia River Anadromous Salmonids, Vol II., 1985.
Leider, S. and P. Hulett. Kalama River Research Station Database, 1991.

Table 15 (AL-2). Mean fork length by brood year and age class[A] for adult hatchery summer steelhead originating in the Kalama River subbasin.

Mean Fork Length (cm)

Brood Year	N	1.1	1.2	1.3	1.4	1.1s1	1.2s1	1.3s1	1.2s1s1
1977	1								86.2[B]
1978	35			83.6			78.5	89.4	87.0[B]
1979	59		71.5	84.0			73.0		
1980	30		72.8	82.8			83.0		
1981	66	56.8	69.1	82.7			78.8		
1982	59	54.8	74.0	82.1	111.5[B]		82.5		
1983	60	58.0	72.9	82.6	86.0[B]		84.3		
1984	64	59.2	69.4	82.3		80.0	83.6		
1985	55	59.1	69.1	81.6			78.4	90.4[B]	
1986	51	58.9	70.0	84.7					
1987	48	55.5	70.8						

[A]Age determined by scale analysis of a subsample for each return year.
[B]Only one fish sampled in this age class.

Source: Stock Assessment of Columbia River Anadromous Salmonids, Vol II., 1985.
Leider S. and P. Hulett. Kalama River Research Station Database, 1991.

Table 16 (TR). Hatchery relases of summer steelhead into the Kalama River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1981	Washougal R	Gobar Pond (Kalama)	Smolt	05/10/82	5.7	14,364	Kalama R	
1981	Washougal R	Gobar Pond (Kalama)	Smolt	05/10/82	5.7	7,142	Kalama R	
1981	Washougal R	Gobar Pond (Kalama)	Smolt	05/10/82	5.7	3,534	Kalama R	
1981	Washougal R	Gobar Pond (Kalama)	Smolt	05/10/82	5.7	10,648	Kalama R	
1981	Washougal R	Gobar Pond (Kalama)	Smolt	05/11/82	5.7	7,097	Kalama R	
1981	Washougal R	Gobar Pond (Kalama)	Smolt	05/11/82	5.7	6,441	Kalama R	
1981	Washougal R	Gobar Pond (Kalama)	Smolt	05/11/82	5.7	15,550	Kalama R	
1981	Washougal R	Skamania Hatchery	Smolt	05/11/83	4.8	9,955	Kalama R	
1981	Washougal R	Skamania Hatchery	Smolt	05/11/83	5.0	6,960	Kalama R	
1981	Washougal R	Skamania Hatchery	Smolt	05/11/83	4.6	6,654	Kalama R	
1981	Washougal R	Skamania Hatchery	Smolt	05/12/83	5.0	14,025	Kalama R	
1981	Washougal R	Skamania Hatchery	Smolt	05/12/83	4.9	13,482	Kalama R	

Table 16 (cont.) Hatchery releases of summer steelhead into the Kalama River by brood year, and if marked, by the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1981	Washougal R	Skamania Hatchery	Smolt	05/13/83	4.7	3,302	Kalama R	
1981	Washougal R	Skamania Hatchery	Smolt	05/13/83	4.8	3,351	Kalama R	
1981	Washougal R	Skamania Hatchery	Smolt	05/11/83	4.8	240	Gobar Cr	
1981	Washougal R	Skamania Hatchery	Smolt	05/12/83	5.0	7,158	Gobar Cr	
1981	Washougal R	Skamania Hatchery	Smolt	05/13/83	4.8	11,137	Gobar Cr	
1983	Washougal R	Vancouver Hatchery	Smolt	04/23/84	5.5	8,250	Kalama R	
1983	Washougal R	Vancouver Hatchery	Smolt	04/23/84	5.7	8,550	Kalama R	
1983	Washougal R	Vancouver Hatchery	Smolt	04/23/84	5.7	8,778	Kalama R	
1983	Washougal R	Vancouver Hatchery	Smolt	04/26/84	5.7	7,068	Kalama R	
1983	Washougal R	Vancouver Hatchery	Smolt	04/30/84	5.6	9,744	Kalama R	
1983	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/09/84	5.0	2,075	Kalama R	AD
1983	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/09/84	5.2	2,964	Kalama R	AD

Table 16 (cont.) Hatchery releases of summer steelhead into the Kalama River by brood year, and if marked, by the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1983	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/09/84	5.5	3,190	Kalama R	AD
1983	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/09/84	5.2	3,250	Kalama R	AD
1983	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/09/84	5.0	2,590	Kalama R	AD
1983	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/10/84	5.0	7,600	Kalama R	AD
1983	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/10/84	5.0	9,375	Kalama R	AD
1983	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/10/84	5.0	7,550	Kalama R	AD
1983	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/11/84	5.2	6,490	Kalama R	AD
1983	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/10/84	5.0	8,675	Gobar Cr	AD
1983	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/11/84	5.2	1,846	Gobar Cr	AD
1983	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/11/84	5.1	4,090	Gobar Cr	AD
1983	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/11/84	5.0	425	Gobar Cr	AD
1983	Washougal R - WF/NF	Skamania Hatchery	Smolt	05/03/84	6.0	6,911	Kalama R	AD

Table 16 (cont.) Hatchery releases of summer steelhead into the Kalama River by brood year, and if marked, by the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1983	Washougal R - WF/NF	Skamania Hatchery	Smolt	05/09/84	5.9	3,103	Kalama R	AD
1984	Chambers Cr	Skamania Hatchery	Smolt	04/24/85	7.3	8,497	Kalama R	AD
1984	Chambers Cr	Skamania Hatchery	Smolt	04/25/85	7.4	8,769	Kalama R	AD
1984	Chambers Cr	Skamania Hatchery	Smolt	04/30/85	7.9	9,125	Kalama R	AD
1984	Cowlitz R	Gobar Pond (Kalama)	Smolt	05/08/85	5.8	2,720	Kalama R	AD
1984	Cowlitz R	Gobar Pond (Kalama)	Smolt	05/08/85	5.8	2,250	Kalama R	AD
1984	Cowlitz R	Gobar Pond (Kalama)	Smolt	05/09/85	5.7	2,138	Kalama R	AD
1984	Cowlitz R	Gobar Pond (Kalama)	Smolt	05/09/85	5.7	1,231	Kalama R	AD
1984	Cowlitz R	Gobar Pond (Kalama)	Smolt	05/09/85	5.8	4,692	Gobar Cr	AD
1984	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/08/85	5.8	9,645	Kalama R	AD
1984	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/08/85	5.8	7,987	Kalama R	AD
1984	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/09/85	5.7	7,581	Kalama R	AD

Table 16 (cont.) Hatchery releases of summer steelhead into the Kalama River by brood year, and if marked, by the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1984	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/09/85	5.7	4,378	Kalama R	AD
1984	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/09/85	5.8	16,623	Gobar Cr	AD
1984	Washougal R - WF/NF	Skamania Hatchery	Smolt	05/16/85	7.1	2,158	Kalama R	AD
1984	Willamette R	Skamania Hatchery	Smolt	05/16/85	7.1	6,142	Kalama R	AD
1985	Washougal R - WF/NF	Alder Creek Pond (Toutle NF)	Smolt	05/09/86	5.3	29,945	Kalama R	AD
1985	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/12/86	5.4	2,616	Kalama R	AD
1985	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/12/86	5.4	3,162	Kalama R	AD
1985	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/12/86	5.3	3,101	Kalama R	AD
1985	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/12/86	5.3	3,221	Kalama R	AD
1985	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/12/86	5.1	3,018	Kalama R	AD
1985	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/12/86	5.0	2,987	Kalama R	AD
1985	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/12/86	5.0	2,956	Kalama R	AD

Table 16 (cont.) Hatchery releases of summer steelhead into the Kalama River by brood year, and if marked, by the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1985	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/13/86	5.2	3,075	Kalama R	AD
1985	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/13/86	5.2	3,138	Kalama R	AD
1985	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/13/86	5.2	2,979	Kalama R	AD
1985	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/13/86	5.6	3,311	Kalama R	AD
1985	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/13/86	4.9	2,902	Kalama R	AD
1985	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/13/86	5.2	3,237	Kalama R	AD
1985	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/12/86	5.0	2,039	Gobar Cr	AD
1985	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/13/86	5.2	18,227	Gobar Cr	AD
1985	Washougal R - WF/NF	Skamania Hatchery	Smolt	04/21/86	6.1	6,838	Kalama R	AD
1985	Washougal R - WF/NF	Skamania Hatchery	Smolt	05/07/86	6.7	7,605	Kalama R	AD
1985	Washougal R - WF/NF	Skamania Hatchery	Smolt	05/08/86	6.2	7,209	Kalama R	AD
1985	Washougal R - WF/NF	Skamania Hatchery	Smolt	05/09/86	7.2	8,296	Kalama R	AD

Table 16 (cont.) Hatchery releases of summer steelhead into the Kalama River by brood year, and if marked, by the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1985	Washougal R - WF/NF	Skamania Hatchery	Smolt	05/12/86	7.1	7,853	Kalama R	AD
1985	Washougal R - WF/NF	Skamania Hatchery	Smolt	05/14/86	7.0	2,639	Kalama R	AD
1986	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	04/29/87	5.0	20,749	Kalama R	AD
1986	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	04/30/87	5.0	30,226	Kalama R	AD
1986	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	05/01/87	5.0	7,226	Kalama R	AD
1987	Washougal R	Gobar Pond (Kalama)	Smolt	05/04/88	5.8	28,594	Kalama R	AD
1987	Washougal R	Gobar Pond (Kalama)	Smolt	05/04/88	5.8	31,001	Gobar Cr	AD
1988	Washougal R	Beaver Creek Hatchery	Smolt	04/26/89	5.2	7,800	Kalama R	AD
1988	Washougal R	Beaver Creek Hatchery	Smolt	04/26/89	5.2	6,500	Kalama R	AD
1988	Washougal R	Beaver Creek Hatchery	Smolt	04/27/89	4.4	6,380	Kalama R	AD
1988	Washougal R	Beaver Creek Hatchery	Smolt	05/15/89	6.6	1,485	Kalama R	AD
1988	Washougal R	Beaver Creek Hatchery	Smolt	05/15/89	6.6	3,795	Kalama R	AD

Table 16 (cont.) Hatchery releases of summer steelhead into the Kalama River by brood year, and if marked, by the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1988	Washougal R - WF/NF	Skamania Hatchery	Smolt	05/04/89	6.0	46,014	Gobar Cr	AD
1988	Washougal R - WF/NF	Skamania Hatchery	Smolt	05/04/89	6.0	4,662	Gobar Cr	AD
1988	Washougal R - WF/NF	Skamania Hatchery	Smolt	05/04/89	6.0	4,662	Gobar Cr	AD
1988	Washougal R - WF/NF	Skamania Hatchery	Smolt	05/04/89	6.0	4,662	Gobar Cr	AD
1989	Washougal R	Gobar Pond (Kalama)	Smolt	04/26/90	4.2	68,019	Kalama R	AD
1990	Washougal R - WF/NF	Beaver Creek Hatchery	Smolt	04/24/91	6.2	7,750	Kalama R	AD
1990	Washougal R - WF/NF	Beaver Creek Hatchery	Smolt	04/29/91	5.7	7,125	Kalama R	AD
1990	Washougal R - WF/NF	Beaver Creek Hatchery	Smolt	04/30/91	5.7	5,700	Kalama R	AD
1990	Washougal R - WF/NF	Beaver Creek Hatchery	Smolt	05/07/91	5.4	8,640	Kalama R	AD
1990	Washougal R - WF/NF	Gobar Pond (Kalama)	Smolt	04/30/91	5.2	59,956	Gobar Cr	AD

Source: Terry Lovgren, WDW Hatchery Stocking Database, 1991.

Table 17 (TD). Parasites and diseases isolated at hatcheries which reared Kalama River summer steelhea smolts[A].

Disease Type	Hatchery	Specific Pathogen
Viral	Gobar Pond[B]	*Infectious Hematopoietic Necrosis* (IHN)
Bacterial	Beaver Creek[C]	*Flavobacterium sp.*
Bacterial	Beaver Creek	*Aeromonas salmonicida* (Furunculosis)
Bacterial	Beaver Creek	*Flexibacter cytophaga* (Coldwater)
Bacterial	Beaver Creek	*Renibacterium salmonarium* (BKD)
Bacterial	Beaver Creek	*Flexibacter columnaris* (Columnaris)
Bacterial	Beaver Creek	*Ichthyoboda sp.* (Costia)
Parasite	Beaver Creek	*Ichthyophthirius multifilis* (Ich)
Parasite	Beaver Creek	*Nanophetyus sp.*
Parasite	Beaver Creek	*Trichodina sp.*
Parasite	Beaver Creek	*Hexamita sp.*
Viral	Beaver Creek	*Infectious Hematopoietic Necrosis* (IHN)
Viral	Beaver Creek	*EZBS*

[A]The Kalama River receives steelhead smolts from fish reared at Skamania Hatchery. Disease history for the Skamania Hatchery is located in the subbasin report for the Washougal River.

[B]Gobar pond is a rearing pond located on Gobar Creek, a tributary of the Kalama River.

[C]Beaver Creek Hatchery is located on the Elochoman River.

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

Source: WDW pathologist, Steve Roberts, 1991.

KALAMA RIVER SUBBASIN

Naturally Produced Winter Steelhead

GEOGRAPHIC LOCATION

The Kalama Subbasin is located in southwest Washington and although the headwaters are located in Skamania County, over 98 percent of the basin is in Cowlitz County. The Kalama originates on the southwest slope of Mount St. Helens and flows 44.5 miles west-southwest where it enters the Columbia River below Bonneville Dam at River Mile (RM) 73.1. The subbasin encompasses a drainage of approximately 205 square miles.

ORIGIN

The wild winter steelhead in the Kalama River is native, although interbreeding has occurred with introduced Chambers Creek, Cowlitz and Elochoman hatchery-stocks. In addition, steelhead which abandoned the Cowlitz system following the eruption of Mount St. Helens in 1980, strayed into the Kalama River and spawned with native Kalama steelhead.

It should be noted that Chilcote et al. (1980) and Leider et al. (1984) observed known summer steelhead spawning with winter steelhead showing that Kalama River winter and summer steelhead are not entirely reproductively separate.

DISTRIBUTION

Table 1 lists rearing and spawning habitat for Kalama River steelhead based on estimates from the Northwest Power Planning Council. Department of Wildlife estimates based on gradient, area and flow methodology is presented in Table 2. Winter and summer steelhead distribution is illustrated in the prior section's map of the Kalama River.

For steelhead to migrate into the upper Kalama River, fish must cross over a falls located at Kalama Falls Hatchery at RM 10. The falls has been laddered to allow fish passage, although tagging studies and visual observations indicate that fish jump the falls in greater numbers than use the fish ladder. A barrier which blocks all anadromous fish migration is a falls approximately 35 feet high at RM 36.8.

PRODUCTION

Production Facilities

There are two hatcheries in the subbasin, the Lower Kalama Salmon Hatchery located at RM 4.3 and Kalama Falls Salmon Hatchery located at RM 10. Both hatcheries produce chinook and coho salmon. Steelhead are acclimated for l-2 months at Gobar Pond which is located approximately four miles up Gobar Creek, a major tributary of the Kalama River. Gobar Creek is located approximately 19.5 miles upstream from the mouth of the Kalama River. Gobar Pond consists of a 1.5 acre dirt bottom pond about 5 or 6 feet in depth with a flow of 2.5 CFS using Gobar Creek water.
Gobar Pond was constructed as a short term rearing station which would acclimate steelhead prior to release, so returns and subsequent sport catch would be enhanced.

Production Summary

Limited data is available on wild smolt production. Number of steelhead smolts counted migrating out of the Kalama River from 1978 through 1984 ranged from 11,175 in 1982 to 46,659 in 1983 (Tables 6 and 7). Production constraints include tributaries which are short and have high gradients, habitat degradation, lack of quality spawning gravel, and stressful summer time high water temperatures.

ADULT LIFE HISTORY

Run Size and Escapement

Estimates of total run size (sport catch and escapement) from 1981 through 1989 ranged from 3,242 fish in 1988-89 to 6,201 fish in 1985-86 (Table 3). Escapement for wild steelhead from 1980 through 1989 ranged from 748 fish in 1982-83 to 2,928 in 1980-81 (Tables 3 and 4). Returns were exceedingly high in 1980-81 due to excessive straying of Cowlitz River steelhead caused by the eruption of Mount St. Helens in 1980. Estimates of hatchery-stock escapement listed in Table 5.

Time of migration

Adult time of entry for winter steelhead is generally from mid-November through June with peak returns occurring in February through April (Leider et al. 1991). Figure 1 illustrates the freshwater life history of winter steelhead in the Kalama subbasin (Kalama Subbasin Production Plan, 1990)

Harvest

Ocean catch of Kalama River winter steelhead is unknown. Kalama River winter steelhead harvested in the Columbia River has been estimated at 6.2 percent.

Sport harvest (hatchery and wild fish), based on permit-card harvest estimates, from 1981 through 1990 ranged from 1,811 in 1983-84 to 5,473 fish in 1980-81 although 1980-81 was an abnormally high return year due to the eruption of Mount St. Helens. From 1976 through 1986 harvest was estimated to contain 48.8 percent hatchery fish and 53.3 percent natural fish. Sport fishing is open year around below Kalama Falls with a two fish catch limit. Winter steelhead wild release regulations were imposed on the Kalama in 1990, limiting legal harvest to hatchery fish only. Table 2 lists yearly sport catch of Kalama River Winter steelhead from 1980 through 1990.

Spawning -period

Spawning, as measured in Gobar Creek, occurred from March through May. Average spawning time for hatchery and wild steelhead was March and April, respectively (Leider et al. 1991).

Spawning area

Winter steelhead spawn throughout most of the mainstem Kalama River and in various tributaries including Gobar and Wild Horse creeks. Leider et al. (1984) suggested that winter steelhead tended to spawn in the lower reaches of Gobar Creek (in contrast to summer steelhead).

Fecundity

No data is available for the Kalama River.

Age composition

Ages of wild winter steelhead were obtained from adults trapped at Kalama Falls Hatchery. Fish sampled from 1980 through 1990, an average of 3.0% were l-ocean, 49.6% were 2-ocean, 35.5% were 3-ocean, and 9.7 % were repeat spawners (Tables 10 and 11).

Size

Mean lengths of wild adult steelhead sampled at Kalama Falls Hatchery were 65.7 cm for 2-ocean fish, 81.9 for 3-ocean fish 73.7 for repeat spawners (Table 13).

Sex ratio

Sex ratio for winter wild/hatchery steelhead for the five years 1979-1984 averaged 58.4% female for hatchery fish and 56.2% female for wild fish. Table 12 shows yearly female percentages for 1979-1984.

Survival rate

No data is available on wild winter steelhead.

JUVENILE LIFE HISTORY

Egg

No data is available on egg production or egg to smolt survival.

Emergence

Emergence occurs from April through early July (Kalama Subbasin Plan, 1990).

Juvenile rearing

Juvenile rearing lasts approximately two years prior to ocean emigration, although some juveniles emigrate after one or three years (Loch et al. 1985; Table 8).

Migration generally occurs from March through June with peak migration from mid-April to mid-May. Based on smolts captured from both the Kalama River and Gobar Creek sixes ranged from 137.1 mm to 167.8 mm (Table 9).

Hatchery releases

The Kalama River receives a yearly allotment of winter steelhead hatchery smolts. Hatchery pre-smolts are transferred to Gobar Pond in February. Until 1988 most smolts conditioned in Gobar pond were trucked to release sites on the lower Kalama River while some fish were released directly into Gobar Creek. In 1988 and 1989, all fish reared in Gobar Pond were released into the lower Kalama River. Since 1990, all fish reared in Gobar Pond have been released directly into Gobar Creek. The Cowlitz, and Beaver Creek Hatcheries have released smolts directly into the Kalama River. Steelhead smolts are released as yearlings. Table 14 outlines the history of winter steelhead plants from 1981 to 1991.

Straying

No data are available on Kalama River steelhead.

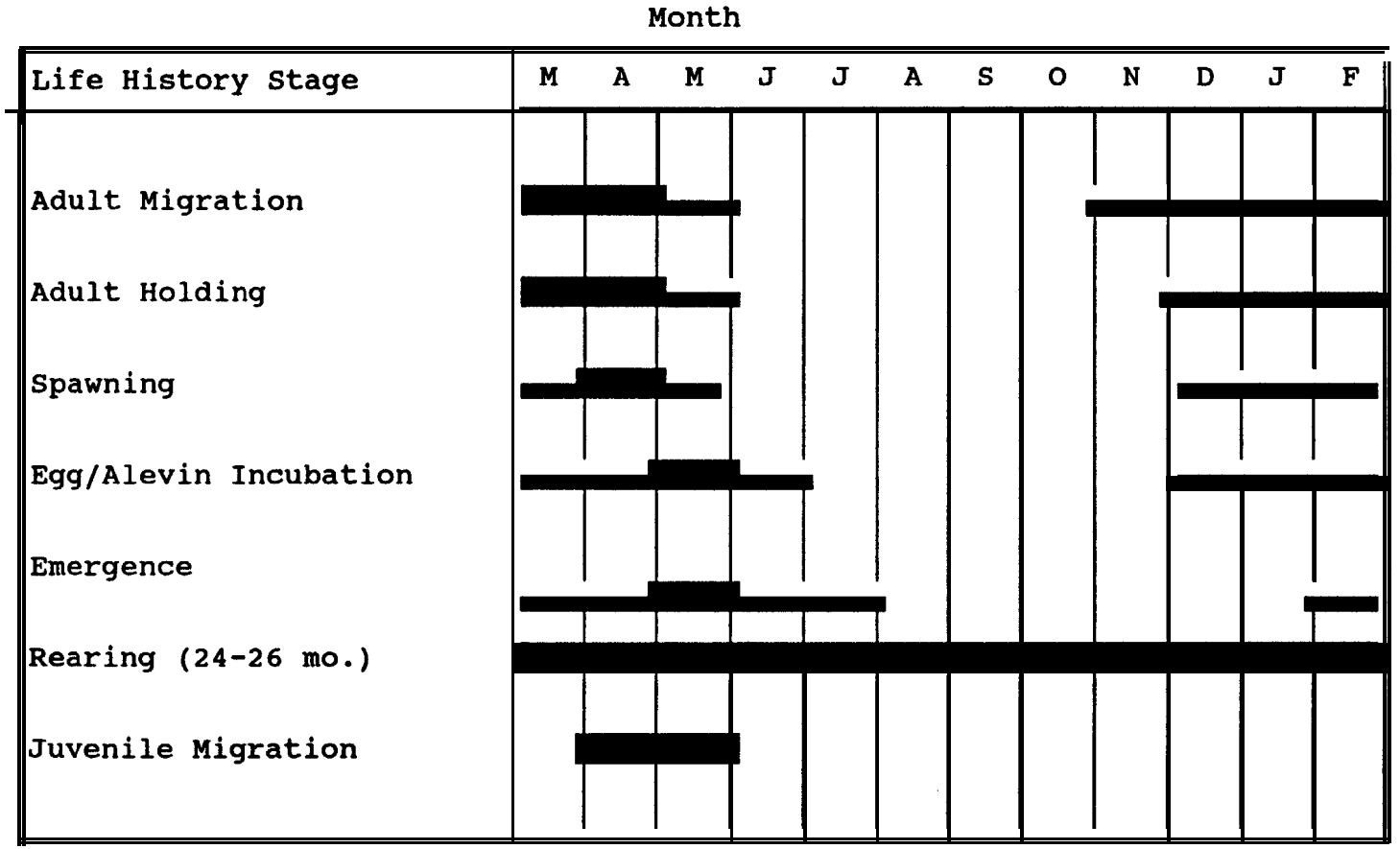
BIOCHEMICAL-GENETIC CHARACTERISTICS

Milner et al. (1980) did an electrophoretic profile of Kalama winter steelhead as part of overall study of Columbia River stocks and the feasibility of using biochemical genetic variation for estimating composition of mixed-stock fisheries. The study concluded sufficient genetic differentiation existed to do so. Since the mid-1970's The Washington Department of Wildlife's Kalama River Research Group has undertaken extensive studies examining reproductive success of hatchery versus wild winter steelhead. Detailed data exists showing genetic profiles, based on electrophoresis, of Kalama River winter steelhead.

DISEASES

Disease history for smolts planted in the Kalama River is presented in Table 15.

Figure 1 (TT). Freshwater life history of subbasin winter steelhead. The developmental stage timing represents basinwide averages; local conditions may cause some variability.



Based on the Kalama Subbasin Production Plan (1990).

Table 1 (HB-1). Estimated* amount of rearing and spawning habitat, by quality, of Kalama subbasin winter steelhead.

Area	Excellent	Good	Fair[B]	Poor[B]	Unknown	Total	Confidence
Miles	6.0%	61.2%	32.9%	0.0%		48.4	Unknown
Acres	1.1%	67.4%	31.5%	0.0%		470.1	Unknown

*Northwest Power Planning Council estimates based on limited observations.

[B]Ratings of fair and poor habitat may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/absence database, NPPC, 1991.

Table 2 (HB-2). Estimated amount of rearing/spawning habitat and potential winter and summer smolt production for the Kalama River. Based on the gradient, area and flow methodology (GAFM).

Water Start	From	To	Length miles	Width feet	Area 100m^2	Gradient	Smolt Potential
Kalama R	mouth	Hatchery Cr	4.3	126	2,659	0.09	575
Hatchery Cr	mouth	Dam	0.5	6	15	4.4	152
Kalama R	Hatchery Cr	Indian Cr	2.7	126	1,669	.35	1,355
Kalama R	Indian Cr	Little Kalama	5.9	126	3,648	0.24	2,058
Little Kalama	mouth	headwaters	2.8	20	275	3.0	2,324
Kalama R	Little Kalama	Wildhorse Cr	5.4	126	3,339	0.28	2,181
Wildhorse Cr	mouth	headwaters	2.5	15	184	2.16	1,264
Kalama R	Wildhorse Cr	Gobar Cr	0.5	126	309	.28	202
Gobar Cr	mouth	headwaters	4.24	25	520	1.14	2,187
Kalama R	Gobar Cr	Arnold Cr	1.3	126	804	.30	578
Arnold Cr	mouth	headwaters	2	12	118	1.52	626
Kalama R	Arnold Cr	Elk Cr	6.3	120	3,170	0.72	6,165
Elk Cr	mouth	headwaters	0.02	15	1	3.79	10
Kalama R	Elk Cr	NF Kalama	7.2	100	3,533	1.05	8,629
NF Kalama	mouth	headwaters	4	20	393	1.14	1,652
Kalama R	NF Kalama	Kalama Falls	2.6	50	638	1.17	1,832
Wolf Cr	mouth	headwaters	1	12	59	6.06	647
Langdon Cr	mouth	headwaters	2.4	12	141	5.02	1,489
Lakeview Cr	mouth	headwaters	1	12	59	7.58	650
Jacks Cr	mouth	headwaters	0.5	10	25	6.06	274

Source: Pat Hulett and Steve Leider, Washington Department of Wildlife, Kalama Research Station, 1991. Presence/Absence database, NPPC, 1990.

Table 3 (RR-a). Returns (escapement and sport catch) of winter steelhead to the Kalama River subbasin.

Return Year	Hatchery Escapement[C]	Wild Escapement[C]	Sport Catch[A B]	Adult Total
1980-81	1,327	2,930	5,473	9,730
1981-82	527	1,311	2,602	4,440
1982-83	586	748	1,908	3,242
1983-84	1,624	1,243	1,811	4,678
1988-85	793	831	2,477	4,101
1985-86	2,580	1,176	2,445	6,201
1986-87	1,318	1,268	3,099	5,685
1987-88	970	1,019	2,601	4,590
1988-89	646	541	2,042	3,229
1989-90			1,918	Unknown

[A]Sport catch assumes WDW cut-offs between summer run and winter run fish although some months the sport catch overlaps.

[B]Sport catch within subbasin only.

[C]Escapement currently being updated which may change numbers stated above.

Sources: Sport catch based on angler returned punchcards to Washington Department Of Wildlife.

Escapement based on 1) expanded rack counts of hatchery and wild fish, 2) ratio of fish which jumped Kalama Falls, 3) exploitation rate of fish handled at Kalama Falls, 4) data generated from tagging studies.

Escapement numbers include strays, particularly in 1980-1981 due to the eruption of Mount St. Helens.

WDW, Studies of Hatchery and Wild Steelhead in the Lower Columbia Region, Dec. 1990.

Table 4 (RN-a). Escapement of wild winter steelhead in the Kalama River by return year and total age.

Total Age-' [B]

Return Year	3	4	5	6	Repeat Spawners	Adult Total
1980-81		1,297	1,241	93	299	2,930
1981-82	9	619	516	51	102	1,311
1982-83	49	206	326	3	164	748
1983-84	73	797	268	5	100	1,243
1984-85	32	450	303	18	28	831
1985-86	68	677	286	5	140	1,176
1986-87	67	555	487	28	130	1,268
1987-88	15	594	296	43	65	1,013
1988-89	18	345	135	9	50	541

[A]Age determined by scale analysis of a subsample for each return year.

[B]Age data and sample size derived from Table 5c.
Fish captured at Kalama Falls Hatchery.

Sources: Columbia Basin System Planning, Kalama Subbasin Production Plan, 1990.
Washington Department of Wildlife, Kalama River Progress Report #90-14.
Pat Hulett and Steve Leider, Kalama River research station database and unpublished WDW data.

Table 5 (RH-a). Escapement of hatchery winter steelhead in the Kalama River by return year and total age.

Total Age[A B]

Return Year	2	3	4	Repeat Spawners	Adult Total
1980-81	2	1,108	190	27	1327
1981-82		326	189	12	527
1982-83		282	248	55	586
1983-84	63	1,468	I 93		1,624
1984-85	45	598	80	69	793
1985-86	3	1,994	562	20	2,580
1986-87	9	902	281	126	1,318
1987-88	72	772	I 109	17	I 970
1988-89	8	4 4 6	183	8	646

[A]Age determined by scale analysis of a subsample for each return year.

[B]Age data derived from Table 5b.
Fish captured at Kalama Falls Hatchery.

Sources: Columbia Basin System Planning, Kalama Subbasin Production Plan, 1990.
Washington Department of Wildlife Kalama, River Progress Report # 90-14.
Steve Leider and Pat Hulett, Kalama River research station database and unpublished WDW data.

Table 6 (JM-a). Number of natural steelhead smolts that migrated from the Kalama River subbasin.

Time of Migration

Year	Number[a] [b]	Time of migration	Peak migration
1978	35,515	March-June	Mid April to late May
1979	34,927	March-June	Mid April to late May
1980	24,150	March-June	Mid April to late May
1981	37,398	March-June	Mid April to late May
1982	11,175	March-June	Mid April to late May
1983	46,659	March-June	Mid April to late May
1984	12,203	March-June	Mid April to late May
1985-90	No Data		

'Estimates for migration period only.
[b]Estimates are from production upstream of Kalama falls Hatchery, excludes lower 10 miles of river.
Fish trapped in the Kalama River

Source: Kalama River Studies, Report # 85-12.
Steve Leider and Pat Hulett, Kalama River research station database.

Table 7 (JM-a). Number of natural steelhead smolts that migrated from Gobar Creek.

Year	Number[A B]	Time of Migration	Peak Migration
1978	349	March-June	Mid April to mid May
1979	571	March-June	Mid April to mid May
1980	301	March-June	Mid April to mid May
1981	316	March-June	Mid April to mid May
1982	222	March-June	Mid April to mid May
1983	465	March-June	Mid April to mid May
1984	90	March-June	Mid April to mid May

*Estimates for migration period only.

[B]Fish trapped in lower Gobar Creek.

Source: Kalama River Studies, report # 85-12.

Table 8 (SA). Age composition by percentage for steelhead smolts in the Kalama River subbasin.

Age Composition (%)

Year Captured	1yr[A]	2yr[A]	3yr[A]	Number[B]
1978	4.7	84.4	10.9	64
1979	5.7	68.0	26.3	122
1980	2.9	80.9	16.2	68
1981	5.6	88.0	6.4	108
1982	12.7	81.0	6.3	63
1983	6.8	81.8	11.4	89
1984	5.0	92.5	2.5	40

*Based on total age of smolts.

[B]Smolts trapped in Kalama River.

Source: Kalama River Studies Final Report, Juvenile Downstream Migrant Studies, Report # 85-12.

Table 9 (SL). Fork lengths of wild/natural steelhead smolts from Kalama River and Gobar Creek.

Location and Year	Number Fish Sampled	Length' ave. (mm)	Length range (mm)	Reference
1978				Source for length data: WDW Kalama River Final Report May 1985 #85-12 No distinction between summer or winter fish.
Kalama River	64	164.0		
Gobar Creek	44	137.1		
1979				
Kalama River	122	158.8		
Gobar Creek	52	156.2		
1980				
Kalama River	68	158.3		
Gobar Creek	34	159.3		
1981				
Kalama River	108	161.0		
Gobar Creek	52	161.0		
1982				
Kalama River	63	160.8		
Gobar Creek	62	158.1		
1983				
Kalama River	'89	167.8		
Gobar Creek	118	162.2		
1984	40			
Kalama River	28	158.9		
Gobar Creek		142.0		
1985-90	No Data			

95% confidence interval.

Table 10 (AC-a). Age composition percentage (freshwater.ocean) for return years of adult hatchery winter steelhead originating in the Kalama River subbasin. The freshwater and ocean ages sum to the total age of the fish. The "s" indicates a spawning year.

Age composition (%)[A]

Return Year	N[B]	1.+	1.1+	1.2+	1.+s+	1.1+s+	1.2+s+	1.+s+s+
1980-81	180	0.2	83.5	14.3		2.0		
1981-82	84		61.9	36.0		1.1	1.1	
1982-83	103		48.2	42.2	0.5	6.5	2.4	
1983-84	106	3.9	90.4	5.7				
1984-85[C]	85	5.7	75.4	10.1		7.5		
1985-86	81	0.1	77.3	21.8		0.4	0.4	
1986-87	74	0.7	68.4	21.3		7.6	2.0	
1987-88	57	7.4	79.6	11.2			1.8	
1988-89[D]	75	1.3	69.	28.0				
1989-90	189	0.4	83.1	13.6		2.2		0.7

[A]Age determined by scale analysis of a subsample from each return year.

[B]Fish sampled at Kalama Falls Hatchery.

[C]1984-85 1.2% repeat spawners exact age unknown.

[D]1988-89 1.3% repeat spawners exact age unknown.

Source: Columbia Basin System Planning, Kalama River Subbasin Production Plan, 1990.
Washington Department of Wildlife, Spawner Recruitment Database, 1976-1990.

Table 11 (AC-b). Age composition percentage (freshwater.ocean) for return years of adult wild winter steelhead originating in the Kalama River subbasin. The freshwater and ocean ages sum to the total age of the fish. The "s" indicates a spawning year.

Age composition (%)[A]

Return Year	N[B]	2.+	2.1+	2.2+	2.3+	3.+	3.1+	3.2+	3.3+	2.+s+	2.1+s+	2.1 +s+s+s+	2.1 +s+s+	2.2 +s+	3.1 +s+s+
1980-81	208		44.3	40.0			2.4	3.3			7.0			2.5	0.5
1981-82	145	0.7	47.2	33.8			5.6	3.9	1.1	1.1	4.8			0.5	1.4
1982-83	138	6.5	27.6	37.0			6.6	0.4		1.7	11.4	1.1	2.4	3.8	1.5
1983-84	133	5.9	59.9	16.2		4.2	5.4	0.4		1.7	3.2		1.5	1.6	
1984-85	109	3.9	54.5	31.4			5.2	2.2			2.8				
1985-86	159	5.8	57.6	22.3			2.0	0.4			6.2		2.5	2.2	1.0
1986-87	153	5.3	43.1	33.7		0.7	4.7	2.2			5.4		0.4	4.5	
1987-88	241	1.7	58.5	27.3			1.6	4.5			5.0		0.5	0.5	
1988-89	214	3.4	60.8	23.2	0.5	3.0	1.6	1.1			5.0		1.1	0.2	
1989-90	179		47.3	39.6	0.3	1.0	3.6	1.8			3.8			1.8	0.5

[A]Age determined by scale analysis of a subsample for each return year.

[B]Fish captured at Kalama Falls Hatchery.

Source: Columbia Basin System Planning, Kalama River Subbasin Production Plan, 1990.
Washington Department of Wildlife, Spawner Recruitment Database, 1976-1990.

Table 12 (AS-a). Percent females by brood year for hatchery and wild winter steelhead originating in the Kalama River subbasin.

% Females*

Brood Year	Hatchery	Wild
1976-77	49.6	55.1
1977-78	44.3	49.0
1978-79	66.2	52.8
1979-80	40.8	48.5
1980-81	67.5	59.0
1981-82	78.2	65.6
1982-83	61.3	61.5
1983-84	44.5	46.4

*Based on fish captured at Kalama Falls Hatchery.

Source: Washington Department of Wildlife, Progress Report # 87-8.

Table 13 (AL-a). Mean fork length by return year and age class[A] for adult winter steelhead originating in the Kalama River subbasin.

Mean Fork Length (cm)

Return Year	N[B]	1.1+	1.2+	2.1+	2.2+	2.3+	3.1+	3.2+	3.3+	1.1 +s+	1.2 +s+	2.1 +s+	2.1+s +s+	2.1+s +s+s+	2.2 +s+	3.1 +s+
1981-82	188	65.7	80.3	65.9	81.9		68.5	82.6	91.3 x			71.3				73.8
1982-83	141	68.4	81.1	68.8	81.8		68.5	81.1 x		72.1	82.9	72.8	78.6		88.4	76.1
1983-84	95	63.2	80.7	67.7	81.4		66.6	79.1				81.1 x	74.5 x	85.5	82.7	
1984-85	81	66.9	80.2	69.0	85.4		68.8	83.0 x		68.2	85.2	70.6				
1985-86	93	67.6	80.7	69.8	81.3		69.0	76.2 x		77.3 x	86.3 x	72.0	75.2		77.3	
1986-87	110	65.9	82.5	67.5	83.2		65.9	83.3		74.4	77.3 x	76.1	76.7 x		80.4	
1987-88	102	64.7	75.4	68.6	81.1		70.1	82.0			81.7 x	76.4	85.5 x			83.8 x
1988-89	95	66.0	78.9	67.3	79.6	84.6 x	68.4	77.0 x		76.5 x		75.7	80.6		79.8 x	
1989-90	140	63.1	81.0	67.9	82.0		71.0	85.5		68.8		76.2	80.0		92.2	70.0

[A]Age determined by scale analysis of a subsample from each return year.
[B]Based on fish captured at Kalama Falls.
[x]indicates only one fish sampled in this age class.

Source: Stock Assessment of Columbia River Anadromous Salmonids, Vol.II 1985.
Kalama River Research Station, Spawner Recruitment Database.

Table 14 (TR). Hatchery releases of winter steelhead into the Kalama River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1981	Bogachiel R	Skamania	Smolt	05/11/83	4.8	8,145	Kalama R	
1981	Bogachiel R	Skamania	Smolt	05/11/83	5.0	5,695	Kalama R	
1981	Bogachiel R	Skamania	Smolt	05/11/83	4.6	5,444	Kalama R	
1981	Bogachiel R	Skamania	Smolt	05/12/83	5.0	11,475	Kalama R	
198	Bogachiel R	Skamania	Smolt	05/12/83	4.9	11,031	Kalama R	
1981	Bogachiel R	Skamania	Smolt	05/13/83	4.7	2,697	Kalama R	
1981	Bogachiel R	Skamania	Smolt	05/13/83	4.8	2,742	Kalama R	
198	Bogachiel R	Skamania	Smolt	05/11/83	4.8	192	Gobar Cr	
1981	Bogachiel R	Skamania	Smolt	05/12/83	< 0	5,857	Gobar Cr	
1981	Bogachiel R	Skamania	Smolt	05/13/83	4.8	9,112	Gobar Cr	
1981	Chambers Cr	Beaver Creek	Smolt	04/27/82	< 0	7,992	Kalama R	
1981	Chambers Cr	Beaver Creek	Smolt	04/29/83	5.0	8,500	Kalama R	
1981	Chambers Cr	Beaver Creek	Smolt	05/04/82	6.0	9,210	Kalama R	

Table 14 (cont.). Hatchery releases of winter steelhead into the Kalama River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1981	Chambers Cr	Beaver Creek	Smolt	05/13/82	6.4	2,176	Kalama R	
1981	Chambers Cr	Gobar Pond (Kalama)	Smolt	05/10/82	5.7	14,364	Kalama R	
1981	Chambers Cr	Gobar Pond (Kalama)	Smolt	05/10/82	5.7	7,136	Kalama R	
1981	Chambers Cr	Gobar Pond (Kalama)	Smolt	05/10/82	5.7	3,534	Kalama R	
1981	Chambers Cr	Gobar Pond (Kalama)	Smolt	05/10/82	5.7	10,642	Kalama R	
1981	Chambers Cr	Gobar Pond (Kalama)	Smolt	05/11/82	5.7	7,097	Kalama R	
1981	Chambers Cr	Gobar Pond (Kalama)	Smolt	05/11/82	5.7	6,441	Kalama R	
1981	Chambers Cr	Gobar Pond (Kalama)	Smolt	05/11/82	5.7	15,544	Kalama R	
1982	Chambers Cr	Beaver Creek	Smolt	05/12/82	7.0	8,925	Kalama R	
1982	Chambers Cr	Beaver Creek	Smolt	05/13/82	7.0	6,440	Kalama R	
1983	Elochoman R	Beaver Creek	Smolt	05/03/84	4.5	6,975	Kalama R	
1983	Elochoman R	Beaver Creek	Smolt	05/04/84	6.5	6,500	Kalama R	

Table 4 (cont.). Hatchery releases of winter steelhead into the Kalama River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1983	Elochoman R	Beaver Creek	Smolt	05/09/84	4.7	838	Kalama R	
1983	Elochoman R	Beaver Creek	Smolt	05/09/84	6.5	9,750	Kalama R	
1983	Elochoman R	Beaver Creek	Smolt	05/09/84	6.0	2,700	Kalama R	
1983	Elochoman R	Beaver Creek	Smolt	05/09/84	5.9	7,493	Kalama R	
1983	Elochoman R	Gobar Pond (Kalama)	Smolt	05/09/84	5.0	2,075	Kalama R	
1983	Elochoman R	Gobar Pond (Kalama)	Smolt	05/09/84	5.2	2,964	Kalama R	
1983	Elochoman R	Gobar Pond (Kalama)	Smolt	05/09/84	5.5	3,190	Kalama R	
1983	Elochoman R	Gobar Pond (Kalama)	Smolt	05/09/84	5.2	3,250	Kalama R	
1983	Elochoman R	Gobar Pond (Kalama)	Smolt	05/09/84	5.0	2,590	Kalama R	
1983	Elochoman R	Gobar Pond (Kalama)	Smolt	05/10/84	5.0	7,600	Kalama R	
1983	Elochoman R	Gobar Pond (Kalama)	Smolt	05/10/84	5.0	9,375	Kalama R	
1983	Elochoman R	Gobar Pond (Kalama)	Smolt	05/10/84	5.0	7,550	Kalama R	

Table 14 (cont.). Hatchery releases of winter steelhead into the Kalama River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1983	Elochoman R	Gobar Pond (Kalama)	Smolt	05/11/84	5.2	6,490	Kalama R	
1983	Elochoman R	Gobar Pond (Kalama)	Smolt	05/10/84	5.0	8,675	Unknown	
1983	Elochoman R	Gobar Pond (Kalama)	Smolt	05/11/84	5.2	1,846	Unknown	
1983	Elochoman R	Gobar Pond (Kalama)	Smolt	05/11/84	5.1	4,090	Unknown	
1983	Elochoman R	Gobar Pond (Kalama)	Smolt	05/11/84	5.0	425	Unknown	
1984	Elochoman R	Alder Creek Pond (Toutle NF)	Smolt	05/02/85	4.7	21,150	Kalama R	AD
1984	Elochoman R	Alder Creek Pond (Toutle NF)	Smolt	05/03/85	4.7	7,285	Kalama R	AD
1984	Elochoman R	Alder Creek Pond (Toutle NF)	Smolt	05/03/85	4.7	7,285	Kalama R	AD
1984	Elochoman R	Alder Creek Pond (Toutle NF)	Smolt	05/02/85	4.7	21,150	Kalama R	AD
1984	Elochoman R	Beaver Creek	Smolt	04/15/85	5.6	7,840	Kalama R	AD
1984	Elochoman R	Gobar Pond (Kalama)	Smolt	05/08/85	5.8	8,329	Kalama R	AD
1984	Elochoman R	Gobar Pond (Kalama)	Smolt	05/08/85	5.8	6,896	Kalama R	AD

Table 14 (cont.). Hatchery releases of winter steelhead into the Kalama River by brood year and, if marked, the coded wire tag code

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1984	Elochoman R	Gobar Pond (Kalama)	Smolt	05/09/85	5.7	6,544	Kalama R	AD
1984	Elochoman R	Gobar Pond (Kalama)	Smolt	05/09/85	5.7	3,488	Kalama R	AD
1984	Elochoman R	Gobar Pond (Kalama)	Smolt	05/09/85	5.8	14,349	Gobar Cr	AD
1984	Green R	Gobar Pond (Kalama)	Smolt	05/08/85	5.8	4,286	Kalama R	AD
1984	Green R	Gobar Pond (Kalama)	Smolt	05/08/85	5.8	3,550	Kalama R	AD
1984	Green R	Gobar Pond (Kalama)	Smolt	05/09/85	5.7	3,374	Kalama R	AD
1984	Green R	Gobar Pond (Kalama)	Smolt	05/09/85	5.7	2,229	Kalama R	AD
1984	Green R	Gobar Pond (Kalama)	Smolt	05/09/85	5.8	7,395	Gobar Cr	AD
1985	Elochoman R	Alder Creek Pond (Toutle NF)	Smolt	05/09/86	4.0	50,000	Kalama R	
1985	Elochoman R	Beaver Creek	Smolt	05/06/86	6.1	9,105	Kalama R	
1985	Elochoman R	Gobar Pond (Kalama)	Smolt	05/12/86	5.4	2,914	Kalama R	
1985	Elochoman R	Gobar Pond (Kalama)	Smolt	05/12/86	5.4	3,523	Kalama R	

Table 14 (cont.). Hatchery releases of winter steelhead into the Kalama River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1985	Elochoman R	Gobar Pond (Kalama)	Smolt	05/12/86	5.3	3,455	Kalama R	
1985	Elochoman R	Gobar Pond (Kalama)	Smolt	05/12/86	5.3	3,589	Kalama R	
1985	Elochoman R	Gobar Pond (Kalama)	Smolt	05/12/86	5.1	3,362	Kalama R	
1985	Elochoman R	Gobar Pond (Kalama)	Smolt	05/12/86	5.0	3,328	Kalama R	
1985	Elochoman R	Gobar Pond (Kalama)	Smolt	05/12/86	5.0	3,294	Kalama R	
1985	Elochoman R	Gobar Pond (Kalama)	Smolt	05/13/86	5.2	3,426	Kalama R	
1985	Elochoman R	Gobar Pond (Kalama)	Smolt	05/13/86	5.2	3,497	Kalama R	
1985	Elochoman R	Gobar Pond (Kalama)	Smolt	05/13/86	5.2	3,319	Kalama R	
1985	Elochoman R	Gobar Pond (Kalama)	Smolt	05/13/86	5.6	3,689	Kalama R	
1985	Elochoman R	Gobar Pond (Kalama)	Smolt	05/13/86	4.9	3,233	Kalama R	
1985	Elochoman R	Gobar Pond (Kalama)	Smolt	05/13/86	5.2	3,606	Kalama R	
1985	Elochoman R	Gobar Pond (Kalama)	Smolt	05/12/86	5.0	2,272	Unknown	

Table 14 (cont.). Hatchery releases of winter steelhead into the Kalama River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1985	Elochoman R	Gobar Pond (Kalama)	Smolt	05/13/86	5.2	20,308	Unknown	
1986	Elochoman R	Beaver Creek	Smolt	04/10/87	4.6	6,900	Kalama R	
1986	Elochoman R	Beaver Creek	Smolt	04/10/87	4.6	6,210	Kalama R	
1986	Elochoman R	Beaver Creek	Smolt	04/13/87	5.1	7,395	Kalama R	
1986	Elochoman R	Beaver Creek	Smolt	04/13/87	5.1	7,140	Kalama R	
1986	Elochoman R	Beaver Creek	Smolt	04/14/87	5.1	5,100	Kalama R	
1986	Elochoman R	Gobar Pond (Kalama)	Smolt	04/29/87	4.5	29,085	Kalama R	
1986	Elochoman R	Gobar Pond (Kalama)	Smolt	04/30/87	4.5	17,349	Kalama R	
1986	Elochoman R	Gobar Pond (Kalama)	Smolt	05/01/87	4.5	6,238	Kalama R	
1987	Elochoman R	Beaver Creek	Smolt	05/04/88	5.3	8,215	Kalama R	AD
1987	Elochoman R	Beaver Creek	Smolt	05/04/88	5.3	6,625	Kalama R	AD
1987	Elochoman R	Beaver Creek	Smolt	05/04/88	5.3	7,950	Kalama R	AD

Table 14 (cont.). Hatchery releases of winter steelhead into the Kalama River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1987	Elochoman R	Beaver Creek	Smolt	05/04/88	4.8	6,000	Kalama R	AD
1987	Elochoman R	Beaver Creek	Smolt	05/04/88	4.5	6,750	Kalama R	AD
1987	Elochoman R	Beaver Creek	Smolt	05/04/88	4.5	5,850	Kalama R	AD
1987	Elochoman R	Beaver Creek	Smolt	05/04/88	4.6	4,255	Kalama R	AD
1987	Elochoman R	Gobar Pond (Kalama)	Smolt	05/04/88	5.5	27,500	Kalama R	AD
1987	Elochoman R	Gobar Pond (Kalama)	Smolt	05/04/88	5.5	30,800	Gobar Cr	AD
1988	Elochoman R	Gobar Pond (Kalama)	Smolt	05/04/89	3.8	66,994	Kalama R	AD
1989	Elochoman R	Beaver Creek	Smolt	05/01/90	4.9	7,595	Kalama R	AD
1989	Elochoman R	Beaver Creek	Smolt	05/04/90	5.2	6,240	Kalama R	AD
1989	Elochoman R	Beaver Creek	Smolt	05/15/90	4.6	8,050	Kalama R	AD
1989	Elochoman R	Beaver Creek	Smolt	05/16/90	4.7	5,170	Kalama R	AD
1989	Elochoman R	Beaver Creek	Smolt	05/16/90	4.7	5,875	Kalama R	AD

Table 14 (cont.). Hatchery releases of winter steelhead into the Kalama River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1989	Elochoman R	Beaver Creek	Smolt	05/17/90	4.8	7,680	Kalama R	AD
1989	Elochoman R	Beaver Creek	Smolt	05/17/90	4.8	6,000	Kalama R	AD
1989	Elochoman R	Gobar Pond (Kalama)	Smolt	04/26/90	3.8	47,158	Kalama R	AD
1990	Elochoman R	Beaver Creek	Smolt	04/17/91	5.5	8,800	Kalama R	AD RV
1990	Elochoman R	Beaver Creek	Smolt	04/22/91	5.5	6,050	Kalama R	AD RV
1990	Elochoman R	Beaver Creek	Smolt	04/22/91	4.8	9,000	Kalama R	AD RV
1990	Elochoman R	Beaver Creek	Smolt	04/22/91	4.8	6,720	Kalama R	AD RV
1990	Elochoman R	Gobar Pond (Kalama)	Smolt	04/30/91	4.8	59,520	Kalama R	AD RV
1991	Elochoman R	Beaver Creek	Non Smolt	04/11/91	675.6	7,094	Gobar Cr	
1991	Elochoman R	Beaver Creek	Non Smolt	04/12/91	679.1	6,655	Summers Cr	
1991	Elochoman R	Beaver Creek	Non Smolt	04/12/91	663.0	6,166	Knolton Cr	

Source: Terry Lovgren, WDW Hatchery Stocking Database, 1991.

Table 15 (TD). Parasites and diseases isolated at hatcheries which reared Kalama River steelhead smolts[a].

Disease Type	Hatchery	Specific Pathogen
Viral	Gobar Pond[b]	*Infectious Hematopoietic Necrosis* (IHN)
Bacterial	Beaver Creek[c]	*Flavobacterium sp.*
Bacterial	Beaver Creek	*Aeromonas salmonicida* (Furunculosis)
Bacterial	Beaver Creek	*Flexibacter columnaris* (Columnaris)
Bacterial	Beaver Creek	*Renibacterium salmonarium* (BKD)
Bacterial	Beaver Creek	*Flexibacter cytophaga* (Coldwater)
Parasite	Beaver Creek	*Ichthyoboda sp.* (Costia)
Parasite	Beaver Creek	*Ichthyophthirius multifiis* (Ich)
Parasite	Beaver Creek	*Nanophetyus sp.*
Parasite	Beaver Creek	*Trichodina sp.*
Parasite	Beaver Creek	*Hexamita sp.*
Viral	Beaver Creek	*Infectious Hematopoietic Necrosis* (IHN)
Viral	Beaver Creek	*EIBS*

[a]The Kalama River receives steelhead smolts from fish reared at Skamania Hatchery. Disease history for the Skamania Hatchery is located in the subbasin plan for the Washougal River.

[b]Gobar pond is a rearing pond located on Gobar Creek, a tributary of the Kalama River.
'Beaver Creek Hatchery is located on the Elochoman River.

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

Source: WDW pathologist, Steve Roberts, 1991.

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LEWIS SUBBASIN

Spring Chinook

GEOGRAPHIC LOCATION

The Lewis River headwaters decend from the southern flanks of Mount Adams and Mount St. Helens. The mainstem of the river, also known as the North Fork Lewis River, flows southwesterly from its source in Skamania county through three impoundments, Merwin Lake at River Mile (RM) 19, Yale Lake RM 34, and Swift Creek Reservoir RM 48. Along the middle and lower sections, the river forms the boundary between Clark and Cowlitz counties. A major tributary, East Fork Lewis River, enters the mainstem at RM 3. From this point the Lewis River continues west, entering the Columbia River at RM 88. Lewis River Hatchery is located at RM 12. Speelyai Hatchery is located at Speelyai Bay on Merwin Reservoir.

ORIGIN

At one time, an indigenous stock of spring chinook existed in the Lewis River, but with the construction of Merwin Dam in 1931, the majority of the spawning reaches became inaccessible and the stock subsequently declined. Early attempts to save the stock through hatchery production failed. In the Lewis River, spring chinook eggs were collected for hatchery production in 1926 and 1927 and from 1931-1941 except for 1936. By 1950, only a remnant population existed in the river, spawning primarily in the waters immediately below Merwin Dam and Cedar Creek (Howell et al. 1985).

Lewis River spring chinook stock sources and hatchery production levels have changed frequently since the initial release of Cowlitz fingerlings in 1972. Since then, releases have been made from both the Speelyai and the Lewis River Hatcheries. Brood stock for the Lewis hatchery programs originated from a variety of sources including Cowlitz, Kalama, Carson, and even Klickitat stock. The stocks used now include Cowlitz and Kalama, along with onstation returns to the Lewis River (Howell et al. 1985). Local stock is collected by voluntary returns to Lewis River Hatchery or fish trapped at Merwin Dam. Only a few hundred spring chinook return annually to the Lewis hatchery due to poor trapping efficiency. Only occasional hatchery releases have been made into the East Fork Lewis River.

DISTRIBUTION

Nearly all of the spawning on the North Lewis River occurs in a four mile reach from Merwin Dam downstream to the Lewis River Hatchery. Few if any spring chinook return to the East Fork Lewis River.

PRODUCTION

Hatchery production is currently the dominant component in the Lewis River. According to the Merwin Dam mitigation agreement, Pacific Power and Light will be responsible for spring chinook production at the level of achieving annual run sizes of 12,800 adults. Both the Lewis and Speelyai Hatcheries continue to release spring chinook as part of their annual programs.

Tables that describe the amount of spring chinook spawning and *rearing* habitat in the Lewis River were not listed in the Presence/Absence database of Northwest Power Planning Council, 1991.

The North Fork Lewis River spring chinook natural spawn escapement from 1978-1984 brood years averaged 2,955 with a low return of 559 for the 1979 brood and a peak of 8,044 for the 1983 brood. North Fork Lewis River natural spawn escapements by age and brood year are presented in Table 1.

Lewis River hatcheries spring chinook returns from 1978-1984 brood years averaged 425 with a low return of 89 for the 1979 brood and a peak of 783 for the 1984 brood. Lewis River hatcheries returns by age and brood year are presented in Table 2.

The North Fork Lewis tributary sport catches from 1978-1984 brood years averaged 5,504 with a low catch of 1,946 for the 1979 brood and a peak of 9,232 for the 1982 brood (based on punch card and actual sampling data). North Fork Lewis River tributary sport catches by age and brood year are presented in Table 3.

The North Fork Lewis spring chinook total returns from 1978-1984 brood years averaged 8,883 with a low return of 2,594 for the 1979 brood and a peak of 17,417 for the 1983 brood. North Fork Lewis spring chinook total returns by age and brood year are presented in Table 4.

ADULT LIFE HISTORY

Run size, catch and escapement

Ocean commercial and recreational fisheries from Alaska to Washington, in addition to Columbia River gill net and sport fisheries, all harvest a portion of the Lewis River origin spring chinook. Although the spring chinook has a low contribution rate in terms of ocean harvest, tributary sport catch harvested an average of 69 percent of the total spring chinook return to the Lewis River between 1977-1987 (WDF, 1990). Columbia River sport and commercial fisheries have not been curtailed by North Fork Lewis River escapement concerns.

Strays from other lower river hatcheries are unusual. Table 5 lists the coded wire tags recovered within the Lewis subbasin which originated outside the Lewis subbasin. Lewis River hatcheries spring chinook releases are generally untagged.

Time of Migration

Upstream migration begins in early April and May.

Spawning Period

Spawning extends from late August to early October with peak activity in September.

Spawning Areas

Nearly all of the spawning on the North Fork Lewis River occurs from Merwin Dam downstream to the Lewis River Hatchery. Few if any spring chinook return to the East Fork Lewis River.

Age Composition

Age ranges from two-year-old mini jacks to six-year-old adults. The adult run is primarily composed of four-year-old and five-year-old fish with a minor number of six-year-olds. Table 6 lists the age composition percentages by brood year and freshwater.ocean rearing for spring chinook returning to the North Fork Lewis River spawning grounds. Table 7 lists the age composition

percentages by brood year and freshwater.ocean rearing for spring chinook returning to the Lewis River hatcheries. Table 8 lists the age composition percentages by brood year for spring chinook caught in the North Fork Lewis sport fishery.

Sex Ratio

Female chinook comprised 47-63 percent of the spring chinook returning to the Lewis River and Speelyai Hatcheries between 1979-1988 return years (WDF, 1990). The percentage of females by age class (freshwater.ocean) for recent years of natural escapements, and hatchery returns are listed in Tables 9 and 10.

The mean fork length by brood year, sex, and freshwater.ocean rearing ages of North Fork Lewis natural spawners for 1982-1987 brood years are available in Tables 11 and 12. The mean fork length by brood year, sex, and freshwater.ocean rearing ages for Lewis River hatcheries returns are available in Tables 13 and 14.

Fecundity

Fecundity at the Lewis River and Speelyai Hatcheries between 1979-1988 return years averaged 4,083 and ranged from a low of 3,547 in 1980 to a high of 4,510 in 1982. Lewis River natural spawn and hatchery fecundity data by age and brood year is unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

Incubation occurs from September through December, followed by emergence from December into January (WDF, 1990).

Time, aee and size at migration

Under natural conditions, outmigration of juveniles generally takes place as yearlings, leaving the river during May and June. Since spring chinook in the North Fork Lewis *River are* of hatchery origin, outmigration is dependent on release. The majority of releases at the two hatcheries been of fingerlings and yearlings. Fish are generally released on station into the North Fork or mainstem Lewis although some off-station releases have been made into the East Fork Lewis River. Releases have also been made into Merwin Lake above the dam. Hatchery release information for the Lewis subbasin by brood year is presented in Table 15.

Length data of natural spring chinook smolts that migrate from the Lewis River subbasin is unavailable. The number of natural juvenile spring chinook that migrate from the Lewis subbasin is also unavailable.

Survival Rate

Smolt-to-adult survival was about 2.0 percent for two 1973 brood coded wire tagged groups of Carson stock spring chinook reared at Speelyai Hatchery and released into the North Fork Lewis River (TAC, 1984).

Egg-to-smolt survival rate at Lewis River and Speelyai Hatcheries between 1981-1987 brood years averaged 76.1 percent and ranged from a low of 68.8 in 1986 to a high of 84.1 in 1984 (WDF, 1990). Lewis River natural spawn survival rate is unavailable.

Studies conducted in the early 1970's, based on coded-wire tags, indicated higher levels of returns for fingerlings as opposed to yearling releases. This information, however, is based only on a two year program (McIsaac and Fiscus 1979).

BIOCHEMICAL-GENETIC CHARACTERISTICS

Data is unavailable.

DISEASE

Bacteria and parasitic diseases found in the Lewis River hatcheries are listed in Table 16 (WDF Salmon Culture, Olympia).

REFERENCES

The references for this section appear at the end of the following chinook section.

Table 1 (RN). Total natural spawner escapement of spring chinook to the North Fork Lewis River by brood year.

	Total Age						
Brood Year	2	3	4	5	6	Total	Adult Total
1974					0		
1975				331	0		
1976			661	107	0		
1977		5	217	517	0		739
1978	5	17	469	366	0	857	835
1979	4	73	366	116	0	559	482
1980	22	46	1,449	45	0	1,562	1,494
1981	23	81	467	188	0	759	655
1982	7	18	1,687	2,599	54	4,365	4,340
1983	0	180	4,251	3,573	40	8,044	7,864
1984	0	51	1,640	2,846	0	4,537	4,486
1985	38	10	597	636			
1986	0	111	709				
1987	0	37					
1988	37						

Age based on scale reading analysis.

Table 2 **(RH).** Total hatchery returns of spring chinook to the North Fork Lewis River by brood **year.**

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974					0		
1975				28	0		
1976			56	236	0		
1977		2	477	256	0		735
1978	0	0	232	51	0	283	283
1979	0	4	52	33	0	89	85
1980	0	1	418	36	0	455	454
1981	0	1	372	46	0	419	418
1982	35	30	407	99	0	571	506
1983	**0**	**102**	**163**	**109**	**1**	**375**	**273**
1984	**0**	**21**	**223**	**535**	**4**	**783**	**762**
1985	**12**	**35**	**326**	**475**			
1986	**185**	**26**	**339**				
1987	**0**	**6**					
1988	0						

Age based on scale reading analysis.

Table 3 (RS). Total sport catches of spring chinook from the North Fork Lewis River by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974					0		
1975				396	0		
1976			793	637	0		
1977		155	1,290	1,266	0		2,711
1978	139	102	1,149	1,417	0	2,807	2,566
1979	25	178	1,417	326	0	1,946	1,743
1980	53	180	4,071	279	0	4,583	4,350
1981	90	215	2,917	595	0	3,817	3,512
1982	18	426	5,336	3,452	0	9,232	8,788
1983	50	843	6,036	1,949	120	8,998	8,105
1984	0	761	3,070	3,177	134	7,142	6,381
1985	69	385	4,376	4,127			
1986	432	338	3,092				
1987	32	97					
1988	0						

Age based on scale reading analysis.

Table 4 **(RB).** Total returns of spring chinook to the North Fork Lewis River by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974					0		
1975				755	0		
1976			1,510	980	0		
1977		162	1,984	2,039	0		4,185
1978	144	119	1,850	1,834	0	3,947	3,684
1979	29	255	1,835	475	0	2,594	2,310
1980	75	227	5,938	360	0	6,600	6,298
1981	113	297	3,756	829	0	4,995	4,585
1982	60	474	7,430	6,150	54	14,168	13,634
1983	50	1,125	10,450	5,631	161	17,417	16,242
1984	0	833	4,933	6,558	138	12,462	11,629
1985	119	430	5,299	5,238			
1986	617	475	4,140				
1987	32	140					
1988	37						

Age based on scale reading analysis.

Table 5 (AI). Immigration of coded wire tagged spring chinook into the Lewis subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Cowlitz	Lewis River, 1989	Hatchery	855	1	1
Cowlitz	Lewis River, 1989	Hatchery	1,085	1	1

*Based on the following tag codes: 63-35-08, and 63-35-10.

Beginning with the 1978 brood.

Table 6 (AC-a). Age composition percentage (freshwater.ocean) by brood year for spring chinook spawning naturally in the North Fork Lewis River.

Age Composition (%)

Brood Year	N	2	3	4	5	6
1978		0.60	2.00	54.70	42.70	0
1979		0.70	13.10	65.50	20.70	0
1980		1.40	2.90	92.80	2.90	0
1981		3.00	10.70	61.50	24.80	0
1982		0.20	0.40	38.70	59.50	1.20
1983		0	2.20	52.90	44.40	0.50
1984		0	1.10	36.20	62.70	0
1985						
1986						
1987						
1988						

Age composition by freshwater.ocean rearing are currently unavailable,
Number of scale samples (N) are also currently unavailable

Age based on scale reading analysis.

Table 7 (AC-b). Age composition percentage **(freshwater.ocean)** by brood year for spring chinook returning to the North Fork Lewis River hatcheries.

Age Composition **(%)**

Brood Year	N	2	3	4	5	6
1978		0	0	82.00	18.00	0
1979		0	4.50	58.40	37.10	0
1980		0	0.20	91.90	7.90	0
1981		0	0.20	88.80	11.00	0
1982		6.10	5.30	71.30	17.30	0
1983		0	27.20	43.50	29.10	0.20
1984		0	2.70	28.50	68.30	0.50
1985						
1986						
1987						
1988						

Age composition by freshwater-ocean rearing are currently unavailable.

Number of scale samples **(N)** are also currently unavailable.

Age based on scale reading analysis.

Table 8 (AC-c). Age composition percentage **(freshwater.ocean)** by brood year for spring chinook caught in the North Fork Lewis River sport fishery.

Age Composition **(%)**

Brood Year	N	2	3	4	5	6
1978		5.00	3.60	40.90	50.50	0
1979		1.30	9.10	72.80	16.80	0
1980		1.20	3.90	88.80	6.10	0
1981		2.40	5.60	76.40	15.60	0
1982		0.20	4.60	57.80	37.40	0
1983		0.50	9.40	67.10	21.70	1.30
1984		0	10.60	43.00	44.50	1.90
1985						
1986						
1987						
1988						

Age composition by **freshwater.ocean** rearing are currently unavailable.

Number of scale samples **(N)** are also currently unavailable.

Age based on scale reading analysis.

Table 9 (AS-l). Percent females by brood year and age class **(freshwater.ocean)** for spring chinook spawning naturally in the North Fork Lewis River.

Females **(%)**

Brood Year	N	1.2	1.3	1.4	2.1	2.2	2.3	2.4	Total % Female
1976									
1977									
1978									
1979									
1980									
1981									
1982								0	
1983	41			33.30			70.20	100.00	
1984	114		57.10	50.00		32.00	75.80	0	
1985	29	0	66.70	66.70	0	41.20	84.60	0	
1986	22	0	60.00	0	0	50.00	65.00		
1987	28	0	0		0	75.70			
1988									

Age based on scale reading analysis.

Table 10 (AS-2). Percent females by brood year and age class **(freshwater.ocean)** for spring chinook returning to the North Fork Lewis River hatcheries.

Females **(%)**

Brood **Year**	N	1.2	1.3	1.4	2.1	2.2	2.3	2.4	Total % Female
1976									
1977									
1978									
1979									
1980									
1981									
1982									
1983	12							100.00	
1984	134		0	57.10		27.50	63.10	50.00	
1985	198		0	0		45.90	76.10	100.00	
1986	93		0	0		47.50	51.40		
1987	36		0			69.20			
1988									

Age based on scale reading analysis.

Table 11 (AL-a). Mean fork length by brood year and age class **(freshwater.ocean)** for female spring chinook spawning naturally in the North Fork Lewis River.

Mean Fork Length (cm)

Brood **Year**	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1982								85
N								3
St. Dev.								
1983			95				82	
N			1				40	
St. Dev.								
1984		88	87			75	93	
N		4	11			8	91	
St. Dev.								
1985		80	86			72	82	
N		2	2			14	11	
St. Dev.								
1986	75	93				75	85	
N	1	3				5	13	
St. Dev.								
1987						77		
N						28		
St. Dev.								

Standard deviation not available for this table.

Age based on scale reading analysis.

Table 12 (AL-b). Mean fork length by brood year and age class **(freshwater.ocean)** for male spring chinook spawning naturally in the North Fork Lewis River.

Mean Fork Length (cm)

Brood Year	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1982								96
N								1
St. Dev.								
1983			106				85	
N			2				17	
St. Dev.								
1984		97	99			76	89	
N		3	11			17	29	
St. Dev.								
1985		75	92		58	71	109	
N		1	1		1	20	2	
St. Dev.								
1986	75	75			50	75	97	
N	1	2			6	5	7	
St. Dev.								
1987		75				81		
N		1				9		
St. Dev.								

Standard deviation not available for this table.

Age based on scale reading analysis.

Table 13 (AL-c). Mean fork length by brood year and age class **(freshwater.ocean)** for female spring chinook returning to the North Fork Lewis River hatcheries.

Mean Fork Length (cm)

Brood Year	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1983							84	90
N							11	1
St. Dev.								
1984		80	87			77	85	89
N		7	4			11	111	1
St. Dev.								
1985		89				73	84	88
N		2				45	150	1
St. Dev.								
1986						75	84	
N						57	36	
St. Dev.								
1987						73		
N						36		
St. Dev.								
1988								
N								
St. Dev.								

Standard deviation not available for this table.

Age based on scale reading analysis.

Table 14 (AL-d). Mean fork length by brood year and age class **(freshwater.ocean)** for male spring chinook returning to the North Fork Lewis River hatcheries.

Mean Fork Length (cm)

Brood Year	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1983			95				96	
N			2				11	
St. Dev.								
1984		83	93			77	95	99
N		2	3			29	65	1
St. Dev.								
1985	79	82				78	90	
N	1	1				53	47	
St. Dev.								
1986						85	90	
N						63	34	
St. Dev.								
1987					54	80		
N					3	16		
St. Dev.								
1988					45			
N					2			
St. Dev.								

Standard deviation not available for this table.

Age based on scale reading analysis.

'able 15 (TR). Hatchery releases of spring chinook salmon into the Lewis River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1971	COWLITZ RIVER	LEWIS RIVER HATCHERY	Fingr	06/05/72	06/05/72	331	122430	LEWIS R (27.0168)	UNTAGGED
1971	COWLITZ RIVER	LEWIS RIVER HATCHERY	Smolt	03/09/73	03/09/73	8	45848	LEWIS R (27.0168)	UNTAGGED
1972	WIND R (CARSON NFH)	SPEELYAI HATCHERY	PreSm	08/21/73	08/21/73	20	20000	LEWIS R (27.0168)	UNTAGGED
1972	WIND R (CARSON NFH)	SPEELYAI HATCHERY	PreSm	08/22/73	08/22/73	22	24200	LEWIS R (27.0168)	UNTAGGED
1972	WIND R (CARSON NFH)	SPEELYAI HATCHERY	PreSm	09/26/73	09/26/73	23	41760	LEWIS R (27.0168)	151407
1972	WIND R (CARSON NFH)	SPEELYAI HATCHERY	PreSm	09/26/73	09/26/73	23	62537	LEWIS R (27.0168)	UNTAGGED
1972	WIND R (CARSON NFH)	SPEELYAI HATCHERY	PreSm	09/26/73	09/26/73	23	62137	LEWIS R (27.0168)	UNTAGGED
1972	WIND R (CARSON NFH)	SPEELYAI HATCHERY	PreSm	11/12/73	11/12/73	20	2320	SPEELYAI CR 27.0430	UNTAGGED
1972	WIND R (CARSON NFH)	SPEELYAI HATCHERY	PreSm	11/12/73	11/12/73	8	8080	SPEELYAI CR 27.0430	UNTAGGED
1972	WIND R (CARSON NFH)	SPEELYAI HATCHERY	Smolt	02/21/74	02/21/74	9	31302	LEWIS R (27.0168)	151402
1972	WIND R (CARSON NFH)	SPEELYAI HATCHERY	Smolt	02/21/74	02/21/74	9	63090	LEWIS R (27.0168)	UNTAGGED
1972	WIND R (CARSON NFH)	SPEELYAI HATCHERY	Smolt	02/21/74	02/21/74	13	43200	LEWIS R (27.0168)	UNTAGGED
1972	WIND R (CARSON NFH)	SPEELYAI HATCHERY	Smolt	02/21/74	02/21/74	9	19890	LEWIS R (27.0168)	UNTAGGED
1973	WIND R (CARSON NFH)	SPEELYAI HATCHERY	PreSm	09/23/74	09/23/74	24	51072	LEWIS R (27.0168)	UNTAGGED
1973	WIND R (CARSON NFH)	SPEELYAI HATCHERY	PreSm	09/24/74	09/24/74	22	28006	LEWIS R (27.0168)	011203
1973	WIND R (CARSON NFH)	SPEELYAI HATCHERY	PreSm	09/24/74	09/24/74	22	125498	LEWIS R (27.0168)	UNTAGGED
1973	WIND R (CARSON NFH)	SPEELYAI HATCHERY	PreSm	09/24/74	09/24/74	22	74426	LEWIS R (27.0168)	UNTAGGED
1973	WIND R (CARSON NFH)	SPEELYAI HATCHERY	PreSm	09/03/74	09/03/74	25	10000	SPEELYAI CR 27.0430	UNTAGGED
1973	WIND R (CARSON NFH)	SPEELYAI HATCHERY	Smolt	02/20/75	02/20/75	10	35994	LEWIS R (27.0168)	UNTAGGED
1973	WIND R (CARSON NFH)	SPEELYAI HATCHERY	Smolt	02/21/75	02/21/75	10	19558	LEWIS R (27.0168)	011110
1973	WIND R (CARSON NFH)	SPEELYAI HATCHERY	Smolt	02/21/75	02/21/75	10	95447	LEWIS R (27.0168)	UNTAGGED
1973	WIND R (CARSON NFH)	SPEELYAI HATCHERY	Smolt	02/21/75	02/21/75	11	59257	LEWIS R (27.0168)	UNTAGGED
1974	KLICKITAT RIVER	SPEELYAI HATCHERY	PreSm	09/09/75	09/09/75	14	75600	LEWIS R (27.0168)	UNTAGGED
1974	KLICKITAT RIVER	SPEELYAI HATCHERY	Smolt	03/30/76	03/30/76	6	127934	LEWIS R (27.0168)	UNTAGGED
1974	KLICKITAT RIVER	SPEELYAI HATCHERY	Smolt	03/30/76	03/30/76	6	126	SPEELYAI CR 27.0430	UNTAGGED
1975	COWLITZ RIVER	LEWIS RIVER HATCHERY	PreSm	09/08/76	09/08/76	11	19316	LEWIS R (27.0168)	UNTAGGED
1975	COWLITZ RIVER	SPEELYAI HATCHERY	Fingr	06/30/76	06/30/76	32	166400	LEWIS R (27.0168)	UNTAGGED
1975	COWLITZ RIVER	SPEELYAI HATCHERY	PreSm	09/09/76	09/09/76	13	144300	LEWIS R (27.0168)	UNTAGGED
1975	COWLITZ RIVER	SPEELYAI HATCHERY	PreSm	11/23/76	11/23/76	9	12750	LEWIS R (27.0168)	UNTAGGED
1975	COWLITZ RIVER	SPEELYAI HATCHERY	PreSm	11/23/76	11/23/76	9	12750	LEWIS R-EF (27.0173)	UNTAGGED
1975	COWLITZ RIVER	SPEELYAI HATCHERY	Smolt	02/14/77	02/14/77	8	54400	LEWIS R (27.0168)	UNTAGGED
1975	COWLITZ RIVER	SPEELYAI HATCHERY	Smolt	02/14/77	02/14/77	8	2400	SPEELYAI CR 27.0430	UNTAGGED
1976	LEWIS RIVER	LEWIS RIVER HATCHERY	PreSm	09/05/77	09/05/77	12	25620	LEWIS R (27.0168)	UNTAGGED
1976	SPEELYAI	SPEELYAI HATCHERY	PreSm	09/13/77	09/13/77	25	300825	LEWIS R (27.0168)	UNTAGGED
1977	SPEELYAI	LEWIS RIVER HATCHERY	PreSm	09/05/78	09/05/78	14	25984	LEWIS R (27.0168)	UNTAGGED
1977	SPEELYAI	SPEELYAI HATCHERY	Fingr	06/21/78	06/21/78	60	201000	LEWIS R (27.0168)	UNTAGGED
1977	SPEELYAI	SPEELYAI HATCHERY	PreSm	09/06/78	09/06/78	20	16000	LAKE MERWIN (27)	UNTAGGED
1977	SPEELYAI	SPEELYAI HATCHERY	PreSm	09/06/78	09/06/78	18	290950	LEWIS R (27.0168)	UNTAGGED
1978	SPEELYAI	LEWIS RIVER HATCHERY	Fingr	07/20/79	07/20/79	33	25806	LEWIS R (27.0168)	UNTAGGED
1978	SPEELYAI	SPEELYAI HATCHERY	PreSm	09/05/79	09/05/79	30	3000	LAKE MERWIN (27)	UNTAGGED
1978	SPEELYAI	SPEELYAI HATCHERY	PreSm	09/05/79	09/05/79	28	368870	LEWIS R (27.0168)	UNTAGGED
1979	LEWIS & KALAMA	LEWIS RIVER HATCHERY	PreSm	09/16/80	09/16/80	21	807408	LEWIS R (27.0168)	UNTAGGED
1980	WIND R (CARSON NFH)	SPEELYAI HATCHERY	PreSm	09/02/81	09/02/81	15	7500	LAKE MERWIN (27)	UNTAGGED
1980	WIND R (CARSON NFH)	SPEELYAI HATCHERY	PreSm	09/02/81	09/02/81	15	163410	LEWIS R (27.0168)	UNTAGGED
1981	COWLITZ RIVER	LEWIS RIVER HATCHERY	PreSm	09/05/82	09/05/82	17	238051	LEWIS R (27.0168)	UNTAGGED
1981	SPEELYAI	LEWIS RIVER HATCHERY	PreSm	09/05/82	09/05/82	17	517650	LEWIS R (27.0168)	UNTAGGED
1981	SPEELYAI	SPEELYAI HATCHERY	PreSm	09/08/82	09/08/82	16	1600	LAKE MERWIN (27)	UNTAGGED
1981	SPEELYAI	SPEELYAI HATCHERY	PreSm	09/08/82	09/08/82	16	259640	LEWIS R (27.0168)	UNTAGGED
1982	COWLITZ RIVER	LEWIS RIVER HATCHERY	Smolt	04/03/84	04/03/84	7	92100	LEWIS R (27.0168)	UNTAGGED
1982	LEWIS RIVER	LEWIS RIVER HATCHERY	Smolt	04/03/84	04/03/84	7	339700	LEWIS R (27.0168)	UNTAGGED
1982	COWLITZ RIVER	LEWIS RIVER HATCHERY	Smolt	04/15/84	04/15/84	7	96400	LEWIS R (27.0168)	UNTAGGED
1982	LEWIS RIVER	LEWIS RIVER HATCHERY	Smolt	04/15/84	04/15/84	7	322200	LEWIS R (27.0168)	UNTAGGED
1983	LEWIS RIVER	LEWIS RIVER HATCHERY	Smolt	03/08/85	03/08/85	10	55500	LEWIS R (27.0168)	UNTAGGED
1983	COWLITZ RIVER	LEWIS RIVER HATCHERY	Smolt	03/08/85	03/08/85	10	294500	LEWIS R (27.0168)	UNTAGGED
1983	LEWIS RIVER	LEWIS RIVER HATCHERY	Smolt	03/14/85	03/14/85	7	109200	LEWIS R (27.0168)	UNTAGGED

Table 15 (cont.). Hatchery releases of spring chinook salmon into the Lewis River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1983	COWLITZ RIVER	LEWIS RIVER HATCHERY	Smolt	03/14/85	03/14/85	7	588300	LEWIS R (27.0168)	UNTAGGED
1983	COWLITZ RIVER	SPEELYAI HATCHERY	Fingr	04/03/84	04/03/84	244	10000	GREEN FORK CR 270287	UNTAGGED
1983	COWLITZ RIVER	SPEELYAI HATCHERY	Fingr	04/03/84	04/03/84	241	22000	GREEN FORK CR 270287	UNTAGGED
1983	COWLITZ RIVER	SPEELYAI HATCHERY	Fingr	04/03/84	04/03/84	243	8000	LEWIS R-EF (27.0173)	UNTAGGED
1983	COWLITZ RIVER	SPEELYAI HATCHERY	Fingr	04/03/84	04/03/84	240	35000	LEWIS R-EF (27.0173)	UNTAGGED
1983	COWLITZ RIVER	SPEELYAI HATCHERY	Fingr	04/03/84	04/03/84	240	86000	LEWIS R-EF (27.0173)	UNTAGGED
1983	COWLITZ RIVER	SPEELYAI HATCHERY	Fingr	04/05/84	04/05/84	225	176200	LEWIS R-EF (27.0173)	UNTAGGED
1983	COWLITZ RIVER	SPEELYAI HATCHERY	Fingr	04/03/84	04/03/84	237	15000	LITTLE CR (27.0286)	UNTAGGED
1984	KALAMA RIVER	LEWIS RIVER HATCHERY	Smolt	03/24/86	03/24/86	8	346800	LEWIS R (27.0168)	UNTAGGED
1984	LEWIS RIVER	LEWIS RIVER HATCHERY	Smolt	03/24/86	03/24/86	8	419600	LEWIS R (27.0168)	UNTAGGED
1984	LEWIS RIVER	SPEELYAI HATCHERY	Smolt	03/25/86	03/25/86	14	98280	LEWIS R (27.0168)	UNTAGGED
1984	LEWIS RIVER	SPEELYAI HATCHERY	Smolt	04/25/86	04/25/86	12	182400	LEWIS R (27.0168)	UNTAGGED
1985	LEWIS RIVER	LEWIS RIVER HATCHERY	Smolt	03/02/87	03/02/87	10	157200	LEWIS R (27.0168)	UNTAGGED
1985	LEWIS RIVER	LEWIS RIVER HATCHERY	Smolt	03/29/87	03/29/87	11	510400	LEWIS R (27.0168)	UNTAGGED
1985	COWLITZ RIVER	SPEELYAI HATCHERY	Smolt	03/17/87	03/17/87	8	149040	LEWIS R (27.0168)	UNTAGGED
1985	COWLITZ RIVER	SPEELYAI HATCHERY	Smolt	04/06/87	04/06/87	7	85050	LEWIS R (27.0168)	UNTAGGED
1986	LEWIS RIVER	LEWIS RIVER HATCHERY	Smolt	03/26/88	03/26/88	8	545600	LEWIS R (27.0168)	UNTAGGED
1986	KALAMA RIVER	SPEELYAI HATCHERY	Smolt	03/30/88	03/30/88	9	179900	LEWIS R (27.0168)	UNTAGGED
1987	KALAMA RIVER	LEWIS RIVER HATCHERY	Smolt	03/29/89	03/29/89	8	184200	LEWIS R (27.0168)	UNTAGGED
1987	LEWIS RIVER	LEWIS RIVER HATCHERY	Smolt	03/29/89	03/29/89	8	314600	LEWIS R (27.0168)	UNTAGGED
1988	LEWIS RIVER	LEWIS RIVER HATCHERY	Smolt	04/06/90	04/06/90	9	113890	LEWIS R (27.0168)	635247
1988	LEWIS RIVER	LEWIS RIVER HATCHERY	Smolt	04/06/90	04/06/90	9	76910	LEWIS R (27.0168)	UNTAGGED
1988	LEWIS RIVER	SPEELYAI HATCHERY	Smolt	04/09/90	04/09/90	12	1200	LEWIS R (27.0168)	UNTAGGED
1988	LEWIS RIVER	SPEELYAI HATCHERY	Smolt	04/09/90	04/09/90	12	196812	LEWIS R (27.0168)	UNTAGGED
1989	LEWIS RIVER	SPEELYAI HATCHERY	Fingr	04/02/90	04/02/90	200	94000	LEWIS R-EF (27.0173)	UNTAGGED

Table 16 (TD-1). Parasites and diseases of spring chinook at the North Fork Lewis River hatcheries.

Disease type	Hatchery	Specific Pathogen
Virus	Lewis River	IHN - Infectious Hematopoietic Necrosis
Bacteria	Lewis River	*Aeromonas salmonicida* (Furunculosis)
Bacteria	Lewis River	*Yersinia ruckeri* (Enteric Redmouth)
Bacteria	Lewis River	*Renibacterium salmoninarium* (Bacterial Kidney Disease)
Parasite	Lewis River	Various Ectoparasites, Endoparasites and Myxosporidians
Parasite	Lewis River	*Saprolengia parasitica* (Fungus)
Virus	Speelyai	IHN - Infectious Hematopietic Necrosis
Bacteria	Speelyai	*Aeromonas salmonicida* (Furunculosis)
Bacteria	Speelyai	*Yersinia ruckeri* (Enteric Redmouth)
Bacteria	Speelyai	*Renibacterium salmoninarium* (Bacterial Kidney Disease)
Parasite	Speelyai	*Saprolegnia parasitica* (Fungus)

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

LEWIS SUBBASIN

Fall Chinook

GEOGRAPHIC LOCATION

The Lewis River headwaters descend from the southern flanks of Mount Adams and Mount St. Helens. The mainstem of the river, also known as the North Fork Lewis River, flows southwesterly from its source in Skamania County through three impoundments, Merwin Lake at River Mile (RM) 19, Yale Lake RM 34, and Swift Creek Reservoir RM 48. Along the middle and lower sections, the river forms the boundary between Clark and Cowlitz counties. A major tributary, East Fork Lewis River, enters the mainstem at RM 3. From this point the Lewis River continues west, entering the Columbia River at RM 88. Lewis River Hatchery is located at RM 12. Speelyai Hatchery is located at Speelyai Bay on Merwin Reservoir.

ORIGIN

A native population of fall chinook was in existence on the North Fork Lewis River prior to construction of the Lewis River Hatchery in 1930. The stock of fall chinook in the Lewis system has maintained a significant population with negligible hatchery influences, unlike any other lower Columbia River stock (McIsaac 1979).

The North Fork Lewis River wild fall chinook represent about 80 to 85 percent of the wild fall chinook returning to the Lower Columbia River (Norman, 1987).

DISTRIBUTION

Nearly all of the spawning on the North Fork Lewis River occurs from Merwin Dam RM 16 downstream to the Lewis River Hatchery. East Fork Lewis River fall chinook spawning ground surveys are conducted annually within the 4.2 mile stretch from the area of the Lewisville Park to Daybreak Park.

PRODUCTION

Both the North and East Fork Lewis Rivers current fall chinook production is entirely natural.

North Fork Lewis River hatchery production of fall chinook have been inconsistent in terms of numbers and types of releases. Some release groups were for experimental rather than production purposes. Since 1971, progeny releases from adults collected at Merwin Dam did not exceed 550,000 fingerlings and typically ranged from 50,000 to 150,000 fish. Most of those releases were offspring of an early spawning segment of the run (Howell et al. 1985). No fall chinook have been planted since 1985.

Tables 1 and 2 describe the amount and quality of spawning and rearing habitat available in the North Fork Lewis River. This data was derived from the Presence/Absence database of the Northwest Power Planning Council, 199 1.

The North Fork Lewis River fall chinook natural spawn escapement from 1978-1984 brood years averaged 13,663 with a low return of 7,345 for the 1980 brood and a peak of 26,486 for the 1984 brood. The East Fork Lewis River fall chinook natural spawn escapement from 1978-1984 brood years averaged 454 with a low return of 356 for the 1982 brood and a peak of 787 for the 1984 brood. North and East Forks Lewis natural spawn escapements by age and brood year are presented in Tables 3 and 4.

North Fork Lewis River hatcheries return from 1979-1984 brood years averaged 368 with a low of 112 for the 1984 brood and a peak of 571 for the 1980 brood. Hatchery returns by age are presented in Table 5.

North Fork Lewis River tributary sport catch estimates between 1977-1987 return years averaged 1,079 fall chinook, ranging from a low of 968 for the 1979 brood and a peak of 3,306 for the 1981 brood (based on punchcard data). Jacks comprise approximately 50 percent of the harvest (WDF, 1990). However, specific age and brood year analysis for the North and East Fork Lewis Rivers sport catches are unavailable.

ADULT LIFE HISTORY

Run size, catch and escapement

Ocean commercial and recreational fisheries from Alaska to Washington harvest Lewis River fall chinook. Based on coded wire recoveries of 1977 brood North Fork Lewis River wild stock, most of the overall ocean harvest occurs in the Alaska and British Columbia troll fisheries (Howell, 1985). In addition, Columbia River gill net and sport fisheries all harvest a portion of the Lewis River origin fall chinook. The tributary sport fishery in the North Fork Lewis River harvests a larger percentage of the North Fork Lewis River run compared to tributary fisheries for other major Columbia River fall chinook stocks. Sport catches within the subbasin normally comprise 15 percent of the total returns (WDF, 1990). The Lower River Wild (LRW) stock has never been a constraining stock of Columbia River sport and commercial fisheries.

The North Fork Lewis River has a large enough escapement to sustain the naturally spawning population. A maximum sustained yield spawning escapement estimate of 5,700 adult spawners has been recommended by Don McIsaac (1990).

Strays from other lower river hatcheries are not unusual. Table 6 lists North Fork Lewis River hatchery and wild origin fall chinook stray coded wire tag recoveries beginning with the 1978 brood through to the 1988 brood. The coded wire tags recovered within the North and East Fork Lewis Rivers which originated outside the Lewis subbasin are listed in Tables 7 and 8 respectively.

Time of Migration

Upstream migration begins from August to September and peaks in September and October, depending partly on early fall rains. However, North Fork Lewis River wild stock fall chinook have been caught in the North Fork Lewis River sport fishery as early as July (based on coded wire tag recoveries) and observed as late as April 19, 1985, when live fall chinook and fresh redds were found in the North Fork Lewis River (Howell, 1985).

Spawning Period

During spawning surveys on the North Fork Lewis River conducted between 1964 and 1982, peak fish count averaged about November 13 (Norman, 1984). In the East Fork Lewis River, two distinct spawning segments are evident. The early segment spawns in October while the late segment spawns November through January.

Spawning Areas

Nearly all of the spawning on the North Fork Lewis River occurs from Merwin Dam downstream to the Lewis River Hatchery. Some fall chinook spawning has also been observed in Cedar Creek. East Fork Lewis River spawning ground surveys are conducted between Lewisville and Daybreak Parks.

Age Comnosition

Age ranges from two-year-old jacks to six-year-old adults with four-year-olds the dominant age class. Total age composition data is summarized in Tables 3 through 5. Tables 9 and 10 respectively list the age composition percentages by brood year and freshwater.ocean rearing for fall chinook returning to the North and East Fork Lewis Rivers spawning grounds. Age composition percentages by brood year and freshwaterocean rearing for fall chinook returning to the Lewis River hatcheries are unavailable.

Sex Ratio

Female fall chinook comprised 43-49 percent of the natural spawners in the North Fork Lewis River between 1981-1984 brood years. Female fall chinook comprised 30-47 percent of the natural spawners in the East Fork Lewis River between 1981-1984 brood years. The percent females by brood year and freshwaterocean rearing ages for North and East Fork Lewis Rivers natural spawners are presented in Tables 11 and 12 respectively.

Based on hatchery returns, female fall chinook comprised 45-71 percent of the fall chinook between 1979-1985 return years (WDF, 1990). A percentage of females by brood year and age class is unavailable.

The mean fork length by brood year, sex, and freshwaterocean rearing ages of North and East Fork Lewis Rivers natural spawners for the 1978-1984 brood years are available in Tables 13 through 16.

Fecundity

Fecundity at the Lewis River Hatchery between 1979-1985 return years averaged 4,429 and ranged from a low of 3,269 in 1984 to a high of 4,956 in 1981 (WDF, 1990). Lewis River natural spawn and hatchery fecundity data by age and brood year are unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

Since 1976, juvenile fall chinook have been seined from the North Fork Lewis River as part of an investigation of wild stock rearing and adult production. A primary task of this study has been the collection and coded wire tagging of naturally produced fingerlings and fry. Recently emerged fry (30-40 mm.) have been observed as early as March 23 (McIsaac, 1980) and as late as August 22 (WDF, 1990). An early March timing for emergence coincides with the 1,800 Temperature Units (TU's) required for chinook fry emergence if the eggs were deposited in early November (McIsaac, 1980). Peak of emergence occurs during April (WDF, 1990). No fall chinook time of emergence data is available for the East Fork Lewis River.

Time. age and size at migration

The number of wild juvenile fall chinook that migrated from the North Fork Lewis River between 1977-1987 (excluding 1980 and 1981) has averaged 2,786,667 and ranged from a low of 1,540,000 for the 1986 brood and a peak of 4,650,000 for the 1983 brood (estimates are based on simple Peterson recapture method using coded wire tags recovered from adult returns). Table 17 lists the number of natural fall chinook that migrated from the North Fork Lewis 1977-1979 and 1982-1987. Hatchery release information for the Lewis River subbasin by brood year is presented in Table 18.

Coded wire tagged North Fork Lewis River fall chinook were recovered in the Columbia estuary primarily in early August, illustrating the extended freshwater rearing of this population. This

estuary recovery information combined with. the August seine catches in the North Lewis, demonstrates the significance of rearing in the natal stream. Most juveniles migrate from the North Fork Lewis River in mid to late summer at approximately 90 mm in length. This data is based on North Fork Lewis River wild juvenile fall chinook seined, marked, coded wire tagged, and released immediately into the North Fork Lewis River and subsequently recaptured at Jones Beach (Columbia River Km 75) by beach seine gear operated by the National Marine Fisheries Service during July through September 1978-1980 (Dawley et al. 1982). The mean fork lengths of coded wire tagged wild fall chinook recaptured from the North Fork Lewis River from 1983 to 1989 ranged from 69 to 86 mm during late June-August post tagging seining evaluations. Average lengths and ranges of North Fork Lewis River wild fall chinook smolts are presented in Tables 19 and 20. Based on scale analysis, ocean entry of the juveniles occurs primarily in the fall but a few remain in freshwater until the following spring and enter the ocean as yearlings.

No hatchery fall chinook releases have been made in the North Fork Lewis River since 1985.

Survival Rate

North Fork Lewis River fall chinook smolt to adult survival rates measured in terms of all catch and escapement was 1.7 percent based on the 14 tag groups originating from the 1977 through 1979 brood years (WDF, 1990).

Hatchery fall chinook egg to smolt survival rates from 1979-1985 return years averaged 71 percent with a low of 57 percent in 1982 and a peak of 90 percent in 1985 (WDF, 1990).

No fall chinook survival information is available for the East Fork Lewis River.

BIOCHEMICAL-GENETIC CHARACTERISTICS

Shreck, et al. (1986) found a statistically significant difference in gene frequencies for one enzyme system between Lewis River Hatchery returns and the naturally spawning fish, which indicated a genetic difference between the two groups. Based on coded wire tag recoveries, strays from Lower River Hatchery production areas are known to enter the Merwin Dam fish trap. This straying could explain the electrophoretic difference.

DISEASE

Information on bacteria and parasitic diseases occuring in Lewis River fall chinook production is unavailable.

Table 1 (HB-1). Estimated amount of rearing and spawning habitat, by quality, of the North Fork Lewis River fall chinook production area.

Distance/Area	Excellent	Good	Fair"	Poor[a]	Unknown	Total	Confidence
Miles (%)	37	62	01	00		39.1	
Acres (%)	45	54	01	00		235.5	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 199 1.

Table 2 (HB-2). Estimated amount of rearing habitat, by quality, of the North Fork Lewis River fall chinook production area.

Distance/Area	Excellent	Good	Fair[a]	Poor[a]	Unknown	Total	Confidence
Miles (%)	00	00	100	00		10.3	
Acres (%)	00	00	100	00		74.9	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 199 1.

Table 3 (RN-l). Total age of natural spawner escapement of fall chinook to the North Fork Lewis River[a], by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974					0		
1975				1,598	0		
1976			9,201	2,766	17		
1977		3,049	14,616	2,552	0		20,217
1978	1,080	1,915	3,070	2,888	95	9,048	7,968
1979	1,979	2,731	9,330	2,263	16	16,319	14,340
1980	837	1,322	3,582	1,538	66	7,345	6,508
1981	1,216	1,192	4,046	2,112	17	8,583	7,367
1982	947	1,891	5,714	2,527	0	11,079	10,132
1983	1,984	4,091	6,922	3,624	160	16,781	14,797
1984	2,578	3,469	6,637	12,210	1,592	26,486	23,908
1985	4,145	1,791	6,261	7,692			
1986	2,601	2,568	7,275				
1987	1,778	947					
1988	1,440						

[a]Includes Cedar Creek

Age based on scale reading analysis.

Table 4 (RN-2). Total age of natural -spawner escapement of fall chinook returning to the East Fork Lewis River, by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974					0		
1975				36	0		
1976			207	57	0		
1977		68	301	5	0		374
1978	215	39	123	35	0	412	197
1979	41	112	235	29	0	417	376
1980	106	35	158	100	0	399	293
1981	29	5	302	31	0	367	338
1982	8	138	183	27	0	356	348
1983	113	175	70	81	0	439	326
1984	56	38	277	302	114	787	731
1985	22	69	240	76			
1986	49	49	95				
1987	31	57					
1988	15						

Age based on scale reading analysis except:

1980 return year-East Fork Lewis River adult proportion based on North Fork Lewis River adults.

1981 return year-age composition from North Fork Lewis River spawning ground survey.

Table 5 (RH). Total hatchery returns-of fall chinook returning to the Lewis River subbasin, by brood year.

Total Age

Brood Year	2	3	4	5'	6	Total	Adult Total
1974							
1975					0		
1976				29	0		
1977			519	24	0		
1978		82	112	24	0		218
1979	116	89	228	6	0	439	323
1980	148	263	108	52	0	571	423
1981	80	45	230	0	0	355	275
1982	195	232	1	0	0	428	233
1983	283	11	11	0	0	305	22
1984	26	76	1	9	0	112	86
1985	21	0	5	2			
1986	1	2	0				
1987	1	0					
1988	0						

Age based on scale reading analysis except:

No data available for 1980 return year.

1988-90 return years based on North Fork Lewis natural spawn age composition.

1982 return year does not include 16 adult fall chinook put upstream and one spring chinook coded wire tag from fall chinook return.

1983 return year does not include 2 spring chinook adults subtracted from fall chinook return based on coded wire tag recoveries.

1984 return year includes Lewis and Speelyai Hatcheries.

1986-1990 return years does not include fish put upstream to spawn naturally.

Table 6 (AE). Emigration of coded wire tagged fall chinook from the (North Fork) Lewis subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Lewis wild, reared at Speelyai H	Kalama, 1980	Hatchery	---	1	2
Lewis wild, reared at Speelyai H	Cowlitz River, 1981	Spawning Ground	381	1	14
Lewis wild, reared at Speelyai H	Kalama, 198 1	Hatchery	5,987	2	2
Lewis wild, reared at Speelyai H	Cowlitz, 1981	Hatchery	5,673	2	2
Lewis wild, reared at Speelyai H	Kalama, 198 1	Hatchery	5,987	1	1
Lewis wild	Cowlitz, 1981	Hatchery	5,673	1	1
Lewis wild, reared at Speelyai H	Washougal, 1982	Hatchery	2,808	1	1
Lewis wild, reared at Speelyai H	Cowlitz, 1982	Hatchery	5,414	1	1
Lewis wild, reared at Speelyai H	Kalama, 1982	Hatchery	1,711	3	3
Lewis wild, reared at Speelyai H	Cowlitz, 1982	Hatchery	5,414	2	2
Lewis wild, reared at Speelyai H	Kalama, 1982	Hatchery	1,711	3	3
Lewis wild	Cowlitz; 1982	Hatchery	5,414	1	1
Lewis wild	Cowlitz River, 1982	Spawning Ground	398	1	6

Table 6. (cont.) Emigration of coded wire tagged fall chinook from the (North Fork) Lewis subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Lewis wild	Kalama, 1982	Hatchery	1,711	2	2
Lewis wild, reared Lewis H	Kalama, 1982	Hatchery	1,711	1	1
Lewis wild, reared Lewis H	Kalama River, 1982	Spawning Ground	1,263	1	3
Lewis wild	Cowlitz, 1983	Hatchery	5,969	1	1
Lewis wild	Kalama Falls, 1983	Hatcher-v	3,778	1	1
Lewis wild	Lewis, 1983	Hatchery	434	1	1
Lewis wild	Lewis, 1983	Hatchery	434	1	1
Lewis River H	Cowlitz, 1987	Hatchery	11,699	1	1
Lewis River H	Cowlitz, 1986	Hatchery	10,757	1	1
Lewis River H	Cowlitz, 1989	Hatchery	11,376	2	2
Lewis River H	Cowlitz, 1988	Hatchery	953	1	1
Lewis River H	Cowlitz, 1989	Hatchery	11,376	1	1
Lewis River H	Cowlitz, 1989	Hatchery	861	1	1
Lewis River H	Cowlitz River, 1987	Spawning Ground	2,556	1	3
Lewis River H	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Lewis River H	Cowlitz River, 1989	Spawning Ground	2,950	1	3
Lewis River H	Cowlitz River, 1989	Spawning Ground	2,950	1	3
Lewis River H	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Lewis River H	Cowlitz River, 1989	Spawning Ground	2,950	2	5

Table 6. (cont.) Emigration of coded wire tagged fall chinook from the (North Fork) Lewis subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Lewis River H	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Lewis River H	Cowlitz River, 1989	Spawning Ground	2,950	2	5
Lewis River H	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Lewis River H	Cowlitz River, 1989	Spawning Ground	2,950	2	5
Lewis River H	Cowlitz River, 1989	Spawning Ground	2,950	1	3
Lewis River H	Cowlitz River, 1988	Spawning Ground	3,227	1	3
Lewis River H	Cowlitz River, 1989	Spawning Ground	2,950	2	5
Lewis River H	Cowlitz River, 1989	Spawning Ground	2,950	3	8
Lewis River H	Cowlitz River, 1989	Spawning Ground	2,950	2	5
Lewis River H	Kalama Falls, 1988	Hatchery	3,438	1	1
Lewis River H	Kalama Falls, 1989	Hatcher-v	2,432	1	1
Lewis River H	Kalama River, 1989	Spawning Ground	3,957	2	11
Lewis River H	Kalama River, 1989	Spawning Ground	3,957	1	5
Lewis River H	Cowlitz, 1988	Hatchery	13,798	1	1
Lewis River H	Cowlitz, 1988	Hatchery	13,798	3	3
Lewis River H	Cowlitz, 1989	Hatchery	11,376	1	1
Lewis River H	Cowlitz, 1988	Hatchery	13,798	5	5
Lewis River H	Cowlitz, 1989	Hatchery	11,376	6	6
Lewis River H	Cowlitz River, 1989	Spawning Ground	2,950	3	8

Table 6. (cont.) Emigration of coded wire tagged fall chinook from the (North Fork) Lewis subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Lewis River H	Cowlitz River, 1989	Spawning Ground	2,950	1	3
Lewis River H	Kalama Falls, 1988	Hatchery	3,438	1	1
Lewis River H	Kalama River, 1988	Spawning Ground	3,814	4	31
Lewis River H	Lewis River, 1984	Spawning Ground	2,557	3	10
Lewis River H	Lewis River, 1985	Spawning Ground	3,059	1	3
Lewis River H	Lewis River, 1986	Spawning Ground	3,375	22	100
Lewis River H	Lewis River, 1987	Spawning Ground	4,939	33	117
Lewis River H	Lewis River and Cedar Creek. 1988	Spawning Ground	3,679	6	25
Lewis River H	Lewis River and Cedar Creek, 1988	Spawning Ground	3,679	38	158
Lewis River H	Lewis River and Cedar Creek, 1989	Spawning Ground	5,808	21	8 5
Lewis River H	Lewis River and Cedar Creek, 1988	Spawning Ground	3,679	37	154
Lewis River H	Lewis River and Cedar Creek, 1989	Spawning Ground	5,808	30	121
Lewis River H	Lewis River and Cedar Creek, 1987	Spawning Ground	187	1	---

Table 6. (cont.) Emigration of coded wire tagged fall chinook from the (North Fork) Lewis subbasin.

Based on the following tag codes: 63-19-50, 63-19-10, 63-19-20, 63-19-50, Hl-02-05, 63-18-58, 63-20-02, 63-21-23, 63-21-60, 63-18-59, 63-18-13, 63-20-21, 63-27-38, 63-31-27, 63-34-12, 63-38-21, 63-50-62, 63-27-37, 63-34-11, 63-38-22, 63-41-51, 63-41-53, 63-50-61, 63-50-62, 63-21-57, 63-23-29, 63-34-09, 63-34-10, and 63-20-21.

Does not include Lewis wild reared at Speelyai Hatchery and recovered at Speelyai Hatchery, or Speelyai Hatchery fish recovered at Lewis River spawning grounds.

Does not include 1976, 1978, and 1979 brood wild fall chinook reared at Lewis and Speelyai Hatcheries and released into the North Fork Lewis River.

Beginning with the 1978 brood.

Table 7 (AI-l). Immigration of coded wire tagged fall chinook into the (North Fork) Lewis River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Trinity River (Calif.)	Lewis River, 1982	Spawning Ground	2,939	1	3
Hagerman released below Bonneville	Lewis River, 1982	Spawning Ground	2,939	1	3
Washougal H	Cedar Creek, 1981	Spawning Ground	23	1	9
Washougal H	Cedar Creek, 1982	Spawning Ground	42	1	4
Washougal H	Lewis River, 1982	Spawning Ground	2,939	1	3
Toutle H	Lewis River, 1982	Hatchery	383	1	1
Priest Rapids H	Lewis River, 1982	Spawning Ground	2,939	1	3
Kalama Falls H	Lewis River, 1982	Hatchery	383	1	1
Kalama Falls H	Lewis River, 1982	Spawning Ground	2,939	1	3
Cowlitz H	Lewis River, 1980	Spawning Ground	3,344	3	14
Cowlitz H	Lewis River, 1981	Hatchery	746	1	1
Cowlitz H	Lewis River, 1982	Spawning Ground	2,939	1	3
Cowlitz H	Lewis River, 1982	Spawning Ground	2,939	1	3
Cowlitz H	Lewis River, 1982	Hatchery	383	1	1
Washougal H	Lewis River, 1989	Spawning Ground	5,808	1	4
Washougal H	Lewis River, 1988	Spawning Ground	3,679	4	17
Washougal H	Lewis River, 1988	Spawning Ground	3,679	2	8
Washougal H	Lewis River, 1988	Spawning Ground	3,679	1	4
Washougal H	Lewis River, 1988	Spawning Ground	3,679	1	4

Table 7. (cont.) Immigration of coded wire tagged fall chinook from the (North Fork) Lewis subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Washougal H	Lewis River, 1988	Spawning Ground	3,679	1	4
Washougal H	Lewis River, 1989	Spawning Ground	5,808	1	4
Washougal H	Lewis River, 1988	Spawning Ground	3,679	1	4
Washougal H	Lewis River, 1989	Spawning Ground	5,808	1	4
Washougal H	Lewis River, 1988	Spawning Ground	3,679	1	4’
Washougal H	Lewis River, 1989	Spawning Ground	5,808	2	8
Washougal H	Lewis River, 1988	Spawning Ground	3,679	1	4
Washougal H	Lewis River, 1989	Spawning Ground	5,808	1	4
Washougal H	Lewis River, 1989	Spawning Ground	5,808	3	12
Washougal H	Lewis River, 1989	Spawning Ground	5,808	4	16
Washougal H	Lewis River, 1989	Spawning Ground	5,808	1	4
Lewis River wild	Lewis River, 1983	Hatchery	434	1	1
Lewis River wild	Lewis River, 1983	Hatchery	434	1	1
Kalama Falls H	Lewis River, 1983	Spawning Ground	2,635	2	11
Lewis River H	Lewis River, 1983	Spawning Ground	2,635	1	6
Lewis River H	Lewis River, 1983	Spawning Ground	2,635	17	95
Speelyai H, released Lewis River	Lewis River, 1983	Spawning Ground	2,635	2	11

Table 7. (cont.) Immigration of coded wire tagged fall chinook from the (North Fork) Lewis subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Speelyai H, releases Lewis River	Lewis River, 1983	Spawning Ground	2,635	3	17
Lewis River H	Lewis River, 1984	Spawning Ground	2,557	3	10
Lewis River H	Lewis River, 1985	Spawning Ground	3,059	1	3
Lewis River H	Lewis River, 1986	Spawning Ground	3,375	22	100
Lewis River H	Lewis River, 1987	Spawning Ground	4,939	33	117
Lewis River H	Lewis River, 1988	Spawning Ground	3,679	6	25
Lewis River H	Lewis River, 1988	Spawning Ground	3,679	38	158
Lewis River H	Lewis River, 1989	Spawning Ground	5,808	21	85
Lewis River H	Lewis River, 1988	Spawning Ground	3,679	37	154
Lewis River H	Lewis River, 1989	Spawning Ground	5,808	30	121
Lewis River H	Cedar Cr. (Lewis), 1987	Spawning Ground	187	1	---
Washougal H	Lewis River, 1986	Hatchery	10	1	11
Washougal H	Lewis River, 1986	Spawning Ground	3,375	2	9
Washougal H	Lewis River, 1986	Spawning Ground	3,375	1	5
Washougal H	Lewis River, 1988	Spawning Ground	3,679	2	8
Washougal H	Lewis River, 1989	Spawning Ground	5,808	5	20
Washougal H	Lewis River, 1988	Spawning Ground	3,679	1	4

Table 7. (cont.) Immigration of coded wire tagged fall chinook from the (North Fork) Lewis subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Washougal H	Lewis River, 1989	Spawning Ground	5,808	2	8
Washougal H	Lewis River, 1989	Spawning Ground	5,808	2	8
Washougal H	Lewis River, 1989	Spawning Ground	5,808	1	4
Washougal H	Lewis River, 1988	Spawning Ground	3,679	1	4
Cowlitz H	Lewis River, 1986	Spawning Ground	3,375	1	5’
Cowlitz H	Lewis River, 1986	Spawning Ground	3,375	2	9
Cowlitz H	Lewis River, 1987	Spawning Ground	4,939	1	4
Cowlitz H	Lewis River, 1986	Spawning Ground	3,375	3	14
Cowlitz H	Lewis River, 1986	Spawning Ground	3,375	1	5
Cowlitz H	Lewis River, 1988	Spawning Ground	3,679	1	4
Cowlitz H	Lewis River, 1988	Spawning Ground	3,679	1	4
Cowlitz H	Lewis River, 1989	Spawning Ground	5,808	1	4
Cowlitz H	Lewis River, 1989	Spawning Ground	5,808	1	4
Cowlitz H	Lewis River, 1989	Spawning Ground	5,808	1	4
Cowlitz H	Lewis River, 1989	Spawning Ground	5,808	1	4
Elochoman H	Lewis River, 1988	Spawning Ground	509	1	io
Grays River H	Lewis River, 1989	Spawning Ground	5,808	1	4
Kalama Falls H	Lewis River, 1986	Spawning Ground	3,375	1	5

Table 7. (cont.) Immigration of coded wire tagged fall chinook from the (North Fork) Lewis subbasin.

Based on the following tag codes: 06-61-09, 05-04-20, 63-19-46, 63-19-38, 63-21-53, 63-19-41, 63-19-48, 63-19-57, 63-19-42, 63-19-51, 63-21-56, 63-20-21, 63-23-29, 63-34-09, 63-34-10, 63-31-16, 63-24-61, 63-33-34, 63-33-35, 63-34-07, 63-34-08, 63-34-14, 63-42-62, 63-25-03, 63-30-19, 63-30-20, 63-31-25, 63-32-35, 63-32-37, 63-34-49, 63-34-50, 63-34-51, 63-34-58, 63-37-61, **63-24-60,** 63-34-15, 63-34-16, 63-34-28, **63-34-31,** 63-34-32, 63-34-33, 63-34-34, 63-38-27, 63-38-30, **63-38-31,** 63-38-32, 63-41-13, 63-41-50, 63-18-58, 63-18-59, 63-18-13, 63-19-20, and 63-19-50.

Table 8 (AI-2). Immigration of coded wire tagged fall chinook into the (East Fork) Lewis subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Washougal H	E.F. Lewis River, 1988	Spawning Ground	124	1	4
Washougal H	E.F. Lewis River, 1989	Spawning Ground	103	1	6
Washougal H	E.F. Lewis River, 1989	Spawning Ground	103	1	6

Based on the following tag codes: 63-34-16, 63-41-13, and 63-41-50.

Table 9 (AC-l). Age composition percentage (freshwater.ocean) by brood year for fall chinook spawning naturally in the North Fork Lewis River.

Age Composition (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1978										
1979										
1980										
1981	424	8.96	16.03	51.18	17.22	0.24	0	3.54	2.83	0
1982	483	11.18	22.36	45.13	16.56	0.21	1.03	3.11	0.21	0.21
1983	704	16.62	22.73	39.20	19.74	0.43	0	0.57	0.71	0
1984	747	16.07	17.40	32.26	31.46	2.41	0.27	0	0	0.13
1985										
1986										
1987										
1988										

Age based on scale reading analysis.

Table 10 (AC-2). Age composition percentage (freshwater.ocean) by brood year for fall chinook spawning naturally in the East Fork Lewis River.

Age Composition (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3
1979									
1980									
1981	19	21.05	5.26	52.64	21.05	0	0	0	0
1982	35	5.72	28.57	57.14	8.57	0	0	0	0
1983	56	16.07	35.71	19.64	25.00	0	1.79	0	1.79
1984	92	6.52	7.61	57.61	26.09	2.17	0	0	0
1985									
1986									
1897									

Age based on scale reading analysis.

Table 11 (AS-l). Percent females by brood year and age class (freshwater.ocean) for fall chinook spawning naturally in the North Fork-Lewis River.

Females (%)

Brood Year	N	1.2	1.3	1.4	1.5	2.2	2.3	2.4	Total % Female
1976									
1977									
1978				76.56	100.00				
1979			65.85	82.91			100.00		
1980		16.98	73.27	76.25		100.00	42.86		
1981	208	1.47	62.21	71.23	100.00	86.67	50.00	0	49.06
1982	204	6.48	61.47	65.00	100.00	53.33	100.00	100.00	42.24
1983	304	11.25	61.96	78.42	66.67	25.00	60.00	0	43.18
1984	361	12.31	62.66	77.87	55.56	0	0	100.00	48.33
1985									
1986									
1987									
1988									

Age based on scale reading analysis.

Table 12 (AS-2). Percent females by brood-year and age class (freshwater.ocean) for fall chinook spawning naturally in the East Fork Lewis River.

Females (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	Total % Female
1976							
1977							
1978	4				20.00		
1979	28			66.67	100.00		
1980	32		0	78.79	75.00		
1981	9	0	0	60.00	75.00	0	47.37
1982	12	0	10.00	45.00	66.67	0	34.28
1983	17	0	10.00	27.27	85.71	0	30.35
1984	42	0	14.29	49.06	54.17	100.00	45.65
1985							
1986							
1987							
1988							

Age based on scale reading analysis.

Table 13 (AL-a). Mean fork length by brood year and age class (freshwaterocean) for female fall chinook spawning naturally in the North Fork Lewis River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1978				94	110				
N				49	1				
St. Dev.				6.14	---				
1979			85	95				86	
N			216	97				4	
St. Dev.			5.62	5.62				2.83	
1980		71	85	96	102		75		
N		9	159	61	2		1		
St. Dev.		4.84	6.46	5.87	10.61		---		
1981		68	86	95			77	87	
N		1	135	52			13	6	
St. Dev.		---	5.69	5.52			3.18	3.37	
1982		72	86				77		
N		7	134				8		
St. Dev.		4.43	5.38				4.46		
1983		73							
N		18							
St. Dev.		4.69							
1984									
N									
St. Dev.									

Age based on scale reading analysis.

Table 14 (AL-b). Mean fork length by brood year and age class (freshwater.ocean) for male fall chinook spawning naturally in the North Fork Lewis River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1978				103					
N				15					
St. Dev.				6.51					
1979			87	103					
N			112	20					
St. Dev.			9.68	7.52					
1980		66	89	106	104			75	
N		44	58	19	2			4	
St. Dev.		6.96	7.51	7.18	4.24			3.77	
1981	41	64	82	100			80	94	
N	38	67	82	21			2	6	
St. Dev.	3.74	8.41	10.64	7.5			---	8	
1982	41	64	87			55	74		
N	54	101	84			5	7		
St. Dev.	3.46	7.42	9.08			6.2	11.51		
1983	44	67				56.4			
N	117	142				5			
St. Dev.	4.03	8.88				9.66			
1984	41								
N	120								
St. Dev.	5.06								

Age based on scale reading analysis.

Table 15 (AL-c). Mean fork length by brood year and age class (freshwater.ocean) for female fall chinook spawning naturally in the East Fork Lewis River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5
1978				92	
N				4	
St. Dev.				2.45	
1979			84	97	
N			22	6	
St. Dev.			5.6	4.43	
1980			86	89	
N			26	6	
St. Dev.			6.54	3.93	
1981			88	94	
N			6	3	
St. Dev.			8.85	8.72	
1982		64	85		
N		1	9		
St. Dev.		---	4		
1983		67			
N		2			
St. Dev.		1.41			
1984					
N					
St. Dev.					

Age based on scale reading analysis.

Table 16 (AL-d). Mean fork length by brood year and age class (freshwater.ocean) for male fall chinook spawning naturally in the East Fork Lewis River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1
1978				100		
N				1		
St. Dev.				---		
1979			11			
N			85			
St. Dev.			11.03			
1980		64	87	108		
N		5	7	2		
St. Dev.		3.95	9.48	7.07		
1981	41	80	85	96		
N	4	1	4	1		
St. Dev.	2.83	---	9.95	---		
1982	76	66	89			
N	2	9	11			
St. Dev.	1.41	5.52	5.57			
1983	45	74				51
N	9	18				1
St. Dev.	4.8	5.24				---
1984	43					
N	6					
St. Dev.	5.21					

Age based on scale reading analysis.

Table 17 (JM-1). Number of natural juvenile fall chinook that migrated from the North Fork Lewis River, 1977 - 1979, and 1982 - 1987.

Brood Year	WDF population estimate
1977	2,620,000
1978	2,800,000
1979	2,410,000
1980	N/A
1981	N/A
1982	2,880,000
1983	4,650,000
1984	3,430,000
1985	3,010,000
1986	1,540,000
1987	1,740,000

Source: "Operation of Merwin Hydroelectric Project FERC Project # 935 Washington". WDF Columbia River Fisheries Laboratory Report, April 12, 1991. Population estimates based on simple Peterson recapture method using tags recovered from adult returns.

Table 18 (TR). Hatchery releases of fall chinook salmon into the Lewis River subbasin sorted by brood year, hatchery and life stage.

Brood Year	stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site		CUT Code
1971	LEUIS RIVER	LEUIS RIVER HATCHERY	Fingr	06/09/72	06/09/72	133	109060	LEUIS R	(27.0168)	UNTAGGED
1971	LEUIS RIVER	SPEELYAI HATCHERY	EmFry	03/10/72	03/10/72	1031	139400	LEWIS R	(27.0168)	UNTAGGED
1976	LEUIS RIVER	LEUIS RIVER HATCHERY	Fingr	07/06/77	07/06/77	110	42202	LEUIS R	(27.0168)	131614
1976	LEVIS RIVER	LEUIS RIVER HATCHERY	Fingr	07/06/77	07/06/77	110	8991	LEUIS R	(27.0168)	UNTAGGED
1976	LEWIS RIVER	LEWIS RIVER HATCHERY	Fingr	07/06/77	07/06/77	109	4919	LEUIS R	(27.0168)	UNTAGGED
1976	LEUIS RIVER	PDNR (UILDSTOCK- N	EmFry	05/ /77	05/ /77	175	8219	LEVIS R	(27.01681	631616
1976	SPEELYAI	SPEELYAI HATCHERY	EmFry	01/22/77	01/22/77	1031	25625	SPEELYAI	CR 27.0430	UNTAGGED
1977	LEUIS RIVER	LEUIS RIVER HATCHERY	Fingr	05/17/78	05/17/78	165	a3477	LEWIS R	(27.0168)	631748
1977	LEWIS RIVER	LEWIS RIVER HATCHERY	Fingr	05/17/78	05/17/78	165	13030	LEWIS R	(27.0168)	UNTAGGED
1977	SPEELYAI	LEUIS RIVER HATCHERY	Fingr	05/22/78	05/22/78	165	10395	LEWIS R	(27.0168)	UNTAGGED
1977	LEUIS RIVER	LEWIS RIVER HATCHERY	Fingr	07/14/78	07/14/78	140	48567	LEWIS R	(27.0168)	631611
1977	LEWIS RIVER	LEWIS RIVER HATCHERY	Fingr	07/14/78	07/14/78	140	293	LEUIS R	(27.0168)	UNTAGGED
1977	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	05/ /78	06/ /78	200	19806	LEUIS R	(27.0168)	631618
1977	LEUIS RIVER	PDNR (WILDSTOCK- N	EmFry	05/ /78	06/ /78	200	439	LEWIS R	(27.0168)	UNTAGGED
1977	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	051 /78	05/ /78	349	50862	LEWIS R	(27.0168)	H10101
1977	LEWIS RIVER	QDNR (UILDSTOCK- N	EmFry	05/ /78	05/ /78	349	16422	LEUIS R	(27.0168)	UNTAGGED
1977	LEWIS RIVER	PDNR (UILDSTOCK- N	EmFry	06/13/ 78	07/06/78	150	15887	LEUIS R	(27.0168)	631619
1977	LEVIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/13/78	07/06/78	150	407	LEWIS R	(27.0168)	UNTAGGED
1977	SPEELYAI	SPEELYAI HATCHERY	Fingr	06/21/78	06/21/78	63	66024	LEWIS R	(27.0168)	UNTAGGED
1977	SPEELYAI	SPEELYAI HATCHERY	PreSm	09/06/78	09/06/78	14	51800	LEWIS R	(27.0168)	UNTAGGED
1978	LEWIS RIVER	LEUIS RIVER HATCHERY	Fingr	07/13/79	07/13/79	141	60912	LEWIS R	(27.0168)	631813
1978	LEWIS RIVER	LEWIS RIVER HATCHERY	Fingr	07/13/79	07/13/79	141	368	LEWIS R	(27.0168)	UNTAGGED
1978	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	05/ /79	05/ /79	251	30654	LEWIS R	(27.0168)	631910
1978	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	05/ /79	05/ /79	251	31	LEWIS R	(27.0168)	UNTAGGED
1978	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	05/ /79	05/ /79	300	31055	LEWIS R	(27.0168)	H10104
1978	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	05/ /79	05/ /79	300	1361	LEWIS R	(27.0168)	UNTAGGED
1978	LEWIS RIVER	PDNR (UILDSTOCK- N	EmFry	05/ /79	05/ /79	300	29793	LEWIS R	(27.0168)	H10105
1978	LEWIS RIVER	QDNR (UILDSTOCK- N	EmFry	05/ /79	05/ /79	300	1437	LEWIS R	(27.0168)	UNTAGGED
1978	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/ /79	06/ /79	200	26242	LEWIS R	(27.0168)	631858
1978	LEWIS RIVER	QDNR (UILDSTOCK- N	EmFry	06/ /79	06/ /79	200	21187	LEWIS R	(27.0168)	631902
1978	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	07/ /79	07/ /79	200	18238	LEWIS R	(27.0168)	632002
1978	LEWIS RIVER	QDNR (UILDSTOCK- N	EmFry	07/ /79	07/ /79	200	55	LEWIS R	(27.0168)	UNTAGGED
1978	GRAYS RIVER	QDNR (UILDSTOCK- N	Fingr	06/05/79	06/05/79	200	23402	LEUIS R	(27.0168)	631859
1978	GRAYS RIVER	QDNR (WILDSTOCK- N	Fingr	06/05/79	06/05/79	200	165	LEWIS R	(27.0168)	UNTAGGED
1978	SPEELYAI	SPEELYAI HATCHERY	Fingr	04/23/79	04/23/79	409	287410	LEWIS R	(27.0168)	UNTAGGED
1978	SPEELYAI	SPEELYAI HATCHERY	Fingr	07/17/79	07/17/79	77	78463	LEWIS R	(27.0168)	UNTAGGED
1978	LEWIS RIVER	SPEELYAI HATCHERY	Fingr	07/19/79	07/19/79	86	104455	LEWIS R	(27.0168)	631950
1978	LEWIS RIVER	SPEELYAI HATCHERY	Fingr	07/19/79	07/19/79	86	81960	LEWIS R	(27.0168)	UNTAGGED
1978	LEWIS RIVER	SPEELYAI HATCHERY	PreSm	09/05/79	09/05/79	28	51660	LEWIS R	(27.0168)	631920
1978	LEWIS RIVER	SPEELYAI HATCHERY	PreSm	09/05/79	09/05/79	28	420	LEUIS R	(27.0168)	UNTAGGED
1979	LEWIS RIVER	LEWIS RIVER HATCHERY	Fingr	06/25/80	06/25/80	349	8050	LEWIS R	(27.0168)	UNTAGGED
1979	LEWIS RIVER	LEWIS RIVER HATCHERY	Fingr	07/02/80	07/02/80	148	63048	LEWIS R	(27.0168)	632021
1979	LEWIS RIVER	LEWIS RIVER HATCHERY	Fingr	07/02/80	07/02/80	148	3300	LEWIS R	(27.0168)	UNTAGGED
1979	LEWIS RIVER	LEWIS RIVER HATCHERY	Fingr	07/15/80	07/15/80	130	102704	LEWIS R	(27.0168)	632160
1979	LEWIS RIVER	LEWIS RIVER HATCHERY	Fingr	07/15/80	07/15/80	130	1776	LEWIS R	(27.0168)	UNTAGGED
1979	LEWIS RIVER	LEWIS RIVER HATCHERY	Fingr	07/15/80	07/15/80	170	117470	LEWIS R	(27.0168)	UNTAGGED
1979	LEWIS RIVER	LEWIS RIVER HATCHERY	Fingr	07/15/80	07/15/80	95	204250	LEUIS R	(27.0168)	UNTAGGED
1979	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	04/ /80	04/ /80	597	26020	LEWIS R	(27.0168)	H10201
1979	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	04/ /80	04/ /80	597	1063	LEWIS R	(27.0168)	UNTAGGED
1979	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	04/ /80	04/ /80	597	27440	LEWIS R	(27.0168)	H10202
1979	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	04/ /80	04/ /80	597	279	LEWIS R	(27.0168)	UNTAGGED
1979	LEUIS RIVER	QDNR (UILDSTOCK- N	EmFry	05/ /80	05/ /80	560	30674	LEUIS R	(27.0168)	H10205
1979	LEWIS RIVER	QDNR (UILDSTOCK- N	EmFry	05/ /80	OS/ /80	560	358	LEWIS R	(27.0168)	UNTAGGED
1979	LEWIS RIVER	QDNR (UILDSTOCK- N	EmFry	05/29/80	05/29/80	468	25028	LEWIS R	(27.0168)	632123
1979	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	05/29/80	05/29/80	468	552	LEUIS R	(27.0168)	UNTAGGED

Table 18 (cont.). Hatchery releases of fall chinook salmon into the Lewis River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site		CWT Code
1979	LEWIS RIVER	PDNR (WILDSTOCK- N	EmFry	06/05/80	06/05/80	391	27505	LEWIS R	(27.0168)	632124
1979	LEWIS RIVER	PDNR (WILDSTOCK- N	EmFry	06/05/80	06/05/80	391	561	LEWIS R	(27.0168)	UNTAGGED
1979	LEWIS RIVER	PDNR (WILDSTOCK- N	EmFry	06/11/80	06/11/80	331	25642	LEWIS R	(27.0168)	632125
1979	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/11/80	06/11/80	331	364	LEWIS R	(27.0168)	UNTAGGED
1979	LEWIS RIVER	PDNR (WILDSTOCK- N	EmFry	06/17/80	06/17/80	311	26181	LEWIS R	(27.0168)	632207
1979	LEWIS RIVER	PDNR (WILDSTOCK- N	EmFry	06/17/80	06/17/80	311	372	LEWIS R	(27.0168)	UNTAGGED
1979	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/25/80	06/25/80	240	24479	LEWIS R	(27.0168)	632208
1979	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/25 /80	06/25/80	240	551	LEWIS R	(27.0168)	UNTAGGED
1979	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	07/ /80	07/ /80	120	26356	LEWIS R	(27.0168)	632214
1979	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	07/ /80	07/ /80	120	374	LEWIS R	(27.0168)	UNTAGGED
1979	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	07/11/80	07/11/80	175	14005	LEWIS R	(27.0168)	632213
1979	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	07/11/80	07/11/80	175	538	LEWIS R	(27.0168)	UNTAGGED
1980	LEWIS RIVER	LEWIS RIVER HATCHERY	Fingr	06/30/81	06/30/81	115	446775	LEWIS R	(27.0168)	UNTAGGED
1980	KALAMA RIVER	SPEELYAI HATCHERY	Fingr	02/18/81	02/18/81	341	668440	LEWIS R	(27.0168)	UNTAGGED
1980	KALAMA RIVER	SPEELYAI HATCHERY	Fingr	02/23/81	02/23/81	280	143360	LEWIS R	(27.0168)	UNTAGGED
1980	KALAMA RIVER	SPEELYAI HATCHERY	PreSm	09/02/81	09/02/81	10	161650	LEWIS R	(27.0168)	UNTAGGED
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/21/81	04/21/81	75	25723	ROCK CR	(27.0222)	050743
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/21/81	04/21/81	75	124043	ROCK CR	(27.0222)	UNTAGGED
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/21/81	04/21/81	75	150544	ROCK CR	(27.0222)	050746
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/21/81	04/21/81	75	725489	ROCK CR	(27.0222)	UNTAGGED
1981	LEWIS RIVER	LEWIS RIVER HATCHERY	Fingr	01/21/82	01/21/82	1163	80500	LAKE MERWIN	(27)	UNTAGGED
1981	LEWIS RIVER	SPEELYAI HATCHERY	EmFry	01/20/82	01/20/82	1163	410000	LAKE MERWIN	(27)	UNTAGGED
1981	LEWIS RIVER	SPEELYAI HATCHERY	EmFry	01/29/82	01/29/82	1163	208000	LAKE MERWIN	(27)	UNTAGGED
1981	LEWIS RIVER	SPEELYAI HATCHERY	EmFry	02/08/82	02/08/82	1163	467850	LAKE MERWIN	(27)	UNTAGGED
1981	LEWIS RIVER	SPEELYAI HATCHERY	Fingr	07/27/82	07/27/82	92	80500	LEWIS R	(27.0168)	UNTAGGED
1982	LEWIS RIVER	LEWIS RIVER HATCHERY	Fingr	04/07/83	04/07/83	567	55900	LAKE MERWIN	(27)	UNTAGGED
1982	LEWIS RIVER	LEWIS RIVER HATCHERY	Fingr	07/18/83	07/18/83	148	61500	LEWIS R	(27.0168)	UNTAGGED
1982	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/06/83	06/11/83	468	48222	LEWIS R	(27.0168)	632737
1982	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/06/83	06/11/83	468	1165	LEWIS R	(27.0168)	UNTAGGED
1982	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/06/83	06/11/83	280	48221	LEWIS R	(27.0168)	632738
1982	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/06/83	06/11/83	280	1161	LEWIS R	(27.0168)	UNTAGGED
1983	LEWIS RIVER	LEWIS RIVER HATCHERY	PreSm	09/28/84	09/28/84	33	97180	LEWIS R	(27.0168)	632329
1983	LEWIS RIVER	LEWIS RIVER HATCHERY	PreSm	09/28/84	09/28/84	33	189820	LEWIS R	(27.0168)	U N T A G G E D
1983	LEUIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/11/84	06/15/84	409	50276	LEWIS R	(27.0168)	633126
1983	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/11/84	06/15/84	409	1770	LEWIS R	(27.0168)	UNTAGGED
1983	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/11/84	06/15/84	225	50994	LEWIS R	(27.0168)	633127
1983	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/11/84	06/15/84	225	1795	LEUIS R	(27.0168)	UNTAGGED
1983	COLUMBIA RIV BRIGHTS	SPRING CR NF HATCHRY	Fingr	05/15/84	05/15/84	159	79442	ROCK CR	(27.0222)	UNTAGGED
1983	COLUMBIA RIV BRIGHTS	SPRING CR NF HATCHRY	Fingr	06/13/84	06/13/84	62	79610	ROCK CR	(27.0222)	H50607
1983	COLUMBIA RIV BRIGHTS	SPRING CR NF HATCHRY	Fingr	06/13/84	06/13/84	62	6923	ROCK CR	(27.0222)	UNTAGGED
1984	LEWIS RIVER	LEWIS RIVER HATCHERY	PreSm	10/08/85	10/08/85	20	51572	LEUIS R	(27.0168)	633409
1984	LEWIS RIVER	LEWIS RIVER HATCHERY	PreSm	10/08/85	10/08/85	20	31595	LEUIS R	(27.0168)	UNTAGGED
1984	LEWIS RIVER	LEWIS RIVER HATCHERY	PreSm	10/08/85	10/08/85	20	49661	LEWIS R	(27.0168)	633410
1984	LEWIS RIVER	LEWIS RIVER HATCHERY	PreSm	10/08/85	10/08/85	20	31572	LEWIS R	(27.0168)	UNTAGGED
1984	LEUIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/13/85	06/21/85	409	34990	LEWIS R	(27.0168)	633411
1984	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/13/85	06/21/85	409	934	LEWIS R	(27.0168)	UNTAGGED
1984	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/13/85	06/21/85	225	34621	LEWIS R	(27.0168)	633412
1984	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/13/85	06/21/85	225	924	LEWIS R	(27.0168)	UNTAGGED
1984	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/20/85	05/20/85	95	96145	ROCK CR	(27.0222)	H50701
1984	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/20/85	05/20/85	95	2185	ROCK CR	(27.0222)	UNTAGGED
1984	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/20/85	05/20/85	136	99919	ROCK CR	(27.0222)	H50704
1984	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/20/85	05/20/85	136	3305	ROCK CR	(27.0222)	UNTAGGED
1984	COLUMBIA RIV BRIGHTS	SPRING CR NF HATCHRY	Fingr	06/04/85	06/04/85	189	36764	ROCK CR	(27.0222)	UNTAGGED
1984	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	06/11/85	06/11/85	165	59670	ROCK CR	(27.0222)	H50705
1984	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	06/11/85	06/11/85	165	909	ROCK CR	(27.0222)	UNTAGGED

Table 18 (cont.). Hatchery releases of fall chinook salmon into the Lewis River subbasin sorted by brood year, hatchery and life stage.

Brood Year	stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site		CWT Code
1984	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	06/11/85	06/11/85	165	62856	ROCK CR	(27.0222)	H50706
1984	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	06/11/85	06/11/85	165	957	ROCK CR	(27.0222)	UNTAGGED
1985	LEWIS RIVER	LEWIS RIVER HATCHERY	PreSm	08/28/86	08/28/86	40	346300	LEWIS R	(27.0168)	UNTAGGED
1985	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/05/86	06/13/86	270	43150	LEWIS R	(27.0168)	633821
1985	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/05/86	06/13/86	270	1106	LEWIS R	(27.0168)	UNTAGGED
1985	LEWIS RIVER	QDNR (UILDSTOCK- N	EmFry	06/05/86	06/13/86	270	41624	LEWIS R	(27.0168)	633822
1985	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/05/86	06/13/86	270	1067	LEWIS R	(27.0168)	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	05/15/86	05/15/86	73	50757	ROCK CR	(27.0222)	850308
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	05/15/86	05/15/86	73	2723	ROCK CR	(27.0222)	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	05/15/86	05/15/86	78	50817	ROCK CR	(27.0222)	850309
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	05/15/86	05/15/86	78	2726	ROCK CR	(27.0222)	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	05/15/86	05/15/86	72	51996	ROCK CR	(27.0222)	850310
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	05/15/86	05/15/86	72	2480	ROCK CR	(27.0222)	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	05/15/86	05/15/86	73	52360	ROCK CR	(27.0222)	850311
1985	-COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	05/15/86	05/15/86	73	2497	ROCK CR	(27.0222)	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	05/20/86	05/20/86	82	53208	ROCK CR	(27.0222)	B50214
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	05/20/86	05/20/86	82	2130	ROCK CR	(27.0222)	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	05/20/86	05/20/86	73	52631	ROCK CR	(27.0222)	850215
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	05/20/86	05/20/86	73	2141	ROCK CR	(27.0222)	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	05/20/86	05/20/86	70	35376	ROCK CR	(27.0222)	850408
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	05/20/86	05/20/86	70	2395	ROCK CR	(27.0222)	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	05/20/86	05/20/86	70	35427	ROCK CR	(27.0222)	B50409
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	05/20/86	05/20/86	70	2389	ROCK CR	(27.0222)	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	06/04/86	06/04/86	206	51850	ROCK CR	(27.0222)	850210
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	06/04/86	06/04/86	206	2614	ROCK CR	(27.0222)	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	06/04/86	06/04/86	206	51851	ROCK CR	(27.0222)	850211
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	06/04/86	06/04/86	206	2614	ROCK CR	(27.0222)	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	06/04/86	06/04/86	206	52128	ROCK CR	(27.0222)	850212
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	06/04/86	06/04/86	206	2629	ROCK CR	(27.0222)	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	06/04/86	06/04/86	233	38140	ROCK CR	(27.0222)	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	06/30/86	06/30/86	206	51851	ROCK CR	(27.0222)	850213
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	06/30/86	06/30/86	206	2614	ROCK CR	(27.0222)	U N T A G G E D
1985	LEWIS RIVER	SPEELYAI HATCHERY	Fingr	03/25/86	03/25/86	483	356640	LAKE MERWIN	(27)	UNTAGGED
1986	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/03/87	06/10/87	50	41577	LEWIS R	(27.0168)	634151
1986	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/03/87	06/1 0/87	SO	607	LEWIS R	(27.0168)	UNTAGGED
1986	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/03/87	06/10/87	50	41577	LEWIS R	(27.0168)	634153
1986	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/03/87	06/10/87	50	610	LEWIS R	(27.0168)	UNTAGGED
1987	LEWIS RIVER	PDNR (WILDSTOCK- N	EmFry	06/07/88	06/15/88	175	50159	LEWIS R	(27.0168)	635061
1987	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/07/88	06/15/88	175	774	LEWIS R	(27.0168)	UNTAGGED
1987	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/07/88	06/15/88	175	50576	LEWIS R	(27.0168)	635062
1987	LEWIS RIVER	QDNR (WILDSTOCK- N	EmFry	06/07/88	06/15/88	175	781	LEWIS R	(27.0168)	UNTAGGED
1988	KALAMA RIVER	LEWIS RIVER HATCHERY	Smolt	04/06/90	04/06/90	12	139800	LEWIS R	(27.0168)	UNTAGGED
1988	LEWIS RIVER	QDNR (WILDSTOCK- N		06/07/89	06/13/89		98049	LEWIS R	(27.0168)	630456
1988	LEWIS RIVER	PDNR (WILDSTOCK- N		06/07/89	06/13/89		6324	LEWIS R	(27.0168)	UNTAGGED
1989	LEWIS RIVER	QDNR (WILDSTOCK- N		06/06/90	06/12/90		10422	LEWIS R	(27.0168)	631350
1989	LEWIS RIVER	QDNR (WILDSTOCK- N		06/06/90	06/12/90		105	LEWIS R	(27.0168)	UNTAGGED

Table 19 (SL-1). Lengths of fall chinook smolts from the North Fork Lewis River, 1978-1980.

Location and year	No. Fish	Length ave. (mm)	Length range (mm)	Reference
Jones Reach (Columbia River Km 75), 1978	145	94	?	"Factors Affecting the Abundance of 1977-79 brood wild fall chinook salmon in the North Fork Lewis River, Washington" by Don McIssac, University of Washington dissertation, 1990.
Jones Reach (Columbia River Km 75), 1979	797	84	?	Same as above.
Jones Reach (Columbia River Km 75), 1980	568	93	?	Same as above.

NMFS intensively sampled outmigrating juvenile salmonids at the head of the Columbia River estuary (Jones Reach, River Km 75) from 1978 through 1980. A sample of the daily catch of chinook salmon with missing adipose fins was sacrificed and measured by NMFS to obtain CWT and length information. Actual catches of marked and tagged chinook salmon were adjusted by the original researchers to represent estimates from a standard effort of 10 sets per day for seven days per week. Numbers of fish examined are the estimated number of North Fork Lewis River wild juvenile fall chinook seined, marked, tagged and released immediately into the North Fork Lewis and subsequently recaptured July-September at Jones Beach (Columbia River) with beach seine gear operated by the NMFS.

Table 20 (SL-2). Lengths of fall chinook smolts from the North Fork Lewis River, 1983-1989.

Location and year	No. Fish	Length ave. (mm)	Length range (mm)	Reference
Merwin Dam to Woodland				
1983	162	79.2	?	North Fork Lewis River wild stock fall chinook tagging project and post-tagging recapture 1983. WDF memorandum from Guy Norman to Don McIssac, April 18, 1984.
1984	125	80.2	57-113	Same title, author, 1984. WDF memorandum August 8, 1985.
1985	142	68.6	48-96	Same title, author, 1985. WDF memorandum December 15, 1986.
1986	66	76.4	59-106	Same title, Ron Roler, 1986. WDF Columbia River Fisheries Laboratory Progress Report # 87-14, June 1987.
1987	123	75.0	53-103	Same title, author, 1987. WDF Columbia River Fisheries Laboratory Progress Report # 88-13, May 1988.
1988	13	85.7	68-l 13	Same title, author, 1988. WDF Columbia River Fisheries Laboratory Progress Report # 89-10, April, 1989.
1989	124	76.4	53-103	Same title, author, 1989. WDF Columbia River Fisheries Laboratory Progress Report # 90-09, April 1, 1990.

Average lengths and ranges are based on marked wild fall chinook recaptured from the North Fork Lewis River during late June-August post-tagging seining evaluations.

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LEWIS SUBBASIN

Coho Salmon

GEOGRAPHIC LOCATION

The Lewis River headwaters descend from the southern flanks of Mount Adams and Mount St. Helens. The mainstem of the river, also known as the North Fork Lewis River, flows southwesterly from its source in Skamania County through three impoundments, Merwin Lake at River Mile (RM) 19, Yale Lake RM 34, and Swift Creek Reservoir RM 48. Along the middle and lower sections, the river forms the boundary between Clark and Cowlitz counties. A major tributary, East Fork Lewis River, enters the mainstem at RM 3. From this point the Lewis River continues west, entering the Columbia River at RM 88. Lewis River Hatchery is located at RM 12. Speelyai Hatchery is located at Speelyai Bay on Merwin Reservoir.

ORIGIN

The Lewis River historically had excellent runs of coho salmon. Before the construction of Merwin, coho spawned in the headwater tributaries of Pine Creek RM 59 and Muddy River RM 60, including Clearwater and Clear Creeks (WDF, 1990). Most existing early coho (Type-S). hatchery programs are considered to be linked to native Toutle River stock coho. Washington stations either received Toutle stock eggs or utilized local native early run coho. Late stock coho (Type-N) are informally considered synonymous with Cowlitz River stock coho. Late stock hatchery programs were developed utilizing Cowlitz River stock, their derivatives, or native late runs. Late coho used in most of the current programs are presumably a blend of all of these, although egg transfers from Cowlitz Hatchery occur most frequently (Howell et al. 1985). The Lewis and Speelyai hatcheries have both stocks of coho.

DISTRIBUTION

Natural spawning occurs in most areas accessible to coho. Historically spawning on the Lewis occurred throughout the watershed. The most extensively utilized stream of the North Fork Lewis River is Cedar Creek. Coho travel upstream for 15 miles into North and South Fork Chelatchie Creeks. On low water flow years coho spawn intensively in the North Fork Lewis River upstream from the Lewis River Hatchery to Merwin Dam.

On the East Fork Lewis River coho spawning occurs below Lucia Falls (RM 21), particularly in side channel areas. Lockwood, Mason, and Rock Creeks are extensively used by spawning coho (WDF, 1973). Some spawning does occur above Lucia Falls but high river flow is needed for fish passage.

PRODUCTION

Despite the blockage by Merwin Dam, coho continue to return in good numbers due to the hatchery program started in 1930. In 1951, the Washington Department of Fisheries estimated coho escapement in the North Fork Lewis to be about 10,000 and the East Fork Lewis at about 5,000 (WDF, 1990). After Merwin was built, but before Yale was constructed, coho were trapped immediately below Merwin and released into the reservoir to utilize upstream habitat (WDF, 1990).

In Washington and Oregon adult production of early and late coho from natural spawners is unknown except for a few instances. A factor of 10 - 15 percent might be considered reasonable for

the percent of the total Columbia River coho production originating from naturally spawning fish (Howell et al. 1985). Escapement estimates are based solely of returns to the hatchery (WDF, 1990).

Tables 1 and 2 describe the amount of spawning and rearing habitat, by quality, available in the Lewis River. This data was derived from the Presence/Absence database of the Northwest Power Planning council, 1991.

The number of Lewis River coho natural spawn escapement is unavailable. Lewis and Speelyai early coho returns during the 1978 - 1987 brood years averaged 8,803 fish and ranged from a low of 1,123 for the 1982 brood to a high of 16,241 for the 1979 brood. Lewis and Speelyai late coho returns during the 1980 - 1987 brood years averaged 30,451 fish and ranged from a low of 10,349 for the 1984 brood to a high of 62,208 for the 1983 brood. Lewis and Speelyai early and late coho returns by brood year are presented in Tables 3 and 4, respectively.

Lewis River tributary sport catch estimates between 1979 - 1988 return years averaged 2,275 adult coho, ranging from a low of 704 in 1981 to a high of 5,525 in 1980 based on punch cards and limited sampling data. Specific age and brood year analysis for Lewis River sport catch is unavailable.

ADULT LIFE HISTORY

Run size, catch and escapement

Ocean commercial and recreational fisheries off the Oregon coast are the primary harvesters of early coho. The Oregon troll fishery accounts for the highest percentage of the overall catch. Most of the freshwater recreational harvest occurs in the Washington tributaries (Howell et al. 1985).

Based on coded-wire tagged releases of 1976 - 1978 brood late coho, most of the harvest occurs in the Washington and Oregon ocean fisheries. Late coho have a more northerly migration pattern than early coho (WDF, 1990). This is reflected in the catch distribution where the Washington coastal catch comprised 40 percent of the total harvest compared to 20 percent for early coho during 1979 - 1981. Late coho also contribute significantly to the lower Columbia River commercial gill net fishery (Howell et al. 1985).

Strays from other lower river hatcheries are not unusual. Table 5 lists Lewis and Speelyai hatchery origin coho stray coded-wire tag recoveries beginning with the 1978 brood through to the 1988 brood. Coded-wire tags which originated outside the Lewis subbasin but were recovered within the Lewis subbasin are listed in Table 6.

Harvest rates have averaged 79 percent and 85 percent for Type-S and N stocks, respectively, between 1983 and 1987. Harvest of Type-S coho is occasionally constrained by one or more of the fall chinook stocks. Harvest of Type-N coho is generally not constrained by weak stocks, with hatchery escapement being the only management constraint (WDF, 1990).

Time of Migration

Early coho enter the Columbia River by mid-August and begin returning to the lower Columbia hatcheries in early September. In the mainstem Columbia River early coho are predominant from August to mid-September. Stock composition shifts to late coho in late September and October. Typically, the late coho run begins entering freshwater in mid to late September with mid-October

considered the main migratory period in the mainstem Columbia River (Howell et al. 1985).

Spawning Period

For Type-S coho, both hatchery and natural spawning occurs around late October, while for Type-N coho spawning will extend from late November through March, with the bulk being in December and early January (Howell et al. 1985)

Snawnine Areas

Natural spawning occurs in most areas accessible to coho (Howell et al. 1985).

Age composition

Coho return as two-year-old jacks and three-year-old adults. Total early and late coho hatchery returns to the Lewis River are listed in Tables 3 and 4. Age composition percentages by brood year for early and late coho returning to the Lewis River hatcheries are listed in Tables 7 and 8, respectively. Age composition percentages by brood year for Lewis subbasin natural spawners are unavailable.

Sex Ratio

The number of Lewis River Hatchery adults for the 1979 - 1988 return year averaged 4,889 with a low return of 1,016 in 1985 and a high of 12,709 in 1892 (WDF, 1990). The percent of Lewis River Hatchery adult females for the return years 1979 -1988 averaged 0.39 percent with a low of 0.24 percent in 1987 and a high of 0.52 percent in 1979 (WDF, 1990). Specific percent females by brood year and age class (freshwaterocean) for coho naturally spawning is unavailable.

Fecundity

Fecundity at the Lewis and Speelyai hatcheries for the 1980 -1988 return years averaged 2,506 with a low of 2,042 in 1983 and a peak of 3,044 in 1988 (WDF ,1990).

Lewis River natural and hatchery fecundity data by age class and brood year are unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

In the Lewis River, at 50 degrees Fahrenheit, fertilization to eyed-egg stage takes about 3.5 weeks, eyed-egg to hatching takes about 2.5 weeks, and hatching to emergence about 8 weeks (Howell et al. 1985). The juvenile life history for Lewis subbasin coho is similar to that of other stocks in the region with a spring emergence (WDF, 1990).

Time. age and size at migration

Hatchery release information for the Lewis subbasin by brood year is presented in Table 9. Because of pond capacity constraints, fingerlings usually constitute the majority of the production.

Survival Rate

A generalized recent year smolt to adult survival rate for coho was estimated to be 2.5 percent (TAC 1983, Howell et al. 1985).

BIOCHEMICAL-GENETIC CHARACTERISTICS

Data has not been compiled.

DISEASE

Bacteria and parasitic diseases found in the Lewis and Speelyai hatcheries are listed in Table 10 (WDF Salmon Culture, Olympia).

Table 1 (HB-1). Estimated amount of rearing and spawning habitat by quality of the Lewis River coho production area.

Distance/Area	Excellent	Good	Fair[a]	Poor[a]	Unknown	Total	Confidence
Miles (%)	00	77	23	00		64.1	
Acres (%)	00	80	20	00		99.0	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 1991.

Table 2 (HB-2). Estimated amount of rearing habitat, by quality, of the Lewis River coho production area.

Distance/Area	Excellent	Good	Fair[a]	Poor[a]	Unknown	Total	Confidence
Miles (%)	00	00	100	00		10.5	
Acres (%)	00	00	100	00		76.4	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 199 1.

Table 3 (RH-1). Total hatchery returns of early coho to the North Fork Lewis River by brood year.

Brood Year	Total Age 2	3	Total	Adult Total
1978	385	4,669	5,054	4,669
1979	3,532	12,709	16,241	12,709
1980	1,028	4,365	5,393	4,365
1981	6,895	5,324	12,219	5,324
1982	107	1,016	1,123	1,016
1983	650	2,914	3,564	2,914
1984	95	13,388	13,483	13,388
1985	6,954	4,997	11,951	4,997
1986	464	13,357	13,821	13,357
1987	451	4,733	5,184	4,733
1988	1,050			

Includes early coho returns to Lewis and Speelyai Hatcheries.

Age composition based on hatchery personnel designation of adults and jacks. Adults were assumed to 2.1 and jacks 2.0.

Table 4 (RH-2). Total hatchery returns of late coho to the Lewis River by brood year.

Brood Year	Total Age 2	3	Total	Adult Total
1978				
1979		10,803		
1980	9,019	13,410	22,429	13,410
1981	5,878	9,712	15,590	9,712
1982	1,983	9,236	11,219	9,236
1983	14,207	48,001	62,208	48,001
1984	1,313	9,036	10,349	9,036
1985	17,053	27,765	44,818	27,765
1986	13,634	34,998	48,632	34,998
1987	7,076	21,286	28,362	21,286
1988	6,613			

Includes late coho returns to Lewis and Speelyai hatcheries.
Age composition based on hatchery personnel designation of adults and jacks.
Adults were assumed to be 2.1 and jacks 2.0.

Table 5 (AE). Emigration of coded wire tagged coho from the North Fork Lewis subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Lewis Hatchery	Lewis River, 1989	Spawning Ground	358	8	---
Lewis Hatchery	Lewis River, 1989	Spawning Ground	358	9	---
Lewis Hatchery	Lewis River, 1989	Spawning Ground	358	2	---
Lewis Hatchery	Cedar Creek, 1988	Spawning Ground	1,008	1	---
Lewis Hatchery	Cedar Creek, 1989	Spawning Ground	200	8	---
Speelyai Hatchery	Kalama Falls Hatchery, 1988	Hatchery	4,877	1	1
Speelyai Hatchery	Lewis River, 1988	Spawning Ground	1,441	7	---
Speelyai Hatchery	Lewis River, 1988	Spawning Ground	1,441	14	---
Speelyai Hatchery	Lewis River, 1988	Spawning Ground	1,441	8	---
Speelyai Hatchery	Cedar Creek, 1988	Spawning Ground	1,008	19	---
Speelyai Hatchery	Cedar Creek, 1988	Spawning Ground	1,008	14	---
Speelyai Hatchery	Cedar Creek, 1988	Spawning Ground	1,008	13	---
Speelyai Hatchery	Pup Creek, 1988	Spawning Ground	21	1	---
Speelyai Hatchery	Colvin Creek, 1988	Spawning Ground	154	7	---
Speelyai Hatchery	Colvin Creek, 1988	Spawning Ground	154	5	---
Speelyai Hatchery	Colvin Creek, 1988	Spawning Ground	154	1	---

Based on the following tag codes: 63-44-50, 63-49-19, 63-49-56, 63-37-02, 63-36-63, 63-37-01, and 63-37-02.
Beginning with the 1978 brood.

Table 6 (AI). Immigration of coded wire tagged coho into the North Fork Lewis subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Chelatchie, (wild)	Lewis Hatchery, 1988	Hatchery	13,634	1	1
Lewis Hatchery	Lewis River, 1989	Spawning Ground	358	8	---
Lewis Hatchery	Lewis River, 1989	Spawning Ground	358	9	---
Lewis Hatchery	Lewis River, 1989	Spawning Ground	358	2	---
Lewis Hatchery	Cedar Creek, 1988	Spawning Ground	1,008	1	---
Lewis Hatchery	Cedar Creek, 1989	Spawning Ground	200	8	---
Speelyai Hatchery	Lewis River, 1988	Spawning Ground	1,441	9	---
Speelyai Hatchery	Lewis River, 1988	Spawning Ground	1,441	14	---
Speelyai Hatchery	Lewis River, 1988	Spawning Ground	1,441	8	---
Speelyai Hatchery	Cedar Creek, 1988	Spawning Ground	1,008	19	---
Speelyai Hatchery	Cedar Creek, 1988	Spawning Ground	1,008	14	---
Speelyai Hatchery	Cedar Creek, 1988	Spawning Ground	1,008	13	---
Speelyai Hatchery	Pup Creek, 1988	Spawning Ground	21	1	---
Speelyai Hatchery	Colvin Creek, 1988	Spawning Ground	154	7	---
Speelyai Hatchery	Colvin Creek, 1988	Spawning Ground	154	5	---
Speelyai Hatchery	Colvin Creek, 1988	Spawning Ground	154	1	---

Based on the following tag codes: 63-32-59, 63-31-57, 63-41-49, 63-44-50, 63-49-19, 63-49-56, 63-36-63, 63-37-01, and 63-37-02.

Beginning with the 1978 brood,

Table 7 (AC-l). Age composition percentage (freshwaterocean) by brood year for early coho returning to the Lewis and Speelyai hatcheries.

Brood Year	N	2.0	2.1
1978		7.62%	92.38%
1979		21.75%	78.25%
1980		19.06%	80.94%
1981		56.43%	43.57%
1982		9.53%	90.47%
1983		18.24%	81.76%
1984		0.70%	99.30%
1985		58.19%	41.81%
1986		3.36%	96.64%
1987		8.70%	91.30%
1988			

Age composition based on hatchery personnel designation of adults and jacks.
Adults assumed to be 2.1 and jacks 2.0.
N (number of scales samples) not applicable.

Table 8 (AC-2). Age composition percentage (freshwaterocean) by brood year for late coho returning to the Lewis and Speelyai hatcheries.

Brood Year	N	2.0	2.1
1980		40.21%	59.79%
1981		37.70%	62.30%
1982		17.68%	82.32%
1983		22.84%	77.16%
1984		12.69%	87.31%
1985		38.05%	61.95%
1986		28.04%	71.96%
1987		24.95%	75.05%
1988			

Age composition based on hatchery personnel designation of adults and jacks.
Adults assumed to be 2.1 and jacks 2.0.
N (number of scales samples) not applicable.

Table 9 (TR). Hatchery releases of COHO salmon into the LEWIS RIVER subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CUT Code
1965	LEVIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/12/67	04/12/67	16	352013	LEWIS R (27.0168)	UNTAGGED
1965	LEVIS RIVER TYPE-S	LEVIS RIVER HATCHERY	Smolt	04/12/67	04/12/67	16	35095	LEWIS R (27.0168)	UNTAGGED
1965	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	04/25/67	04/25/67	17	30478	LEWIS R (27.0168)	UNTAGGED
1965	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	04/25/67	04/25/67	17	298662	LEWIS R (27.01681	UNTAGGED
1966	LEWIS RIVER TYPE-S	LEVIS RIVER HATCHERY	Smolt	04/17/68	04/17/68	17	664845	LEWIS R (27.0168)	UNTAGGED
1966	LEWIS RIVER TYPE-S	LEVIS RIVER HATCHERY	Smolt	04/17/68	04/17/68	17	62055	LEWIS R (27.0168\	UNTAGGED
1966	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	EmFry	01/30/67	01/30/67	1296	425754	LEWIS R (27.0168)	UNTAGGED
1966	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	EmFry	02/17/67	02/17/67	1375	76450	LEWIS R (27.0168)	UNTAGGED
1966	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	EmFry	02/16/67	02/16/67	1375	104250	SPEELYAI CR 27.0430	UNTAGGED
1966	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	04/22/68	04/22/68	16	26604	LEWIS R (27.0168)	UNTAGGED
1966	LEUIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	04/22/68	04/22/68	16	251156	LEWIS R (27.0168\	UNTAGGED
1967	KALAMA RIVER TYPE-S	KALAMA FALLS HATCHRY	EmFry	02/09/68	02/09/68	1134	306501	YACOLT CR (27.0248)	UNTAGGED
1967	LEWIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/28/69	04/28/69	15	733968	LEWIS R (27.0168)	UNTAGGED
1967	LEVIS RIVER TYPE-S	SPEELYAI HATCHERY	EmFry	01/19/68	01/19/68	1417	301000	LEWIS R-EF (27.0173)	UNTAGGED
1967	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	04/21/69	04/21/69	17	490561	LEWIS R (27.0168)	UNTAGGED
1968	LEWIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Smolt	03/26/70	03/26/70	16	845760	LEWIS R (27.0168\	UNTAGGED
1968	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	04/17/70	04/17/70	16	512000	LEWIS R (27.0168)	UNTAGGED
1968	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	04/20/70	04/20/70	16	165200	LEWIS R (27.0168)	UNTAGGED
1969	LEUIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/02/71	04/02/71	17	892500	LEWIS R (27.0168)	UNTAGGED
1969	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	EmFry	02/09/70	02/09/70	1296	50700	GREEN FORK CR 270287	UNTAGGED
1969	LOWER KALAMA TYPE-S	SPEELYAI HATCHERY	EmFry	02/28/70	02/28/70	1296	479700	LEWIS R (27.0168)	UNTAGGED
1969	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	EmFry	02/09/70	02/09/70	1296	44200	LOCKWOOD CR 27.0189	UNTAGGED
1969	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	EmFry	02/09/70	02/09/70	1296	49400	ROCK CR (27.0222\	UNTAGGED
1969	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	EmFry	02/16/70	02/16/70	1296	59800	ROCK CR (27.0222)	UNTAGGED
1969	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	EmFry	02/16/70	02/16/70	1296	62400	YACOLT CR (27.0248)	UNTAGGED
1969	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	04/06/71	04/06/71	20	146500	LEWIS R (27.0168)	UNTAGGED
1969	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	04/06/71	04/06/71	20	297700	LEWIS R (27.0168)	UNTAGGED
1969	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	04/08/71	04/08/71	18	31500	LEWIS R (27.0168)	UNTAGGED
1969	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	04/08/71	04/08/71	2	28710	LEWIS R (27.0168)	UNTAGGED
1969	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	04/09/71	04/09/71	17	137700	LEWIS R (27.0168\	UNTAGGED
1969	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	molt	04/13/71	04/13/71	18	30060	LEWIS R (27.0168)	UNTAGGED
1969	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	molt	04/13/71	04/13/71	18	379994	LEWIS R (27.0168)	UNTAGGED
1970	LEWIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/11/72	04/11/72	16	90496	LEWIS R (27.0168)	UNTAGGED
1970	LEWIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/11/72	04/11/72	15	543420	LEWIS R (27.0168)	UNTAGGED
1970	LEWIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/11/72	04/11/72	14	47404	LEUIS R (27.0168)	UNTAGGED
1970	LEWIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/11/72	04/11/72	14	150094	LEUIS R (27.0168)	UNTAGGED
1970	LEWIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/11/72	04/11/72	13	102778	LEWIS R (27.0168\	UNTAGGED
1970	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	EmFry	02/01/71	02/01/71	1512	249000	BIG CREEK (27.0251)	UNTAGGED
1970	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	EmFry	01/25/71	01/25/71	1512	189000	LEWIS R-EF (27.0173)	UNTAGGED
1970	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	EmFry	01/26/71	01/26/71	1512	150000	LEWIS R-EF (27.0173)	UNTAGGED
1970	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	EmFry	01/26/71	01/26/71	1512	234000	LEWIS R-EF (27.0173)	UNTAGGED
1970	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	EmFry	01/26/71	01/26/71	1512	100000	ROCK CR (27.0222\	UNTAGGED
1970	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Smolt	04/10/72	04/10/72	15	126000	LEWIS R (27.0168)	UNTAGGED
1970	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Smolt	04/11/72	04/11/72	16	108800	LEWIS R (27.0168)	UNTAGGED
1970	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Smolt	04/11/72	04/11/72	16	374400	LEWIS R (27.0168)	UNTAGGED
1970	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Smolt	04/11/72	04/11/72	15	418500	LEWIS R (27.0168)	UNTAGGED
1970	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Smolt	04/12/72	04/12/72	15	43605	LEWIS R (27.0168)	UNTAGGED
1970	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Smolt	04/12/72	04/12/72	15	46395	LEWIS R (27.0168)	UNTAGGED
1970	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Smolt	04/12/72	04/12/72	14	44730	LEWIS R (27.0168)	UNTAGGED
1970	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Smolt	04/12/72	04/12/72	14	47670	LEWIS R (27.0168)	UNTAGGED
1970	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Smolt	04/13/72	04/13/72	15	97500	LEUIS R (27.0168)	UNTAGGED
1970	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Smolt	04/13/72	04/13/72	14	236600	LEWIS R (27.0168\	UNTAGGED
1970	WASHOUGAL R TYPE-S	UASHOUGAL HATCHERY	Fingr	03/31/71	03/31/71	744	1162128	ROCK CREEK UPR EF LE	UNTAGGED
1971	LEWIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/16/73	04/16/73	16	771733	LEWIS R (27.0168)	UNTAGGED
1971	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Fingr	03/31/72	03/31/72	498	300000	COPPER CR (27.0275)	UNTAGGED

Table 9. Hatchery releases of COHO salmon into the LEWIS RIVER subbasin sorted by brood year, hatchery and Life stage - CONTINUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /Lb.	Number Released	Release Site	CWT Code
1971	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Fingr	03/30/72	03/30/72	498	300000	GREEN FORK CR 270287	UNTAGGED
1971	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	04/16/73	04/16/73	18	271800	LEWIS R (27.0168)	UNTAGGED
1971	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	04/17/73	04/17/73	18	108000	LEWIS R (27.0168)	UNTAGGED
1971	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	04/30/73	04/30/73	16	153328	LEWIS R (27.0168)	UNTAGGED
1971	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	05/01/73	05/01/73	18	610200	LEWIS R (27.0168)	UNTAGGED
1971	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	05/01/73	05/01/73	17	481406	LEWIS R (27.0168)	UNTAGGED
1971	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	05/03/73	05/03/73	18	99000	LEWIS R (27.0168)	UNTAGGED
1971	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	05/03/73	05/03/73	18	256500	LEWIS R (27.0168)	UNTAGGED
1972	LEWIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/25/74	04/25/74	16	1086032	LEWIS R (27.0168)	UNTAGGED
1972	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Fingr	04/23/73	04/23/73	251	140000	CEDAR CREEK (27)	UNTAGGED
1972	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Fingr	06/06/73	06/06/73	126	88452	CEDAR CREEK (27)	UNTAGGED
1972	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Fingr	06/06/73	06/06/73	107	18297	CEDAR CREEK (27)	UNTAGGED
1972	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Fingr	04/23/73	04/23/73	251	70000	CHELATCHIE CREEK -NF	UNTAGGED
1972	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Fingr	04/23/73	04/23/73	251	70000	CHELATCHIE CREEK -NF	UNTAGGED
1972	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Fingr	05/23/73	05/23/73	135	74925	CHELATCHIE CREEK -NF	UNTAGGED
1972	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Fingr	06/06/73	06/06/73	126	46746	CHELATCHIE CREEK -NF	UNTAGGED
1972	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Fingr	03/15/73	03/15/73	630	346500	COPPER CR (27.0275)	UNTAGGED
1972	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Fingr	03/15/73	03/15/73	630	346500	GREEN FORK CR 270287	UNTAGGED
1972	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	smoit	04/29/74	04/29/74	16	158400	LEWIS R (27.0168)	UNTAGGED
1972	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	04/30/74	04/30/74	17	350676	LEWIS R (27.0168)	U N T A G G E D
1972	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	04/30/74	04/30/74	16	165600	LEWIS R (27.0168)	UNTAGGED
1972	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	05/01/74	05/01/74	17	68850	LEWIS R (27.0168)	UNTAGGED
1972	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	05/01/74	05/01/74	17	77928	LEWIS R (27.0168)	UNTAGGED
1972	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	05/01/74	05/01/74	17	226100	LEWIS R (27.0168)	UNTAGGED
1972	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	05/01/74	05/01/74	17	238663	LEWIS R (27.0168)	UNTAGGED
1973	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	04/23/75	04/23/75	16	522320	LEWIS R (27.0168)	UNTAGGED
1973	LEWIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/23/75	04/23/75	16	638672	LEWIS R (27.0168)	UNTAGGED
1973	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	EmFry	01/21/74	01/21/74	1512	757500	SPEELYAI CR 27.0430	UNTAGGED
1973	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Fingr	04/16/74	04/16/74	240	216000	COPPER CR (27.0275)	UNTAGGED
1973	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Fingr	04/16/74	04/16/74	240	288000	GREEN FORK CR 270287	UNTAGGED
1973	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Smolt	04/30/75	04/30/75	15	647250	LEWIS R (27.0168)	UNTAGGED
1973	LEWIS RIVER TYPE-N	SPEELYAI HATCHERY	Smolt	04/30/75	04/30/75	15	751500	LEWIS R (27.0168)	UNTAGGED
1974	LEWIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Smolt	05/07/76	05/07/76	16	1175488	LEWIS R (27.0168)	UNTAGGED
1974	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Fingr	03/18/75	03/18/75	416	313500	GREEN FORK CR 270287	UNTAGGED
1974	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Fingr	05/20/75	05/20/75	171	80883	LEWIS R-EF (27.0173)	UNTAGGED
1974	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Fingr	03/18/75	03/18/75	416	313500	ROCK CR (27.0222)	UNTAGGED
1974	LEWIS RIVER TYPE-S	SPEELYAI HATCHERY	Fingr	05/20/75	05/20/75	171	94221	SPEELYAI CR 27.0430	UNTAGGED ,
1974	CDWLITZ TYPE-N STOCK	SPEELYAI HATCHERY	Smolt	05/03/76	05/03/76	16	1472768	LEWIS R (27.0168)	UNTAGGED
1974	COWLITZ TYPE-N STOCK	SPEELYAI HATCHERY	Smolt	05/03/76	05/03/76	16	6400	SPEELYAI CR 27.0430	UNTAGGED
1975	TYPE-S (SPEELYAI	LEWIS RIVER HATCHERY	Smolt	04/04/77	04/04/77	16	338480	LEWIS R (27.0168)	UNTAGGED
1975	TYPE-S (SPEELYAI	LEWIS RIVER HATCHERY	Smolt	04/28/77	04/28/77	15	805485	LEWIS R (27.0168)	UNTAGGED
1975	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Fingr	05/07/76	05/07/76	180	180000	COPPER CR (27.0275)	UNTAGGED
1975	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Fingr	05/06/76	05/06/76	180	180000	GREEN FORK CR 270287	UNTAGGED
1975	COWLITZ TYPE-N STOCK	SPEELYAI HATCHERY	Fingr	02/15/77	02/15/77	20	203000	LEWIS R (27.0168)	UNTAGGED
1975	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Fingr	05/06/76	05/06/76	180	180000	ROCK CR (27.0222)	UNTAGGED ,
1975	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Fingr	05/19/76	05/19/76	165	474540	SPEELYAI CR 27.0430	UNTAGGED
1975	CDWLITZ TYPE-N STOCK	SPEELYAI HATCHERY	Smolt	05/03/77	05/03/77	15	1129620	LEWIS R (27.0168)	UNTAGGED
1975	CDWLITZ TYPE-N STOCK	SPEELYAI HATCHERY	Smolt	05/03/77	05/03/77	15	55380	SPEELYAI CR 27.0430	UNTAGGED
1976	LEWIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Fingr	07/06/77	07/06/77	110	7115	LEWIS R (27.0168)	631617
1976	LEWIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Fingr	07/06/77	07/06/i?	110	7045	LEWIS R (27.0168)	UNTAGGED
1976	LEWIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Fingr	07/06/77	07/06/77	111	5331	LEWIS R (27.0168)	UNTAGGED
1976	LEWIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Fingr	12/09/77	12/09/77	26	78884	LEWIS R (27.0168)	UNTAGGED
1976	TYPE-S (SPEELYAI	LEWIS RIVER HATCHERY	Smolt	03/26/78	03/26/78	15	99540	LEWIS R (27.0168)	UNTAGGED
1976	TYPE-S (SPEELYAI	LEWIS RIVER HATCHERY	Smolt	05/09/78	05/09/78	13	304811	LEWIS R (27.0168)	UNTAGGED
1976	TYPE-S (SPEELYAI	LEWIS RIVER HATCHERY	Smolt	06/12/78	06/12/78	9	614156	LEWIS R (27.0168)	UNTAGGED

Table 9. Hatchery releases of COHO salmon into the LEUIS RIVER subbasin sorted by brood year, hatchery and life stage - CONTINUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Cede
1976	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Fingr	05/11/77	05/11/77	251	108250	CEDAR CREEK (27)	UNTAGGED
1976	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Fingr	05/11/77	05/11/77	251	12500	LAKE MERWIN (27)	UNTAGGED ,
1976	CDWLITZ TYPE-N STOCK	SPEELYAI HATCHERY	Smolt	05/03/78	05/03/78	16	7750	LAKE MERWIN (27)	UNTAGGED
1976	CDWLITZ TYPE-N STOCK	SPEELYAI HATCHERY	Smolt	05/03/78	05/03/78	16	1227600	LEWIS R (27.0168)	UNTAGGED
1977	TYPE-S (SPEELYAI	LEWIS RIVER HATCHERY	Fingr	12/10/78	12/10/78	24	43584	LEWIS R (27.0168)	UNTAGGED
1977	TYPE-S (SPEELYAI	LEWIS RIVER HATCHERY	Smolt	04/25/79	04/25/79	16	250992	LEWIS R (27.0168)	UNTAGGED
1977	TYPE-S (SPEELYAI	LEWIS RIVER HATCHERY	Smolt	06/03/79	06/03/79	13	751777	LEWIS R (27.0168)	UNTAGGED
1977	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Smolt	05/02/79	05/02/79	15	7500	LAKE MERWIN (27)	UNTAGGED
1977	CDWLITZ TYPE-N STOCK	SPEELYAI HATCHERY	Smolt	05/02/79	05/02/79	15	7500	LAKE MERWIN (27)	UNTAGGED
1977	CDWLITZ TYPE-N STOCK	SPEELYAI HATCHERY	Smolt	05/02/79	05/02/79	15	875982	LEWIS R (27.0168)	UNTAGGED
1977	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Smolt	05/02/79	05/02/79	15	615800	LEWIS R (27.0168)	UNTAGGED
1978	TYPE-S (SPEELYAI	LEWIS RIVER HATCHERY	Fingr	01/12/80	01/12/80	27	169911	LEWIS R (27.0168)	UNTAGGED
1978	LEWIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Fingr	03/30/79	03/30/79	1106	80300	LOCKWOOD CR 27.0189	UNTAGGED
1978	LEWIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Fingr	03/30/79	03/30/79	1106	118800	MASON CR (27.0200)	UNTAGGED
1978	LEWIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Fingr	03/30/79	03/30/79	1106	44000	RILEY CR (27.0190)	UNTAGGED
1978	TYPE-S (SPEELYAI	LEWIS RIVER HATCHERY	Smolt	04/16/80	04/16/80	20	12432	LEWIS R (27.0168)	UNTAGGED
1978	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	04/16/80	04/16/80	20	15568	LEWIS R (27.0168)	UNTAGGED
1978	TYPE-S (SPEELYAI	LEWIS RIVER HATCHERY	Smolt	04/16/80	04/16/80	20	177600	LEWIS R (27.0168)	UNTAGGED
1978	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	04/16/80	04/16/80	20	222400	LEWIS R (27.0168)	UNTAGGED
1978	TYPE-S (SPEELYAI	LEWIS RIVER HATCHERY	Smolt	05/07/80	05/07/80	17	22379	LEWIS R (27.0168)	UNTAGGED
1978	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/07/80	05/07/80	17	28025	LEWIS R (27.0168)	UNTAGGED
1978	TYPE-S (SPEELYAI	LEWIS RIVER HATCHERY	Smolt	05/07/80	05/07/80	17	114163	LEWIS R (27.0168)	UNTAGGED
1978	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/07/80	05/07/80	17	142961	LEWIS R (27.0168)	UNTAGGED
1978	TYPE-S (SPEELYAI	LEWIS RIVER HATCHERY	Smolt	05/15/80	05/15/80	17	23595	LEWIS R (27.0168)	UNTAGGED
1978	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/15/80	05/15/80	17	29547	LEWIS R (27.0168)	UNTAGGED
1978	TYPE-S (SPEELYAI	LEWIS RIVER HATCHERY	Smolt	05/15/80	05/15/80	17	570206	LEWIS R (27.0168)	UNTAGGED
1978	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/15/80	05/15/80	17	714042	LEWIS R (27.0168)	UNTAGGED
1978	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Fingr	06/13/79	06/13/79	171	86184	COPPER CR (27.0275)	UNTAGGED
1978	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Fingr	06/13/79	06/13/79	171	172197	GREEN FORK CR 270287	UNTAGGED
1978	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Fingr	06/13/79	06/13/79	171	85500	ROCK CR (27.0222)	UNTAGGED
1978	TYPE-S (SPEELYAI	SPEELYAI HATCHERY	Fingr	06/13/79	06/13/79	171	85500	SPEELYAI CR 27.0430	UNTAGGED
1979	LEWIS RIVER TYPE-S	LEWIS RIVER HATCHERY	Fingr	06/25/80	06/25/80	200	4400	LEWIS R (27.0168)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	03/16/81	03/16/81	22	197890	LEWIS R (27.0168)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	03/17/81	03/17/81	27	126360	LEWIS R (27.0168)	UNTAGGED
1979	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	03/17/81	03/17/81	27	184140	LEWIS R (27.0168)	UNTAGGED
1979	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Smolt	03/17/81	03/17/81	18	177660	LEWIS R (27.0168)	UNTAGGED
1979	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Smolt	03/17/81	03/17/81	18	329940	LEWIS R (27.0168)	UNTAGGED ,
1979	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Smolt	03/18/81	03/18/81	22	140140	LEWIS R (27.0168)	UNTAGGED
1979	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Smolt	03/18/81	03/18/81	22	260260	LEWIS R (27.0168)	UNTAGGED
1979	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/24/81	04/24/81	18	139860	LEWIS R (27.0168)	UNTAGGED
1979	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/24/81	04/24/81	18	259740	LEWIS R (27.0168)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	04/24/81	04/24/81	17	389844	LEWIS R (27.0168)	UNTAGGED
1979	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/24/81	04/24/81	15	483030	LEWIS R (27.0168)	UNTAGGED
1979	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/24/81	04/24/81	15	895095	LEWIS R (27.0168)	UNTAGGED
1979	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Smolt	05/03/81	05/03/81	17	317832	LEWIS R (27.0168)	UNTAGGED
1979	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Smolt	05/03/81	05/03/81	17	644691	LEWIS R (27.0168)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	molt	05/30/81	05/30/81	13	998881	LEWIS R (27.0168)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/31/81	05/31/81	13	373048	LEWIS R (27.0168)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/31/81	05/31/81	13	541099	LEWIS R (27.0168)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	SPEELYAI HATCHERY	Fingr	02/25/81	02/25/81	27	69520	LAKE MERWIN (27)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	SPEELYAI HATCHERY	Fingr	02/24/81	02/24/81	27	330480	LEWIS R (27.0168)	UNTAGGED
1979	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Smolt	05/05/81	05/05/81	16	4800	LAKE MERWIN (27)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	SPEELYAI HATCHERY	Smolt	05/06/81	05/06/81	18	9000	LAKE MERWIN (27)	UNTAGGED
1979	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Smolt	05/05/81	05/05/81	16	339200	LEWIS R (27.0168)	UNTAGGED
1979	COWLITZ TYPE-N STOCK	SPEELYAI HATCHERY	Smolt	05/06/81	05/06/81	18	511200	LEWIS R (27.0168)	UNTAGGED

Table 9. Hatchery releases of COHO salmon into the LEUIS RIVER subbasin sorted by brood year, hatchery and Life stage - CONTINUED.

Brood Year	stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1980	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Fingr	01/16/81	01/16/81	1334	152950	LOCKWOOD CR 27.0189	UNTAGGED
1980	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Fingr	01/16/81	01/16/81	1334	152950	MASON CR (27.0200)	UNTAGGED
1980	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Fingr	01/16/81	01/16/81	1334	202160	RILEY CR (27.0190)	UNTAGGED
1980	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Smolt	05/07/82	05/07/82	15	498810	LEWIS R (27.0168)	UNTAGGED
1980	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/16/82	05/16/82	17	3469360	LEWIS R (27.0168)	UNTAGGED
1980	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	EmFry	01/15/81	01/15/81	1334	690900	CEDAR CREEK (27)	UNTAGGED
1980	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	EmFry	01/15/81	01/15/81	1375	124950	CHELATCHIE CREEK -NF	UNTAGGED
1980	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	EmFry	02/17/81	02/17/81	1512	150000	LAKE MERWIN (27)	UNTAGGED
1980	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	EmFry	02/17/81	02/17/81	1512	1099500	LEWIS R-EF (27.0173)	UNTAGGED
1980	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	EmFry	02/17/81	02/17/81	1512	330000	ROCK CR (27.0222)	UNTAGGED
1980	TOUTLE R TYPE-S	SPEELYAI HATCHERY	Smolt	05/04/82	05/04/82	19	51205	LEWIS R (27.0168)	632304
1980	TWTLE R TYPE-S	SPEELYAI HATCHERY	Smolt	05/04/82	05/04/82	19	710220	LEWIS R (27.0168)	UNTAGGED
1980	TDUTLE R TYPE-S	SPEELYAI HATCHERY	Smolt	06/02/82	06/02/82	17	51323	LEWIS R (27.0168)	632305
1980	TOUTLE R TYPE-S	SPEELYAI HATCHERY	molt	06/02/82	06/02/82	17	70788	LEWIS R (27.0168)	UNTAGGED
1981	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	EmFry	12/15/81	12/15/81	1680	480000	LEWIS R (27.0168)	UNTAGGED
1981	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/11/83	05/11/83	18	1365480	LEWIS R (27.0168)	UNTAGGED
1981	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/15/83	05/15/83	18	1401930	LEWIS R (27.0168)	UNTAGGED
1981	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	EmFry	01/04/82	01/04/82	1417	272000	LAKE MERWIN (27)	UNTAGGED
1981	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	EmFry	01/09/82	01/09/82	1463	64000	LAKE MERWIN (27)	UNTAGGED
1981	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Smolt	05/03/83	05J03J83	20	10000	LAKE MERWIN (27)	UNTAGGED
1981	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Smolt	05/03/83	05/03/83	20	993220	LEWIS R (27.0168)	UNTAGGED
1981	TDUTLE R TYPE-S	SPEELYAI HATCHERY	Smolt	06/20/83	06120183	20	50985	LEWIS R (27.0168)	632735
1981	TOUTLE R TYPE-S	SPEELYAI HATCHERY	Smolt	06/20/83	06/20/83	20	64515	LEWIS R (27.0168)	UNTAGGED
1982	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/29/84	05/29/84	19	100700	LAKE MERWIN (27)	UNTAGGED
1982	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/19/84	05/19/84	18	3165300	LEWIS R (27.0168)	UNTAGGED
1982	COWLITZ TYPE-N STOCK	LOWER KALAMA HATCHRY	Fingr	04/28/83	04/28/83	613	927000	LEWIS R-EF (27.0173)	UNTAGGED
1982	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	07/18/83	07/18/83	60	154600	LAKE MERWIN (27)	UNTAGGED
1982	TDUTLE R TYPE-S	SPEELYAI HATCHERY	Smolt	05/01/84	05/01/84	17	49260	LEWIS R (27.0168)	633015
1982	TDUTLE R TYPE-S	SPEELYAI HATCHERY	Smolt	05/01/84	05/01/84	17	750844	LEWIS R (27.0168)	UNTAGGED
1982	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Smolt	05/01/84	05/01/84	19	147269	LEWIS R (27.0168)	UNTAGGED
1982	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Smolt	05/01/84	05/01/84	17	42500	LEWIS R (27.0168)	UNTAGGED
1982	TDUTLE R TYPE-S	SPEELYAI HATCHERY	Smolt	05/30/84	05/30/84	19	51335	LEWIS R (27.0168)	633016
1982	TOUTLE R TYPE-S	SPEELYAI HATCHERY	Smolt	05/30/84	05/30/84	19	86415	LEWIS R (27.0168)	UNTAGGED
1983	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/26/85	04/26/85	18	84300	LEWIS R (27.0168)	UNTAGGED
1983	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/26/85	04/26/85	18	198400	LEWIS R (27.0168)	UNTAGGED
1983	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/26/85	04/26/85	18	395800	LEWIS R (27.0168)	UNTAGGED
1983	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	04/26/85	04/26/85	18	417600	LEWIS R (27.0168)	UNTAGGED ,
1983	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/27/85	05/27/85	17	4246500	LEWIS R (27.0168)	UNTAGGED
1983	COWLITZ TYPE-N STOCK	SPEELYAI HATCHERY	Fingr	06/29/84	06/29/84	150	150300	LAKE MERVIN (27)	UNTAGGED
1983	CDWLITZ TYPE-N STOCK	SPEELYAI HATCHERY	Smolt	04/30/85	04/30/85	18	151300	LAKE MERWIN (27)	UNTAGGED
1984	LEWIS RIVER	LEWIS RIVER HATCHERY	EmFry	04/17/86	06/30/86	25	4720	LEWIS RIVER TRIBS	633130
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/01/85	07/01/85	409	13120	CHELATCHIE CREEK -NF	UNTAGGED
1984	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/01/85	07/01/85	409	13120	CHELATCHIE CREEK -NF	UNTAGGED
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/01/85	07/01/85	409	13530	CHELATCHIE CREEK -NF	UNTAGGED
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/01/85	07/01/85	409	13530	CHELATCHIE CREEK -NF	UNTAGGED
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/01/85	07/01/85	409	13940	CHELATCHIE CREEK -NF	UNTAGGED
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/01/85	07/01/85	409	16400	CHELATCHIE CREEK -NF	UNTAGGED
1984	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/01/85	07/01/85	409	16776	CHELATCHIE CREEK -NF	UNTAGGED
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/03/85	07J03J85	391	49900	COPPER CR (27.0275)	UNTAGGED
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/03/85	07/03/85	391	33200	GREEN FORK CR 270287	UNTAGGED
1984	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Fingr	04/29/85	04/29/85	810	16200	HOUGHTON CR 27.0319	UNTAGGED
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/02/85	07/02/85	391	23000	JENNY CR (27.0174)	UNTAGGED
1984	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Fingr	04/29/85	04/29/85	810	113400	LAKE MERWIN (27)	UNTAGGED
1984	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Fingr	04/29/85	04/29/85	810	113400	LAKE MERWIN (27)	UNTAGGED
1984	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Fingr	04/29/85	04/29/85	810	283500	LAKE MERWIN (27)	UNTAGGED

Table 9. Hatchery releases of COHO salmon into the LEWIS RIVER subbasin sorted by brood year, hatchery and life stage - CONTINUED.

Brood Year	stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/04/85	06/04/85	698	203000	LEWIS R (27.0168)	UNTAGGED
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/02/85	07/02/85	391	44500	LOCKWOOD CR 27.0189	UNTAGGED
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/02/85	07/02/85	391	34700	MASON CR (27.0200)	UNTAGGED
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/02/85	07/02/85	388	12000	RILEY CR (27.0190)	UNTAGGED
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/12/85	06/12/85	498	97500	ROCK CR (27.0222)	UNTAGGED
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/02/85	07/02/85	391	15200	ROCK CR (27.0222)	UNTAGGED
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/02/85	07/02/85	391	15200	ROCK CREEK UPR EF LE	UNTAGGED
1984	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Fingr	04/29/85	04/29/85	810	8100	ROSS CR (27.0305)	UNTAGGED
1984	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Fingr	04/29/85	04/29/85	810	16200	ROSS CR (27.0305)	UNTAGGED
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/01/85	07/01/85	391	17600	WEAVER CR (27.0249)	UNTAGGED
1984	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/01/85	07/01/85	391	18700	WEAVER CR (27.0249)	UNTAGGED
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/12/85	06/12/85	498	44500	YACOLT CR (27.0248)	UNTAGGED
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/01/85	07/01/85	391	14800	YACOLT CR (27.0248)	UNTAGGED
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/01/85	07/01/85	391	14800	YACOLT CR (27.0248)	UNTAGGED
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/07/86	05/07/86	18	647100	LEWIS R (27.0168)	UNTAGGED
1984	COLUMBIA R - TYPE-S	LEWIS RIVER HATCHERY	Smolt	05/07/86	05/07/86	18	1232100	LEWIS R (27.0168)	UNTAGGED
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/18/86	05/18/86	18	1878300	LEWIS R (27.0168)	UNTAGGED
1984	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/21/86	05/21/86	17	1878500	LEWIS R (27.0168)	UNTAGGED
1984	CHELATCHIE CREEK -NF	PDNR (WILDSTOCK- N	EmFry	04/18/86	06/30/86		4227	CHELATCHIE CREEK -NF	633401
1984	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/09/85	04/09/85	5::	24200	CEDAR CREEK (27)	UNTAGGED
1984	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/09/85	04/09/85	553	38500	CEDAR CREEK (27)	UNTAGGED
1984	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/09/85	04/09/85	553	63800	CEDAR CREEK (27)	UNTAGGED
1984	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/09/85	04/09/85	553	64900	CEDAR CREEK (27)	UNTAGGED
1984	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/09/85	04/09/85	553	77000	CEDAR CREEK (27)	UNTAGGED
1984	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/09/85	04/09/85	553	38500	JOHN CR (27.0335)	UNTAGGED
1984	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/08/85	04/08/85	553	66000	LAKE MERWIN (27)	UNTAGGED
1984	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/09/85	04/09/85	553	117200	LAKE MERWIN (27)	UNTAGGED
1984	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/09/85	04/09/85	553	121000	LAKE MERWIN (27)	UNTAGGED
1984	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/09/85	04/09/85	553	121000	LAKE MERWIN (27)	UNTAGGED
1984	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	07/09/85	07/09/85	85	150400	LAKE MERWIN (27)	UNTAGGED
1984	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/08/85	04/08/85	553	34100	LEWIS R-EF (27.0173)	UNTAGGED
1984	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/08/85	04/08/85	553	46200	LEWIS R-EF (27.0173)	UNTAGGED
1984	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/08/85	04/08/85	553	200200	LEWIS R-EF (27.0173)	UNTAGGED
1984	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/08/85	04/08/85	553	23100	LITTLE CR (27.0286)	UNTAGGED
1984	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/09/85	04/09/85	553	38500	PUP CREEK (27.0345)	UNTAGGED
1984	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/09/85	04/09/85	553	38500	PUP CREEK (27.0345)	UNTAGGED
1984	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/08/85	04/08/85	553	23100	SLIDE CR (27.0284)	UNTAGGED
1984	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	01/08/86	01/08/86	38	6300	SPEELYAI CR 27.0430	UNTAGGED
1984	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Smolt	07/01/86	07/01/86	14	151200	SPEELYAI CR 27.0430	UNTAGGED
1985	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/13/86	05/13/86	445	114100	CEDAR CREEK (27)	UNTAGGED
1985	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/03/86	06/03/86	498	70000	CEDAR CREEK (27)	UNTAGGED
1985	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/24/86	06/24/86	261	49400	CEDAR CREEK (27)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/24/86	06/24/86	215	14620	CHELATCHIE CREEK -NF	UNTAGGED
1985	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/24/86	06/24/86	215	14835	CHELATCHIE CREEK -NF	UNTAGGED
1985	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/24/86	06/24/86	215	14845	CHELATCHIE CREEK -NF	UNTAGGED
1985	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/24/86	06/24/86	215	15050	CHELATCHIE CREEK -NF	UNTAGGED
1985	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/24/86	06/24/86	215	15050	CHELATCHIE CREEK -NF	UNTAGGED
1985	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/24/86	06/24/86	215	15050	CHELATCHIE CREEK -NF	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/24/86	06/24/86	215	15050	CHELATCHIE CREEK -NF	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/03/86	06/03/86	498	60000	COPPER CR (27.0275)	UNTAGGED
1985	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/06/86	05/06/86	521	24000	JENNY CR (27.0174)	UNTAGGED
1985	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/03/86	06/03/86	498	30000	JOHN CR (27.0335)	UNTAGGED
1985	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/27/86	05/27/86	560	42000	JOHNSON CR (27.0327)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/24/86	06/24/86	210	29400	JOHNSON CR (27.0327)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/28/86	05/28/86	621	50000	LEWIS R-EF (27.0173)	UNTAGGED

Table 9. Hatchery releases of COHO salmon into the LEUIS RIVER subbasin sorted by brood year, hatchery and life stage • CONTINUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CUT Code
1985	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/03/86	06/03/86	498	90000	LEWIS R-EF (27.0173)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEUIS RIVER HATCHERY	Fingr	06/03/86	06/03/86	498	125000	LEWIS R-EF (27.0173)	UNTAGGED
1985	COULITZ TYPE-N STOCK	LEUIS RIVER HATCHERY	Fingr	05/06/86	05/06/86	521	46900	LOCKWOOD CR 27.0189	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/06/86	05/06/86	515	44000	LOCKWOOD CR 27.0189	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEUIS RIVER HATCHERY	Fingr	05/06/86	05/06/86	521	70800	MASON CR (27.0200)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/14/86	05/14/86	449	82000	MASON CR (27.0200)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/24 /86	06/24/86	261	37700	PUP CREEK (27.0345)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/24/86	06/24/86	261	37700	PUP CREEK (27.0345)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/06/86	05/06/86	521	14000	RILEY CR (27.0190)	UNTAGGED
1985	COULITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/28/86	05/28/86	574	72000	ROCK CR (27.0222)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEVIS RIVER HATCHERY	Fingr	05/06/86	05/06/86	515	29500	ROCK CREEK UPR EF LE	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/24/86	06/24/86	210	35700	WEAVER CR (27.0249)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/24/86	06/24/86	210	35700	WEAVER CR (27.0249)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/24/86	06/24/86	210	29400	YACOLT CR (27.0248)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/24/86	06/24/86	210	29400	YACDLT CR (27.0248)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/24/86	06/24/86	210	29400	YACOLT CR (27.0248)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	04/15/87	04/15/87	15	91576	LEWIS R (27.0168)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	04/16/87	04/16/87	18	723824	LEWIS R (27.0168)	UNTAGGED
1985	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/25/87	05/25/87	18	1444376	LEWIS R (27.0168)	UNTAGGED
1985	COULITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/25/87	05/25/87	16	2117124	LEWIS R (27.0168)	U N T A G G E D
1985	CHELATCHIE CREEK -NF	PDNR (WILDSTOCK- N	EmFry	04/11/87	06/04/87	20	7403	CHELATCHIE CREEK -NF	634149
1985	CHELATCHIE CREEK -NF	QDNR (WILDSTOCK- N	EmFry	04/1 1/87	06/04/87		6185	CHELATCHIE CREEK -NF	634442
1985	COLUMBIA R • TYPE-S	SPEELYAI HATCHERY	Fingr	04/08/86	04/08/86	328	a8200	CEDAR CREEK (27)	UNTAGGED
1985	COLUMBIA R • TYPE-S	SPEELYAI HATCHERY	Fingr	04/08/86	04/08/86	349	14700	DEAN CREEK (27)	UNTAGGED
1985	COLUMBIA R • TYPE-S	SPEELYAI HATCHERY	Fingr	04/08/86	04/08/86	349	12200	HOUGHTON CR 27.0319	UNTAGGED
1985	COLUMBIA R • TYPE-S	SPEELYAI HATCHERY	Fingr	04/08/86	04/08/86	349	6300	MCCORMICK CR 27.0182	UNTAGGED
1985	COLUMBIA R • TYPE-S	SPEELYAI HATCHERY	Fingr	04/08/86	04/08/86	349	5600	ROBINSON CR 27.0300	UNTAGGED
1985	COLUMBIA R • TYPE-S	SPEELYAI HATCHERY	Fingr	04/08/86	04/08/86	352	104800	ROCK CREEK UPR EF LE	UNTAGGED
1985	COLUMBIA R • TYPE-S	SPEELYAI HATCHERY	Fingr	04/08/86	04/08/86	349	24000	ROSS CR (27.0305)	UNTAGGED
1985	COLUMBIA R • TYPE-S	SPEELYAI HATCHERY	Fingr	07/29/86	07/29/86	75	150900	SPEELYAI CR 27.0430	UNTAGGED
1985	COLUMBIA R • TYPE-S	SPEELYAI HATCHERY	Fingr	04/08/86	04/08/86	349	12900	UNNAMED STREAM (27)	UNTAGGED
1985	TOUTLE R TYPE-S	SPEELYAI HATCHERY	Smolt	04/15/87	04/16/87	15	23214	LEWIS R (27.0168)	633663
1985	TOUTLE R TYPE-S	SPEELYAI HATCHERY	Smolt	04/15/87	04/16/87	15	298502	LEWIS R (27.0168)	UNTAGGED
1985	TOUTLE R TYPE-S	SPEELYAI HATCHERY	Smolt	04/15/87	04/16/87	15	25228	LEVIS R (27.0168)	633701
1985	TOUTLE R TYPE-S	SPEELYAI HATCHERY	Smolt	04/15/87	04/16/87	15	298542	LEWIS R (27.0168)	UNTAGGED
1985	TCUTLE R TYPE-S	SPEELYAI HATCHERY	Smolt	04/15/87	04/16/87	15	24935	LEWIS R (27.0168)	633702
1985	TOUTLE R TYPE-S	SPEELYAI HATCHERY	Smolt	04/15/87	04/16/87	15	298538	LEWIS R (27.0168)	UNTAGGED
1985	COLUMBIA R • TYPE-S	SPEELYAI HATCHERY	Smolt	07/01/87	07/01 /87	10	150150	SPEELYAI CR 27.0430	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	04/09/87	04/09/87	1260	35000	DEAN CREEK (27)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	03/19/87	03/19/87	1226	186200	JOHN CR (27.0335)	UNTAGGED
1986	COULITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	03/12/87	03/12/87	1163	71300	JOHNSON CR (27.0327)	UNTAGGED
1986	COULITZ TYPE-N STOCK	LEUIS RIVER HATCHERY	EmFry	03/13/87	03/13/87	1260	117300	LAKE MERWIN (27)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	04/03/87	04/03/87	1194	100800	LOCKWOOD CR 27.0189	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	04/09/87	04/09/87	1260	110000	LOCKWOOD CR 27.0189	UNTAGGED
1986	COULITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	03/18/87	03/18/87	1226	58800	MASON CR (27.0200)	UNTAGGED
1986	COULITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	03/18/87	03/18/87	1226	63700	MASON CR (27.0200)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	03/ 18/87	03/18/87	1226	83300	MASON CR (27.0200)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	03/18/87	03/18/87	1226	83300	MASON CR (27.0200)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	03/12/87	03/1 2/87	1163	55200	PINE CR (27.0514)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	03/1 2/87	03/12/87	1163	48300	ROCK CR (27.0222)	UNTAGGED
1986	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	03/19/87	03/19/87	1226	34300	ROCK CR (27.0222)	UNTAGGED
1986	COULITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	03/19/87	03/19/87	1226	39200	ROCK CR (27.0222)	UNTAGGED
1986	COULITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	03/1 2/87	03/12/87	1163	46000	ROSS CR (27.0305)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	03/12/87	03/12/87	1163	57500	STAPLES CR (27.0315)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	03/19/87	03/19/87	1226	29400	UNNAMED STREAM (27)	UNTAGGED

Table 9. Hatchery releases of COHO salmon into the LEWIS RIVER subbasin sorted by brood year, hatchery and life stage - CONTINUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CUT Cede
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	03/12/87	03/12/87	1163	48300	WOODLAND PARK CREEK	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	03/20/87	03/20/87	926	111600	CEDAR CREEK (27)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	04/21/87	04/21/87	483	54720	CEDAR CREEK (27)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	04/21/87	04/21/87	483	54720	CEDAR CREEK (27)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	04/21/87	04/21/87	483	54720	CEDAR CREEK (27)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	04/30/87	04/30/87	515	27810	GREEN FORK CR 270287	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	04/21/87	04/21/87	483	22080	JENNY CR (27.0174)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	04/22/87	04/22/87	483	125760	LEWIS R-EF (27.0173)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	04/31/87	04/31/87	515	136990	LEWIS R-EF (27.0173)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	03/20/87	03/20/87	926	139500	PUP CREEK (27.0345)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	04/21/87	04/21/87	483	14400	ROCK CR (27.0222)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	04/22/87	04/22/87	483	69120	ROCK CR (27.0222)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	04/21/87	04/21/87	483	17280	WEAVER CR (27.0249)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	04/21/87	04/21/87	483	43200	YACOLT CR (27.0248)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	04/05/88	05/30/88	20	45247	LEUIS R (27.0168)	634919
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	04/05/88	05/30/88	20	1181853	LEWIS R (27.0168)	UNTAGGED
1986	TWTLE R TYPE-S	LEUIS RIVER HATCHERY	Smolt	04/16/88	04/23/88	20	917833 76667	LEWIS R (27.0168)	634450
1986	TOUTLE R TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/16/88	04/23/88			LEWIS R (27.0168)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	04/16/88	05/22/88	18	49319	LEWIS R (27.0168)	634956
1986	COWLITZ TYPE-N STOCK	LEUIS RIVER HATCHERY	Smolt	04/16/88	05/22/88	18	1784581	LEWIS R (27.0168)	U N T A G G E D
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	04/16/88	04/16/88	20	11000	LEWIS R (27.0168)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	04/16/88	04/16/88	20	14600	LEWIS R (27.0168)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	04/16/88	04/16/88	20	64600	LEWIS R (27.0168)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	04/23/88	04/23/88	18	88200	LEWIS R (27.0168)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	04/23/88	04/23/88	18	117900	LEWIS R (27.0168)	UNTAGGED
1986	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	04/23/88	04/23/88	18	520200	LEWIS R (27.0168)	UNTAGGED
1986	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/17/87	04/17/87	336	9380	CHELATCHIE CREEK -NF	UNTAGGED
1986	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/17/87	04/17/87	336	9380	CHELATCHIE CREEK -NF	UNTAGGED
1986	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/17/87	04/17/87	336	9380	CHELATCHIE CREEK -NF	UNTAGGED
1986	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/17/87	04/17/87	336	9380	CHELATCHIE CREEK -NF	UNTAGGED
1986	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/17/87	04/17/87	336	10050	CHELATCHIE CREEK -NF	UNTAGGED
1986	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/17/87	04/17/87	336	10050	CHELATCHIE CREEK -NF	UNTAGGED
1986	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/17/87	04/17/87	336	10050	CHELATCHIE CREEK -NF	UNTAGGED
1986	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/17/87	04/17/87	336	12730	CHELATCHIE CREEK -NF	UNTAGGED
1986	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	07/28/87	07/28/87	62	149400	SPEELYAI CR 27.0430	UNTAGGED
1986	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Smolt	07119188	07/19/88	14	148250	LAKE MERWIN (27)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	03/30/88	03/30/88	1194	38400	LEWIS R (27.0168)	UNTAGGED ,
1987	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/08/88	07/08/88	230	13800	JOHNSON CR (27.0327)	UNTAGGED
1987	CDWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	03/30/88	03/30/88	945	77900	LEWIS R (27.0168)	UNTAGGED
1987	COULITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/08/88	07/08/88	230	4600	ROSS CR (27.0305)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/08/88	07/08/88	230	4600	ROSS CR (27.0305)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	07/08/88	07/08/88	230	4600	STAPLES CR (27.0315)	UNTAGGED
1987	TOUTLE R TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/30/89	04/30/89	18	73521	LEWIS R (27.0168)	635256
1987	TOUTLE R TYPE-S	LEWIS RIVER HATCHERY	Smolt	04/30/89	04/30/89	18	610879	LEWIS R (27.0168)	UNTAGGED ,
1987	COLUMBIA R - TYPE-S	LEVIS RIVER HATCHERY	Smolt	04/30/89	04/30/89	la	370700	LEWIS R (27.0168)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	04/30/89	04/30/89	18	744200	LEWIS R (27.0168)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/15/89	05/15/89	la	125000	LEWIS R (27.0168)	UNTAGGED
1987	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/21/89	05/21/89	la	1500000	LEWIS R (27.0168)	UNTAGGED
1987	COULITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/25/89	05/25/89	18	1965100	LEWIS R (27.0168)	UNTAGGED
1987	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	07/28/88	07/28/88	56	154100	LAKE MERWIN (27)	UNTAGGED
1987	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	04/13/88	04/13/88	589	147500	LEWIS R (27.0168)	UNTAGGED
1987	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Smolt	06/19/89	06/19/89	la	151800	SPEELYAI CR 27.0430	UNTAGGED
1988	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	04/23/89	04/23/89	1260	183800	LEWIS R (27.0168)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	04/27/89	04/27/89	1296	174600	LEWIS R (27.0168)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	04/30/89	04130189	1296	473500	LEWIS R (27.0168)	UNTAGGED

Table 9. Hatchery releases of COHO salmon into the LEWIS RIVER subbasin sorted by brood year, hatchery and Life stage • CONTINUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CUT Cede
1988	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	381	24300	CEDAR CREEK (27)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	381	57700	CEDAR CREEK (27)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	LEVIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	381	57700	CEDAR CREEK (27)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	381	57800	CEDAR CREEK (27)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	381	57800	CEDAR CREEK (27)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	378	33400	CEDAR CREEK (27)	UNTAGGED
1988	COWLITZ TYPE-N STOCK	LEVIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	420	11800	CHELATCHIE CREEK -NF	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	394	25200	CHELATCHIE CREEK -NF	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	394	34700	CHELATCHIE CREEK -NF	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	384	9200	CHELATCHIE CREEK -NF	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	498	18000	COPPER CR (27.0275)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	420	50100	COPPER CR (27.0275)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	498	27000	GREEN FORK CR 270287	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	04/11/89	04/11/89	965	80000	HOUGHTON CR 27.0319	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	369	17000	JENNY CR (27.0174)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	04/11/89	04/11/89	965	80000	JOHNSON CR (27.0327)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	04/11/89	04/11/89	965	160000	LEWIS R (27.0168)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	369	26600	LEWIS R (27.0168)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEUIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	369	150000	LEWIS R (27.0168)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	344	10300	LEWIS R (27.0168)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	339	140000	LEWIS R (27.0168)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	331	416900	LEWIS R (27.0168)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	326	10100	LEWIS R (27.0168)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	311	402600	LEWIS R (27.0168)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/26/89	06/26/89	200	256400	LEWIS R (27.0168)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/28/89	06/28/89	245	166350	LEWIS R (27.0168)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	369	232700	LEWIS R-EF (27.0173)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/28/89	06/28/89	251	75000	LEWIS R-EF (27.0173)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	498	15000	LITTLE CR (27.0286)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	369	64400	LOCKWOOD CR 27.0189	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	372	51100	MASON CR (27.0200)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	372	51100	MASON CR (27.0200)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	05/31/89	05/31/89	372	10400	RILEY CR (27.0190)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/28/89	06/28/89	251	24000	ROCK CR (27.0222)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/28/89	06/28/89	251	15250	ROCK CREEK UPR EF LE	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	04111189	04/11/89	965	80000	STAPLES CR (27.0315)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/28/89	06/28/89	251	18000	WEAVER CR (27.0249)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	06/28/89	06/28/89	251	22500	YACOLT CR (27.0248)	UNTAGGED
1988	TOUTLE R TYPE-S	LEWIS RIVER HATCHERY	Smolt	05/13/90	05/13/90	16	73584	LEWIS R (27.0168)	630144
1988	TOUTLE R TYPE-S	LEWIS RIVER HATCHERY	Smolt	05/13/90	05/13/90	16	984016	LEWIS R (27.0168)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/13/90	05/13/90	16	72819	LEWIS R (27.0168)	630147
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/13/90	05/13/90	16	2175181	LEWIS R (27.0168)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Smolt	05/13/90	05/13/90	16	71200	LEWIS R (27.0168)	UNTAGGED
1988	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	EmFry	12/30/88	12/30/88	1194	195000	LEWIS R (27.0168)	UNTAGGED
1988	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	EmFry	01/30/89	01/30/89	1296	550000	LEWIS R (27.0168)	UNTAGGED
1988	CWLITZ TYPE-N STOCK	SPEELYAI HATCHERY	EmFry	02/21/89	02/21/89	1463	1600000	SPEELYAI CR 27.0430	UNTAGGED
1988	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	03/29/89	03/29/89	498	200000	LEWIS R (27.0168)	UNTAGGED
1988	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	06/21/89	06/21/89	72	458100	SPEELYAI CR 27.0430	UNTAGGED
1988	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Smolt	05/13/90	05/13/90	9	131200	SPEELYAI CR 27.0430	UNTAGGED
1989	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	EmFry	04/03/90	04/03/90	1194	154600	LEWIS R (27.0168)	UNTAGGED
1989	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	03/22/90	03/22/90	1031	111616	CEDAR CREEK (27)	UNTAGGED
1989	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	03/22/90	03/22/90	1031	151552	CEDAR CREEK (27)	UNTAGGED
1989	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	03/23/90	03/23/90	1031	26624	CHELATCHIE CREEK -NF	UNTAGGED
1989	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	03123190	03/23/90	1031	28672	CHELATCHIE CREEK -NF	UNTAGGED
1989	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	03/23/90	03/23/90	1031	30720	CHELATCHIE CREEK -NF	UNTAGGED

Table 9 (cont.). Hatchery releases of coho salmon into the Lewis River subbasin sorted by brood year, hatchery and life stage.

Brood Year	stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CUT Code
1989	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	03/23/90	03/23/90	1031	30760	CHELATCHIE CREEK -NF	UNTAGGED
1989	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	03/23/90	03/23/90	1031	31744	CHELATCHIE CREEK -NF	UNTAGGED
1989	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	03/23/90	03/23/90	1031	31744	CHELATCHIE CREEK -NF	UNTAGGED
1989	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	03/23/90	03/23/90	1031	52224	CHELATCHIE CREEK -NF	UNTAGGED
1989	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	03/22/90	03/22/90	1031	78848	PUP CREEK (27.0345)	UNTAGGED
1989	CWLITZ TYPE-N STOCK	LEWIS RIVER HATCHERY	Fingr	03122190	03/22/90	1031	80896	PUP CREEK (27.0345)	UNTAGGED
1989	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	06126190	06126190	106	71000	LEWIS R (27.0168)	UNTAGGED
1989	CWLITZ TYPE-N STOCK	SPEELYAI HATCHERY	Fingr	03/05/90	03/05/90	965	233770	LEWIS R-EF (27.0173)	UNTAGGED
1989	COLUMBIA R - TYPE-S	SPEELYAI HATCHERY	Fingr	07/24/90	07/24/90	32	454272	SPEELYAI CR 27.0430	UNTAGGED

Table 10 (TD-1). Parasites and diseases of coho at the Lewis and Speelyai hatcheries.

Disease type	Hatchery	Specific -Pathogen .
Bacteria	Lewis River	*Cytophaga psychrophila* (Cold Water Disease)
virus	Lewis River	EIBS - Erythrocytic Inclusion Body Syndrome
Bacteria	Lewis River	*Aeromonas salmonicida* (Furunculosis)
Bacteria	Lewis River	*Yersinia ruckeri* (Enteric Redmouth Disease)
Parasite	Lewis River	*Saprolegnia parasitica (Fungus)*
Parasite	Lewis River	Various Ectoparasites and Endoparasites
Bacteria	Speelyai	*Cytophaga psychrophila* (Cold Water Disease)
Bacteria	Speelyai	*Aeromonas salmonicida* (Furunculosis)
Parasite	Speelyai	*Saprolegnia parasitica* (Fungus)
Parasite	Speelyai	Various Ectoparasites and Endoparasites

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

REFERENCE

Howell, P. J., K. Jones, D. Scarnecchia, L. LaVoy, W. Kendra, and D. Ortmann. 1985. Stock Assessment of Columbia River Anadromous Salmonids, Volumes I & II. Final Report of Oregon Department of Fish and Wildlife, Washington Department of Fisheries, Washington Department of Game, and Idaho Department of Fish and Game (Project 83-335, Contract DE-AI79-84BP12737) to Bonneville Power Administration, Portland, Oregon.

Washington Department of Fisheries. 1990. Elochoman River Subbasin, Salmon and Steelhead Production Plan.

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LEWIS.RIVER SUBBASIN

Naturally Produced Summer Steelhead

GEOGRAPHIC LOCATION

The Lewis drainage begins on the southern slopes of Mount St. Helens and Mount Adams. The mainstem of the river is known as the North Fork Lewis River which drains a watershed of 828 square miles. From its source, the North Fork flows southwest through three separate lakes, Swift Creek, Yale Lake and Merwin Reservoir before a major tributary, East Fork Lewis River, draining a watershed of 212 square miles joins the mainstem at river mile (RM) 3.5. From this point the Lewis River continues west, entering the Columbia River at RM 88.

ORIGIN

The wild summer steelhead stock in the Lewis River is native, although interbreeding with introduced Skamania hatchery stock has likely occurred. In addition, steelhead which abandoned the Cowlitz system following the eruption of Mount St. Helens in 1980, probably strayed into the Lewis River and spawned with native Lewis stock.

DISTRIBUTION

Table 1 lists rearing and spawning habitat, by quality, for Lewis River steelhead based on estimates from the Northwest Power Planning Council.

Current steelhead population distribution on the North Fork occurs from approximately RM 7 to RM 20 (Lewis River Production Plan, 1990). There are three dams (Swift, Yale, Merwin) which block passage of anadromous fish into the upper areas of the North Fork Lewis (Figure 1). A dam located on Cedar Creek, a tributary to the North Fork, was removed in 1946 and in combination with stream improvements spawning now occurs throughout most of Cedar Creek.

The East Fork Lewis River allows steelhead access and spawning throughout most of the river (Figure 2). The lower portion of the river is becoming increasingly impacted by urbanization while the upper portion remains relatively unchanged. Few steelhead were reported to have ascended sunset falls prior to 1982 when the falls were "notched." This lowered the falls from 13.5 ft to 8 ft and made the upper reaches more accessible. Now spawning takes place in the mainstem as well as Rock Creek and other tributaries. Summer run fish do not pass over the falls as readily as winter run fish (Howell et al.), and numerous small falls provide barriers to migrating adults during periods of low flow.

PRODUCTION

Production Facilities

There are two hatcheries in the subbasin, Lewis River Hatchery and Speelyai Hatchery. Lewis River Hatchery is located on the North Fork four miles below Merwin Dam. The hatchery is a major producer of coho salmon and also operates a spring chinook program. Speelyai Hatchery is located on Speelyai Creek, above Merwin Dam, also on the North Fork. The hatchery rears both coho and spring chinook salmon. An additional rearing facility (Ariel Hatchery) to be used for steelhead, rainbow and cutthroat trout production is planned, with construction targeted at the base of Merwin Dam. A net pen rearing system has been in operation since 1979 in Merwin Reservoir rearing a mean of 60,000 summer steelhead smolts for release annually on winter plants into the North Fork Lewis River.

Production Summary

No data are available on wild smolt production. Natural production continues in both the North and East Fork Lewis but estimates on smolt production do not exist. The lower section of the North Fork Lewis from Merwin Dam downstream is the only section available for fish production. Merwin Dam, a 240 foot high dam, blocks upstream passage and converts the middle sections of river into three large impoundments. The East Fork provides rearing habitat throughout most of the river. Although access to the upper reaches of the East Fork is difficult due to its steep gradient with numerous drops and waterfalls, excellent steelhead habitat can be found there.

ADULT LIFE HISTORY

Run Size and Escapement

Estimates of total run size and escapement is lacking with the exception of 1984 when wild summer steelhead entering the East Fork were estimated at 600 while wild steelhead entering the North Fork was estimated at less than 50 fish. Run size estimates for past years show steelhead returns between 1925 and 1933 estimated at 4,000 fish, while run size between 1963 and 1967 averaged 6,150 fish. In 1985 (Lucas B.) determined the wild portion of summer steelhead at Lucia Falls averaged 27 percent for fish creeled between 1974 and 1983.

Time of migration

Adult time of entry for summer steelhead is generally from April through October with peak returns occurring in July (Lewis River Subbasin Plan, 1990). The freshwater life history of summer steelhead in the Lewis River is depicted in Figure 3.

Harvest

Ocean harvest of Lewis River wild summer steelhead is unknown.

The amount of Columbia River harvest is unknown, however, large numbers of steelhead are harvested by the sport fishery on the Columbia River as well as treaty Indian fisheries above Bonneville Dam, with some Lewis River steelhead being harvested in the Columbia River catch.

Steelhead are also being caught in the commercial fisheries operating below Bonneville Dam. These fish are not sold, but released dead or alive. The incidence of delayed mortality is unknown, but it is thought to be high (Weinheimer 1992).

Based on permit-card harvest estimates, sport harvest for both North and East Fork summer steelhead (hatchery and wild) from 1980 through 1991 ranged from 3,001 steelhead in 1983-84 to 8,700 in 1986-87 (Table 2). In the past, the East Fork had the greater share of steelhead caught in the Lewis subbasin, however, average catch on the North Fork has increased since the 1970's and currently exceeds the East Fork fishery. The East Fork still remains a popular sport fishery as anglers fish for the large, wild summer steelhead which continue to propagate in this system.

Treaty Indian fishing rights are not exercised in the Lewis River subbasin.

Spawning period

Mean time of spawning occurred from January through May, peaking in February and March.

Spawning area

Spawning in the North Fork Lewis is limited with the blockage of spawning areas by Merwin Dam. Most natural spawning occurs in Cedar Creek a tributary of the North Fork. Steelhead spawn throughout most of the mainstem of the Fast Fork Lewis River as well as Rock Creek and other tributaries. Summer run steelhead may not ascend the numerous upstream falls in the mainstem as readily as winter fish (Howell et al. 1983) due to lower summer flows.

Fecundity

No data are available for Lewis River steelhead.

Age composition

No data are available for Lewis River steelhead.

Size

No data are available for Lewis River steelhead.

Sex ratio

No data are available for Lewis River steelhead.

Survival rate

No data are available for Lewis River steelhead.

JUVENILE LIFE HISTORY

Egg

Egg to smolt survival for wild summer steelhead is unknown.

Emergence

Emergence occurs from late February and runs through June.

Juvenile rearing

Juvenile rearing lasts approximately two years prior to ocean emigration, although some juveniles emigrate after one or three years (Loch et al. 1985).

Migration generally occurs from March through May with peak migration in early May. Average smolt size is estimated at 160 mm.

Hatchery releases

Currently, no steelhead hatchery operates in this subbasin although construction of Ariel Hatchery on the North Fork will include summer steelhead production. Summer steelhead smolts are reared in Merwin Lake net pens as part of Merwin Dam relicensing agreement. Washington Department of Wildlife releases hatchery smolts annually into the North Fork and East Fork Lewis River. Since 1979, Pacific Power and Light has reared about 60,000 additional summer steelhead smolts which are released annually into the North Fork. Table 3 outlines smolts released into the Lewis River

from 1981 to 1991.

Straying

No data on Lewis River steelhead.

BIOCHEMICAL-GENETIC CHARACTERISTICS

No data are available on Lewis River steelhead.

DISEASES

Disease history for smolts planted in the Lewis River is presented in Table 4.

REFERENCES

The references for this section appear at the end of the following steelhead section.

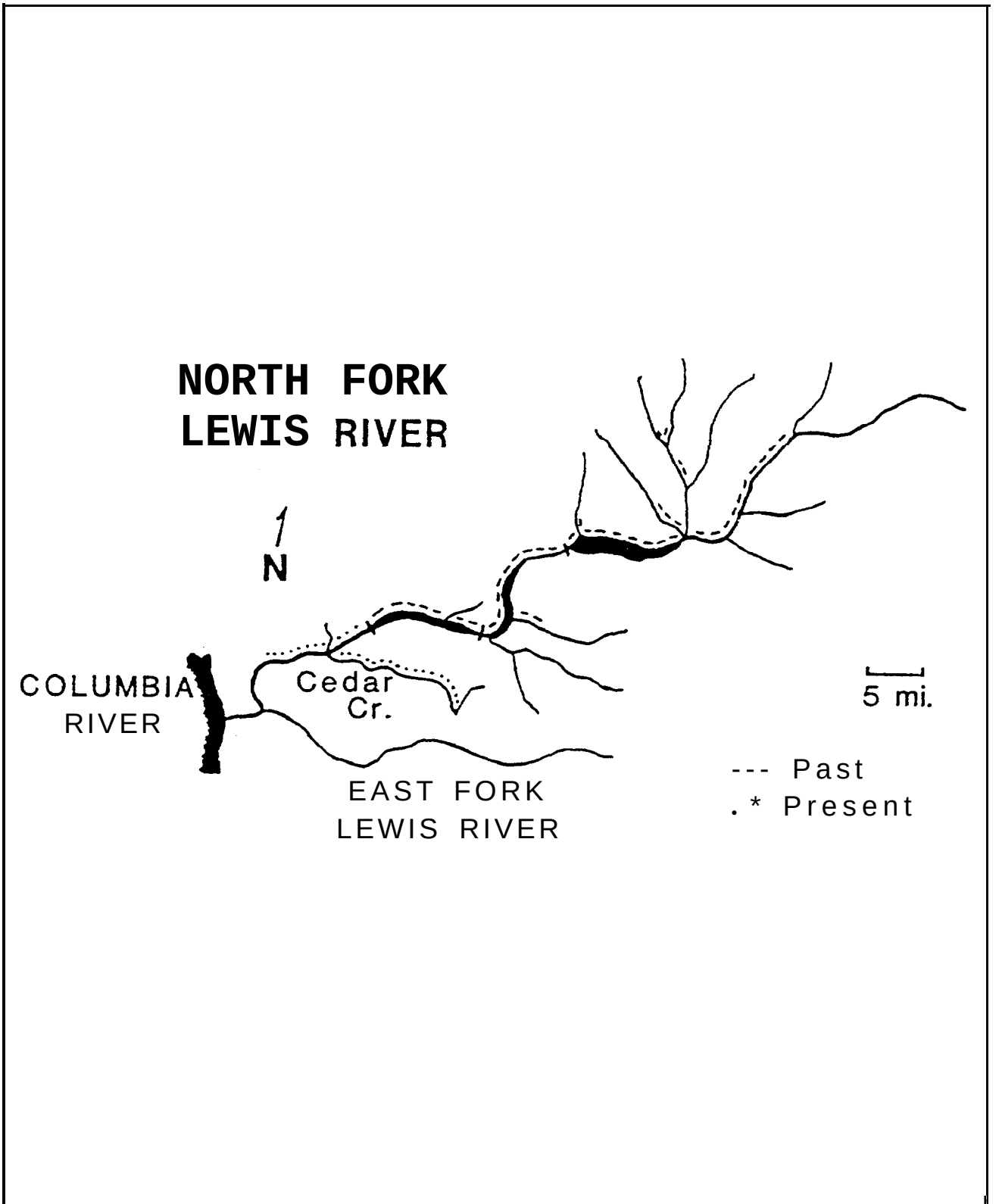


Figure I (A U-I). Probable past and present spawning areas of wild winter and summer steelhead in the North Fork Lewis River, Washington (Fulton 1970; B. Crawford, WDG, personal communication)., Howell et al. 1985.

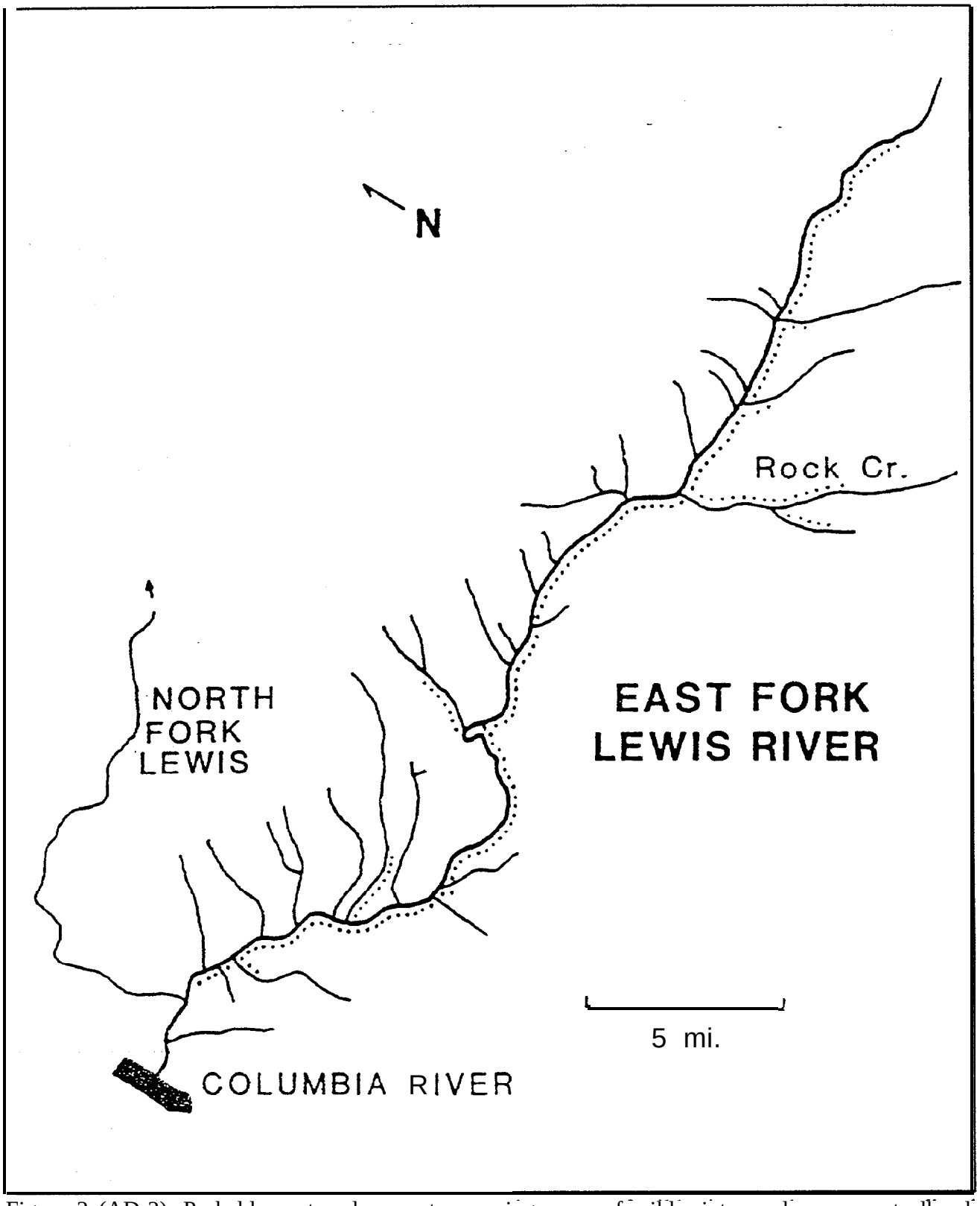


Figure 2 (AD-2). Probable past and present spawning areas of wild winter and summer steelhead in the East Fork Lewis River, Washington (B. Crawford, Washington Department of Game, personal communication)., Howell et al. 1985.

Figure 3 (TT). Freshwater life history of Lewis River summer steelhead.

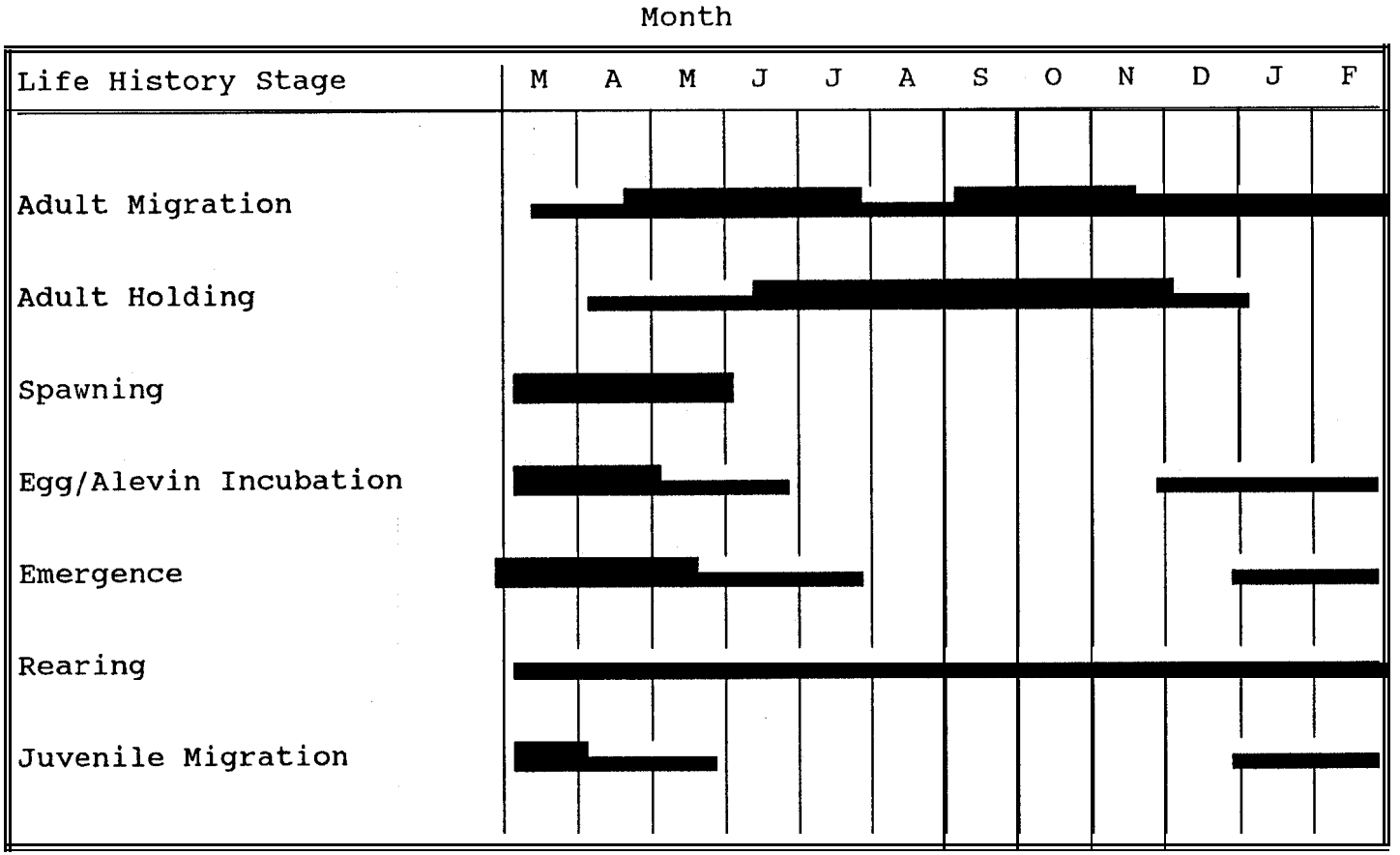


Table 1 (HB-1). Estimated" amount of rearing and spawning habitat, by quality, of Lewis River subbasin summer steelhead.

Area	Excellent	Good	Fair[b]	POOP	Unknown	Total	Confidence
Miles	35.5%	45.3%	19.2%	0.0%		104.3	Unknown
Acres	39.6%	55.3%	5.1%	0.0%		716.2	Unknown

"Northwest Power Planning Council estimates based on limited observations.

[b]Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by man.

Source: Presence/absence database, NPPC, 1991.

Table 2 (RS-a). Returns (sport catch/escapement) of summer steelhead to the Lewis River subbasin.

Return Year	Escapement	Sport Catch"	Adult Total
1980		5,079	Unknown
1981		4,729	Unknown
1982		5,062	Unknown
1983		3,001	Unknown
1984		5,017	Unknown
1985		5,676	Unknown
1986		8,700	Unknown
1987		6,366	Unknown
1988		4,566	Unknown
1989		3,583	Unknown

"Includes both North and East forks. Catch within subbasin only.

Source: Sport catch based on WDW permit-card harvest estimates.
Due to wild release regulations, post 1985 sport catch is of hatchery origin only.

Table 3 (TR). Hatchery releases of summer steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release site	CWT Codes/ Fin Clip
1981	Washougal R	S kamania	Smolt	04/21/82	6.6	8,151	Lewis R	
1981	Washougal R	Skamania	Smolt	04/21/82	5.9	7,275	Lewis R- East Fork	
1981	Washougal R	Skamania	Smolt	04/22/82	6.4	8,004	Lewis R- East Fork	
1981	Washougal R	Skamania	Smolt	04122182	6.2	7,564	Lewis R- East Fork	
1981	Washougal R	Skamania	Smolt	05/04/82	6.0	6,360	Lewis R- East Fork	
1981	Washougal R	Skamania	Smolt	05/04/82	6.1	7,442	Lewis R- East Fork	
1981	Washougal R	Skamania	Smolt	05/05/82	6.1	1,860	Lewis R- East Fork	
1981	Washougal R	Skamania	Smolt	05/06/82	5.9	7,228	Lewis R- East Fork	
1981	Washougal R	Skamania	Smolt	05/06/82	5.9	7,199	Lewis R- East Fork	
1981	Washougal R	Skamania	Smolt	05/13/82	5.7	1,625	Lewis R- East Fork	
1981	Washougal R	Skamania	Smolt	05/14/82	6.9	8.729	Lewis R- East Fork	
1981	Washougal R	Skamania	Smolt	05/14/82	7.1	8,911	Lewis R- East Fork	
1981	Washougal R	Skamania	Smolt	05/17/82	7.4	8,658	Lewis R- East Fork	
198 1	Washougal R	Skamania	Smolt	05/17/82	6.9	6,831	Lewis R- East Fork	
1981	Washougal R	Skamania	Smolt	04/19/83	4.8	5,760	Lewis R- North Fork	
1981	Washougal R	Skamania	Smolt	04/20/82	5.5	6,837	Lewis R- North Fork	
1981	Washougal R	Skamania	Smolt	04/20/83	5.2	6,344	Lewis R- North Fork	
1981	Washougal R	Skamania	Smolt	04/20/83	5.2	6.058	Lewis R- North Fork	
1981	Washougal R	Skamania	Smolt	04/21/83	5.2	6,573	Lewis R- North Fork	
1981	Washougal R	Skamania	Smolt	05/03/82	6.0	7,320	Lewis R- North Fork	

Table 3 (cont.). Hatchery releases of summer steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release site	CWT Codes/ Fin Clip
1981	Washougal R	Skamania	Smolt	05/03/82	5.9	7,272	Lewis R- North Fork	
1981	Washougal R	Skamania	Smolt	05/05/82	6.1	7,412	Lewis R- North Fork	
1981	Washougal R	Skamania	Smolt	05/12/82	5.7	7,460	Lewis R- North Fork	
1981	Washougal R	Skamania	Smolt	05/12/82	5.7	6,128	Lewis R- North Fork	
1981	Washougal R	Vancouver	Smolt	04/26/83	4.8	7,392	Lewis R- East Fork	
1981	Washougal R	Vancouver	Smolt	04/26/83	5.2	7,852	Lewis R- East Fork	
1981	Washougal R	Vancouver	Smolt	04/26/83	5.2	7,956	Lewis R- East Fork	
1981	Washougal R	Vancouver	Smolt	04/27/83	5.0	7,550	Lewis R- East Fork	
1981	Washougal R	Vancouver	Smolt	04/27/83	5 .0	7,650	Lewis R- East Fork	
1981	Washougal R	Vancouver	Smolt	04/27/83	5.0	5,500	Lewis R- East Fork	
1983	Washougal R	Merwin Net Pens	Non-Smolt	04/27/84	10.1	30,300	Lewis R- North Fork	
1983	Washougal R	Merwin Net Pens	Smolt	04/27/84	9.1	18,200	Lewis R- North Fork	
1983	Washougal R	Vancouver	Smolt	04/23/84	3.1	6,042	Lewis R- North Fork	
1983	Washougal R	Vancouver	Smolt	04/24/84	5.7	8,550	Lewis R- North Fork	
1983	Washougal R	Vancouver	Smolt	04/24/ 84	5.7	8,607	Lewis R- North Fork	
1983	Washougal R	Vancouver	Smolt	04/24/84	5.7	8,493	Lewis R- North Fork	
1983	Washougal R	Vancouver	Smolt	04/24/84	5.6	8,680	Lewis R- North Fork	
1983	Washougal R	Vancouver	Smolt	04/25/84	5.7	8,664	Lewis R- North Fork	
1983	Washougal R	Vancouver	Smolt	04/25/84	5.7	8,693	Lewis R- North Fork	
1983	Washougal R	Vancouver	Smolt	04/25/84	5.7	8,807	Lewis R- North Fork	

Table 3 (cont.). Hatchery releases of summer steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release site	CWT Codes/ Fin Clip
1983	Washougal R	Vancouver	Smolt	04/25/84	5.7	8,607	Lewis R- North Fork	
1983	Washougal R	Vancouver	Smolt	04/26/84	5.7	5.643	Lewis R- North Fork	
1983	Washougal R - WFINF	Skamania	Smolt	04/19/84	5.8	6,676	Lewis R- East Fork	AD
1983	Washougal R - WF/NF	S kamania	Smolt	04/19/84	5.7	6,672	Lewis R- East Fork	AD
1983	Washougal R - WFINF	S kamania	Smolt	04/20/84	5.6	6,472	Lewis R- East Fork	AD
1983	Washougal R - WFINF	Skamania	Smolt	04/20/84	5.4	6,313	Lewis R- East Fork	AD
1983	Washougal R - WFINF	Skamania	Smolt	04/27/84	5.1	5,416	Lewis R- East Fork	AD
1983	Washougal R - WFINF	Skamania	Smolt	05/01/84	5.6	3,069	Lewis R- East Fork	AD
1983	Washougal R - WFINF	Skamania	Smolt	05/03/84	6.1	7,074	Lewis R- East Fork	AD
1983	Washougal R - WF/NF	Skamania	Smolt	05/04/84	6.0	7,032	Lewis R- East Fork	AD ,
1983	Washougal R - WFINF	Skamania	Smolt	05/04/84	6.0	6,990	Lewis R- East Fork	AD
1983	Washougal R - WFINF	Skamania	Smolt	05/04/84	6.0	7,038	Lewis R- East Fork	AD
1983	Washougal R - WFINF	Skamania	Smolt	05/08/84	5.7	6,669	Lewis R- East Fork	AD

Table 3 (cont.). Hatchery releases of summer steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release site	CWT Codes/ Fin Clip
1983	Washougal R - WFINF	Skamania	Smolt	05/08/84	5.7	2,212	Lewis R- East Fork	AD
1983	Washougal R - WF/NF	Skamania	Smolt	05/16/84	5.9	6,815	Lewis R- East Fork	AD
1983	Washougal R - WFINF	Skamania	Smolt	05/16/84	5.8	6,849	Lewis R- East Fork	AD
1983	Washougal R - WFINF	Skamania	Smolt	05/15/84	6.1	7,186	Lewis R- North Fork	AD
1983	Washougal R - WFINF	Skamania	Smolt	05/15/84	6.1	8,113	Lewis R- North Fork	AD
1983	Washougal R - WF/NF	Skamania	Smolt	05/16/84	5.9	6,879	Lewis R- North Fork	AD
1983	Washougal R - WF/NF	Skamania	Smolt	05/17/84	5.5	6,006	Lewis R- North Fork	AD
1984	Chambers Cr	Skamania	Smolt	04/25/85	7.4	8,602	Lewis R- North Fork	AD
1984	Chambers Cr	Skamania	Smolt	04/26/85	7.3	3,008	Lewis R- North Fork	AD
1984	Cowlitz R	Skamania	Smolt	05/07/85	7.0	2,660	Lewis R- North Fork	AD
1984	Skykomish R	Skamania	Smolt	05/07/85	6.6	7,748	Lewis R- North Fork	AD
1984	Skykomish R	Skamania	Smolt	05/07/85	6.5	4,979	Lewis R- North Fork	AD
1984	Skykomish R	Skamania	Smolt	05/07/85	6.4	7,462	Lewis R- North Fork	AD
1984	Skykomish R	Skamania	Smolt	05/10/85	7.2	5,350	Lewis R- North Fork	AD
1984	Skykomish R	Skamania	Smolt	05/17/85	6.7	4,610	Lewis R- North Fork	AD
1984	Skykomish R	Skamania	Smolt	05/17/85	6.7	7,873	Lewis R- North Fork	AD

Table 3 (cont.). Hatchery releases of summer steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release site	CWT. Codes/ Fin Clip
1984	Skvkomish R	Skamania	Smolt	05/17/85	6.7	4.060	Lewis R- North Fork	AD
1984	Washougal R	Merwin Net Pens	Smolt	05/06/85	8.1	38,734	Lewis R- North Fork	AD
1984	Washougal R	Vancouver	Smolt	05/01/85	4 . 5	5,625	Lewis R- East Fork	AD
1984	Washougal R	Vancouver	Smolt	05/01/85	4.5	5,625	Lewis R- East Fork	AD
1984	Washougal R	Vancouver	Smolt	05/07/ 85	4.5	5,400	Lewis R- East Fork	AD
1984	Washougal R - WF/NF	S kamania	Smolt	04/23/85	6.9	8,108	Lewis R- East Fork	AD
1984	Washougal R - WFINF	Skamania	Smolt	04/26/85	6.9	8,108	Lewis R- East Fork	AD
1984	Washougal R - WFINF	Skamania	Smolt	05/01/84	6.5	3,978	Lewis R- East Fork	AD
1984	Washougal R - WFINF	S kamania	Smolt	05/13/85	7.2	8,352	Lewis R- East Fork	AD
1984	Washougal R - WFINF	Skamania	Smolt	05/13/85	7.2	8,352	Lewis R- East Fork	AD
1984	Washougal R - WF/NF	Skamania	Smolt	05/13/85	7.2	8,597	Lewis R- East Fork	AD
1984	Washougal R - WF/NF	Skamania	Smolt	05/14/85	7.3	6,482	Lewis R- East Fork	AD
1984	Washougal R - WF/NF	Skamania	Smolt	05/17/84	5.5	6,149	Lewis R- East Fork	AD
1984	Washougal R - WF/NF	Skamania	Smolt	05/17/84	5.5	3,795	Lewis R- East Fork	AD

Table 3 (cont.). Hatchery releases of summer steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release site	CWT Codes/ Fin Clip
1984	Washougal R - WFINF	Skamania	Smolt	04/26/85	7.4	5,210	Lewis R- North Fork	AD
1984	Washougal R - WF/NF	Vancouver	Smolt	04/29/85	4.8	7,200	Lewis R- East Fork	AD
1984	Washougal R - WFINF	Vancouver	Smolt	04/29/85	5.0	7,025	Lewis R- East Fork	AD
1984	Washougal R - WFINF	Vancouver	Smolt	04/29/85	4.8	7,704	Lewis R- East Fork	AD
1984	Washougal R - WFINF	Vancouver	Smolt	04/29/85	4.8	7,320	Lewis R- East Fork	AD
1984	Willamette R	Skamania	Smolt	05/10/85	9.7	3,938	Lewis R- North Fork	AD
1984	Willamette R	Skamania	Smolt	05/16/85	7.5	8,760	Lewis R- North Fork	AD
1984	Willamette R	Skamania	Smolt	05/16/85	7.1	7,107	Lewis R- North Fork	AD
1984	Willamette R	Skamania	Smolt	05/16/85	7.5	7,545	Lewis R- North Fork	AD
1984	Willamette R	Skamania	Smolt	05/17/85	7.2	3,348	Lewis R- North Fork	AD
1985	Washougal R	Merwin Net Pens	Smolt	05/01/86	9.0	35,100	Lewis R- North Fork	AD
1985	Washougal R	Vancouver	Non-smolt	11/08/85	22.6	28,875	Lewis R- North Fork	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/15/86	5.4	6,145	Lewis R- East Fork	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/16/86	5.6	6,300	Lewis R- East Fork	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/17/86	6.0	6,906	Lewis R- East Fork	AD

Table 3 (cont.). Hatchery releases of summer steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release site	CWT Codes/ Fin Clip
1985	Washougal R - WFINF	Skamania	Smolt	04/21/86	6.4	7,270	Lewis R- East Fork	AD
1985	Washougal R - WF/NF	Skamania	Smolt	04/22/86	7.0	8,008	Lewis R- East Fork	AD
1985	Washougal R - WF/NF	Skamania	Smolt	04/28/86	6.3	7,119	Lewis R- East Fork	AD
1985	Washougal R - WF/NF	Skamania	Smolt	05/05/86	6.4	7,416	Lewis R- East Fork	AD
1985	Washougal R - WFINF	Skamania	Smolt	05/05/86	6.4	7,398	Lewis R- East Fork	AD
1985	Washougal R - WF/NF	Skamania	Smolt	05/06/86	6.5	7,586	Lewis R- East Fork	AD
1985	Washougal R - WF/NF	Skamania	Smolt	05/06/ 86	6.6	5,927	Lewis R- East Fork	AD
1985	Washougal R - WFINF	Skamania	Smolt	05/09/86	6.4	5,011	Lewis R- East Fork	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/25/86	7.2	8,194	Lewis R- North Fork	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/28/86	7.2	8,316	Lewis R- North Fork	AD
1985	Washougal R - WF/NF	Skamania	Smolt	04/30/86	7.7	8,709	Lewis R- North Fork	AD
1985	Washougal R - WF/NF	Skamania	Smolt	05/02/86	7.7	8,793	Lewis R- North Fork	AD

Table 3 (cont.). Hatchery releases of summer steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release site	CWT Codes/ Fin Clip
1985	Washougal R - WFINF	Skamania	Smolt	05/05/86	7.3	8,488	Lewis R- North Fork	AD
1985	Washougal R - WFINF	Skamania	Smolt	05/05/ 86	7.4	8,480	Lewis R- North Fork	AD
1985	Washougal R - WFINF	S kamania	Smolt	05/06/86	7.2	7,891	Lewis R- North Fork	AD
1985	Washougal R - WFINF	Skamania	Smolt	05/15/86	8.7	10,5 10	Lewis R- North Fork	AD
1985	Washougal R - WFINF	Skamania	Smolt	05/16/86	9.7	11,118	Lewis R- North Fork	AD
1985	Washougal R - WFINF	Skamania	Smolt	05/16/86	9.5	8,275	Lewis R- North Fork	AD
1985	Washougal R - WFINF	Vancouver	Smolt	04/22/86	5.2	7,020	Lewis R- East Fork	AD
1985	Washougal R - WFINF	Vancouver	Smolt	04/23/86	5.2	7,800	Lewis R- East Fork	A D
1985	Washougal R - WFINF	Vancouver	Smolt	04/23/86	5.2	8,500	Lewis R- East Fork	AD
1985	Washougal R - WFINF	Vancouver	Smolt	04/23/86	5.2	8,450	Lewis R- East Fork	AD
1985	Washougal R - WFINF	Vancouver	Smolt	04/23/86	5.2	6,760	Lewis R- East Fork	AD
1985	Washougal R - WFINF	Vancouver	Smolt	04/24/86	5.2	6,630	Lewis R- East Fork	AD
1986	Washougal R	Beaver Creek	Smolt	04/27/87	5.6	7.000	Lewis R- East Fork	AD

Table 3 (cont.). Hatchery releases of summer steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release site	CWT Codes/ Fin Clip
1986	Washougal R	Beaver Creek	Smolt	04/28/87	5.7	5,700	Lewis R- East Fork	AD
1986	Washougal R	Beaver Creek	Smolt	04/27/87	5.7	2,850	Lewis R- North Fork	AD
1986	Washougal R	Beaver Creek	Smolt	04/27/87	5.7	3,990	Lewis R- North Fork	AD
1986	Washougal R	Merwin Net Pens	Smolt	04/06/87	5.3	11,925	Lewis R- North Fork	AD
1986	Washougal R	Merwin Net Pens	Smolt	04/06/87	6.0	21,300	Lewis R- North Fork	AD
1986	Washougal R	Merwin Net Pens	Smolt	04/06/87	5.5	15,400	Lewis R- North Fork	AD
1986	Washougal R	Powerline Ponds (Sultan River)	Smolt	04/27/87	5 .O	8,000	Lewis R- North Fork	AD
1986	Washougal R	Power-line Ponds (Sultan River)	Smolt	04/28/87	5.0	8,000	Lewis R- North Fork	AD
1986	Washougal R	Powerli'ne Ponds (Sultan River)	Smolt	04/28/87	5.0	6,625	Lewis R- North Fork	AD
1986	Washougal R	Vancouver	Smolt	04/16/87	5.0	29,375	Lewis R- East Fork	AD
1986	Washougal R	Vancouver	Smolt	04/17/87	5.0	7,500	Lewis R- East Fork	AD
1986	Washougal R	Vancouver	Smolt	04/18/87	5.0	8,125	Lewis R- East Fork	AD
1987	Washougal R	Vancouver	Smolt	04/15/88	5.5	8,690	Lewis R- East Fork	AD
1987	Washougal R	Vancouver	Smolt	04/15/88	5.4	8,721	Lewis R- East Fork	AD
1987	Washougal R	Vancouver	Smolt	04/15/88	5.6	8,876	Lewis R- East Fork	AD
1987	Washougal R	Vancouver	Smolt	04/15/88	5.5	9,267	Lewis R- East Fork	AD
1987	Washougal R	Vancouver	Smolt	04/20/88	5.5	8,965	Lewis R- East Fork	AD
1987	Washougal R	Vancouver	Smolt	04/21/88	5.6	5,600	Lewis R- East Fork	AD

Table 3 (cont.). Hatchery releases of summer steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release site	CWT Codes/ Fin Clip
1988	Washougal R	Beaver Creek	Smolt	05/1 1/89	5.6	5,040	Lewis R- East Fork	AD
1988	Washougal R	Beaver Creek	Smolt	05/1 1/89	5.6	5,040	Lewis R- East Fork	AD
1988	Washougal R	Beaver Creek	Smolt	05/02/89	4.6	11,960	Lewis R- North Fork	AD
1988	Washougal R	Beaver Creek	Smolt	05/15/89	5.6	6,160	Lewis R- North Fork	AD
1988	Washougal R	Vancouver	Smolt	04/19/89	5.3	25,493	Lewis R- East Fork	AD
1988	Washougal R	Vancouver	Smolt	04/19/89	5.3	8,612	Lewis R- East Fork	AD
1988	Washougal R	Vancouver	Smolt	04/21/89	5.3	8,771	Lewis R- East Fork	AD
1988	Washougal R	Vancouver	Smolt	04/21/89	5.3	9,619	Lewis R- East Fork	AD
1988	Washougal R - WFINF	Skamania	Smolt	05/01/89	6.5	9,262	Lewis R- East Fork	AD
1988	Washougal R - WFINF	Skamania	Smolt	05/01/89	6.5	9,197	Lewis R- East Fork	AD
1988	Washougal R - WF/NF	Skamania	Smolt	05/01/89	6.6	9,306	Lewis R- East Fork	A D
1988	Washougal R - WFINF	Skamania	Smolt	05/05/89	6.7	6,331	Lewis R- East Fork	AD
1988	Washougal R - WFINF	Skamania	Smolt	04/24/89	5.9	8,289	Lewis R- North Fork	AD
1988	Washougal R - WFINF	Skamania	Smolt	04/24/89	5.9	8,289	Lewis R- North Fork	AD
1988	Washougal R - WFINF	Skamania	Smolt	04/25/89	5.9	8,260	Lewis R- North Fork	AD

Table 3 (cont.). Hatchery releases of summer steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release site	CWT Codes/ Fin Clip
1988	Washougal R - WFINF	Skamania	Smolt	04/25/89	5.9	8,319	Lewis R- North Fork	AD
1988	Washougal R - WFINF	Skamania	Smolt	04/25/89	5.9	8,289	Lewis R- North Fork	AD
1988	Washougal R - WFINF	Skamania	Smolt	04/25/89	5.9	8,348	Lewis R- North Fork	AD
1988	Washougal R - WFINF	Skamania	Smolt	04/26/89	5.9	8,319	Lewis R- North Fork	AD
1988	Washougal R - WF/NF	Skamania	Smolt	04/27/89	6.0	8,490	Lewis R- North Fork	AD
1988	Washougal R - WFINF	Skamania	Smolt	04/27/89	6.1	8,601	Lewis R- North Fork	AD
1988	Washougal R - WFINF	Skamania	Smolt	04/28/89	6.1	8,540	Lewis R- North Fork	AD
1988	Washougal R - WFINF	Skamania	Smolt	04/28/89	6.0	8,880	Lewis R- North Fork	A D
1988	Washougal R - WF/NF	Skamania	Smolt	04/28/89	6.0	8,460	Lewis R- North Fork	AD
1988	Washougal R - WFINF	Skamania	Smolt	04/28/89	6.1	9,058	Lewis R- North Fork	AD
1989	Washougal R	Beaver Creek	Smolt	04/26/90	5.7	7,695	Lewis R- East Fork	AD
1989	Washougal R	Beaver Creek	Smolt	04/26/90	7.0	7,700	Lewis R- East Fork	AD
1989	Washougal R	Beaver Creek	Smolt	05/16/90	7.3	3,102	Lewis R- East Fork	AD
1989	Washougal R	Beaver Creek	Smolt	05/17/90	6.6	10,560	Lewis R- East Fork	AD

Table 3 (cont.). Hatchery releases of summer steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release site	CWT Codes/ Fin Clip
1989	Washougal R	Beaver Creek	Smolt	05/18/90	6.6	10,560	Lewis R- East Fork	AD
1989	Washougal R	Beaver Creek	Smolt	05/18/90	6.6	10.560	Lewis R- East Fork	AD
1989	Washougal R	Beaver Creek	Smolt	04/19/90	5.7	9,120	Lewis R- North Fork	AD
1989	Washougal R	Beaver Creek	Smolt	04/25/90	7.2	16.020	Lewis R- North Fork	AD
1989	Washougal R	Beaver Creek	Smolt	04/26/90	7.0	13,650	Lewis R- North Fork	AD
1989	Washougal R	Beaver Creek	Smolt	04/26/90	6.8	5,440	Lewis R- North Fork	AD
1989	Washougal R	Beaver Creek	Smolt	05/01/90	6.6	8,250	Lewis R- North Fork	AD
1989	Washougal R	Beaver Creek	Smolt	05/15/90	7.3	9,125	Lewis R- North Fork	AD
1989	Washougal R	Beaver Creek	Smolt	05/17/90	6.6	8,250	Lewis R- North Fork	AD
1989	Washoueal R	Beaver Creek	Smolt	05/18/90	6.6	8,250	Lewis R- North Fork	AD
1989	Washougal R	Beaver Creek	Smolt	05/18/90	6.6	8,250	Lewis R- North Fork	AD
1989	Washougal R	Vancouver	Smolt	04/18/90	4.6	6.923	Lewis R- East Fork	
1989	Washougal R	Vancouver	Smolt	04/24/90	4.8	7,200	Lewis R- East Fork	
1989	Washougal R	Vancouver	Smolt	04/25/90	4.6	5,198	Lewis R- East Fork	
1989	Washougal R	Vancouver	Smolt	04/25/90	4.9	13,401	Lewis R- East Fork	
1989	Washougal R	Vancouver	Smolt	04/24/90	4.8	10,008	Lewis R- North Fork	
1989	Washougal R	Vancouver	Smolt	04/25/90	5.2	3,770	Lewis R- North Fork	
1990	Washougal R	Vancouver	Smolt	04/22/91	5.3	7,897	Lewis R- East Fork	AD
1990	Washougal R	Vancouver	Smolt	04/24/91	5.4	6.534	Lewis R- East Fork	AD
1990	Washougal R	Vancouver	Smolt	04/25/91	5.6	4,116	Lewis R- East Fork	AD

Table 3 (cont.). Hatchery releases of summer steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release site	CWT Codes/ Fin Clip
1990	Washougal R	Vancouver	Smolt	04/26/91	5.6	8,484	Lewis R- East Fork	AD
1990	Washougal R - WFINF	Beaver Creek	Smolt	04/23/91	7.5	12,000	Lewis R- North Fork	AD
1990	Washougal R - WFINF	Beaver Creek	Smolt	04/24/91	7.0	5,600	Lewis R- North Fork	AD
1990	Washougal R - WFINF	Beaver Creek	Smolt	04/24/91	6.2	4,340	Lewis R- North Fork	AD
1990	Washougal R - WFINF	Beaver Creek	Smolt	04/24/91	6.2	7,440	Lewis R- North Fork	AD
1990	Washougal R - WFINF	Merwin Net Pens	Smolt	04/17/91	6.8	20,000	Lewis R- North Fork	AD
1990	Washougal R - WFINF	Skamania	Smolt	05/04/91	5.3	5,480	Lewis R- East Fork	AD
1990	Washougal R - WFINF	Skamania	Smolt	05/06/91	5.3	7,420	Lewis R- East Fork	AD
1990	Washougal R - WFINF	Skamania	Smolt	05/06/91	5.5	7,700	Lewis R- East Fork	AD
1990	Washougal R - WFINF	Skamania	Smolt	05/08/91	5.5	7,672	Lewis R- East Fork	AD
1990	Washougal R - WFINF	Skamania	Smolt	05/08/91	5.4	7,817	Lewis R- East Fork	AD
1990	Washougal R - WFINF	Skamania	Smolt	05/08/91	5.4	3,402	Lewis R- East Fork	AD
1990	Washougal R - WFINF	Skamania	Smolt	05/08/91	5.4	13,770	Lewis R- East Fork	AD

Table 3 (cont.). Hatchery releases of summer steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release site	CWT Codes/ Fin Clip
1990	Washougal R - WFINF	Skamania	Smolt	05/09/91	6.0	11,718	Lewis R- East Fork	AD
1990	Washougal R - WF/NF	Skamania	Smolt	05/09/91	6.0	8,700	Lewis R- North Fork	AD
1990	Washougal R - WF/NF	Skamania	Smolt	05/10/91	5.1	28,560	Lewis R- North Fork	AD
1990	Washougal R - WF/NF	Skamania	Smolt	05/13/91	5.0	14,630	Lewis R- North Fork	AD
1990	Washougal R - WF/NF	Skamania	Smolt	05/13/91	5.1	13,650	Lewis R- North Fork	AD
1990	Washougal R WF/NF	Skamania	Smolt	05/14/91	5.6	7,300	Lewis R- North Fork	AD

Source: Terry Lovgren, WDW, Stocking Database, 1991.

Table 5 (TD). Parasites and diseases isolated at hatcheries which reared Lewis River summer steelhead smolts".

Disease Type	Hatchery	Specific Pathogen
Bacterial	Skamania[b]	*Renibacterium salmonarium* (BKD)
Bacterial	Skamania	*Flexibacter columnaris* (Columnaris)
Bacterial	Skamania	*Flexibacter cytophaga* (Coldwater)
Bacterial	Skamania	*Renibacterium salmonarium* (BKD)
Parasite	Skamania	*Hexamita sp.*
Parasite	Skamania	*Ichthyophthirius multiflis* (Ich)
Parasite	Skamania	*Ichthyoboda sp.* (Costia)
Parasite	Skamania	*Trichodina sp.*
Viral	Skamania	Infectious hematopoietic necrosis (IHN)
Bacterial	Vancouver[c]	*Aeromonas salmonicida* (Furunculosis)
Bacterial	Vancouver	*Flexibacter cytophaga* (Coldwater)
Bacterial	Vancouver	*Flavobacterium sp.*
Bacterial	Vancouver	*Renibacterium salmonarium* (BKD)
Parasite	Vancouver	*Gyrodactylus sp.*
Parasite	Vancouver	*Hexamita sp.*
Parasite	Vancouver	*Ichthyoboda sp.* (Costia)
Parasite	Vancouver	*Ichthyophthirius multiflis* (Ich)
Parasite	Vancouver	*Trichodina sp.*

"Summer steelhead smolts released into the Lewis River were also reared at the Beaver Creek Hatchery located on the Elochoman River.
[b]Skamania Hatchery is located on the Washougal River.
'Vancouver Hatchery is located in the city of Vancouver WA.

Disease history represents pathogens isolated at these hatcheries and not necessarily a disease outbreak.
Source: WDW pathologist, Steve Roberts, 1991.

LEWIS -RIVER SUBBASIN

Naturally Produced Winter S teelhead

GEOGRAPHIC LOCATION

The Lewis subbasin begins on the southern slopes of Mount St. Helens and Mount Adams. The mainstem of the river is known as the North Fork Lewis River which drains a watershed of 828 square miles. From its source the North Fork flows southwest through three separate lakes, Swift Creek Reservoir, Yale Lake and Merwin Reservoir before a major tributary, East Fork Lewis River, draining a watershed of 212 square miles entering the mainstem at river mile (RM) 3.5. From this point the Lewis River continues west, entering the Columbia River at RM 88.

ORIGIN

The wild winter steelhead stock in the Lewis River is native, although interbreeding with introduced Cowlitz, Chambers Creek and Elochoman Hatchery stocks has likely occurred. In addition, steelhead which abandoned the Cowlitz system following the eruption of Mount St. Helens in 1980, probably strayed into the Lewis River and spawned with native Lewis stock.

DISTRIBUTION

Table 1 lists rearing and spawning habitat for Lewis River steelhead based on estimates from the Northwest Power Planning Council.

There are three dams (Swift, Yale, Merwin) which block passage of anadromous fish into the upper areas of the North Fork Lewis. Steelhead distribution on the North Fork occurs from approximately RM 7 to RM 20. A dam located on Cedar Creek, a tributary to the North Fork, was removed in 1946 and in combination with stream improvements spawning now occurs throughout most of Cedar Creek (Figure 1 of the prior summer steelhead section).

The East Fork Lewis River allows steelhead access and spawning throughout most of the river. Figure 2 in the prior summer steelhead section depicts wild winter and summer spawning areas in the East Fork. The lower portion of the river is becoming increasingly impacted by urbanization while the upper portion remains relatively unchanged. Prior to 1982 Sunset Falls blocked most steelhead from accessing the upper reaches of the East Fork. In 1982, the falls were "notched" lowering the falls from 13.5 ft. to 8 ft. and allowing steelhead access to the upper section of the river.

PRODUCTION

Production Facilities

There are two hatcheries in the subbasin, Lewis River Hatchery and Speelyai Hatchery. Lewis River Hatchery is located on the North Fork four miles below Merwi Dam. The hatchery is a major producer of coho salmon and also operates a spring chinook program. Speelyai Hatchery is located on Speelyai Creek above Merwin Dam, also on the North Fork. The hatchery rears both coho and spring chinook salmon.

An additional rearing facility (Ariel Hatchery) to be used for steelhead, rainbow and cutthroat trout production is planned for construction at the base of Merwin Dam. A net pen rearing system has been in operation since 1979 in Merwin Reservoir rearing 35,000 winter steelhead smolts annually for release into the North Fork Lewis River.

No data are available on wild smolt production. Natural production continues in both the North and East Fork Lewis but estimates on smolt production do not exist. The lower section of the North Fork Lewis from Merwin Dam downstream is the only section available for fish production. Merwin Dam, a 240 foot high dam, blocks upstream passage and converts the middle sections of river into three large impoundments. The East Fork provides rearing habitat throughout most of the river although access to the upper reaches are difficult due to its steep gradient with numerous drops and waterfalls.

ADULT LIFE HISTORY

Run Size and Escapement

No estimates of total run size or escapement exist for either the North or East Fork Lewis River. The Lewis basin continues to propagate a fairly large wild steelhead population. Lucas (1985) determined that the wild portion of winter steelhead at Lucia Falls ranged from 35 percent to 74 percent of fish creeled between 1973-1984, with an average of 56 percent wild fish.

Time of migration

Adult time of entry for winter steelhead is generally from November through May with peak returns occurring in January for hatchery fish and March for wild fish. Figure 1 depicts the freshwater life history of winter steelhead in the Lewis River subbasin.

Harvest

Ocean harvest of Lewis River winter steelhead is unknown.

The amount of Columbia River harvest of Lewis River steelhead is unknown, however, some Lewis River steelhead are likely part of the Lower Columbia harvest. Sport fishing in both the North and East Fork Lewis are popular fisheries. Catch estimates from the North Fork averaged 300 fish through the 1960's and 1970's while catches in the 1980's, based on permit-card harvest estimates, averaged 1,577 steelhead. The East Fork sport fishery continues to attract anglers in pursuit of the large wild fish which propagate in this stream. The current state record winter steelhead (32 pounds, 12 ounces,) was caught in the East Fork in April of 1980. Total sport harvest from 1980 through 1990 for both North and East Forks averaged 4,385 (and wild; Table 2).

Treaty Indian fishing rights are not exercised in the Lewis River subbasin.

Spawning period

Spawning occurs from March through June in both North and East Forks peaking in mid-April through late May.

Spawning area

Spawning in the North Fork Lewis is limited with the blockage of upper spawning area by Merwin Dam and the three resevoirs. Most natural spawning occurs in Cedar Creek a tributary of the North Fork. Winter steelhead utilize most of the East Fork Lewis River for spawning although the upper section is more difficult to reach due to the numerous drops and falls in this section of the river.

Fecundity

No data are available for the Lewis River.

Age composition

Limited data on age composition of wild winter steelhead. From 12 wild fish sampled between 1977 through 1980 in the North Fork fishery, 17 percent were l-ocean jacks and 83 percent were 2-ocean adults (Lavoy and Fenton 1983; Table 3). An additional study by Lavoy and Fenton (1983) in which 364 fish were sampled from the North Fork winter fishery showed the age composition as follows: 2 percent were l-ocean fish, 63 percent were 2-ocean fish and 30 percent were 3-ocean fish plus return spawners.

Size

Table 4 lists mean fork lengths of 364 fish sampled from the North Fork winter fishery from 1977 through 1981.

Sex ratio

No data are available for Lewis River steelhead.

Survival rate

No data on smolt to adult survival.

JUVENILE LIFE HISTORY

Emergence

Emergence occurs from April and runs through July.

Juvenile rearing

Juvenile rearing lasts approximately two years prior to ocean emigration, with 83 percent emigrating after two years and 17 percent emigrating after three years (Lavoy and Fenton 1983).
Most fish outmigrate from April through May. Average smolt size is estimated at 160 mm.

Hatchery releases

No winter steelhead hatchery operates in the Lewis Subbasin, although construction of Ariel Hatchery include plans for winter steelhead production. Smolt releases began in the mid 1950's with fish released into both North Fork and East Fork with current smolt releases continuing in both the North Fork and East Fork Lewis (Table 5). Smolts are reared at Beaver Creek, and Skamania hatcheries as well as Merwin Lake Net Pens.

S traying

No data on Lewis River steelhead.

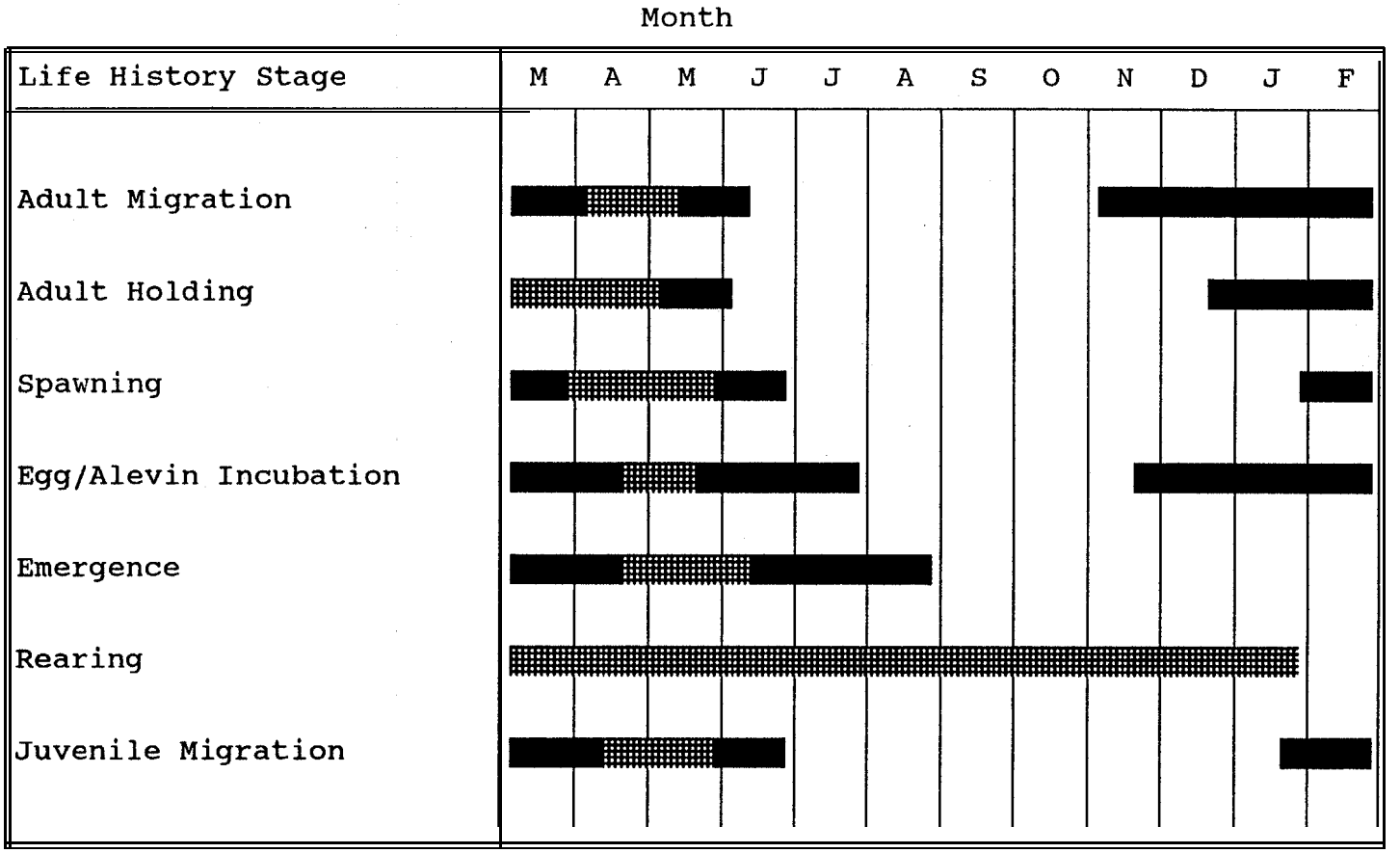
BIOCHEMICAL-GENETIC CHARACTERISTICS

No data are available for Lewis River steelhead.

DISEASES

Disease history for smolts planted in the Lewis River is presented in Table 6.

Figure 1. Freshwater life history of Lewis River winter steelhead.



▒ = Periods of heaviest activity.

Table 1 (HB-1). Estimated* amount of rearing and spawning habitat, by quality, of Lewis River subbasin winter steelhead.

Area	Excellent	Good	Fair[B]	Poor[B]	Unknown	Total	Confidence
Miles	38.6%	41.4%	20.3%	0 . 0 %		95.9	Unknown
Acres	42.4%	53.1%	4.8%	0.0%		673.2	Unknown

*Northwest Power Planning Council estimates based on limited observations.

*Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by man.

Source: Presence/absence database, NPPC, 1991.

Table 2 (RS-a). Returns (sport catch and escapement) of winter steelhead to the Lewis River subbasin. (November - April)

Return Year	Escapement	Sport Catch[A]	Adult Total
1980-8 l		6,766	Unknown
1981-82		3,141	Unknown
1982-83		2.245	Unknown
1983-84		4,693	Unknown
1984-85		6,046	Unknown
1985-86		4,145	Unknown
1986-87		4,924	Unknown
1987-88		4,232	Unknown
1988-89		3,645	Unknown
1989-90		3,915	Unknown

*Includes both North and East forks. Catch within subbasin only.

Source: Sport catch based WDW permit-card harvest estimates.

Table 3(AC-a). Age composition percentage (freshwater.ocean), by return year, for adult wild winter steelhead originating in -the -Lewis River subbasin.

Age composition (%)

Return Year	X.1	x.2	x.3
1977-78[A]	17.0%	83.0%	

*Based on 12 wild fish sampled from North Fork sport catch.
X.1 = l-ocean fish
X.2 = 2-ocean fish
X.3 = 3-ocean fish

Source: Columbia Basin System Plan, Lewis River, 1990.

Table 4 (AL-a). Mean fork length and age class for adult winter steelhead originating in the Lewis River subbasin.

Mean Fork Length (cm)

Return Year	x.1	x.2	x.3	Number[A]
1977		67.1	80.1	33
1978	46.0	71.0	84.2	45
1979		68.3	80.1	137
1980		69.1	81.9	86
1981	24.0	68.1	81.3	63

*Fish sampled from sport fishery on North Fork.
X.1 = 1 ocean fish
x.2 = 2 ocean fish
x.3 = 3 ocean fish

Source: Columbia Basin System Plan, Lewis River, 1990.

Table 5 (TR). Hatchery releases of winter steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Code/ Fin Clip
1981	Bogachiel R	Beaver Creek	Smolt	05/22/82	5.6	7,812	Lewis R- East Fork	
1981	Bogachiel R	Beaver Creek	Smolt	05/11/82	5.6	8,120	Lewis R- North Fork	
1981	Bogachiel R	Skamania	Smolt	04/18/83	4.2	5,048	Lewis R- East Fork	LV
1981	Bogachiel R	Skamania	Smolt	04/18/83	4.2	4.843	Lewis R- East Fork	LV
1981	Bogachiel R	Skamania	Smolt	04/18/83	4.2	4,981	Lewis R- East Fork	LV
1981	Bogachiel R	Skamania	Smolt	04/19/83	4.8	5,541	Lewis R- East Fork	LV
1981	Bogachiel R	Skamania	Smolt	04/19/83	5.1	6,110	Lewis R- East Fork	LV
1981	Bogachiel R	Skamania	Smolt	04/21/83	5.1	5,962	Lewis R- East Fork	LV
1981	Bogachiel R	Skamania	Smolt	04/21/83	5.2	6,032	Lewis R- East Fork	LV
1981	Bogachiel R	Skamania	Smolt	04/22/83	5.3	6,079	Lewis R- East Fork	LV
1981	Bogachiel R	S kamania	Smolt	04/22/83	5.3	6,811	Lewis R- East Fork	LV
1981	Bogachiel R	Skamania	Smolt	04/21/83	5.1	6,156	Lewis R- North Fork	
1981	Bogachiel R	Skamania	Smolt	04/21/83	5.1	6,089	Lewis R- North Fork	
1981	Bogachiel R	Skamania	Smolt	04/22/83	5.1 I	3.233	Lewis R- North Fork	
1981	Bogachiel R	Skamania	Smolt	04/22/83	5.1	4,641	Lewis R- North Fork	
1981	Chambers Cr	Beaver Creek	Smolt	04/27/82	5.4	6,993	Lewis R- East Fork	
1981	Chambers Cr	Beaver Creek	Smolt	04/28/82	5.4	7,722	Lewis R- East Fork	
1981	Chambers Cr	Beaver Creek	Smolt	04/28/83	4.5	6,750	Lewis R- East Fork	
1981	Chambers Cr	Beaver Creek	Smolt	04/29/82	5.4	7,911	Lewis R- East Fork	
1981	Chambers Cr	Beaver Creek	Smolt	04/30/82	5.8	8,294	Lewis R- East Fork	

Table 5 (cont.). Hatchery releases of winter steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Code/ Fin Clin
1981	Chambers Cr	Beaver Creek	Smolt	05/05/82	6.0	7,448	Lewis R- East Fork	
1981	Chambers Cr	Beaver Creek	Smolt	05/07/82	6.4	8,896	Lewis R- East Fork	
1981	Chambers Cr	Beaver Creek	Smolt	05/11/83	5.0	6,000	Lewis R- East Fork	
1981	Chambers Cr	Beaver Creek	Smolt	04/28/82	5.4	7.857	Lewis R- North Fork	
1981	Chambers Cr	Beaver Creek	Smolt	04/29/82	5.4	7,803	Lewis R- North Fork	
1981	Chambers Cr	Beaver Creek	Smolt	04/30/82	5.8	8,642	Lewis R- North Fork	
1981	Chambers Cr	Beaver Creek	Smolt	05/03/82	6.2	4,588	Lewis R- North Fork	
1981	Chambers Cr	Beaver Creek	Smolt	05/03/82	5.8	4,060	Lewis R- North Fork	
1981	Chambers Cr	Beaver Creek	Smolt	05/04/82	6.0	7.950	Lewis R- North Fork	
1981	Chambers Cr	Beaver Creek	Smolt	05/05/82	6.4	9,056	Lewis R- North Fork	
1981	Chambers Cr	Beaver Creek	Smolt	05/06/82	5.9	8,643	Lewis R- North Fork	
1981	Chambers Cr	Beaver Creek	Smolt	05/07/82	6.4	1,952	Lewis R- North Fork	
1981	Chambers Cr	Beaver Creek	Smolt	05/07/82	6.8	7,854	Lewis R- North Fork	
1981	Chambers Cr	Merwin Net Pens	Smolt	04/26/83	5.0	41,000	Lewis R- North Fork	
1981	Chambers Cr	Skamania	Smolt	04/05/82	5.6	5,236	Lewis R- East Fork	
1981	Chambers Cr	Skamania	Smolt	04/05/82	7.6	9,234	Lewis R- East Fork	
1981	Chambers Cr	Skamania	Smolt	04/06/82	7.7	9,602	Lewis R- East Fork	
1981	Chambers Cr	Skamania	Smolt	04/13/82	6.2	5.890	Lewis R- East Fork	
1981	Chambers Cr	Skamania	Smolt	04/13/82	6 . 1	7,808	Lewis R- East Fork	

Table 5 (cont.). Hatchery releases of winter steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Code/ Fin Clip
1981	Chambers Cr	Skamania	Smolt	04/14/82	6.2	7,894	Lewis R- East Fork	
1981	Chambers Cr	Skamania	Smolt	04/14/82	6.2	8.308	Lewis R- East Fork	
1983	Elochoman R	Beaver Creek	Smolt	05/02/84	4.6	6,670	Lewis R- East Fork	
1983	Elochoman R	Beaver Creek	Smolt	05/02/84	4.6	7,130	Lewis R- East Fork	
1983	Elochoman R	Beaver Creek	Smolt	05/04/84	6.0	7,890	Lewis R- East Fork	
1983	Elochoman R	Beaver Creek	Smolt	05/07/84	6.0	4,080	Lewis R- East Fork	
1983	Elochoman R	Beaver Creek	Smolt	05/07/84	6.0	3.450	Lewis R- East Fork	
1983	Elochoman R	Beaver Creek	Smolt	05/10/84	5.9	9,440	Lewis R- East Fork	
1983	Elochoman R	Beaver Creek	Smolt	05/02/84	4.2	5,250	Lewis R- North Fork	
1983	Elochoman R	Beaver Creek	Smolt	05/02/84	4.2	5,250	Lewis R- North Fork	
1983	Elochoman R	Beaver Creek	Smolt	05/02/84	4.2	5,208	Lewis R- North Fork	
1983	Elochoman R	Beaver Creek	Smolt	05/03/84	4.2	5.208	Lewis R- North Fork	
1983	Elochoman R	Beaver Creek	Smolt	05/03/84	4.2	5,187	Lewis R- North Fork	
1983	Elochoman R	Beaver Creek	Smolt	05/03/84	4.2	5,145	Lewis R- North Fork	
1983	Elochoman R	Beaver Creek	Smolt	05/07/84	4.6	5,773	Lewis R- North Fork	
1983	Elochoman R	Beaver Creek	Smolt	05/08/84	4.6	5,290	Lewis R- North Fork	
1983	Elochoman R	Beaver Creek	Smolt	05/08/84	4.6	6,762	Lewis R- North Fork	
1983	Elochoman R	Beaver Creek	Smolt	05/09/84	4.6	5,658	Lewis R- North Fork	
1983	Elochoman R	Beaver Creek	Smolt	05/09/84	4.6	5.474	Lewis R- North Fork	
1983	Elochoman R	Skamania	Smolt	05/08/84	6.3	4,845	Lewis R- East Fork	AD

Table 5 (cont.). Hatchery releases of winter steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Code/ Fin Clip
1983	Elochoman R	Skamania	Smolt	05/08/84	6.3	7,617	Lewis R- East Fork	AD
1983	Elochoman R	S kamania	Smolt	05/15/84	6.5	6,481	Lewis R- East Fork	AD
1983	Washougal R	Merwin Net Pens	Smolt	04/27/84	5.3	10,865	Lewis R- North Fork	
1984	Elochoman R	Beaver Creek	Smolt	04/24/85	5.6	8,960	Lewis R- East Fork	AD
1984	Elochoman R	Beaver Creek	Smolt	04/25/85	5.0	7,250	Lewis R- East Fork	AD
1984	Elochoman R	Beaver Creek	Smolt	04/25/85	5.0	7,250	Lewis R- East Fork	AD
1984	Elochoman R	Beaver Creek	Smolt	04/26/85	5.0	7,000	Lewis R- East Fork	AD
1984	Elochoman R	Beaver Creek	Smolt	05/06/85	4.9	6,787	Lewis R- East Fork	AD
1984	Elochoman R	Beaver Creek	Smolt	05/08/85	4.9	7,105	Lewis R- East Fork	AD
1984	Elochoman R	Beaver Creek	Smolt	05/10/85	5.3	7,818	Lewis R- East Fork	AD
1984	Elochoman R	Beaver Creek	Smolt	05/10/85	5.3	5,300	Lewis R- East Fork	A D
1984	Elochoman R	Beaver Creek	Smolt	05/13/85	5.9	8,260	Lewis R- East Fork	AD
1984	Elochoman R	Beaver Creek	Smolt	05/14/85	5.9	4,720	Lewis R- East Fork	AD
1984	Elochoman R	Beaver Creek	Smolt	05/14/85	4.8	2,880	Lewis R- East Fork	AD
1984	Elochoman R	Beaver Creek	Smolt	05/14/85	4.8	5,760	Lewis R- East Fork	AD
1984	Elochoman R	Beaver Creek	Smolt	05/01/85	4.9	6,885	Lewis R- North Fork	AD
1984	Elochoman R	Beaver Creek	Smolt	05/08/85	4.9	6,860	Lewis R- North Fork	AD
1984	Elochoman R	Beaver Creek	Smolt	05/09/85	4.9	6,370	Lewis R- North Fork	AD
1984	Elochoman R	Beaver Creek	Smolt	05/09/85	5.1	4,080	Lewis R- North Fork	AD

Table 5 (cont.). Hatchery releases of winter steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Code/ Fin Clip
1984	Elochoman R	Beaver Creek	Smolt	05109185	4.2	2.520	Lewis R- North Fork	AD
1984	Elochoman R	Beaver Creek	Smolt	05/10/85	5.3	2,915	Lewis R- North Fork	AD
1984	Elochoman R	Beaver Creek	Smolt	05/10/85	4.7	2,585	Lewis R- North Fork	AD
1984	Elochoman R	Beaver Creek	Smolt	05/13/85	4.7	6,815	Lewis R- North Fork	AD
1984	Elochoman R	Beaver Creek	Smolt	05/14/85	4.8	7,200	Lewis R- North Fork	AD
1984	Elochoman R	Beaver Creek	Smolt	05/20/85	6.6	6.930	Lewis R- North Fork	AD
1984	Green Duwamish R	Beaver Creek	Smolt	05/20/85	8.5	3,826	Lewis R- North Fork	AD
1984	Green Duwamish R	Beaver Creek	Smolt	05/20/85	8.5	16,150	Lewis R- North Fork	AD
1984	Unknown	Beaver Creek	Smolt	04/19/84	4.5	5,850	Lewis R- East Fork	
1984	Unknown	Beaver Creek	Smolt	04/20/84	4.5	6.075	Lewis R- East Fork	
1984	Unknown	Beaver Creek	Smolt	04/23/84	6.0	8,400	Lewis R- East Fork	
1984	Unknown	Beaver Creek	Smolt	04/24/84	4.5	6,300	Lewis R- East Fork	
1984	Unknown	Beaver Creek	Smolt	04/25/84	4.2	5,880	Lewis R- East Fork	
1985	Elochoman R	Beaver Creek	Smolt	04/14/86	4.0	6,000	Cedar Cr	
1985	Elochoman R	Beaver Creek	Smolt	05/19/86	6.0	8.700	Cedar Cr	
1985	Elochoman R	Beaver Creek	Smolt	04/30/86	4.7	46,025	Lewis R- East Fork	
1985	Elochoman R	Beaver Creek	Smolt	05/19/86	5.0	68,275	Lewis R- East Fork	
1985	Elochoman R	Beaver Creek	Smolt	04/29/86	4.5	24,960	Lewis R- North Fork	

Table 5 (cont.). Hatchery releases of winter steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Code/ Fin Clip
1985	Elochoman R	Beaver Creek	Smolt	05/20/86	4.9	54,646	Lewis R- North Fork	
1985	Washougal R	Merwin Net Pens	Smolt	05/01/86	7.7	18,865	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/05/87	4.6	5,566	Cedar Cr	
1986	Elochoman R	Beaver Creek	Smolt	505/14/87.	8	4,060	Cedar Cr	
1986	Elochoman R	Beaver Creek	Smolt	04/20/87	4.7	7,050	Lewis R- East Fork	
1986	Elochoman R	Beaver Creek	Smolt	04/22/87	4.7	6,933	Lewis R- East Fork	
1986	Elochoman R	Beaver Creek	Smolt	04/23/87	4.7	6,815	Lewis R- East Fork	
1986	Elochoman R	Beaver Creek	Smolt	04/23/87	4.7	6,815	Lewis R- East Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/07/87	4.6	5,060	Lewis R- East Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/07/87	4.6	6.440	Lewis R- East Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/08/87	4.6	5,750	Lewis R- East Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/08/87	4.6	5,980	Lewis R- East Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/08/87	4.6	7,130	Lewis R- East Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/12/87	4.9	5,880	Lewis R- East Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/13/87	4.9	7,718	Lewis R- East Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/14/87	4.9	6,370	Lewis R- East Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/14/87	5.8	8.120	Lewis R- East Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/15/87	5.8	6,960	Lewis R- East Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/20/87	4.6	5.520	Lewis R- East Fork	

Table 5 (cont.). Hatchery releases of winter steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb,	Number Released	Release Site	CWT Code/ Fin Clip
1986	Elochoman R	Beaver Creek	Smolt	05/04/87	4.6	5,704	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/05/87	4.6	7,061	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/06/87	4.6	5,520	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/06/87	4.6	5,520	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/07/87	4.6	5,060	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/07/87	4.6	6,670	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/08/87	4.6	5,520	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/08/87	4.6	5,750	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/08/87	4.6	5,980	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/08/87	4.6	7,130	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/1 1/87	4.6	5,520	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/11/87	4.6	6,900	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/12/87	4.9	5,880	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/12/87	4.9	7,350	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/12/87	4.9	7,350	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/13/87	4.9	6,125	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/14/87	4.9	5,880	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/14/87	5.8	6,960	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/14/87	5.8	7,540	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/15/87	5.8	6,960	Lewis R- North Fork	

Table 5 (cont.). Hatchery releases of winter steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes,

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Code/ Fin Clin
1986	Elochoman R	Beaver Creek	Smolt	05/18/87	5.8	5,075	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/18/87	4.5	6,525	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/20/87	4.6	5,520	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/20/87	4.6	6,440	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/20/87	4.6	6.440	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/20/87	5.6	6,720	Lewis R- North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/20/87	5.6	7,280	Lewis R - North Fork	
1986	Elochoman R	Beaver Creek	Smolt	05/22/87	4.6	8,050	Lewis R- North Fork	
1987	Elochoman R	Beaver Creek	Smolt	04/27/88	5.0	7,500	Lewis R- East Fork	AD
1987	Elochoman R	Beaver Creek	Smolt	04/27/88	5.0	5.000	Lewis R- East Fork	AD
1987	Elochoman R	Beaver Creek	Smolt	04/29/88	4.9	2,279	Lewis R- East Fork	AD
1987	Elochoman R	Beaver Creek	Smolt	04/29/88	5.1	2,728	Lewis R- East Fork	AD
1987	Elochoman R	Beaver Creek	Smolt	04/29/88	5.1	5,738	Lewis R- East Fork	AD
1987	Elochoman R	Beaver Creek	Smolt	05/03/88	4.9	7,350	Lewis R- East Fork	AD
1987	Elochoman R	Beaver Creek	Smolt	05/03/88	4.9	6.125	Lewis R- East Fork	AD
1987	Elochoman R	Beaver Creek	Smolt	05/06/88	4.9	6,125	Lewis R- East Fork	AD
1987	Elochoman R	Beaver Creek	Smolt	05/06/88	4.9	7,350	Lewis R- East Fork	AD
1987	Elochoman R	Beaver Creek	Smolt	05/06/88	4.9	6,125	Lewis R- East Fork	AD
1987	Elochoman R	Beaver Creek	Smolt	05/10/88	4.8	3,720	Lewis R- East Fork	AD
1987	Elochoman R	Beaver Creek	Smolt	05/17/88	4.5	6,750	Lewis R- East Fork	AD

Table 5 (cont.). Hatchery releases of winter steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Code/ Fin Clip
1987	Elochoman R	Beaver Creek	Smolt	05/18/88	4.5	6,750	Lewis R- East Fork	AD
1987	Elochoman R	Beaver Creek	Smolt	05/18/88	4.5	5,625	Lewis R- East Fork	AD
1987	Elochoman R	Beaver Creek	Smolt	05/18/88	4.5	5,625	Lewis R- East Fork	AD
1987	Elochoman R	Beaver Creek	Smolt	04/27/88	5.0	7,500	Lewis R- North Fork	AD
1987	Elochoman R	Beaver Creek	Smolt	04/27/88	5.0	5,000	Lewis R- North Fork	AD
1987	Elochoman R	Beaver Creek	Smolt	04/28/88	5.1	7,650	Lewis R- North Fork	AD
1987	Elochoman R	Beaver Creek	Smolt	04/28/88	5.1	5,100	Lewis R- North Fork	AD
1987	Elochoman R	Beaver Creek	Smolt	04/29/88	4.9	5,880	Lewis R- North Fork	AD
1987	Elochoman R	Merwin Net Pens	Smolt	04/28/88	4.8	63,960	Lewis R- North Fork	AD
1988	Elochoman R	Beaver Creek	Smolt	04/24/ 89	4.4	6,600	Lewis R- East Fork	AD
1988	Elochoman R	Beaver Creek	Smolt	04/20/89	4.4	6,160	Lewis R- North Fork	AD
1988	Elochoman R	Beaver Creek	Smolt	04/24/89	4.4	5,500	Lewis R- North Fork	AD
1988	Elochoman R	Beaver Creek	Smolt	04/24/89	4.4	5,500	Lewis R- North Fork	AD
1988	Elochoman R	Beaver Creek	Smolt	04/24/89	4.4	6,600	Lewis R- North Fork	AD
1988	Elochoman R	Beaver Creek	Smolt	04/26/89	4.8	20,400	Lewis R- North Fork	AD
1988	Elochoman R	Beaver Creek	Smolt	05/08/89	4.7	19,975	Lewis R- North Fork	AD
1988	Elochoman R	Beaver Creek	Smolt	05/09/89	4.7	25,850	Lewis R- North Fork	AD
1988	Elochoman R	Merwin Net Pens	Smolt	04/26/89	4.6	20,930	Lewis R- North Fork	AD

Table 5 (cont.). Hatchery releases of winter steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Code/ Fin Clip
1988	Elochoman R	Merwin Net Pens	Smolt	04/26/89	5.2	16,900	Lewis R- North Fork	AD
1988	Washougal R - WFINF	Merwin Net Pens	Smolt	04/19/90	5.0	8,250	Lewis R- North Fork	AD
1988	Washougal R - WFINF	Merwin Net Pens	Smolt	04/19/90	5.0	7,500	Lewis R- North Fork	AD
1988	Washougal R - WF/NF	Merwin Net Pens	Smolt	04/ 9/90	5.0	5,750	Lewis R- North Fork	AD
1988	Washougal R - WF/NF	Merwin Net Pens	Smolt	04/19/90	4.5	4,950	Lewis R- North Fork	AD
1988	Washougal R - WFINF	Merwin Net Pens	Smolt	04/ 9/90	4.5	6,300	Lewis R- North Fork	AD
1988	Washougal R - WFINF	Merwin Net Pens	Smolt	04/19/90	4.5	8,325	Lewis R- North Fork	AD
1988	Washougal R - WF/NF	Merwin Net Pens	Smolt	04/ 9/90	4.7	5,875	Lewis R- North Fork	AD
1988	Washougal R - WFINF	Merwin Net Pens	Smolt	04/19/90	4.7	6,580	Lewis R- North Fork	AD
1988	Washougal R - WF/NF	Merwin Net Pens	Smolt	04/19/90	4.7	8,812	Lewis R- North Fork	AD
1988	Washougal R - WF/NF	Skamania	Smolt	04/ 7/89	5.1	7,140	Lewis R- East Fork	AD
1988	Washougal R - WF/NF	Skamania	Smolt	04/17/89	5.1	7,191	Lewis R- East Fork	AD

Table 5 (cont.). Hatchery releases of winter steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Code/ Fin Clip
1988	Washougal R - WFINF	Skamania	Smolt	04/18/89	5.0	6,925	Lewis R- East Fork	AD
1988	Washougal R - WFINF	Skamania	Smolt	04/18/89	4.9	6,860	Lewis R- East Fork	AD
1988	Washougal R - WFINF	Skamania	Smolt	04/19/89	4.9	6,884	Lewis R- East Fork	AD
1988	Washougal R - WFINF	Skamania	Smolt	04/19/89	5.1	7,191	Lewis R- East Fork	AD
1988	Washougal R - WFINF	Skamania	Smolt	04/19/89	5.3	7,420	Lewis R- East Fork	AD
1988	Washougal R - WFINF	Skamania	Smolt	04/19/89	5.3	7,420	Lewis R- East Fork	AD
1988	Washougal R - WFINF	Skamania	Smolt	04/20/89	5.3	7,261	Lewis R- East Fork	AD
1988	Washougal R - WFINF	S kamania	Smolt	04/20/89	6.1	8,631	Lewis R- East Fork	AD
1988	Washougal R - WFINF	Skamania	Smolt	04/20/89	6.1	8,906	Lewis R- East Fork	AD
1988	Washougal R - WFINF	Skamania	Smolt	05/01/89	6.0	8,520	Lewis R- East Fork	AD
1988	Washougal R - WF/NF	S kamania	Smolt	05/02/89	6.0	8,550	Lewis R- East Fork	AD
1989	Elochoman R	Beaver Creek	Smolt	05/03/90	5.2	6,500	Lewis R- East Fork	AD
1989	Elochoman R	Beaver Creek	Smolt	05/03/90	5.2	6,500	Lewis R- East Fork	AD

Table 5 (cont.). Hatchery releases of winter steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Code/ Fin Clip
1989	Elochoman R	Beaver Creek	Smolt	05/03/90	5.2	8,060	Lewis R- East Fork	AD
1989	Elochoman R	Beaver Creek	Smolt	05/04/90	5.2	8,320	Lewis R- East Fork	AD
1989	Elochoman R	Beaver Creek	Smolt	05/04/90	5.2	8,060	Lewis R- East Fork	AD
1989	Elochoman R	Beaver Creek	Smolt	05/07/90	5.2	8,320	Lewis R- East Fork	AD
1989	Elochoman R	Beaver Creek	Smolt	05/07/ 90	5.2	8,320	Lewis R- East Fork	AD
1989	Elochoman R	Beaver Creek	Smolt	05/08/90	5.2	8.320	Lewis R- East Fork	AD
1989	Elochoman R	Beaver Creek	Smolt	05/09/90	5.2	8,320	Lewis R- East Fork	AD
1989	Elochoman R	Beaver Creek	Smolt	05/09/90	5.2	8,320	Lewis R- East Fork	AD
1989	Elochoman R	Beaver Creek	Smolt	05/10/90	6.2	9,920	Lewis R- East Fork	AD
1989	Elochoman R	Beaver Creek	Smolt	05/15/90	4.6	4,140	Lewis R- East Fork	AD
1989	Elochoman R	Beaver Creek	Smolt	05/02/90	4.9	7,350	Lewis R- North Fork	AD
1989	Elochoman R	Beaver Creek	Smolt	05/02/90	4.9	7,350	Lewis R- North Fork	AD
1989	Elochoman R	Beaver Creek	Smolt	05/09/90	6.2	3,100	Lewis R- North Fork	AD
1989	Elochoman R	Beaver Creek	Smolt	05/09/90	5.2	3.900	Lewis R- North Fork	AD
1989	Elochoman R	Beaver Creek	Smolt	05/10/90	6.2	2,480	Lewis R- North Fork	AD
1989	Elochoman R	Beaver Creek	Smolt	05/10/90	4.8	4.080	Lewis R- North Fork	AD
1989	Elochoman R	Beaver Creek	Smolt	05/15/90	4.6	7,360	Lewis R- North Fork	AD
1989	Elochoman R	Beaver Creek	Smolt	05/16/90	4.7	6,110	Lewis R- North Fork	AD
1989	Elochoman R	Beaver Creek	Smolt	05/16/90	4.8	1,440	Lewis R- North Fork	AD
1990	Elochoman R	Beaver Creek	Smolt	05/02/91	5.2	8,580	Lewis R- East Fork	AD

Table 5 (cont.). Hatchery releases of winter steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Code/ Fin Clip
1990	Elochoman R	Beaver Creek	Smolt	05/02/91	5.2	6,500	Lewis R- East Fork	AD
1990	Elochoman R	Beaver Creek	Smolt	05/02/91	5.2	4,992	Lewis R- East Fork	AD
1990	Elochoman R	Beaver Creek	Smolt	04/16/91	4.6	2,300	Lewis R- North Fork	AD
1990	Elochoman R	Beaver Creek	Smolt	04/22/91	4.6	7,360	Lewis R- North Fork	AD
1990	Elochoman R	Beaver Creek	Smolt	05/01/91	5.2	8,060	Lewis R- North Fork	AD
1990	Elochoman R	Beaver Creek	Smolt	05/01/91	5.2	6,500	Lewis R- North Fork	AD
1990	Elochoman R	Beaver Creek	Smolt	05/03/91	5.2	8,320	Lewis R- North Fork	AD
1990	Elochoman R	Beaver Creek	Smolt	05/03/91	5.2	6,500	Lewis R- North Fork	AD
1990	Elochoman R	Beaver Creek	Smolt	05/06/91	5.2	6,500	Lewis R- North Fork	AD
1990	Elochoman R	Beaver Creek	Smolt	05/06/91	5.2	8,320	Lewis R- North Fork	AD
1990	Elochoman R	Beaver Creek	Smolt	05/06/91	5.2	6,500	Lewis R- North Fork	AD
1990	Elochoman R	Beaver Creek	Smolt	05/07/91	5.2	8,320	Lewis R- North Fork	AD
1990	Elochoman R	Beaver Creek	Smolt	05/08/91	5.2	8,320	Lewis R- North Fork	AD
1990	Elochoman R	Beaver Creek	Smolt	05/08/91	5.2	6,500	Lewis R- North Fork	AD
1990	Elochoman R	Beaver Creek	Smolt	05/09/91	5.2	8,580	Lewis R- North Fork	AD
1990	Elochoman R	Beaver Creek	Smolt	05/09/91	5.2	8,320	Lewis R- North Fork	AD
1990	Elochoman R	Beaver Creek	Smolt	05/10/91	5.2	5,720	Lewis R- North Fork	AD
1990	Elochoman R	Merwin Net Pens	Smolt	04/17/91	5.0	39,400	Lewis R- North Fork	AD
1990	Elochoman R	Skamania	Smolt	04/18/91	5.0	2 1,000	Lewis R- East Fork	AD

Table 5 (cont.). Hatchery releases of winter steelhead into the Lewis River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Code/ Fin Clip
1990	Elochoman R	Skamania	Smolt	04/22/91	5.8	8,200	Lewis R- East Fork	AD
1990	Elochoman R	Skamania	Smolt	04/23/91	4.6	6,532	Lewis R- East Fork	AD
1990	Elochoman R	Skamania	Smolt	04/24/91	4.9	6,860	Lewis R- East Fork	AD
1990	Elochoman R	Skamania	Smolt	04/26/91	5.1	21,420	Lewis R- East Fork	AD
1990	Elochoman R	Skamania	Smolt	04/29/91	5.6	22,260	Lewis R- East Fork	AD
1990	Elochoman R	Skamania	Smolt	04/30/91	5.1	22,720	Lewis R- East Fork	A D
1990	Elochoman R	Skamania	Smolt	05/01/91	4.5	6,300	Lewis R- East Fork	AD
1990	Elochoman R	Skamania	Smolt	04/22/91	4.6	6,532	Lewis R- North Fork	AD
1990	Elochoman R	Skamania	Smolt	04/23/91	4.6	6,440	Lewis R- North Fork	AD
1990	Elochoman R	Skamania	Smolt	04/24/91	4.9	13,965	Lewis R- North Fork	AD

Source: Terry Lovgren, WDW Hatchery Stocking Database, 1991.

Table 6 (TD). Parasites and diseases isolated at the hatcheries which reared Lewis River winter steelhead smolts[a].

Disease Type	Hatchery	Specific Pathogen
Bacterial	Merwin Net Pens[b]	*Renibacterium salmonarium* (BKD)
Bacterial	Beaver Creek[c]	*Flavobacterium sp.*
Bacterial	Beaver Creek	*Aeromonas salmonicida* (Furunculosis)
Bacterial	Beaver Creek	*Flexibacter columnaris* (Columnaris)
Bacterial	Beaver Creek	*Renibacterium salmonarium* (BKD)
Bacterial	Beaver Creek	*Flexibacter cytophaga* (Coldwater)
Parasite	Beaver Creek	*Ichthyoboda sp.* (Costia)
Parasite	Beaver Creek	*Ichthyophthirius multiflis* (Ich)
Parasite	Beaver Creek	*Nanophetyus sp.*
Parasite	Beaver Creek	*Trichodina sp.*
Parasite	Beaver Creek	*Hexamita sp.*
Viral	Beaver Creek	Infectious Hematopoietic Necrosis (IHN)
Viral	Beaver Creek	EIBS

"The Lewis River receives steelhead smolts from fish reared at Skamania Hatchery.

Disease history for the Skamania Hatchery is located in the subbasin report for the Washougal River.

[b]Merwin Net Pens is a acclimating station located above Merwin Dam in Merwin Reservoir.

'Beaver Creek Hatchery is located on the Elochoman River.

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

Source: WDW pathologist, Steve Roberts, 1991.

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WASHOUGAL SUBBASIN

Fall Chinook

GEOGRAPHIC LOCATION

The Washougal River is located in southwest Washington, originating in Skamania County and flowing southwesterly into Clark County, joining the Columbia River at River Mile (RM) 121 at the town of Camas. The drainage area encompasses approximately 240 square miles. The subbasin is relatively small compared to other major rivers entering the Columbia River. The mainstem Washougal runs approximately for 33 miles from headwaters to the mouth. The Washougal Hatchery is located 16 miles northeast of the town of Washougal.

ORIGIN

Native fall chinook have been reported in the Washougal (WDF, 1951), but a distinct stock no longer exists. Natural spawning does occur, but these fish are identified as hatchery strays (Devore, 1984).

Brood stock for the Washougal Hatchery is usually obtained from local returning stocks. However, transfers of other stocks into the system is a common practice. In recent years, such stocks as Kalama, Bonneville, Toutle, Washougal, Elochoman, and Grays River have also been been imported to fill hatchery needs (WDF, 1990).

DISTRIBUTION

Washougal River fall chinook spawning ground index counts are conducted annually between the Salmon Falls Bridge at RM 15 and the Wildlife Access at RM 12, a distance of approximately 4 miles. Salmon Falls was considered a barrier to salmon migration until a fishway was constructed in the 1950s.

PRODUCTION

In 1951 the Washington Department of Fisheries estimated the fall chinook escapement to be about 3,000 fish. The number of Washougal fall chinook natural spawners each year during 1967 - 1971 was estimated to be about 550 fish (WDF, 1973). Hatchery production is currently the dominant component in the Washougal River although some natural production also occurs.

Tables 1 and 2 describe the amount of spawning and rearing habitat by quality, available in the Washougal River. This data was derived from the Presence/Absence database of Northwest Power Planning Council, 199 1.

The Washougal River fall chinook natural spawn escapement from 1978 - 1984 brood years averaged 2,525 with a low return of 978 for the 1978 brood and a peak of 6,285 for the 1984 brood. Washougal River natural spawn escapements by age and brood year are presented in Table 3.

Washougal Hatchery fall chinook returns from 1978 - 1984 brood years averaged 5,822 with a low return of 1,599 for the 1978 brood and a peak of 17,471 for the 1983 brood. Washougal Hatchery returns by age and brood year are presented in Table 4.

Washougal River tributary sport catch estimates between 1977 - 1987 return years averaged 477 fall chinook, ranging from a low of 84 in 1979 to a high of 1,362 in 1987, based on punchcard data. However, specific age and brood year analysis for Washougal River sport catch is unavailable.

ADULT LIFE HISTORY

Run size, catch and escapement

Ocean commercial and recreational fisheries from Alaska to Washington, in addition to Columbia River gill net and sport fisheries all harvest a portion of the. Washougal River origin fall chinook. A special sport fishing area near Washougal Hatchery was established in the late 1960s to harvest surplus fall chinook. This fishery included legal snagging and was discontinued after 1986. Columbia River sport and commercial fisheries are managed to ensure attainment of hatchery egg-take requirements.

Strays from other lower river hatcheries are not unusual. Table 5 lists Washougal Hatchery origin fall chinook stray coded wire tag recoveries beginning with the 1978 brood through to the 1988 brood, and Table 6 lists the coded wire tags recovered within the Washougal subbasin which originated outside the Washougal subbasin.

Time of Migration

Adult chinook move into the Washougal River from late September through the middle of November. Figure 1 illustrates the freshwater life history of fall chinook in the Washougal River.

Spawning Period

The holding period is relatively short with spawning occurring from the first of October through November.

Spawning Areas

Natural production occurs in the mainstem Washougal River downstream from the salmon hatchery. Although this includes 20 miles of stream channel, bed rock and bouldered areas result in light spawning in the stream with spawning most intensive from RM 12 - 15. Washougal River fall chinook spawning ground peak index counts are conducted annually between Salmon Falls Bridge and the Wildlife Access, a distance of approximately 4 miles.

Age Comnosition

Age ranges from two-year-old jacks to six-year-old adults with three-year-olds or four-year-olds usually the dominant age classes. Total age composition data is summarized in Tables 3 and 4. Table 7 lists the age composition percentages by brood year and freshwater.ocean rearing for fall chinook returning to the Washougal River spawning grounds. Table 8 lists the age composition percentages by brood year and freshwater.ocean rearing for fall chinook returning to the Washougal Hatchery.

Sex Ratio

Female fall chinook comprised 57 - 79 percent of the natural spawners in the Washougal River between 1981 - 1984 brood years. The percent females by brood year and freshwater.ocean rearing ages for Washougal River natural spawners are presented in Table 9.

Female fall chinook comprised 25 - 47 percent of the fall chinook returning to the Washougal Hatchery between 1981 - 1984 brood years. The percent females by brood year and freshwater.ocean rearing ages for Washougal Hatchery returns are presented in Table 10. The mean fork length by brood year, sex, and freshwater.ocean rearing ages of Washougal River

natural spawners for 1978 - 1985 brood years are available in Tables 11 and 12. The mean fork length by brood year, sex, and freshwater:ocean rearing ages for Washougal Hatchery returns from 1978 - 1987 brood years are available in Tables 13 and 14.

Fecundity

Fecundity at the Washougal Hatchery between 1979 - 1988 return years averaged 4,354 and ranged from a low of 3,849 in 1987 to a high of 4,818 in 1981 (WDF, 1990). Washougal River natural spawn and Washougal Hatchery fecundity data by age and brood year is unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

Incubation takes place from early October through January, with emergence sometime in February.

Time. age and size at migration

Under natural conditions, lower river hatchery chinook generally migrate downstream as subyearlings, leaving the river by late summer or fall. A small percentage of juveniles do remain in the system throughout the winter, outmigrating as yearlings (Reimers and Loeffel, 1967).

The number of wild juvenile fall chinook that migrated from the Washougal River in 1980 was estimated to be 5,000,000. Population estimates are based upon comparing seining results of chinook per square feet before and after hatchery releases. Table 15 lists the number of natural juvenile fall chinook that migrated from the Washougal River in 1980.

The average natural fall chinook fork length from the Washougal River in 1980 was 49 mm. The average fork length data is based upon five biweekly seining trips to the Washougal River between May 1 - June 27, before Washougal Hatchery releases beginning on June 27th. Average fork length and ranges of 1979 brood Washougal River natural fall chinook smolts are presented in Table 16.

Hatchery release information for the Washougal subbasin by brood year is presented in Table 17.

Survival Rate

Egg-to-smolt survival rate from 1979 - 1988 averaged 92.5 percent (WDF, 1990). Washougal Hatchery 1976 brood coded wire tag (63-16-41) smelt-to-all adult survival was 1.6 percent, smolt-to-fisheries 1.4 percent, and from smolt-to-Columbia River 0.6 percent (Howell et al., 1985).

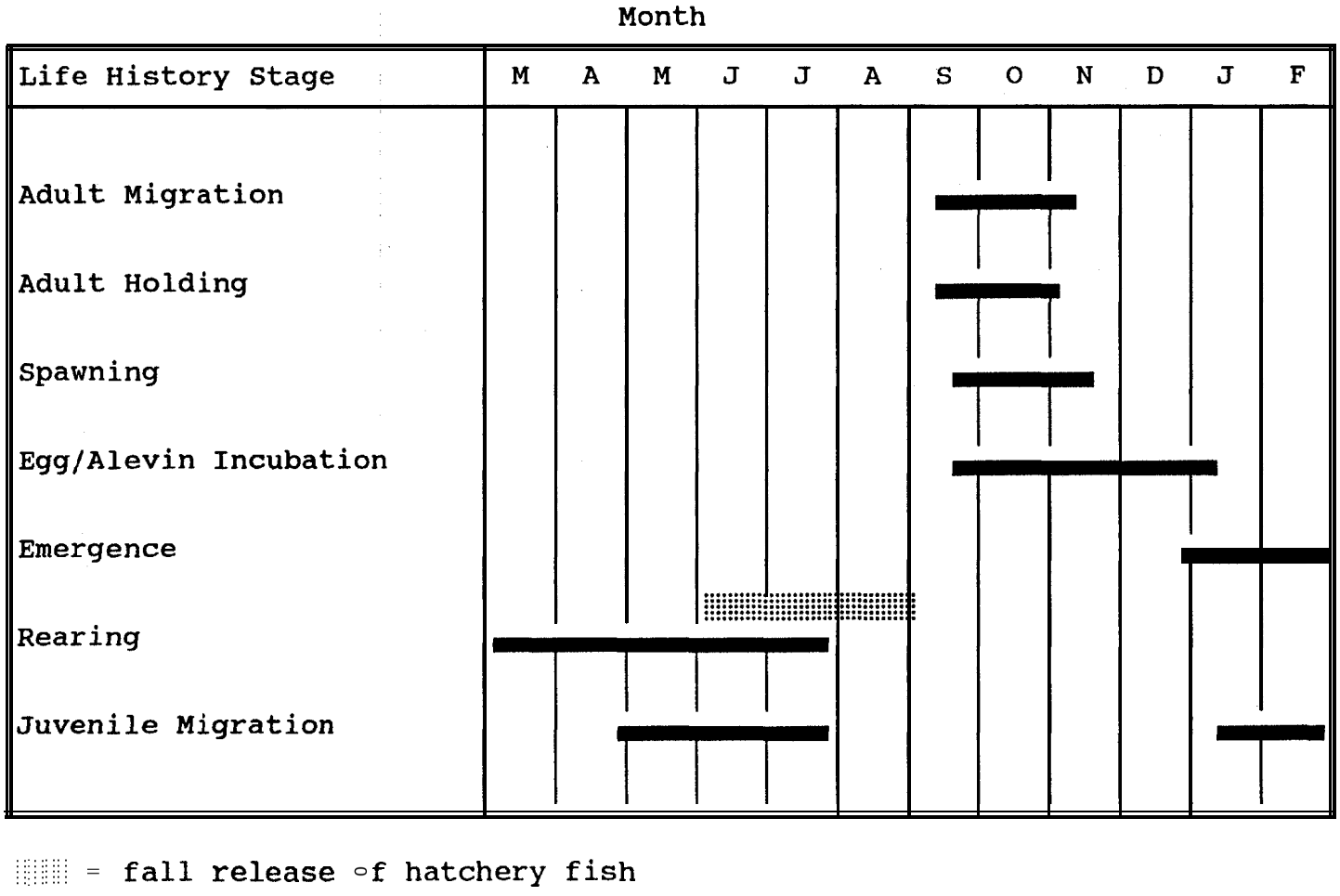
BIOCHEMICAL-GENETIC CHARACTERISTICS

Data not available.

DISEASE

Bacteria and parasitic diseases found in the Washougal Hatchery are listed in Table 18. (WDF Salmon Culture, Olympia).

Figure 1 (TT). Washougal fall chinook freshwater life history.



▒ = fall release of hatchery fish

Table 1 (HB-1). Estimated amount of rearing and spawning habitat, by quality, of the Washougal River fall chinook production area.

Distance/Area	Excellent	Good	Fair[a]	Poor[a]	Unknown	Total	Confidence
Miles (%)	20	73	07	00		14.3	
Acres (%)	20	73	07	00		103.8	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC , 199 1.

Table 2 (HB-2). Estimated amount of rearing habitat, by quality, of the Washougal River fall chinook production area.

Distance/Area	Excellent	Good	Fair[a]	Poor"	Unknown	Total	Confidence
Miles (%)	00	00	00	100		2.3	
Acres (%)	00	00	00	100		16.7	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 1991.

Table 3 (RN). Total age of natural spawner- escapement of fall chinook returning to the Washougal River subbasin, by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974					0		
1975				378	0		
1976			2,143	86	0		
1977		631	1,524	29	0		2,184
1978	285	179	172	342	0	978	693
1979	52	100	1,909	90	0	2,151	2,099
1980	29	426	1,053	276	0	1,784	1,755
1981	0	52	1,043	90	0	1,185	1,185
1982	22	404	545	138	0	1,109	1,087
1983	260	636	2,904	383	0	4,183	3,923
1984	318	536	2,689	2,742	0	6,285	5,967
1985	47	63	1,355	546			
1986	193	311	1,392				
1987	170	124					
1988	143						

Age based on scale reading analysis.

Table 4 (RH). Total hatchery returns of fall chinook to the Washougal subbasin by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974					0		
1975				184	0		
1976			1,052	177	0		
1977		481	3,133	595	0		4,209
1978	121	366	1,013	99	0	1,599	1,478
1979	104	940	3,084	157	0	4,285	4,181
1980	260	849	1,830	361	6	3,306	3,046
1981	26	90	1,347	233	0	1,696	1,670
1982	39	1,595	1,253	69	23	2,979	2,940
1983	4,628	9,049	3,448	339	7	17,471	12,843
1984	447	2,188	4,349	2324	108	9,416	8,969
1985	103	543	2,732	788			
1986	190	1,652	2,209				
1987	206	1,712					
1988	293						

Age based on scale reading analysis.

Table 5 (AE). Emigration of coded wire tagged fall chinook from the Washougal Hatchery.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC j
Washoueal H	Kalama. 198 1	Hatchery	5,987	1	1
Washougal H	Washougal River, 1981	Spawning Ground	339	3	16
Washougal H	Cedar Creek, 1981	Spawning Ground	23	1	9
Washougal H	Cedar Creek, 1982	Spawning Ground	42	1	4
Washougal H	Kalama, 1982	Hatchery	1,711	1	1
Washougal H	Kalama River. 1982	Spawning Ground	1,263	2	6
Washougal H	Washougal River, 1982	Spawning Ground	47	1	3
Washougal H	Kalama, 1982	Hatchery	1,711	8	8
Washougal H	Kalama River, 1982	Spawning Ground	1,263	2	6
Washougal H	Lewis River, 1982	Spawning Ground	2,939	1	3
Washougal H	Kalama River. 1982	Spawning Ground	1,263	1	3
Washougal H	Washougal River, 1983	Spawning Ground	373	1	7
Washougal H	Cowlitz , 1989	Hatchery	5,658	1	1
Washougal H	Cowlitz River, 1988	Spawning Ground	3,227	1	‘3
Washougal H	Kalama Falls, 1985	Hatchery	3,445	1	1
Washougal H	Kalama Falls. 1986	Hatchery	3,672	1	1
Washougal H	Kalama Falls, 1985	Hatchery	3,445	5	· 5
Washougal H	Kalama Falls. 1986	Hatcher-v	3.672	9	9
Washougal H	Kalama Falls, 1989	Hatchery	2,432	1	1
Washougal H	Kalama Falls, 1988	Hatchery	3,438	1	1

Table 5. (cont.) Emigration of coded wire tagged fall chinook from the Washougal Hatchery.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Washougal H	Kalama Falls, 1988	Hatchery	3,438	1	1
Washougal H	Kalama Falls, 1989	Hatchery	2,432	1	1
Washougal H	Kalama Falls, 1988	Hatchery	3,438	4	4
Washougal H	Kalama Falls, 1989	Hatchery	2,432	3	3
Washougal H	Kalama Falls, 1988	Hatchery	3,438	4	4
Washougal H	Kalama Falls, 1988	Hatchery	3,438	1	1
Washougal H	Kalama Falls, 1988	Hatchery	3,438	3	3
Washougal H	Kalama Falls, 1988	Hatchery	3,438	2	2
Washougal H	Kalama Falls, 1988	Hatchery	3,438	4	4
Washougal H	Kalama Falls, 1988	Hatchery	3,438	2	2
Washougal H	Kalama Falls. 1989	Hatcher-v	2,432	2	2
Washougal H	Kalama Falls, 1989	Hatchery	2,432	4	4
Washougal H	Kalama Falls, 1989	Hatchery	2,432	1	1
Washougal H	Kalama Falls, 1988	Hatchery	3,438	1	1
Washougal H	Kalama Falls, 1989	Hatchery	2,432	1	1
Washougal H	Kalama Falls, 1989	Hatchery	2.432	1	1
Washougal H	Kalama Falls, 1989	Hatchery	2,432	1	1
Washougal H	Kalama River, 1986	Spawning Ground	936	1	3
Washougal H	Kalama River, 1986	Spawning Ground	936	2	6
Washougal H	Kalama River, 1988	Spawning Ground	3,814	1	8

Table 5. (cont.) Emigration of coded wire tagged fall chinook from the Washougal Hatchery.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Washougal H	Kalama River, 1988	Spawning Ground	3,814	1	8
Washougal H	Kalama River, 1989	Spawning Ground	3,957	1	5
Washougal H	Kalama River, 1989	Spawning Ground	3,957	4	22
Washougal H	Kalama River, 1988	Spawning Ground	3,814	2	15
Washougal H	Kalama River, 1989	Spawning Ground	3,957	1	5
Washougal H	Kalama River, 1988	Spawning Ground	3,914	1	8
Washougal H	Kalama River, 1989	Spawning Ground	3,957	1	5
Washougal H	Kalama River, 1988	Spawning Ground	3,814	2	15
Washougal H	Kalama River, 1989	Spawning Ground	3,957	4	22
Washougal H	Kalama River, 1988	Spawning Ground	3,814	1	8
Washougal H	Kalama River, 1989	Spawning Ground	3,957	3	16
Washougal H	Kalama River, 1988	Spawning Ground	3,814	1	8
Washougal H	Kalama River, 1989	Spawning Ground	3,957	2	11
Washougal H	Kalama River, 1989	Spawning Ground	3,957	1	'5
Washougal H	Kalama River, 1989	Spawning Ground	3,957	2	11
Washougal H	Kalama River, 1989	Spawning Ground	3,957	1	5
Washougal H	Kalama River, 1989	Spawning Ground	3,957	5	27
Washougal H	Kalama River, 1989	Spawning Ground	3,957	4	22
Washougal H	Kalama River, 1989	Spawning Ground	3,957	2	11
Washougal H	Kalama River, 1988	Spawning Ground	3,814	2	15

Table 5. (cont.) Emigration of coded wire tagged fall chinook from the Washougal Hatchery.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Washougal H	Kalama River, 1989	Spawning Ground	3,957	8	43
Washougal H	Lower Kalama, 1986	Hatchery	2,495	1	1
Washougal H	Lower Kalama, 1986	Hatchery	2,495	7	7
Washougal H	Lower Kalama, 1986	Hatchery	2,495	1	1
Washougal H	Lower Kalama, 1988	Hatchery	658	1	1
Washougal H	Lower Kalama, 1989	Hatchery	1,307	1	1
Washougal H	Lower Kalama, 1989	Hatchery	1,307	2	2
Washougal H	Lower Kalama, 1988	Hatchery	658	1	1
Washougal H	Lower Kalama, 1988	Hatchery	658	1	1
Washougal H	Lower Kalama, 1989	Hatchery	1,307	2	2
Washougal H	Lower Kalama, 1988	Hatchery	658	2	2
Washougal H	Lower Kalama, 1989	Hatchery	1,307	3	3
Washougal H	Lower Kalama, 1989	Hatchery	1,307	1	1
Washougal H	Lower Kalama, 1989	Hatchery	1,307	1	1
Washougal H	Lower Kalama, 1988	Hatchery	658	1	1
Washougal H	Lower Kalama, 1988	Hatchery	658	1	1
Washougal H	Lower Kalama, 1988	Hatchery	658	1	1
Washougal H	Lower Kalama, 1988	Hatchery	658	1	1
Washougal H	Lower Kalama, 1989	Hatchery	1,307	2	2
Washougal H	Lower Kalama, 1988	Hatchery	658	1	1

Table 5. (cont.) Emigration of coded wire tagged fall chinook from the Washougal Hatchery.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Washougal H	Lower Kalama, 1989	Hatchery	1,307	1	
Washougal H	Lower Kalama, 1988	Hatchery	658	2	2
Washougal H	Lower Kalama, 1989	Hatchery	1,307	5	5
Washougal H	Lower Kalama, 1989	Hatchery	1,307	1	
Washougal H	Lewis Hatchery, 1986	Hatchery	10	1	11
Washougal H	Lewis River, 1986	Spawning Ground	3,375	2	9
Washougal H	Lewis River, 1986	Spawning Ground	3,375	1	5
Washougal H	Lewis River and Cedar Creek, 1988	Spawning Ground	3,679	2	8
Washougal H	Lewis River and Cedar Creek, 1989	Spawning Ground	5,808	5	20
Washougal H	Lewis River and Cedar Creek, 1988	Spawning Ground	3,679	1	4
Washougal H	Lewis River and Cedar Creek, 1989	Spawning Ground	5,808	2	8
Washougal H	Lewis River and Cedar Creek, 1989	Spawning Ground	5,808	2	8
Washougal H	Lewis River and Cedar Creek, 1989	Spawning Ground	5,808	1	4
Washougal H	Lewis River and Cedar Creek, 1988	Spawning Ground	3,679	1	4
Washougal H	Lewis River and Cedar Creek, 1989	Spawning Ground	5,808	1	4
Washougal H	Lewis River and Cedar Creek, 1988	Spawning Ground	3,679	4	17
Washougal H	Lewis River and Cedar Creek, 1988	Spawning Ground	3,679	2	8
Washougal H	Lewis River and Cedar Creek, 1988	Spawning Ground	3,679	1	4
Washougal H	Lewis River and Cedar Creek, 1988	Spawning Ground	3,679	1	4
Washougal H	Lewis River and Cedar Creek, 1988	Spawning Ground	3,679	1	4

Table 5. (cont.) Emigration of coded wire tagged fall chinook from the Washougal Hatchery.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Washougal H	Lewis River and Cedar Creek, 1989	Spawning Ground	5,808	1	4
Washougal H	Lewis River and Cedar Creek, 1988	Spawning Ground	3,679	1	4
Washougal H	Lewis River and Cedar Creek, 1989	Spawning Ground	5,808	1	4
Washougal H	Lewis River and Cedar Creek, 1988	Spawning Ground	3,679	1	4
Washougal H	Lewis River and Cedar Creek, 1989	Spawning Ground	5,808	2	8
Washougal H	Lewis River and Cedar Creek, 1988	Spawning Ground	3,679	1	4
Washougal H	Lewis River and Cedar Creek, 1989	Spawning Ground	5,808	1	4
Washougal H	Lewis River and Cedar Creek, 1989	Spawning Ground	5,808	3	12
Washougal H	Lewis River and Cedar Creek, 1989	Spawning Ground	5,808	4	16
Washougal H	Lewis River and Cedar Creek, 1989	Spawning Ground	5,808	1	4
Washougal H	Fast Fork Lewis River, 1988	Spawning Ground	124	1	4
Washougal H	East Fork Lewis River, 1989	Spawning Ground	103	1	6
Washougal H	East Fork Lewis River, 1989	Spawning Ground	103	1	6
Washougal H	Washougal River, 1987	Spawning Ground	1,613	1	‘2
Washougal H	Washougal River, 1988	Spawning Ground	536	2	13
Washougal H	**Washougal River, 1986**	**Spawning Ground**	**105**	**1**	**15**
Washougal H	**Washougal River, 1989**	**Spawning Ground**	**859**	**5**	**27**
Washougal H	**Washougal River, 1988**	**Spawning Ground**	**536**	**1**	**7**
Washougal H	**Washougal River, 1989**	**Spawning Ground**	**859**	**5**	**27**
Washougal H	**Washougal River, 1988**	**Spawning Ground**	**536**	**1**	**7**

Table 5. (cont.) Emigration of coded wire tagged fall chinook from the Washougal Hatchery.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Washougal H	Washougal River, 1989	Spawning Ground	859	4	22
Washougal H	Washougal River, 1989	Spawning Ground	859	2	11
Washougal H	Washougal River, 1989	Spawning Ground	859	1	5
Washougal H	Washougal River, 1988	Spawning Ground	536	2	13
Washougal H	Washougal River, 1989	Spawning Ground	859	2	11
Washougal H	Washougal River, 1988	Spawning Ground	536	3	20
Washougal H	Washougal River, 1989	Spawning Ground	859	7	38
Washougal H	Washougal River, 1989	Spawning Ground	859	1	5
Washougal H	Washougal River, 1989	Spawning Ground	859	2	11
Washougal H	Washougal River, 1988	Spawning Ground	536	2	13
Washougal H	Washougal River, 1988	Spawning Ground	536	1	7
Washougal H	Washougal River, 1989	Spawning Ground	859	6	33
Washougal H	Washougal River, 1989	Spawning Ground	859	1	5
Washougal H	Washougal River, 1989	Spawning Ground	859	5	‘27
Washougal H	Washougal River, 1989	Spawning Ground	859	5	27
Washougal H	Washougal River, 1989	Spawning Ground	859	5	27
Washougal H	Washougal River, 1989	Spawning Ground	859	3	16
Washougal H	Washougal River, 1988	Spawning Ground	536	1	7
Washougal H	Washougal River, 1989	Spawning Ground	859	8	44
Washougal H	Washougal River, 1989	Spawning Ground	859	2	11

Table 5. (cont.) Emigration of coded wire tagged fall chinook from the Washougal Hatchery.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Washougal H	Washougal River, 1989	Spawning Ground	859	1	5
Washougal H	Little White Salmon, 1984	Hatchery	1,052	1	1
Washougal H	Little White Salmon, 1985	Hatchery	853	1	1
Washougal H	Little White Salmon, 1986	Hatchery	730	1	1
Washougal H	Spring Creek, 1986	Hatchery	2,107	1	1
Washougal H	Spring Creek, 1986	Hatchery	2,107	1	1
Washougal H	Little White Salmon, 1986 (brights)	Hatchery	853	1	1
Washougal H	Spring Creek, 1987	Bonneville Dam Trap	1,487	1	1
Washougal H	Spring Creek, 1987	Bonneville Dam Trap	1,487	1	1
Washougal H	Little White Salmon, 1988	Hatchery	2,092	1	1
Washougal H	Spring Creek, 1988	Hatchery	2,981	1	1
Washougal H	Spring Creek/Dam Trap, 1988	Hatchery	2,884	1	1
Washougal Hatchery/Dam Trap	Spring Creek, 1989	Hatchery	1,556	1	1
Washougal H	Spring Creek, 1990	Hatchery	11,434	1	1

Based on the following tag codes: 63-19-46, 63-19-38, 63-21-53, 63-22-51, 63-34-33, 63-34-16, 63-21-48, 63-22-39, 63-22-51, 63-31-16, 63-31-19, 63-33-34, 63-33-35, 63-34-07, 63-34-08, 63-34-14, 63-34-28, 63-34-31, 63-34-32, 63-38-29, 63-38-30, 63-38-31, 63-41-13, 63-41-50, 63-24-61, 63-34-15, 63-34-34, 63-38-27, 63-38-28, 63-38-32, 63-52-28, 63-30-02, 63-31-17, and 63-31-18.

Beginning with the 1978 brood.

Table 6 (AI). Immigration of coded wire tagged fall chinook into the Washougal subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Washougal H	Washougal River, 198 1	Spawning Ground	339	3	16
Washougal H	Washougal River, 1982	Spawning Ground	47	1	7
Lewis wild	Washougal, 1982	Hatchery	2,808	1	1
Washougal H	Washougal River, 1987	Spawning Ground	1,613	1	2
Washougal H	Washougal River, 1988	Spawning Ground	536	2	13
Washougal H	Washougal River, 1986	Spawning Ground	105	1	1 5
Washougal H	Washougal River, 1989	Spawning Ground	859	5	2 7
Washougal H	Washougal River, 1988	Spawning Ground	536	1	7
Washougal H	Washougal River, 1989	Spawning Ground	859	5	27
Washougal H	Washougal River, 1988	Spawning Ground	536	1	7
Washougal H	Washougal River, 1989	Spawning Ground	859	4	22
Washougal H	Washougal River, 1989	Spawning Ground	859	2	11
Washougal H	Washougal River, 1989	Spawning Ground	859	1	5
Washougal H	Washougal River, 1988	Spawning Ground	536	2	i3
Washougal H	Washougal River, 1989	Spawning Ground	859	2	11
Washougal H	Washougal River, 1988	Spawning Ground	536	3	20
Washougal H	Washougal River, 1989	Spawning Ground	859	7	38
Washougal H	Washougal River, 1989	Spawning Ground	859	1	5
Washougal H	Washougal River, 1989	Spawning Ground	859	2	11
Washougal H	Washougal River, 1988	Spawning Ground	536	2	13

Table 6. (cont.) immigration of coded wire tagged fall chinook into the Washougal subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Washougal H	Washougal River,	1988	Spawning Ground	536	1 7
Washougal H	Washougal River,	1989	Spawning Ground	859	6 33
Washougal H	Washougal River,	1989	Spawning Ground	859	1 5
Washougal H	Washougal River,	1989	Spawning Ground	859	5 27
Washougal H	Washougal River,	1989	Spawning Ground	859	5 27
Washougal H	Washougal River,	1989	Spawning Ground	859	5 27
Washougal H	Washougal River,	1989	Spawning Ground	859	3 16
Washougal H	Washougal River,	1988	Spawning Ground	536	1 7
Washougal H	Washougal River,	1989	Spawning Ground	859	8 44
Washougal H	Washougal River,	1989	Spawning Ground	859	2 11
Washougal H	Washougal River,	1989	Spawning Ground	859	1 5
Washougal H	Washougal River,	1983	Spawning Ground	373	1 7

Based on the following tag codes: 63-19-46, 63-18-58, 63-22-39, 63-31-16, 63-33-34, 63-33-35, 63-34-07, 63-34-08, 63-34-14, 63-34-15, 63-34-16, 63-34-28, 63-34-31, 63-34-33, 63-34-31, 63-34-33, 63-34-34, 63-38-28, 63-38-29, 63-38-30, 63-38-31, 63-38-32, 63-41-13, 63-41-50, 63-52-28, and 63-19-38.

Beginning with the 1978 brood.

Table 7 (AC-l). Age composition percentage (freshwater.ocean) by brood year for fall chinook spawning naturally in the Washougal River.

	Age Composition (%)						
Brood Year	N	1.1	1.2	1.3	1.4	1.5	2.1	2.2
1978								
1979								
1980								
1981	34	0	2.94	94.12	2.94	0	0	0
1982	25	0	44.00	40.00	16.00	0	0	0
1983	216	6.48	5.09	83.33	4.63	0	0	0.46
1984	225	2.22	27.11	33.78	36.89	0	0	0
1985								
1986								
1987								
9 8 8								

Age based on scale reading analysis.

Table 8 (AC-2). Age composition percentage (freshwater.ocean) by brood year for fall chinook returning to the Washougal River Hatchery.

Age Composition (%)

Brood Year	N	1.1	1.2	1.3	1.4'	1.5	2.1	2.2	2.3
1978									
1979									
1980									
1981	584	0.34	6.51	87.84	5.31	0	0	0	0
1982	526	3.04	59.89	35.36	1.33	0	0	0.38	0
1983	2,395	26.81	50.11	20.33	2.25	0.04	0.25	0.21	0
1984	1,584	3.28	21.34	53.09	21.34	0.69	0	0.13	0.13
1985									
1986									
1987									
1988									

Age based on scale reading analysis.

Table 9 (AS-l). Percent females by brood year and age class (freshwater.ocean) for fall chinook spawning naturally in the Washougal River.

Females (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	Total % Female
1976							
1977							
1978					100.00		
1979				61.11			
1980			33.33	50.00	72.73		
1981	27	0	100.00	78.13	100.00	0	79.42
1982	6	0	9.09	20.00	75.00	0	73.09
1983	123	0	36.36	62.22	70.00	0	56.94
1984	136	0	42.62	71.05	67.47	0	60.44
1985							
1986							
1987							
1988							

Age based on scale reading analysis.

Table 10 (AS-2). Percent females by brood year and age class (freshwater.ocean) for fall chinook returning to the Washougal River Hatchery.

Females (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	Total % Female
1976										
1977										
1978					70.00					
1979				52.18	89.80			100.00		
1980			7.96	55.26	75.35	100.00				
1981	276	0	7.89	48.73	74.19	0	0	0	0	47.26
1982	133	0	9.21	52.69	57.14	0	0	100.00	0	25.29
1983	592	0	25.67	48.87	77.78	100.00	0	60.00	0	24.72
1984	720	0	13.31	52.32	65.98	90.91	0	50.00	50.00	45.45
1985										
1986										
1987										
1988										

Age based on scale reading analysis.

Table 11 (AL-a). Mean fork length by brood year and age class (freshwater.ocean) for female fall chinook spawning naturally in the Washougal River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2
1978				90			
N				2			
St. Dev.				4.24			
1979			83				
N			33				
St. Dev.			8.11				
1980		81	83	91			
N		4	6	8			
St. Dev.		1.5	2.73	6.48			
1981		77	86	94			
N		1	25	1			
St. Dev.		---	6.03	---			
1982		72	92	94			
N		1	2	3			
St. Dev.		---	6.36	7.23			
1983		77	89				
N		4	112				
St. Dev		2.63	5.05				
1984		77					
N		26					
St. Dev.		4.99					

ge based on scale reading analysis.

Table 12 (AL-b). Mean fork length by brood year and age class (freshwater.ocean) for male fall chinook spawning naturally in the Washougal River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2
1979			90				
N			21				
St. Dev.			8				
1980		74	91	102			
N		8	6	3			
St. Dev.		5.51	6.25	7.51			
1981			94				
N			7				
St. Dev.			4.54				
1982		69	90	96			
N		10	8	1			
St. Dev.		5.03	3.14	---			
1983	49	75	94				80
N	14	7	68				1
St. Dev.	4.27	7.52	7.59				---
1984	49	73					
N	5	35					
St. Dev.	6.96	8.23					
1985	43						
N	3						
St. Dev.	2						

Age based on scale reading analysis.

Table 13 (AL-c). Mean fork length by brood year and age class (freshwater.ocean) for female fall chinook returning to the Washougd Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3
1978				94				
N				21				
St. Dev.				5.3				
1979			86	93				
N			454	44				
St. Dev.			5.09	6.24				
1980		72	85	93	109			
N		18	389	107	1			
St. Dev.		5.48	4.61	5.5	---			
1981		75	86	95				
N		3	250	23				
St. Dev.		10.21	5.2	5.69				
1982		76	86	90			82	
N		29	98	4			2	
St. Dev.		3.03	5.27	3.74			2.83	
1983		75	85	94	96		75	
N		308	238	42	1		3	
St. Dev.		4.64	5.65	6.97	---		10.44	
1984		75	86	92			70	89
N		45	440	223			1	1
St. Dev.		4.18	6.02	5.72			---	---

Table 13. (cont.) Mean fork length by brood year and age class (freshwater.ocean) for female fall chinook returning to the Washougal Salmon Hatchery.

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3
1985		70	85				84	
N		11	263				1	
St. Dev.		5.12	5.81				---	
1986		72						
N		56						
St. Dev.		4.87						

Age based on scale reading analysis.

Table 14 (AL-d). Mean fork length by brood year and age class (freshwater.ocean) for male fall chinook returning to the Washougal Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3
1978				96				
N				9				
St. Dev.				5.61				
1979			87	89			72	
N			416	5			1	
St. Dev.			6.88	12.03			---	
1980		72	86	95				
N		208	315	35				
St. Dev.		7.08	6.26	6.95				
1981	42	75	88	94				
N	2	35	263	8				
St. Dev.	2.12	7.31	6.35	2.33				
1982	43	73	87	95				
N	16	289	88	3				
St. Dev.	5.24	6.14	6.16	6.51				
1983	48	75	85	95		66	74	
N	642	892	249	12		6	2	
St. Dev.	3.62	5.95	5.65	6.37		9.16	0.71	
1984	48	70	86	94			74	85
N	52	293	401	115			1	1
St. Dev.	6.15	6.66	7.8	7.92			---	---

Table 14. (cont.) Mean fork length by brood year and age class (freshwater-ocean) for male fall chinook returning to the Washougal Salmon Hatchery.

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3
1985	46	69	86			57		
N	15	91	310			1		
St. Dev.	5.8	6.77	6.9			---		
1986	46	71						
N	37	256						
St. Dev.	3.96	6.06						
1987	46							
N	40							
St. Dev.	3.69							

Age based on scale reading analysis.

Table 15 (JM). Number of natural juvenile fall chinook that migrated from the Washougal River, 1980.

Brood Year	WDF population estimate
1979	5,000,000

Source: "Washougal River juvenile chinook observations". WDF memorandum from Hugh Fiscus to Clint Stockley, July 8, 1980. Based upon comparing seining results of chinook per square feet before and after hatchery releases.

Table 16 (SL). Lengths of fall chinook smolts from the Washougal River, 1980.

Location and year	No. Fish	Length ave. (mm)	Length range (mm)	Reference
Washougal River between River Miles 2-15.3, 1980	352	49	32-75	Various WDF memorandums May-June 1980.

Data is based upon five biweekly seining trips to the Washougal River between May l-June 27, 1980. Not included are additional seining trips made after the Washougal Hatchery plant of fall chinook beginning June 27th. Chinook average length and ranges are based on the former seining results and may reflect rearing and/or outmigration size patterns.

Table 17 (TR). Hatchery releases of fall chinook salmon into the Uashougal River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1966	ABERNATHY CREEK	UASHCUGAL HATCHERY	Fingr	05/23/67	05/23/67	105	345120	WASHWGAL R 28.0159	UNTAGGED
1966	UNKNOWN	UASHWGAL HATCHERY	Fingr	06/15/67	06/15/67	104	833924	UASHWGAL R 28.0159	UNTAGGED
1966	UNKNOUN	UASHWGAL HATCHERY	Fingr	06/15/67	06/15/67	104	a33924	UASHWGAL R 28.0159	UNTAGGED
1966	ABERNATHY CREEK	WASHWGAL HATCHERY	Fingr	06/15/67	06/15/67	73	243017	UASHWGAL R 28.0159	UNTAGGED
1967	KALAHA RIVER	UASHWGAL HATCHERY	Fingr	06/17/68	06/ 17/68	80	884000	UASHWGAL R 28.0159	UNTAGGED
1967	KALAMA RIVER	UASHWGAL HATCHERY	Fingr	06/17/68	06/17/68	77	76538	UASHWGAL R 28.0159	UNTAGGED
1967	KALAMA RIVER	UASHWGAL HATCHERY	Fingr	06/17/68	06/17/68	77	77924	UASHWGAL R 28.0159	UNTAGGED
1967	KALAMA RIVER	UASHWGAL HATCHERY	Fingr	06/17/68	06/17/68	77	78694	UASHWGAL R 28.0159	UNTAGGED
1967	KALAMA RIVER	WASHOUGAL HATCHERY	Fingr	06/17/68	06/17/68	77	124817	UASHWGAL R 28.0159	UNTAGGED
1967	KALAMA RIVER	UASHWGAL HATCHERY	Fingr	06/29/68	06/29/68	81	1355176	UASHWGAL R 28.0159	UNTAGGED
1968	TWTLE (GREEN RIVER)	WASHWGAL HATCHERY	Fingr	06/19/69	06/19/69	144	94752	UASHWGAL R 28.0159	UNTAGGED
1968	TWTLE (GREEN RIVER)	UASHWGAL HATCHERY	Fingr	06/20/69	06/20/69	146	874978	UASHWGAL R 28.0159	UNTAGGED
1969	TDUTLE (GREEN RIVER)	UASHWGAL HATCHERY	Fingr	06/27/70	06/27/70	89	2751257	UASHWGAL R 28.0159	UNTAGGED
1969	KALAHA RIVER	UASHWGAL HATCHERY	Fingr	06/30/70	06/30/70	140	447580	UASHWGAL R 28.0159	UNTAGGED
1969	UASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	06/30/70	06/30/70	75	184800	UASHWGAL R 28.0159	UNTAGGED
1970	OREGON - BIG CREEK	UASHWGAL HATCHERY	Fingr	05/19/71	05/19/71	150	856650	UASHWGAL R 28.0159	UNTAGGED
1971	WASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	06/30/72	06/30/72	100	364000	UASHWGAL R 28.0159	UNTAGGED
1971	UASHWGAL RIVER	UASHWGAL HATCHERY	PreSm	11/17/72	11/17/72	15	302430	UASHWGAL R 28.0159	UNTAGGED
1972	UASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	07/02/73	07/02/73	84	2171904	UASHWGAL R 28.0159	UNTAGGED
1972	UASHWGAL RIVER	UASHWGAL HATCHERY	PreSm	11/30/73	11/30/73	7	219800	UASHWGAL R 28.0159	UNTAGGED
1973	KALAMA RIVER	UASHWGAL HATCHERY	Fingr	06/30/74	06/30/74	61	890905	UASHWGAL R 28.0159	UNTAGGED
1973	KALAMA RIVER	UASHWGAL HATCHERY	Fingr	06/30/74	06/30/74	33	816932	UASHWGAL R 28.0159	UNTAGGED
1973	UASHWGAL RIVER	UASHWGAL HATCHERY	PreSm	11/07/74	11/07/74	a	31358	UASHWGAL R 28.0159	010206
1973	UASHWGAL RIVER	UASHWGAL HATCHERY	PreSm	11/07/74	11/07/74	a	284146	UASHWGAL R 28.0159	UNTAGGED
1973	UASHWGAL RIVER	UASHWGAL HATCHERY	PreSm	11/07/74	11/07/74	8	284146	UASHWGAL R 28.0159	UNTAGGED
1974	TWTLE (GREEN RIVER)	UASHWGAL HATCHERY	Fingr	06/30/75	06/30/75	49	755335	UASHWGAL R 28.0159	UNTAGGED
1974	UASHWGAL RIVER	UASHWGAL HATCHERY	PreSm	08/28/75	08/28/75	15	270180	UASHWGAL R 28.0159	UNTAGGED
1975	KALAMA RIVER	WASHWGAL HATCHERY	Fingr	03/29/76	03/29/76	597	493850	UASHWGAL R 28.0159	UNTAGGED
1975	UASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	06/30/76	06/30/76	77	1105874	UASHWGAL R 28.0159	UNTAGGED
1975	UASHWGAL RIVER	UASHWGAL HATCHERY	PreSm	08/20/76	08/20/76	16	416064	UASHWGAL R 28.0159	UNTAGGED
1976	WASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	06/28/77	06/28/77	64	126007	UASHWGAL R 28.0159	631641
1976	UASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	06/28/77	06/28/77	64	543578	WASHWGAL R 28.0159	UNTAGGED
1976	UASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	06/28/77	06/28/77	64	538434	UASHWGAL R 28.0159	UNTAGGED
1976	COLUMBIA (N BONNEVL)	UASHWGAL HATCHERY	Fingr	06/29/77	06/29/77	77	1982519	UASHWGAL R 28.0159	UNTAGGED
1976	UASHWGAL RIVER	UASHWGAL HATCHERY	PreSm	08/04/77	08/04/77	30	636000	UASHWGAL R 28.0159	UNTAGGED
1977	UASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	06/07/78	06/07/78	115	973475	WASHWGAL R 28.0159	UNTAGGED
1977	UASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	06/15/78	06/15/78	97	3136980	UASHWGAL R 28.0159	UNTAGGED
1977	UASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	06/15/78	06/15/78	52	1995968	UASHWGAL R 28.0159	UNTAGGED
1977	UASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	06/27/78	06/27/78	62	151399	UASHWGAL R 28.0159	631803
1977	UASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	06/27/78	06/27/78	62	1144	UASHWGAL R 28.0159	UNTAGGED
1977	UASHWGAL RIVER	UASHWGAL HATCHERY	PreSm	08/04/78	08/04/78	23	410000	UASHWGAL R 28.0159	UNTAGGED
1978	UASHWGAL + TWTLE	UASHWGAL HATCHERY	Fingr	06/14/79	09/02/79	82	97417	UASHWGAL R 28.0159	631938
1978	UASHWGAL + TWTLE	UASHWGAL HATCHERY	Fingr	06/14/79	09/02/79	82	1967563	UASHWGAL R 28.0159	UNTAGGED
1978	UASHWGAL + TWTLE	UASHWGAL HATCHERY	Fingr	06/14/79	09/02/79	82	154477	UASHWGAL R 28.0159	631946
1978	UASHWGAL + TWTLE	WASHWGAL HATCHERY	Fingr	06/14/79	09/02/79	82	3122690	WASHWGAL R 28.0159	UNTAGGED
1978	TWTLE (GREEN RIVER)	WASHWGAL HATCHERY	Fingr	06/14/79	06/14/79	110	1550434	WASHWGAL R 28.0159	UNTAGGED
1978	UASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	06/14/79	06/14/79	95	2879939	WASHWGAL R 28.0159	UNTAGGED
1978	TWTLE (GREEN RIVER)	WASHWGAL HATCHERY	PreSm	09/02/79	09/02/79	23	396380	WASHWGAL R 28.0159	UNTAGGED
1979	CDULITZ MIXED STOCKS	UASHWGAL HATCHERY	Fingr	06/30/80	06/30/80	220	314605	WASHWGAL R 28.0159	632153
1979	CDULITZ MIXED STOCKS	UASHWGAL HATCHERY	Fingr	06/30/80	06/30/80	220	5807593	WASHWGAL R 28.0159	UNTAGGED
1979	CDULITZ RIVER	UASHWGAL HATCHERY	Fingr	06/30/80	06/30/80	220	798092	WASHWGAL R 28.0159	UNTAGGED
1979	TWTLE (GREEN RIVER)	UASHWGAL HATCHERY	Fingr	06/30/80	06/30/80	95	1028358	UASHWGAL R 28.0159	UNTAGGED
1979	UASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	06/30/80	06/30/80	95	3017375	UASHWGAL R 28.0159	UNTAGGED
1979	UASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	06/30/80	06/30/80	80	928000	WASHWGAL R 28.0159	UNTAGGED

Table 17 (cont.). Hatchery releases of fall chinook salmon into the Uashougal River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /Lb.	Number Released	Release Site	CWT Code
1980	WASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	04/21/81	04/21/81	275	50000	WASHWGAL R 28.0159	UNTAGGED
1980	COLUMBIA (N BONNEVL)	WASHWGAL HATCHERY	Fingr	04/21/81	04/21/81	275	370000	WASHWGAL R 28.0159	UNTAGGED
1980	BONNEVILLE+WASHOUGAL	WASHWGAL HATCHERY	Fingr	06/30/81	07/06/81	74	278774	WASHWGAL R 28.0159	63225 1
1980	BONNEVILLE+WASHOUGAL	WASHWGAL HATCHERY	Fingr	06/30/81	07/06/81	74	5231048	WASHWGAL R 28.0159	UNTAGGED
1980	WASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	06/30/81	06/30/81	74	1567396	WASHWGAL R 28.0159	UNTAGGED
1980	COLUMBIA (N BONNEVL)	WASHWGAL HATCHERY	Fingr	06/30/81	06/30/81	74	3657261	WASHWGAL R 28.0159	UNTAGGED
1980	WASHWGAL RIVER	WASHOUGAL HATCHERY	Fingr	07/06/81	09/04/81	81	28708	WASHWGAL R 28.0159	632148
1980	WASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	07/06/81	09/04/81	81	483376	WASHWGAL R 28.0159	UNTAGGED
1980	WASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	07/06/81	07/06/81	81	83170	UASHWGAL R 28.0159	UNTAGGED
1980	WASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	07/06/81	07/06/81	70	3354	UASHWGAL R 28.0159	UNTAGGED
1980	WASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	07/29/81	07/29/81	50	26321	UASHWGAL R 28.0159	UNTAGGED
1980	WASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	09/04/81	09/04/81	31	373717	UASHWGAL R 28.0159	UNTAGGED
1981	WASHWGAL RIVER	WASHWGAL HATCHERY	EmFry	02/17/82	02/17/82	1008	1016000	UASHWGAL R 28.0159	UNTAGGED
1981	WASHWGAL RIVER	WASHOUGAL HATCHERY	Fingr	03/30/82	03/30/82	589	157500	WASHWGAL R 28.0159	UNTAGGED
1981	WASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	06/30/82	07/06/82	90	170424	WASHWGAL R 28.0159	632461
1981	WASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	06/30/82	07/06/82	90	3276417	UASHWGAL R 28.0159	UNTAGGED
1981	WASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	06/30/82	06/30/82	251	2117740	UASHWGAL R 28.0159	UNTAGGED
1982	WASHWGAL RIVER	WASHWGAL HATCHERY	EmFry	02/23/83	02/23/83	1106	84000	UASHWGAL R 28.0159	UNTAGGED
1982	WASHWGAL RIVER	WASHWGAL HATCHERY	EmFry	02/23/83	02/23/83	1106	84000	WASHWGAL R -WF (28)	UNTAGGED
1982	COLUMBIA (N BONNEVL)	WASHWGAL HATCHERY	Fingr	03/16/83	03/16/83	515	384000	UASHWGAL R 28.0159	UNTAGGED
1982	COLUMBIA (N BONNEVL)	WASHWGAL HATCHERY	Fingr	06/10/83	06/10/83	104	1670100	UASHWGAL R 28.0159	UNTAGGED
1982	UASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	06/10/83	06/10/83	104	4029900	UASHWGAL R 28.0159	UNTAGGED
1982	COLUMBIA (N BONNEVL)	WASHWGAL HATCHERY	Fingr	06/29/83	06/29/83	81	30400	WASHWGAL R 28.0159	UNTAGGED
1982	UASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	06/29/83	06/29/83	81	73200	WASHWGAL R 28.0159	UNTAGGED
1982	UASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	08/31/83	08/31/83	27	101206	UASHWGAL R 28.0159	632259
1982	WASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	08/31/83	08/31/83	27	29594	UASHWGAL R 28.0159	UNTAGGED
1982	WASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	10/11/83	10/11/83	23	100572	UASHWGAL R 28.0159	632239
1982	UASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	10/11/83	10/11/83	23	18728	WASHWGAL R 28.0159	UNTAGGED
1982	WASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	11/02/83	11/02/83	22	100264	WASHWGAL R 28.0159	632238
1982	WASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	11/02/83	11/02/83	22	9336	WASHWGAL R 28.0159	UNTAGGED
1983	KALAMA RIVER	WASHWGAL HATCHERY	Fingr	04/10/84	04/10/84	449	135000	UASHWGAL R 28.0159	UNTAGGED
1983	WASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	06/28/84	06/28/84	73	101594	UASHWGAL R 28.0159	633116
1983	UASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	06/28/84	06/28/84	73	5294668	UASHWGAL R 28.0159	UNTAGGED
1983	KALAMA RIVER	UASHWGAL HATCHERY	Fingr	06/28/84	06/28/84	73	249400	WASHWGAL R 28.0159	UNTAGGED
1983	WASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	07/03/84	07/03/84	74	66000	UASHWGAL R 28.0159	UNTAGGED
1983	UASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	08/30/84	08/30/84	36	100892	WASHWGAL R 28.0159	633117
1983	WASHWGAL RIVER	UASHWGAL HATCHERY	PreSm	08/30/84	08/30/84	36	32734	WASHWGAL R 28.0159	UNTAGGED
1983	UASHWGAL RIVER	UASHWGAL HATCHERY	PreSm	09/28/84	09/28/84	24	101498	WASHWGAL R 28.0159	633118
1983	UASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	09/28/84	09/28/84	24	21902	UASHWGAL R 28.0159	UNTAGGED
1983	WASHWGAL RIVER	UASHWGAL HATCHERY	PreSm	10/31/84	10/31/84	18	101223	UASHWGAL R 28.0159	633119
1983	UASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	10/31/84	10/31/84	18	11577	UASHWGAL R 28.0159	UNTAGGED
1984	WASHWGAL RIVER	WASHWGAL HATCHERY	EmFry	03/13/85	03/13/85	1080	25000	UASHWGAL R 28.0159	UNTAGGED
1984	UASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	06/16/85	06/16/85	94	52077	WASHWGAL R 28.0159	633334
1984	UASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	06/16/85	06/16/85	94	1769097	UASHWGAL R 28.0159	UNTAGGED
1984	UASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	06/16/85	06/16/85	94	52725	UASHWGAL R 28.0159	633335
1984	WASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	06/16/85	06/16/85	94	1769101	WASHWGAL R 28.0159	UNTAGGED
1984	GRAYS RIVER	WASHWGAL HATCHERY	Fingr	06/ 16/85	06/16/85	94	27057	WASHWGAL R 28.0159	633428
1984	GRAYS RIVER	UASHWGAL HATCHERY	Fingr	06/16/85	06/16/85	94	54	WASHWGAL R 28.0159	UNTAGGED
1984	GRAYS RIVER	WASHWGAL HATCHERY	Fingr	06/16/85	06/16/85	94	26538	UASHWGAL R 28.0159	63343 1
1984	GRAYS RIVER	WASHWGAL HATCHERY	Fingr	06/16/85	06/16/85	94	53	UASHWGAL R 28.0159	UNTAGGED
1984	GRAYS RIVER	WASHWGAL HATCHERY	Fingr	06/16/85	06/16/85	94	25995	UASHWGAL R 28.0159	633432
1984	GRAYS RIVER	WASHWGAL HATCHERY	Fingr	06/16/85	06/16/85	94	53	WASHWGAL R 28.0159	UNTAGGED
1984	KALAHA RIVER	WASHWGAL HATCHERY	Fingr	06/16/85	06/16/85	94	1896500	UASHWGAL R 28.0159	UNTAGGED
1984	WASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	07/03/85	07/03/85	80	86000	WASHWGAL R 28.0159	UNTAGGED
1984	WASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	08/30/85	08/30/85	33	51408	WASHWGAL R 28.0159	633416

Table 17 (cont.). Hatchery releases of fall chinook salmon into the Washougal River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1984	UASHWGAL RIVER	UASHWGAL HATCHERY	PreSm	08/30/85	08/30/85	33	14334	WASHWGAL R 28.0159	UNTAGGED
1984	WASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	08/30/85	08/30/85	33	26173	WASHWGAL R 28.0159	633433
1984	UASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	08/30/85	08/30/85	33	7298	WASHWGAL R 28.0159	UNTAGGED
1984	UASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	08/30/85	08/30/85	33	25169	UASHWGAL R 28.0159	633434
1984	WASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	08/30/85	08/30/85	33	7018	UASHWGAL R 28.0159	UNTAGGED
1984	WASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	10/04/85	10/04/85	25		UASHWGAL R 28.0159	633414
1984	WASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	10/04/85	10/04/85	25	37889 7111	WASHWGAL R 28.0159	UNTAGGED
1984	UASHWGAL RIVER	UASHWGAL HATCHERY	PreSm	10/04/85	10/04/85	25		UASHWGAL R 28.0159	633415
1984	UASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	10/04/85	10/04/85	25	37799 7101	UASHWGAL R 28.0159	UNTAGGED
1984	WASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	10/31/85	10/31/85	20		UASHWGAL R 28.0159	633407
1984	WASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	10/31/85	10/31/85	20	50936 4164	WASHWGAL R 28.0159	UNTAGGED
1984	WASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	10/31/85	10/31/85	20	50936	WASHWGAL R 28.0159	633408
1984	WASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	10/31/85	10/31/85	20	4164	WASHWGAL R 28.0159	UNTAGGED
1985	ELOCHOMAN RIVER	WASHWGAL HATCHERY	Fingr	06/14/86	06/14/86	89	75373	WASHWGAL R 28.0159	633320
1985	ELOCHOMAN RIVER	WASHWGAL HATCHERY	Fingr	06/14/86	06/14/86	89	227	UASHWGAL R 28.0159	UNTAGGED
1985	WASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	06/14/86	06/14/86	89	214371	WASHWGAL R 28.0159	634113
1985	WASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	06/14/86	06/14/86	89	3296129	WASHWGAL R 28.0159	UNTAGGED
1985	COWLITZ RIVER	WASHWGAL HATCHERY	Fingr	06/14/86	06/14/86	89	568900	WASHWGAL R 28.0159	UNTAGGED
1985	ABERNATHY CREEK	UASHWGAL HATCHERY	Fingr	06/14/86	06/14/86	88	1651100	UASHWGAL R 28.0159	UNTAGGED
1985	UASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	06/20/86	06/20/86	34	48981 2100	WASHWGAL R 28.0159	UNTAGGED
1985	UASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	09/02/86	09/02/86			UASHWGAL R 28.0159	633831
1985	UASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	09/02/86	09/02/86	34	15517	UASHWGAL R 28.0159	UNTAGGED
1985	WASHWGAL RIVER	UASHWGAL HATCHERY	PreSm	09/02/86	09/02/86	34	49591	WASHWGAL R 28.0159	633832
1985	UASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	09/02/86	09/02/86	34	15711	WASHWGAL R 28.0159	UNTAGGED
1985	UASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	09/29/86	09/29/86	25	46527	WASHWGAL R 28.0159	633829
1985	WASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	09/29/86	09/29/86	25	11573	WASHWGAL R 28.0159	UNTAGGED
1985	WASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	09/29/86	09/29/86	25	46527	WASHWGAL R 28.0159	633830
1985	WASHWGAL RIVER	UASHWGAL HATCHERY	PreSm	09/29/86	09/29/86	20	47202 11573	WASHWGAL R 28.0159	UNTAGGED
1985	WASHWGAL RIVER	UASHWGAL HATCHERY	PreSm	10/30/86	10/30/86			WASHWGAL R 28.0159	633827
1985	UASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	10/30/86	10/30/86	20	7348	WASHWGAL R 28.0159	UNTAGGED
1985	UASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	10/30/86	10/30/86	20	46907	WASHWGAL R 28.0159	633828
1985	UASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	10/30/86	10/30/86	20	7343	UASHWGAL R 28.0159	UNTAGGED
1986	WASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	06/19/87	06/19/87	82	207377	UASHWGAL R 28.0159	634150
1986	UASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	06/19/87	06/19/87	82	5636623	UASHWGAL R 28.0159	UNTAGGED
1986	WASHWGAL RIVER	WASHWGAL HATCHERY	PreSm	08/10/87	08/10/87	49	363000	WASHWGAL R 28.0159	UNTAGGED
1987	WASHWGAL RIVER	WASHWGAL HATCHERY	EmFry	02/16/88	02/16/88	1080	225000	WASHWGAL R 28.0159	UNTAGGED
1987	WASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	05/11/88	05/11/88	190	107800	WASHWGAL R 28.0159	UNTAGGED
1987	UASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	05/26/88	05/26/88	160	57500	WASHWGAL R 28.0159	UNTAGGED
1987	UASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	06/20/88	06/20/88	88	213935	UASHWGAL R 28.0159	635228
1987	WASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	06/20/88	06/20/88	88	5398065	UASHWGAL R 28.0159	UNTAGGED
1987	UASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	07/26/88	07/26/88	52	503000	UASHWGAL R 28.0159	UNTAGGED
1988	WASHWGAL RIVER	WASHWGAL HATCHERY	EmFry	01/19/89	01/19/89	1055	127000	WASHWGAL R 28.0159	UNTAGGED
1988	WASHWGAL RIVER	WASHWGAL HATCHERY	EmFry	01/25/89	01/25/89	1106	505000	WASHWGAL R 28.0159	UNTAGGED
1988	WASHWGAL RIVER	UASHWGAL HATCHERY	EmFry	01/27/89	01/27/89	1106	765000	UASHWGAL R 28.0159	UNTAGGED
1988	UASHWGAL RIVER	WASHWGAL HATCHERY	EmFry	01/30/89	01/30/89	1080	156000	UASHWGAL R 28.0159	UNTAGGED
1988	WASHWGAL RIVER	UASHWGAL HATCHERY	EmFry	02/08/89	02/08/89	1080	66000	UASHWGAL R 28.0159	UNTAGGED
1988	WASHWGAL RIVER	UASHWGAL HATCHERY	Fingr	03/15/89	03/15/89	709	328500	WASHWGAL R 28.0159	UNTAGGED
1988	PRIEST RAPIDS	WASHWGAL HATCHERY	Fingr	06/15/89	06/15/89	82	1216800	WASHWGAL R 28.0159	UNTAGGED
1988	WASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	06/15/89	06/15/89	82	4461200	WASHWGAL R 28.0159	UNTAGGED
1988	WASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	07/24/89	07/24/89	51	520200	WASHWGAL R 28.0159	UNTAGGED
1989	WASHWGAL RIVER	WASHWGAL HATCHERY	EmFry	01/22/90	01/22/90	1106	725000	UASHWGAL R 28.0159	UNTAGGED
1989	UASHWGAL RIVER	WASHWGAL HATCHERY	EmFry	02/19/90	02/19/90	1008	480000	UASHWGAL R 28.0159	UNTAGGED
1989	WASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	06/13/90	06/13/90	71	93542	WASHWGAL R 28.0159	635904
1989	WASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	06/13/90	06/13/90	71	5550458	WASHWGAL R 28.0159	UNTAGGED
1989	WASHWGAL RIVER	WASHWGAL HATCHERY	Fingr	07/23/90	07/23/90	40	497000	UASHWGAL R 28.0159	UNTAGGED

Table 18 (TD). Parasites and diseases of fall chinook at the Washougal Hatchery.

Disease type	Hatchery	Specific Pathogen
Bacteria	Washougal H	*Aeromonas salmonicida* (Furunculosis)
Bacteria	Washougal H	*Chondrococcus columnaris* (Columnaris)

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak

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WASHOUGAL SUBBASIN

Coho

GEOGRAPHIC LOCATION

The Washougal River is located in southwest Washington, originating in Skamania County and flowing southwesterly into Clark County, joining the Columbia River at River Mile (121) at the town of Camas. The drainage area encompasses approximately 240 square miles. The subbasin is relatively small compared to other major rivers entering the Columbia River. The Washougal Hatchery is located 16 miles northeast of the town of Washougal.

ORIGIN

In the Washougal River coho were not divided into Type-S and Type-N stocks until 1982.

Most existing early coho (Type-S) hatchery programs are considered to be linked to native Toutle River stock coho. Washington stations either received Toutle stock eggs or utilized local native early run coho. Late stock coho (Type-N) are informally considered synonymous with Cowlitz River stock coho. Late stock hatchery programs were developed utilizing Cowlitz River stock, their derivatives, or native late runs. Late coho used in most of the current programs are presumably a blend of all of these, although egg transfers from Cowlitz Hatchery occur most frequently (Howell et al. 1985).

By the time fish surveys were conducted on the Washougal River, serious habitat damage had already occurred. Due to the Yacolt Burn, the steep hills were deforested resulting in erosion and flooding. In 1947, the Cotterell Power Company removed the last of three small hydroelectric dams which were considered low water barriers to fish migration (WDF, 1990).

In 1958, the Washougal Salmon Hatchery was completed.

DISTRIBUTION

Natural spawning occurs in most areas accessible to coho. On the Washougal River the heaviest natural spawning occurs in the mainstem between RM 12 and 15 (WDF, 1990). Natural spawning also occurs in the Little Washougal and West Fork Washougal.

PRODUCTION

In Washington and Oregon adult production of early and late coho from natural spawners is unquantified except for a few instances. A factor of 10 - 15 percent might be considered reasonable for the percent of the total Columbia River coho production originating from naturally spawning fish (Howell et al. 1985). Hatchery production is the dominant component in the Washougal River although some natural production also occurs.

Tables 1 and 2 describe the amount of spawning and rearing habitat, by quality, available in the Washougal River. This data was derived from the Presence/Absence database of the Northwest Power Planning Council, 1991.

Washougal River tributary sport catch estimates between 1979 - 1986 return years averaged 924 adult coho, and ranged from a low of 172 in 1983 to a high of 2,629 in 1986. These estimates were based on catch records and limited actual sampling data. However, specific

age and brood year analysis for Washougal River sport catch is unavailable.

The number of Washougal River coho natural spawn escapement is unavailable. Washougal River Hatchery returns from the 1979 -1988 brood years of Type-S coho averaged 5,740 with a low of 551 in 1984 and a peak of 16,999 in 1983. Hatchery returns of Type-N coho for the 1979 - 1988 brood year averaged 5,296 with a low of 2.743 in 1985 and a high of 10,443 in 1986. Hatchery returns by age and brood year for early and late coho are presented in Tables 3 and 4, respectively.

An additional special snag fishery of excess coho was once present on the Washougal River near the hatchery. The last full season of the fishery was in 1986 with a partial season of three days in 1987 due to the fact no substantial catch was available. Harvest rates for the 1979 - 1986 snag fishery averaged 1,193 adults with a low of 325 in 1979 and a high of 3,073 in 1982 based on catch records and limited sampling.

ADULT LIFE HISTORY

Run size. catch and escapement

Ocean commercial and recreational fisheries off the Oregon coast are the primary harvesters of early coho. The Oregon troll fishery accounts for the highest percentage of the overall catch. Most of the freshwater recreational harvest occurs in the Washington tributaries (Howell et al. 1985).

Based on coded-wire tagged releases of 1976 - 1978 brood late coho, most of the harvest occurs in the Washington and Oregon ocean fisheries. Late coho have a more northerly migration pattern than early coho (WDF, 1990). This is reflected in the catch distribution where the Washington coastal catch comprised 40 percent of the total harvest compared to 20 percent for early coho during 1979 - 1981. Late coho also contribute significantly to the lower Columbia River commercial gill net fishery (Howell et al. 1985).

Strays from other lower river hatcheries are not unusual. Table 5 lists coded-wire tagged coho from the Washougal Hatchery which were recovered by non-harvest means outside of the subbasin, beginning with the 1978 brood, and ending with the 1988 brood. Coded-wire tags which originated outside the Washougal subbasin but were recovered within the Washougal subbasin are listed in Table 6.

In 1934 coho salmon in the Washougal had the first good run in 22 years (WDF, 1990). In 1951, coho escapement was estimated at 3,000 fish. By 1973 the largest salmon run was early stock hatchery coho (WDF, 1990).

Harvest rates have averaged 79 percent and 85 percent for Type-S and N stocks, respectively, between 1983 and 1987. Harvest of Type-S coho is occasionally constrained by one or more of the fall chinook stocks. Harvest of Type-N coho is generally not constrained by weak stocks, with hatchery escapement being the only management constraint (WDF, 1990).

Time of Migration

Early coho enter the Columbia River by mid-August and begin returning to the lower Columbia hatcheries in early September. In the mainstem Columbia River early coho predominate from August to mid-September. Stock composition shifts to late coho in late September and October. Typically, the late coho run begins entering freshwater in mid to late September with mid-October considered the main migratory period in the mainstem

Columbia River (Howell et al. 1985).

Spawning Period

For Type-S coho, both hatchery and natural spawning occurs around late October, while for Type-N coho spawning will extend from late November through March, with the bulk being in December and early January (Howell et al. 1985).

Spawning Areas

Natural spawning occurs in most areas accessible to coho.

Age composition

Coho return as two-year-old jacks and three-year-old adults. The age composition of the late coho run entering the Columbia River is not available because of incomplete escapement information and the differential trapping of adults and jacks at many collection facilities (Howell et al. 1985). Specific age composition percentage (freshwaterocean) by brood year for coho spawning naturally and hatchery returns are unavailable.

Sex Ratio

Accounting for the differential harvest of adult males and females in the gill net fishery, the adult run entering the Columbia River was estimated to be 46 percent females in 1982 and 30 percent females in 1983. Hatchery adult returns were 33 percent females in 1982 and 34 percent females in 1983 (Howell et al. 1985). The percent of Type-S coho females for the 1982 - 1988 return years averaged 38 percent with a low return of 30 percent in 1987 and a high of 74 percent in 1986 (WDF, 1990). The percent of Type-N coho females for the 1982 - 1988 return years averaged 27 percent with a low return of 21 percent in 1986 and a high of 37 percent in 1985 (WDF, 1990). Specific percent females by brood year and age class (freshwater.ocean) for coho spawning naturally and hatchery returns are unavailable.

Fecundity

Type-S stock coho fecundity at the Washougal Hatchery for 1982 - 1988 return years averaged 2,331, with a low of 1,977 in 1988 and a high of 2,755 in 1985.
Type-N stock coho fecundity at the Washougal Hatchery for 1982 - 1988 return years averaged 2,446 and ranged from a low of 1,863 in 1989 to a high of 2,736 in 1982.

Washougal River natural spawn and Washougal Hatchery fecundities by brood year and age class are unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

The juvenile life history for Washougal subbasin coho is similar to that of other stocks in the region with a spring emergence (WDF, 1990).

Time, age and size at migration

Freshwater rearing generally lasts for about 14 months. Hatchery release information for the Washougal subbasin by brood year is presented in Table 7. Based on coded-wire tag recovery studies by Dawley et al. (1982), arrival in the Columbia River estuary occurs soon

after hatchery release (Howell et al. 1985). Length data of natural coho smolts from the Washougal River is unavailable. The number of natural juvenile coho salmon that migrate from the Washougal River is also unavailable.

Survival Rate

A generalized recent year smolt to adult survival rate for coho was estimated to be 2.5 percent (TAC 1983) (Howell et al. 1985). Type-S stock coho egg to smolt survival at the Washougal Hatchery for the 1979 - 1986 return years averaged 80 percent with a low of 38 percent in 1984 and a high of 91 percent in 1980 and 1985 (WDF, 1990).

Type-N stock coho egg to smolt survival at the Washougal Hatchery for the 1982 - 1986 return years averaged 86 percent with a low of 83 percent in 1985 and a high of 89 percent for 1984 (WDF, 1990).

BIOCHEMICAL-GENETIC CHARACTERISTICS

Data has not been compiled.

DISEASE

Bacteria and parasitic diseases found in the Washougal Hatchery are listed in Table 8. (WDF Salmon Culture, Olympia).

Table 1 (HB-1). Estimated amount of rearing and spawning habitat, by quality, of the Washougal River coho production area.

Distance/Area	Excellent	Good	Fair[a]	Poor[a]	Unknown	Total	Confidence
Miles (%)	43	53	04	00		23.2	
Acres (%)	54	43	02	00		44.4	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 199 1.

Table 2 (HB-2). Estimated amount of rearing habitat, by quality, of the Washougal River coho production area.

Distance/Area	Excellent	Good	Fair"	Poor[a]	Unknown	Total	Confidence
Miles (%)	00	00	28	72		3.2	
Acres (%)	00	00	28	72		23.3	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 199 1.

Table 3(RH). Total hatchery returns of early coho to the Washougal river by brood year.

	Total Age			
Brood Year	2	3	Total	Adult Total
1979		16,956		
1980	1,079	4,483	5,562	4,483
1981	440	7,341	7,781	7,341
1982	481	4,489	4,970	4,489
1983	1,434	16,999	18,433	16,999
1984	48	551	599	551
1985	18	580	598	580
1986	24		24	
1987				
1988				

Age composition based on hatchery personnel designation of adults and jacks..
Adults were assumed to be 2.1 and jacks 2.0.

Table 4(RH). Total hatchery returns of late coho to the Washougal River by brood year.

	Total age			
Brood Year	2	3	Total	Adult Total
1979				
1980				
1981				
1982	687	4,917	5,604	4,917
1983	836	4,105	4,941	4.105
1984	1,065	6,375	7,440	6,375
1985	965	2.743	3.708	2,743
1986	158	10,443	10,601	10,443
1987	39	3,196	3,235	3,196
1988	215			

Age composition based on hatchery personnel designation of adults and jacks..
Adults were assumed to be 2.1 and jacks 2.0.

Table 5 (AE). Emigration of coded wire tagged coho from the Washougal subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC j
Washougal Hatchery	Washougal River, 198 1	Spawning Ground	10	1	1
Washougal Hatchery	Minter Creek/ Hupp Spring	Hatchery	---	1	1
Washougal Hatchery	Washougal River, 1982	Spawning Ground	54	1	37
Washougal Hatchery	Washougal River, 1982	Spawning Ground	54	7	259
Washougal Hatchery	Washougal River, 1986	Spawning Ground	23	1	---
Washougal Hatchery	Washougal River, 1986	Spawning Ground	23	2	---
Washougal Hatchery	Washougal River, 1986	Spawning Ground	23	1	---

Based on the following tag codes: 63-19-54, 63-20-39, 63-21-51, 63-22-03, 63-31-32, 63-31-33, and 63-31-34.

Beginning with the 1978 brood.

Table 6 (AI). Immigration of coded wire tagged coho into the Washougal subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Washougal Hatchery	Washougal River, 198 1	Spawning Ground	10	1	1
Washougal Hatchery	Washougal River, 1982	Spawning Ground	54	1	37
Washougal Hatchery	Washougal River, 1982	Spawning Ground	54	7	259
Willard Hatchery, released below Bonneville	Washougal, 198 1	Hatchery	14,680	1	1
Washougal Hatchery	Washougal River, 1986	Spawning Ground	23	1	---
Washougal Hatcherv	Washougal River, 1986	Spawning Ground	23	2	---
Washougal Hatchery	Washougal River, 1986	Spawning Ground	23	1	---

Based on the following tag codes: 63-19-54, 63-21-51, 63-22-03, 05-06-51, 63-31-32, 63-31-33, and 63-31-34.

Beginning with the 1978 brood.

Table 7 (TR). Hatchery releases of COHO salmon into the WASHOUGAL subbasin sorted by brood year, hatchery and Life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CUT Code
1965	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Smolt	04/28/67	04/28/67	21	129519	UASHWGAL R 28.0159	UNTAGGED
1965	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Smolt	04/28/67	04/28/67	21	567781	UASHWGAL R 28.0159	UNTAGGED
1965	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Smolt	04/28/67	04/28/67	21	567781	UASHWGAL R 28.0159	UNTAGGED
1965	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Smolt	04/28/67	04/28/67	19	116418	UASHWGAL R 28.0159	UNTAGGED
1965	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Smolt	04/28/67	04/28/67	19	510350	UASHWGAL R 28.0159	UNTAGGED
1965	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Smolt	04/28/67	04/28/67	19	510351	UASHWGAL R 28.0159	UNTAGGED
1966	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	EmFry	02/02/67	02/02/67	1194	100800	UASHWGAL R 28.0159	UNTAGGED
1966	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	EmFry	02/08/67	02/08/67	1163	52110	UASHWGAL R 28.0159	UNTAGGED
1966	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	EmFry	02/08/67	02/08/67	1163	52110	UASHWGAL R 28.0159	UNTAGGED
1966	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	EmFry	02/02/67	02/02/67	1194	162000	UASHWGAL R -NF (28)	UNTAGGED
1966	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	EmFry	02/08/67	02/08/67	1163	88008	UASHWGAL R -NF (28)	UNTAGGED
1966	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	EmFry	02/02/67	02/02/67	1194	229200	UASHWGAL R -WF (28)	UNTAGGED
1966	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	EmFry	02/08/67	02/08/67	1163	46320	UASHWGAL R -WF (28)	UNTAGGED
1966	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	EmFry	02/06/67	02/06/67	1163	52110	UDDDUARD CR 28.0298	UNTAGGED
1966	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	06/05/67	06/05/67	122	616832	UASHWGAL R 28.0159	UNTAGGED
1966	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	06/06/67	06/06/67	122	287310	UASHWGAL R -UF (28)	UNTAGGED
1966	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Smolt	04/26/68	04/26/68	18	88919	UASHWGAL R 28.0159	UNTAGGED
1966	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Smolt	04/26/68	04/26/68	18	798499	UASHWGAL R 28.0159	UNTAGGED
1967	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	02/21/68	02/21/68	986	34650	UASHWGAL R 28.0159	UNTAGGED
1967	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	02/21/68	02/21/68	986	249480	UASHWGAL R 28.0159	UNTAGGED
1967	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	02/23/68	02/23/68	986	245520	UASHWGAL R 28.0159	UNTAGGED
1967	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	03/27/68	03/27/68	498	128982	UASHWGAL R 28.0159	UNTAGGED
1967	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	04/03/68	04/03/68	498	124500	WASHOUGAL R 28.0159	UNTAGGED
1967	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	02/21/68	02/21/68	986	249480	UASHWGAL R -WF (28)	UNTAGGED
1967	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Smolt	04/25/69	04/25/69	18	1813500	UASHWGAL R 28.0159	UNTAGGED
1968	COLUMBIA R - TYPE-S	RINGOLD HATCHERY	Smolt	04/03/70	04/03/70	18	63293	UASHWGAL R 28.0159	UNTAGGED
1968	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Smolt	03/30/70	03/30/70	23	1308999	UASHWGAL R 28.0159	UNTAGGED
1969	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Smolt	04/09/71	04/09/71	22	87824	WASHWGAL R 28.0159	UNTAGGED
1969	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Smolt	04/09/71	04/09/71	18	87876	UASHWGAL R 28.0159	UNTAGGED
1969	UASHWGAL R TYPE-S	WASHWGAL HATCHERY	Smolt	04/09/71	04/09/71	18	2584800	UASHWGAL R 28.0159	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	EmFry	02/02/71	02/02/71	1194	54000	DEER CR (28.0264)	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	EmFry	02/03/71	02/03/71	1194	162000	DEER CR (28.0264)	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	EmFry	02/08/71	02/08/71	1296	61100	MCCLOSKEY CR 28.0246	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	EmFry	02/10/71	02/10/71	1296	122200	TEXAS CR (28.0237)	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	EmFry	02/02/71	02/02/71	1194	54000	UASHWGAL R 28.0159	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	EmFry	02/02/71	02/02/71	1194	54000	UASHWGAL R 28.0159	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	EmFry	02/10/71	02/10/71	1296	183300	UASHWGAL R 28.0159	UNTAGGED ,
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	EmFry	02/10/71	02/10/71	1296	183300	UASHWGAL R 28.0159	UNTAGGED
1970	TYPE-S (BIG)	UASHWGAL HATCHERY	EmFry	02/02/71	02/02/71	1194	54000	UASHWGAL R -UF (28)	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	EmFry	02/04/71	02/04/71	1194	102000	UASHWGAL R -UF (28)	UNTAGGED
1970	TYPE-S (BIG)	UASHWGAL HATCHERY	EmFry	02/02/71	02/02/71	1194	54000	WOODWARD CR 28.0298	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	07/18/71	07/18/71	87	113100	MCCLOSKEY CR 28.0246	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	08/17/71	08/17/71	87	120147	MCCLOSKEY CR 28.0246	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	08/19/71	08/19/71	87	113100	MCCLOSKEY CR 28.0246	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	08/02/71	08/02/71	194	58200	UASHWGAL R 28.0159	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	08/03/71	08/03/71	194	47491	UASHWGAL R 28.0159	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	08/03/71	08/03/71	194	58200	UASHWGAL R 28.0159	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	08/03/71	08/03/71	194	58200	UASHWGAL R 28.0159	UNTAGGED
1970	TYPE-S (BIG)	UASHWGAL HATCHERY	Fingr	11/10/71	11/10/71	12	267600	UASHWGAL R 28.0159	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	08/04/71	08/04/71	99	29700	UASHWGAL R -UF (28)	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	08/04/71	08/04/71	99	29700	UASHWGAL R -WF (28)	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	08/05/71	08/05/71	99	29700	UASHWGAL R -WF (28)	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	08/05/71	08/05/71	99	31086	UASHWGAL R -UF (28)	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	08/06/71	08/06/71	99	29700	UASHWGAL R -UF (28)	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	08/06/71	08/06/71	99	30789	UASHWGAL R -UF (28)	UNTAGGED

Table 7. Hatchery releases of COHO salmon into the UASHWGAL subbasin sorted by brood year, hatchery and Life stage - CONTINUED.

Brood Year	stock	Hatchery		Life Stage	Release Date 1	Release Date 2	Fish /Lb.	Number Released	Release Site	CUT Code
1970	WASHWGAL R TYPE-S	UASHWGAL	HATCHERY	Fingr	08/16/71	08/16/71	87	26100	UASHWGAL R -WF (28)	UNTAGGED
1970	WASHWGAL R TYPE-S	UASHWGAL	HATCHERY	Smolt	04/07/72	04/07/72	16	1260432	UASHWGAL R 28.0159	UNTAGGED
1970	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	Smolt	04/22/72	04/22/72	16	1216848	UASHWGAL R 28.0159	UNTAGGED
1971	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	EmFry	01/25/72	01/25/72	1296	54096	UASHWGAL R 28.0159	UNTAGGED
1971	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	EmFry	01/25/72	01/25/72	1296	108192	UASHWGAL R -WF (28)	UNTAGGED
1971	WASHWGAL R TYPE-S	UASHWGAL	HATCHERY	Fingr	04/04/72	04/04/72	560	240800	DEER CR (28.0264)	UNTAGGED
1971	UASHOUGAL R TYPE-S	UASHWGAL	HATCHERY	Smolt	04/26/73	04/26/73	17	161891	UASHWGAL R 28.0159	UNTAGGED
1971	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	Smolt	05/15/73	05/15/73	16	3041168	UASHWGAL R 28.0159	UNTAGGED
1972	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	EmFry	01/24/73	01/24/73	1334	50046	DOUGAN CR (28.0250)	UNTAGGED
1972	UASHOUGAL R TYPE-S	UASHWGAL	HATCHERY	EmFry	02/08/73	02/08/73	1134	353878	MEANDER CR (28.0267)	UNTAGGED
1972	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	EmFry	01/24/73	01/24/73	1334	50046	STEBBINS CR 28.0254	UNTAGGED
1972	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	EmFry	01/24/73	01/24/73	1334	119847	TEXAS CR (28.0237)	UNTAGGED
1972	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	EmFry	01/25/73	01/25/73	1334	50046	WOODWARD CR 28.0298	UNTAGGED
1972	WASHWGAL R TYPE-S	UASHWGAL	HATCHERY	Fingr	07/31/73	07/31/73	140	87640	UASHWGAL R -WF (28)	UNTAGGED
1972	COULITZ RIVER TYPE-S	UASHWGAL	HATCHERY	Smolt	05/01/74	05/01/74	18	561387	UASHWGAL R 28.0159	UNTAGGED
1972	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	Smolt	05/01/74	05/01/74	18	1108892	UASHWGAL R 28.0159	UNTAGGED
1972	COWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/01/74	05/01/74	18	1550049	UASHWGAL R 28.0159	UNTAGGED
1973	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	Fingr	06/18/74	06/18/74	192	81216	DEER CR (28.0264)	UNTAGGED
1973	WASHOUGAL R TYPE-S	UASHWGAL	HATCHERY	Fingr	06/18/74	06/18/74	192	51456	UASHWGAL R -WF (28)	UNTAGGED
1973	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	Smolt	04/24/75	04/24/75	16	1137312	UASHWGAL R 28.0159	U N T A G G E D
1973	CDULITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	04/24/75	04/24/75	16	2159392	UASHWGAL R 28.0159	U N T A G G E D
1974	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	EmFry	01/22/75	01/22/75	190	7980	MEANDER CR (28.0267)	UNTAGGED
1974	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	EmFry	01/22/75	01/22/75	190	7980	UASHWGAL R 28.0159	UNTAGGED
1974	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	EmFry	01/22/75	01/22/75	190	7220	UASHWGAL R -WF (28)	UNTAGGED
1974	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	Smolt	04/06/76	04/06/76	16	569696	UASHWGAL R 28.0159	UNTAGGED
1974	TWTLE (GREEN) TIP-S	UASHWGAL	HATCHERY	Smolt	04/26/76	04/26/76	16	51184	UASHWGAL R 28.0159	130512
1974	TWTLE (GREEN) TYP-S	UASHWGAL	HATCHERY	Smolt	04/26/76	04/26/76	16	520112	UASHWGAL R 28.0159	UNTAGGED
1974	COWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	04/26/76	04/26/76	16	47728	UASHWGAL R 28.0159	130605
1974	COWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	04/26/76	04/26/76	16	1630432	UASHWGAL R 28.0159	UNTAGGED
1974	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	Smolt	04/26/76	04/26/76	16	517040	UASHWGAL R 28.0159	UNTAGGED
1974	COULITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	04/26/76	04/26/76	16	1624096	UASHWGAL R 28.0159	UNTAGGED
1975	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	Smolt	04/25/77	04/25/77	16	968704	UASHWGAL R 28.0159	UNTAGGED
1975	COULITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	04/25/77	04/25/77	16	1591088	UASHWGAL R 28.0159	UNTAGGED
1976	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	EmFry	03/16/77	03/16/77	1680	233937	UASHWGAL R -WF (28)	UNTAGGED
1976	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	Fingr	12/02/77	12/02/77	50	848000	UASHWGAL R 28.0159	UNTAGGED
1976	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	Smolt	05/01/78	05/01/78	15	2085990	UASHWGAL R 28.0159	UNTAGGED
1977	COULITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	04/16/79	04/16/79	21	331506	UASHWGAL R 28.0159	UNTAGGED ,
1977	COWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	04/24/79	04/24/79	18	126700	UASHWGAL R 28.0159	UNTAGGED
1977	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	Smolt	04/24/79	04/24/79	18	1277500	UASHWGAL R 28.0159	UNTAGGED
1977	CDULITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/07/79	05/07/79	17	74378	UASHWGAL R 28.0159	631923
1977	COULITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/07/79	05/07/79	17	2697	UASHWGAL R 28.0159	UNTAGGED
1977	COULITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/07/79	05/07/79	16	80652	UASHWGAL R 28.0159	631924
1977	CDULITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/07/79	05/07/79	16	2323	UASHWGAL R 28.0159	UNTAGGED
1977	CDULITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	06/07/79	06/07/79	20	73010	UASHWGAL R 28.0159	631925
1977	COWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	06/07/79	06/07/79	20	1910	UASHWGAL R 28.0159	U N T A G G E D
1977	COWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	06/07/79	06/07/79	19	82887	UASHWGAL R 28.0159	631926
1977	CDULITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	06/07/79	06/07/79	19	1176	UASHWGAL R 28.0159	UNTAGGED
1977	COWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	07/06/79	07/06/79	20	81028	UASHWGAL R 28.0159	631927
1977	COULITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	07/06/79	07/06/79	20	1150	UASHWGAL R 28.0159	UNTAGGED
1977	CDULITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	07/06/79	07/06/79	20	82066	UASHWGAL R 28.0159	631934
1977	COULITZ TYPE-N STOCK	WASHOUGAL	HATCHERY	Smolt	07/06/79	07/06/79	20	1165	UASHWGAL R 28.0159	UNTAGGED
1978	CGULITZ TYPE-N STOCK	UASHWGAL	HATCHERY	EmFry	04/16/79	04/16/79	1512	150480	DEER CR (28.0264)	UNTAGGED
1978	UASHWGAL R TYPE-S	UASHWGAL	HATCHERY	EmFry	01/29/79	01/29/79	1417	166600	UASHWGAL R 28.0159	UNTAGGED
1978	CDULITZ TYPE-N STOCK	UASHWGAL	HATCHERY	EmFry	04/16/79	04/16/79	1512	91200	UASHWGAL R -WF (28)	UNTAGGED
1978	COULITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/01/80	05/01/80	21	776830	UASHWGAL R 28.0159	UNTAGGED

Table 7. Hatchery releases of COHO salmon into the UASHWGAL subbasin sorted by brood year, hatchery and life stage - CONTINUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CUT Code
1978	UASHWGAL RIV TYPE-N	UASHWGAL HATCHERY	Smolt	05/01/80	05/01/80	21	1306986	UASHWGAL R 28.0159	UNTAGGED
1978	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/08/80	05/08/80	18	99638	UASHWGAL R 28.0159	632039
1978	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/08/80	05/08/80	18	4662	UASHWGAL R 28.0159	UNTAGGED
1978	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/08/80	05/08/80	18	98683	UASHWGAL R 28.0159	632040
1978	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/08/80	05/08/80	18	4617	UASHWGAL R 28.0159	UNTAGGED
1978	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	06/09/80	06/09/80	18	97280	UASHWGAL R 28.0159	632037
1978	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	06109180	06/09/80	18	4577	UASHWGAL R 28.0159	UNTAGGED
1978	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	smott	06/09/80	06/09/80	18	97823	UASHWGAL R 28.0159	632038
1978	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	06/09/80	06/09/80	18	4551	UASHWGAL R 28.0159	UNTAGGED
1978	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	smott	06/09/80	06/09/80	18	5169	UASHWGAL R 28.0159	UNTAGGED
1978	COULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	07/07/80	07/07/80	19	98396	UASHWGAL R 28.0159	631954
1978	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	07/07/80	07/07/80	19	4398	UASHWGAL R 28.0159	UNTAGGED
1978	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	07/07/80	07/07/80	18	100020	UASHWGAL R 28.0159	631955
1978	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	07/07/80	07/07/80	18	4471	UASHWGAL R 28.0159	UNTAGGED
1979	COULITZ TYPE-N STOCK	UASHWGAL HATCHERY	EmFry	03/06/80	03/06/80	1512	63000	UASHWGAL R 28.0159	UNTAGGED
1979	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	EmFry	03/07/80	03/07/80	1417	40600	UASHWGAL R 28.0159	UNTAGGED
1979	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	03/21/80	03/21/80	769	40000	UASHWGAL R 28.0159	UNTAGGED
1979	UASHWGAL R TYPE-S	UASHWGAL HATCHERY	Fingr	03/21/80	03/21/80	769	189000	UASHWGAL R -WF (28)	UNTAGGED
1979	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	04/30/81	04130181	18	51784	UASHWGAL R 28.0159	632150
1979	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	smott	04/30/81	04/30/81	18	1525916	UASHWGAL R 28.0159	U N T A G G E D
1979	TWTLE R TYPE-S	UASHWGAL HATCHERY	Smolt	04/30/81	04/30/81	18	51976	UASHWGAL R 28.0159	632202
1979	TWTLE R TYPE-S	UASHWGAL HATCHERY	Smolt	04/30/81	04/30/81	18	901062	UASHWGAL R 28.0159	UNTAGGED
1979	COLUMBIA R - TYPE-S	UASHWGAL HATCHERY	Smolt	04/30/81	04/30/81	18	901220	UASHWGAL R 28.0159	UNTAGGED
1979	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	04/30/81	04/30/81	18	1525812	UASHWGAL R 28.0159	UNTAGGED
1979	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/27/81	05/27/81	20	52895	UASHWGAL R 28.0159	632151
1979	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/27/81	05127181	20	67460	UASHWGAL R 28.0159	UNTAGGED
1979	TWTLE R TYPE-S	UASHWGAL HATCHERY	smott	05/27/81	05127181	20	52432	UASHWGAL R 28.0159	632203
1979	TWTLE R TYPE-S	UASHWGAL HATCHERY	Smolt	05/ 27/81	05/27/81	20	22978	UASHWGAL R 28.0159	UNTAGGED
1979	COLUMBIA R - TYPE-S	UASHWGAL HATCHERY	Smolt	05/27/81	05/27/81	20	22979	UASHWGAL R 28.0159	UNTAGGED
1979	COULITZ TYPE-N STOCK	UASHWGAL HATCHERY	smott	05/27/81	05/27/81	20	67430	UASHWGAL R 28.0159	UNTAGGED
1979	COLUMBIA R - TYPE-S	UASHWGAL HATCHERY	Smolt	05/27/81	05/27/81	20	381919	UASHWGAL R 28.0159	UNTAGGED
1980	COLUMBIA R - TYPE-S	UASHWGAL HATCHERY	EmFry	03/17/81	03/17/81	1296	69000	MCCLOSKEY CR 28.0246	UNTAGGED
1980	COLUMBIA R - TYPE-S	UASHWGAL HATCHERY	EmFry	01 /02/81	01/02/81	1814	249000	UASHWGAL R 28.0159	UNTAGGED
1980	COLUMBIA R - TYPE-S	UASHWGAL HATCHERY	EmFry	01/19/81	01/19/81	1334	255100	UASHWGAL R -WF (28)	UNTAGGED
1980	COLUMBIA R - TYPE-S	UASHWGAL HATCHERY	EmFry	01/23/81	01/23/81	1417	147750	UASHWGAL R -WF (28)	UNTAGGED
1980	COLUMBIA R - TYPE-S	UASHWGAL HATCHERY	Fingr	05/13/81	05/13/81	248	750000	UASHWGAL R 28.0159	UNTAGGED
1980	COLUMBIA R - TYPE-S	UASHWGAL HATCHERY	Fingr	06/03/81	06/03/81	177	233000	UASHWGAL R 28.0159	UNTAGGED ,
1980	COLUMBIA R - TYPE-S	UASHWGAL HATCHERY	Fingr	06/24/81	06/24/81	147	141282	UASHWGAL R 28.0159	UNTAGGED
1980	COLUMBIA R - TYPE-S	UASHWGAL HATCHERY	Fingr	08/06/81	08/06/81	87	118000	UASHWGAL R 28.0159	UNTAGGED
1980	COULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Fingr	09/1 1/81	09/1 1/81	87	307450	UASHWGAL R 28.0159	UNTAGGED
1980	COLUMBIA R - TYPE-S	UASHWGAL HATCHERY	Fingr	04/16/81	04/16/81	360	202000	UASHWGAL R -WF (28)	UNTAGGED
1980	COLUMBIA R - TYPE-S	UASHWGAL HATCHERY	Smolt	04/30/82	04/30/82	20	1346710	UASHWGAL R 28.0159	UNTAGGED
1980	COULITZ TYPE-N STOCK	UASHWGAL HATCHERY	smott	04/30/82	04/30/82	19	1231290	UASHWGAL R 28.0159	UNTAGGED
1980	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	10173	UASHWGAL R 28.0159	632513
1980	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	11016	UASHWGAL R 28.0159	UNTAGGED
1980	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	9874	UASHWGAL R 28.0159	632514
1980	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05125182	05/25/82	21	11001	UASHWGAL R 28.0159	UNTAGGED
1980	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	10269	UASHWGAL R 28.0159	632515
1980	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	11001	UASHWGAL R 28.0159	UNTAGGED
1980	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	9930	UASHWGAL R 28.0159	632516
1980	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	11001	UASHWGAL R 28.0159	UNTAGGED
1980	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	9841	UASHWGAL R 28.0159	632517
1980	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	11000	UASHWGAL R 28.0159	UNTAGGED
1980	CDULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	10120	WASHWGAL R 28.0159	632518

Table 7. Hatchery releases of COHO salmon into the UASHWGAL subbasin sorted by brood year, hatchery and life stage • CONTINUED.

Brood Year	Stock	Hatchery	life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CUT Code
1980	COULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	7476	UASHWGAL R 28.0159	UNTAGGED
1980	COWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	10110	UASHWGAL R 28.0159	632519
1980	COWLITZ TYPE-N STOCK	WASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	7476	UASHWGAL R 28.0159	UNTAGGED
1980	COULITZ TYPE-N STOCK	UASHWGAL HATCHERY	smott	05/25/82	05/25/82	21	10093	UASHWGAL R 28.0159	632520
1980	COWLITZ TYPE-N STOCK	WASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	7476	WASHWGAL R 28.0159	UNTAGGED
1980	COULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	10203	UASHWGAL R 28.0159	632521
1980	COULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	7476	WASHWGAL R 28.0159	UNTAGGED
1980	COULITZ TYPE-N STOCK	UASHWGAL HATCHERY	smott	05125182	05/25/82	21	10251	UASHWGAL R 28.0159	632522
1980	COULITZ TYPE-N STOCK	UASHWGAL HATCHERY	smott	05/25/82	05/25/82	21	7477	UASHWGAL R 28.0159	UNTAGGED
1980	COULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	22	10165	UASHWGAL R 28.0159	632523
1980	COWLITZ TYPE-N STOCK	WASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	22	4804	UASHWGAL R 28.0159	UNTAGGED
1980	COULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	22	10076	WASHWGAL R 28.0159	632524
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	22	4803	WASHWGAL R 28.0159	UNTAGGED
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	22	10110	UASHWGAL R 28.0159	632525
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	22	4804	UASHWGAL R 28.0159	UNTAGGED
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	22	10185	UASHWGAL R 28.0159	632526
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	smott	05/25/82	05/25/82	22	4805	UASHWGAL R 28.0159	UNTAGGED
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	22	10091	WASHWGAL R 28.0159	632527
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	22	4804	UASHWGAL R 28.0159	UNTAGGED
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	10121	UASHWGAL R 28.0159	632528
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	2694	WASHWGAL R 28.0159	UNTAGGED
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05125182	05/25/82	21	10166	UASHWGAL R 28.0159	632529
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	2706	UASHWGAL R 28.0159	UNTAGGED
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	10139	UASHWGAL R 28.0159	632530
1980	CWLITZ TYPE-N STOCK	WASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	2699	UASHWGAL R 28.0159	UNTAGGED
1980	CWLITZ TYPE-N STOCK	WASHWGAL HATCHERY	smott	05/25/82	05/25/82	21	10049	WASHWGAL R 28.0159	632531
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	2227	UASHWGAL R 28.0159	UNTAGGED
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	9930	WASHWGAL R 28.0159	632532
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	2227	UASHWGAL R 28.0159	UNTAGGED
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	9698	UASHWGAL R 28.0159	632533
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	578	WASHWGAL R 28.0159	UNTAGGED
1980	CWLITZ TYPE-N STOCK	WASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	9612	UASHWGAL R 28.0159	632534
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	576	WASHWGAL R 28.0159	UNTAGGED
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	smott	05/25/82	05/25/82	21	9686	WASHWGAL R 28.0159	632535
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	576	UASHWGAL R 28.0159	UNTAGGED
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	9572	UASHWGAL R 28.0159	632536
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	576	UASHWGAL R 28.0159	UNTAGGED ,
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05125182	21	9862	WASHWGAL R 28.0159	632537
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	21	577	UASHWGAL R 28.0159	UNTAGGED
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	20	8037	UASHWGAL R 28.0159	632538
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	20	288	UASHWGAL R 28.0159	UNTAGGED
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	20	7917	UASHWGAL R 28.0159	632539
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	20	287	UASHWGAL R 28.0159	UNTAGGED
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	20	8104	UASHWGAL R 28.0159	632540
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	20	288	WASHWGAL R 28.0159	UNTAGGED
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	20	8104	UASHWGAL R 28.0159	632541
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	20	288	UASHWGAL R 28.0159	UNTAGGED
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	20	7999	UASHWGAL R 28.0159	632542
1980	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/82	05/25/82	20	288	UASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Fingr	11/16/82	11/16/82	57	16300	MCCLOSKEY CR 28.0246	UNTAGGED
1981	COULITZ TYPE-N STOCK	UASHWGAL HATCHERY	Fingr	11/18/82	11/18/82	52	88868	UASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Fingr	07/14/82	07/14/82	221	50000	WASHWGAL R -WF (28)	UNTAGGED
1981	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Fingr	08/09/82	08/09/82	131	36000	WASHWGAL R -WF (28)	UNTAGGED
1981	TWTLE R TYPE-S	UASHWGAL HATCHERY	Smolt	04/30/83	04/30/83	18	50852	WASHWGAL R 28.0159	632645
1981	TWTLE R TYPE-S	UASHWGAL HATCHERY	Smolt	04/30/83	04/30/83	18	855448	UASHWGAL R 28.0159	UNTAGGED

Table 7. Hatchery releases of COHO salmon into the WASHOUGAL subbasin sorted by brood year, hatchery and life stage - CONTINUED.

Brood Year	Stock			Hatchery		Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CUT Code
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	04/30/83	04/30/83	18	1743700	UASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	7954	UASHWGAL R 28.0159	632651
1981	CWLITZ	TYPE-N	STOCK	WASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	58	WASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHOUGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	7948	WASHWGAL R 28.0159	632652
1981	CWLITZ	TYPE-N	STOCK	WASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	58	UASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	7990	UASHWGAL R 28.0159	632653
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	58	WASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	7980	UASHWGAL R 28.0159	632654
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	58	UASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	7859	UASHWGAL R 28.0159	632655
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	57	UASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	9357	WASHWGAL R 28.0159	632656
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	23	UASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	9745	UASHWGAL R 28.0159	632657
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	24	WASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHOUGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	9900	WASHWGAL R 28.0159	632658
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	24	WASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	9777	UASHWGAL R 28.0159	632659
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	24	WASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	9743	WASHWGAL R 28.0159	632660
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	24	WASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	9856	UASHWGAL R 28.0159	632661
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	1635	UASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	9907	WASHWGAL R 28.0159	632662
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	1643	WASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	9866	UASHWGAL R 28.0159	632663
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	1637	UASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	9673	WASHWGAL R 28.0159	632701
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	1605	WASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	10041	WASHWGAL R 28.0159	632702
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	1667	WASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	10089	WASHWGAL R 28.0159	632703
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	3957	WASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	10385	UASHWGAL R 28.0159	632704
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	4074	WASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	10134	UASHWGAL R 28.0159	632705
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	3975	WASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	10572	UASHWGAL R 28.0159	632706
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	4148	WASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	WASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	10052	UASHWGAL R 28.0159	632707
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	3944	WASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	10436	WASHWGAL R 28.0159	632708
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	6275	WASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	10299	WASHWGAL R 28.0159	632709
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	6192	WASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	10407	WASHWGAL R 28.0159	632710
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	6257	WASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	10352	WASHWGAL R 28.0159	632711
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	6225	WASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	10476	WASHWGAL R 28.0159	632712
1981	CWLITZ	TYPE-N	STOCK	WASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	6299	UASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	10049	WASHWGAL R 28.0159	632713
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	9432	WASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	10874	WASHWGAL R 28.0159	632714
1981	CWLITZ	TYPE-N	STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	10206	WASHWGAL R 28.0159	UNTAGGED

Table 7. Hatchery releases of COHO salmon into the UASHWGAL subbasin sorted by brood year, hatchery and life stage - CONTINUED.

Brood Year	stock	Hatchery		Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1981	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	10323	WASHWGAL R 28.0159	632715
1981	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	smott	05/27/83	05/27/83	19	9689	WASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	10346	WASHWGAL R 28.0159	632716
1981	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05127183	19	9710	UASHWGAL R 28.0159	UNTAGGED
1981	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	10644	UASHWGAL R 28.0159	632717
1981	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/27/83	05/27/83	19	9991	WASHWGAL R 28.0159	UNTAGGED
1982	COLUMBIA R - TYPE-S	UASHWGAL	HATCHERY	Fingr	07/28/83	07/28/83	108	22000	COUGAR CR (28.0225)	UNTAGGED
1982	COLUMBIA R - TYPE-S	UASHWGAL	HATCHERY	Fingr	03/22/83	03/22/83	477	83000	MCCLOSKEY CR 28.0246	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Fingr	07/27/83	07127183	123	25000	MCCLOSKEY CR 28.0246	UNTAGGED
1982	COLUMBIA R - TYPE-S	UASHWGAL	HATCHERY	Fingr	03/30/83	03/30/83	468	85800	WASHWGAL R 28.0159	UNTAGGED
1982	COLUMBIA R - TYPE-S	UASHWGAL	HATCHERY	Fingr	07/28/83	07/28/83	104	128000	WASHWGAL R 28.0159	UNTAGGED
1982	COLUMBIA R - TYPE-S	UASHWGAL	HATCHERY	Fingr	03/22/83	03122183	477	83000	WASHWGAL R -WF (28)	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Fingr	07/27/83	07/27/83	113	8000	UINKLER CR (28.0229)	UNTAGGED
1982	COLUMBIA R - TYPE-S	WASHOUGAL	HATCHERY	Smolt	04/26/84	04/26/84	17	1062570	WASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	04/26/84	04/26/84	17	1636930	WASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	18	10460	UASHWGAL R 28.0159	632942
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	18	9663	WASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	18	10638	UASHWGAL R 28.0159	632943
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	18	9827	UASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	18	10530	WASHWGAL R 28.0159	632944
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	18	9728	UASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05125184	18	10420	UASHWGAL R 28.0159	632945
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	18	9625	WASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	18	10401	WASHWGAL R 28.0159	632946
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	18	9608	WASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	18	10485	UASHWGAL R 28.0159	632947
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	18	5936	WASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	18	10459	WASHWGAL R 28.0159	632948
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	18	5921	WASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	18	10610	UASHWGAL R 28.0159	632949
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	18	6006	WASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	18	10620	UASHWGAL R 28.0159	632950
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05125184	18	6012	UASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	18	10568	WASHWGAL R 28.0159	632951
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05125184	18	5983	WASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	smott	05/25/84	05125184	17	10574	UASHWGAL R 28.0159	632952
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	17	3576	UASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	17	10440	UASHWGAL R 28.0159	632953
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	smott	05/25/84	05/25/84	17	3529	WASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05125184	17	10501	UASHWGAL R 28.0159	632954
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	17	3551	WASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	17	10597	WASHWGAL R 28.0159	632955
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05125184	05/25/84	17	3584	UASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	17	10572	UASHWGAL R 28.0159	632956
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	17	3576	WASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	19	10431	UASHWGAL R 28.0159	632957
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	19	908	WASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	19	10434	WASHWGAL R 28.0159	632958
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	19	908	UASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	smott	05/25/84	05/25/84	19	10515	WASHWGAL R 28.0159	632959
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	19	915	WASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	19	10407	WASHWGAL R 28.0159	632960
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	19	905	UASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/25/84	05/25/84	19	10471	WASHWGAL R 28.0159	632961

Table 7. Hatchery releases of COHO salmon into the WASHWGAL subbasin sorted by brood year, hatchery and life stage - CONTINUED.

Brood Year	stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /Lb.	Number Released	Release Site	CUT Code
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/84	05/25/84	19	906	UASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/84	05/25/84	18	9582	UASHWGAL R 28.0159	632962
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/84	05/25/84	18	116	UASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/84	05/25/84	18	9592	UASHWGAL R 28.0159	632963
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/84	05/25/84	18	117	UASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/84	05/25/84	18	9592	UASHWGAL R 28.0159	633001
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/84	05/25/84	18	117	UASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/84	05/25/84	18	9606	UASHWGAL R 28.0159	633002
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	smott	05/25/84	05/25/84	18	117	UASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/84	05/25/84	18	9347	WASHWGAL R 28.0159	633003
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/84	05/25/84	18	114	WASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/84	05/25/84	18	7803	UASHWGAL R 28.0159	'633004
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	smott	05/25/84	05/25/84	18	111	UASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/84	05/25/84	18	7803	WASHWGAL R 28.0159	633005
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	smott	05/25/84	05/25/84	18	111	UASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/84	05/25/84	18	7803	UASHWGAL R 28.0159	633006
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/84	05/25/84	18	Ill	UASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/84	05/25/84	18	7833	WASHWGAL R 28.0159	633007
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/84	05/25/84	18	111	UASHWGAL R 28.0159	UNTAGGED
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/25/84	05125184	18	7803	UASHWGAL R 28.0159	633008
1982	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	smott	05/25/84	05/25/84	18	111	UASHWGAL R 28.0159	UNTAGGED
1983	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Fingr	05/21/84	05/21/84	428	42700	COUGAR CR (28.0225)	UNTAGGED
1983	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Fingr	06/06/84	06/06/84	200	20000	UASHWGAL R 28.0159	UNTAGGED
1983	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Fingr	05/21/84	05/21/84	428	68300	UASHWGAL R -WF (28)	UNTAGGED
1983	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Fingr	06/06/84	06/06/84	206	38000	UASHWGAL R -WF (28)	UNTAGGED
1983	TWTLE R TYPE-S	UASHWGAL HATCHERY	Smolt	05/02/85	05/02/85	18	25695	WASHWGAL R 28.0159	633134
1983	TWTLE R TYPE-S	UASHWGAL HATCHERY	smott	05/02/85	05/02/85	18	465451	UASHWGAL R 28.0159	UNTAGGED
1983	TWTLE R TYPE-S	UASHWGAL HATCHERY	Smolt	05/02/85	05/02/85	18	25664	WASHWGAL R 28.0159	633135
1983	TWTLE R TYPE-S	WASHWGAL HATCHERY	Smolt	05/02/85	05/02/85	18	465450	UASHWGAL R 28.0159	UNTAGGED
1983	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/02/85	05/02/85	18	430100	WASHWGAL R 28.0159	UNTAGGED
1983	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/02/85	05/02/85	18	439800	UASHWGAL R 28.0159	UNTAGGED
1983	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	05/02/85	05/02/85	18	846300	UASHWGAL R 28.0159	UNTAGGED
1983	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	smott	05/17/85	05/17/85	20	402700	UASHWGAL R 28.0159	UNTAGGED
1983	TWTLE R TYPE-S	UASHWGAL HATCHERY	Smolt	05/20/85	05/20/85	17	25617	UASHWGAL R 28.0159	633132
1983	TWTLE R TYPE-S	WASHWGAL HATCHERY	Smolt	05/20/85	05/20/85	17	15633	UASHWGAL R 28.0159	UNTAGGED
1983	TWTLE R TYPE-S	UASHWGAL HATCHERY	Smolt	05/20/85	05/20/85	17	25782	WASHWGAL R 28.0159	633133
1983	TWTLE R TYPE-S	UASHWGAL HATCHERY	Smolt	05/20/85	05/20/85	17	15468	UASHWGAL R 28.0159	UNTAGGED
1984	COLUMBIA R - TYPE-S	UASHWGAL HATCHERY	Fingr	06/05/85	06/05/85	170	9000	BOULDER CR (28.0213)	UNTAGGED
1984	COLUMBIA R - TYPE-S	UASHWGAL HATCHERY	Fingr	06/05/85	06/05/85	171	6000	COUGAR CR (28.0225)	UNTAGGED
1984	COLUMBIA R - TYPE-S	UASHWGAL HATCHERY	Fingr	06/05/85	06/05/85	171	7000	JONES CR (28.0218)	UNTAGGED
1984	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Fingr	07/23/85	07/23/85	116	80000	UASHWGAL R 28.0159	UNTAGGED
1984	COLUMBIA R - TYPE-S	WASHWGAL HATCHERY	Fingr	04/03/85	04/03/85	597	82000	WASHWGAL R -WF (28)	UNTAGGED
1984	COLUMBIA R - TYPE-S	WASHWGAL HATCHERY	Fingr	06/05/85	06/05/85	172	5000	UASHWGAL R -WF (28)	UNTAGGED
1984	TWTLE R TYPE-S	UASHWGAL HATCHERY	Smolt	04/30/86	04/30/86	19	26225	UASHWGAL R 28.0159	633515
1984	TWTLE R TYPE-S	UASHWGAL HATCHERY	Smolt	04/30/86	04130186	19	305740	WASHWGAL R 28.0159	UNTAGGED
1984	TWTLE R TYPE-S	UASHWGAL HATCHERY	Smolt	04/30/86	04/30/86	19	26324	WASHWGAL R 28.0159	633516
1984	TWTLE R TYPE-S	UASHWGAL HATCHERY	smott	04/30/86	04/30/86	19	306892	WASHWGAL R 28.0159	UNTAGGED
1984	TWTLE R TYPE-S	WASHWGAL HATCHERY	Smolt	04/30/86	04/30/86	19	26253	WASHWGAL R 28.0159	633517
1984	TWTLE R TYPE-S	UASHWGAL HATCHERY	Smolt	04/30/86	04/30/86	19	306066	WASHWGAL R 28.0159	UNTAGGED
1984	CWLITZ TYPE-N STOCK	UASHWGAL HATCHERY	Smolt	04/30/86	04/30/86	19	1631000	WASHWGAL R 28.0159	UNTAGGED
1984	TWTLE R TYPE-S	UASHWGAL HATCHERY	Smolt	05/27/86	05/27/86	17	26274	WASHWGAL R 28.0159	633518
1984	TWTLE R TYPE-S	UASHWGAL HATCHERY	Smolt	05/27/86	05127186	17	66	WASHWGAL R 28.0159	UNTAGGED
1984	TWTLE R TYPE-S	UASHWGAL HATCHERY	Smolt	05/27/86	05/27/86	17	26166	WASHWGAL R 28.0159	633519
1984	TWTLE R TYPE-S	UASHWGAL HATCHERY	smott	05/27/86	05/27/86	17	66	WASHWGAL R 28.0159	UNTAGGED
1984	TWTLE R TYPE-S	UASHOUGAL HATCHERY	smott	05/27/86	05/27/86	17	25165	WASHWGAL R 28.0159	633520

Table 7. Hatchery releases of COHO salmon into the WASHWGAL subbasin sorted by brood year, hatchery and Life stage - CONTINUED.

Brood Year	stock	Hatchery		Life Stage	Release Date 1	Release Date 2	Fish Number /lb.	Released	Release Site	CUT Code
1984	TWTLE R TYPE-S	WASHWGAL	HATCHERY	Smolt	05/27/86	05/27/86	17	63	WASHWGAL R 28.0159	UNTAGGED
1984	CWLITZ TYPE-N STOCK	WASHWGAL	HATCHERY	Smolt	05/27/86	05/27/86	17	320300	WASHWGAL R 28.0159	UNTAGGED
1985	CWLITZ TYPE-N STOCK	WASHWGAL	HATCHERY	Fingr	04/09/86	04/09/86	567	153300	WASHWGAL R -WF (28)	UNTAGGED
1985	CWLITZ TYPE-N STOCK	WASHWGAL	HATCHERY	Fingr	04/09/86	04/09/86	560	86700	WASHWGAL R -WF (28)	UNTAGGED
1985	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	04/17/87	04/17/87	20	20468	UASHWGAL R 28.0159	UNTAGGED
1985	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	04/17/87	04/17/87	20	23450	UASHWGAL R 28.0159	UNTAGGED
1985	COLUMBIA R - TYPE-S'	UASHWGAL	HATCHERY	Smolt	04/17/87	04/17/87	20	26082	WASHWGAL R 28.0159	UNTAGGED
1985	CWLITZ TYPE-N STOCK	WASHWGAL	HATCHERY	Smolt	05/05/87	05/05/87	20	20600	WASHWGAL R 28.0159	UNTAGGED
1985	CWLITZ TYPE-N STOCK	WASHWGAL	HATCHERY	Smolt	05/05/87	05/05/87	20	123800	UASHWGAL R 28.0159	UNTAGGED
1985	CWLITZ TYPE-N STOCK	WASHWGAL	HATCHERY	Smolt	05/26/87	05/26/87	19	2300	WASHWGAL R 28.0159	UNTAGGED
1985	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/26/87	05/26/87	19	357200	WASHWGAL R 28.0159	UNTAGGED
1986	CWLITZ TYPE-N STOCK	WASHWGAL	HATCHERY	Fingr	11/12/87	11/12/87	50	13650	JONES CR (28.0218)	UNTAGGED
1986	COLUMBIA R - TYPE-S	WASHWGAL	HATCHERY	Fingr	03/16/87	03/16/87	605	65200	UASHWGAL R 28.0159	UNTAGGED
1986	CWLITZ TYPE-N STOCK	WASHWGAL	HATCHERY	Fingr	05/22/87	05/22/87	449	103100	WASHWGAL R -WF (281	UNTAGGED
1986	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	04/14/88	04114188	21	73500	UASHWGAL R 28.0159	UNTAGGED
1986	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/01/88	05/01/88	19	127000	WASHWGAL R 28.0159	UNTAGGED
1986	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/15/88	05/15/88	18	127000	WASHWGAL R 28.0159	UNTAGGED
1986	CWLITZ TYPE-N STOCK	WASHWGAL	HATCHERY	Smolt	05/27/88	05127188	17	254900	WASHWGAL R 28.0159	UNTAGGED
1987	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Fingr	10/21/88	10/21/88	58	17600	COUGAR CR (28.0225)	UNTAGGED
1987	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Fingr	05/18/88	05/18/88	311	31000	JONES CR (28.0218)	U N T A G G E D
1987	CWLITZ TYPE-N STOCK	WASHWGAL	HATCHERY	Fingr	10/24/88	10/24/88	58	79900	UASHWGAL R 28.0159	UNTAGGED
1987	CWLITZ TYPE-N STOCK	WASHWGAL	HATCHERY	Fingr	11/03/88	11/03/88	56	138200	UASHWGAL R 28.0159	UNTAGGED
1987	CWLITZ TYPE-N STOCK	WASHWGAL	HATCHERY	Fingr	05/18/88	05/18/88	311	31000	UASHWGAL R -WF (28)	UNTAGGED
1987	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Fingr	10/24/88	10/24/88	58	36500	WASHWGAL R -WF (28)	UNTAGGED
1987	CWLITZ TYPE-N STOCK	WASHWGAL	HATCHERY	Smolt	04/13/89	04/13/89	20	31800	WASHWGAL R 28.0159	UNTAGGED
1987	CWLITZ TYPE-N STOCK	WASHWGAL	HATCHERY	Smolt	04/13/89	04/13/89	20	48200	WASHWGAL R 28.0159	UNTAGGED
1987	CWLITZ TYPE-N STOCK	WASHWGAL	HATCHERY	Smolt	06/01/89	06/01/89	17	505000	WASHWGAL R 28.0159	UNTAGGED
1988	COLUMBIA R - TYPE-S	WASHWGAL	HATCHERY	EmFry	01/17/89	01/17/89	1814	268000	WASHWGAL R 28.0159	UNTAGGED
1988	CWLITZ TYPE-N STOCK	WASHWGAL	HATCHERY	Smolt	05/29/90	05/29/90	18	30174	UASHWGAL R 28.0159	631131
1988	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Smolt	05/29/90	05/29/90	18	487126	WASHWGAL R 28.0159	UNTAGGED
1989	CWLITZ TYPE-N STOCK	WASHWGAL	HATCHERY	Fingr	06/13/90	06/13/90	161	251400	UASHWGAL R 28.0159	UNTAGGED
1989	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Fingr	07/26/90	07/26/90	139	180100	WASHWGAL R 28.0159	UNTAGGED
1989	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Fingr	07/26/90	07/26/90	137	255400	WASHWGAL R 28.0159	UNTAGGED
1989	CWLITZ TYPE-N STOCK	WASHWGAL	HATCHERY	Fingr	10/24/90	10/24/90	53	62000	WASHWGAL R 28.0159	UNTAGGED
1989	CWLITZ TYPE-N STOCK	UASHWGAL	HATCHERY	Fingr	12/03/90	12/03/90	50	49850	WASHWGAL R 28.0159	UNTAGGED
1989	CWLITZ TYPE-N STOCK	WASHWGAL	HATCHERY	Fingr	06/08/90	06/08/90	190	78100	WASHWGAL R -WF (28)	UNTAGGED
1989	CWLITZ TYPE-N STOCK	WASHWGAL	HATCHERY	Fingr	06/13/90	06/13/90	153	36000	WASHWGAL R -WF (28)	UNTAGGED

Table 8 (TD). Parasites and diseases of coho at the Washougal River Salmon Hatchery located on the Washougal River.

Disease type	Hatchery	Specific Pathogen
Bacteria	Washougal Salmon Hatchery	Aeromonas salmonicida (Furunculosis)
Bacteria	Washougal Salmon Hatchery	Chondrococcus columnaris (Columnaris)
Bacteria	Washougal Salmon Hatchery	Cytophaga psychrophila (Cold Water Disease)
Virus	Washougal Salmon Hatchery	EIBS - Erythrocytic Inclusion Cody Syndrome

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

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TAC (Technical Advisory Committee). 1984. Report to Columbia River Management Plan Renegotiation Committee concerning hatchery reprogramming. 6/28/84.

Washington Department of Fisheries. 1990. Washougal River Subbasin, Salmon and Steelhead Production Plan.

WASHOUGAL RIVER SUBBASIN

Naturally Produced Summer Steelhead

GEOGRAPHIC LOCATION

The Washougal River is located in southwest Washington, within Skamania and Clark counties. From its headwaters the Washougal River flows southwesterly approximately 33 miles joining the Columbia River at river mile (RM) 121 near the town of Camas. Along its course numerous tributaries join the mainstem with the largest being the West Fork Washougal, Little Washougal, Stebbins Creek and Cougar Creek. Total drainage area encompasses approximately 240 square miles.

ORIGIN

The summer steelhead stock in the Washougal River is indigenous, although interbreeding with introduced Skamania and Cowlitz hatchery stocks has probably occurred. In addition, steelhead which abandoned the Cowlitz system following the eruption of Mount St. Helens in 1980, may have strayed into the Washougal River and spawned with native Washougal stock.

DISTRIBUTION

Table 1 lists spawning and rearing habitat, by quality, for Washougal River steelhead based on estimates from the Northwest Power Planning Council.

Summer steelhead are distributed throughout the mainstem Washougal River including the tributaries of the West Fork Washougal, Little Washougal River and Stebbins and Cougar creeks (Figure 1). Dougan Falls located at RM 21 is considered a low water barrier to steelhead. Above Dougan Falls the stream gradient increases with numerous falls and cascades which limit the number of fish that can access the upper section of river.

PRODUCTION

Production Facilities

There are two hatcheries in the subbasin, the Washougal Hatchery located on the mainstem Washougal River 16 miles northeast of the town of Washougal and the Skamania Hatchery located on the North Fork Washougal River. The Washougal Hatchery is operated by Washington Department of Fisheries and is a major producer of coho and chinook salmon. Skamania Hatchery is operated by Washington Department of Wildlife and produces summer and winter steelhead.

Production Summary

No data is available on wild smolt production. Production has fluctuated widely due to a number of natural events and human activities including; gravel mining on the lower 20 miles of river which stripped the lower river of most of its spawmng gravel, pollution from a pulp mill which releases its effluent near the mouth of the river, logging in the upper watershed, and earlier this century forest fires which occurred in the upper subbasin. In an effort to increase production, several small dams which blocked or impeded fish passage have been removed or by-passed allowing steelhead access to more of both the mainstem Washougal River and several tributaries.

ADULT LIFE HISTORY

Run Size and Escapement

Steelhead run size and escapement. between 1925 and 1933 was estimated at 2,500 fish. In 1935, steelhead were believed to be the largest fish run in the Washougal River at which time investigators counted 539 steelhead below Dougan Falls (Bryant 1949). In 1953, spawning surveys began on the Washougal River which resulted in estimates of 500 wild fish. Schuck (1980) estimated a total run of 4,268 summer steelhead (hatchery and wild) returning to the Washougal in 1979 although the wild portion of the run was estimated at only 268 fish or 6.6 percent. Average total run size (hatchery and wild) from 1964 through 1984 was 2,525 steelhead with the exact numbers of wild fish not known but believed to be very low (Subbasin Plan 1990).

Time of migration

Angling data collected between 1971 and 1984 show that wild adult summer steelhead enter the Washougal subbasin between March and November, with two distinct peaks. About 38 percent of the fish return between March and July with the remaining 68 percent of the fish entering the subbasin from August through November. Figure 2 illustrates the freshwater life history of summer steelhead in the Washougal River.

Harvest

Ocean catch of Washougal River steelhead are unknown.

The number of Washougal River steelhead caught in the Columbia River is unknown. However, large numbers of steelhead are harvested in the Columbia River including

Based on permit-card harvest estimates, sport catch ranged from 272 fish in the 1964-1965 season to a high of 5,699[A] fish in the 1989-1990 season. Average annual sport catch from 1983 through 1990 was at 1,560 fish (Table 2). As of 1986, fishing regulations allow legal harvest of hatchery fish only, with mandatory release of wild steelhead.

Treaty Indian harvest does not occur in the Washougal Subbasin or below Bonneville Dam on the Columbia River.

Spawning period

Spawning occurs from January through April, peaking in February and March (Howell et al. 1985).

Spawning area

Spawning occurs in the mainstem Washougal River,the West Fork Washougal and in the tributaries of Stebbins and Cougar creeks and the Little Washougal River.

Fecundity

No data is available for Washougal steelhead.

ASport catch 1981-1982 may be biased due to steelhead straying from eruption of Mount St. Helms.

Age Composition

Limited data on Washougal summer steelhead age composition. Based on 7 wild steelhead sampled from a 1979 creel census, 14.3 percent were from age class 2.1, 71.4 percent were from age class 2.2 and 14.3 percent were from age class 2.3.

Size

Fork lengths from 7 wild steelhead sampled from creel census showed average length of 2.1, 2.2 and 2.3 age class fish were 57 cm, 76 cm and 97 cm, respectively.

Sex ratio

Sex ratio for the 7 wild steelhead sampled in 1979 was four males and three females.

Survival Rate

No data is available for Washougal steelhead.

JUVENILE LIFE HISTORY

Egg

No data is available on egg production or egg to smolt survival.

Emergence

Wild steelhead fry emerge March through May (Subbasin Plan, 1990).

Juvenile rearing

Juvenile rearing lasts approximately two years prior to ocean emigration.

Juvenile steelhead outmigration generally occurs from April through May at an average size of 160 mm.

Hatchery Releases

The Washougal River receives hatchery smolts from the Skamania Hatchery which is located on the Washougal River. Hatchery releases into the Washougal River and data associated with Skamania hatchery stock is listed in the adjoining Washougal River hatchery summer steelhead report.

Straying

No data on Washougal steelhead.

BIOCHEMICAL-GENETIC CHARACTERISTICS

No data is available on Washougal steelhead.

DISEASES

Disease history for smolts planted in the Washougal River is presented in the adjoining Washougal River hatchery summer steelhead report.

REFERENCES

The references for this section appear at the end of the Skamania Hatchery winter steelhead section.

Figure 1 (AD). Probable spawning areas of wild steelhead in the Washougal River, Washington (B. Crawford, Washington Department of Game, personal communication)., Howell et al. 1985.

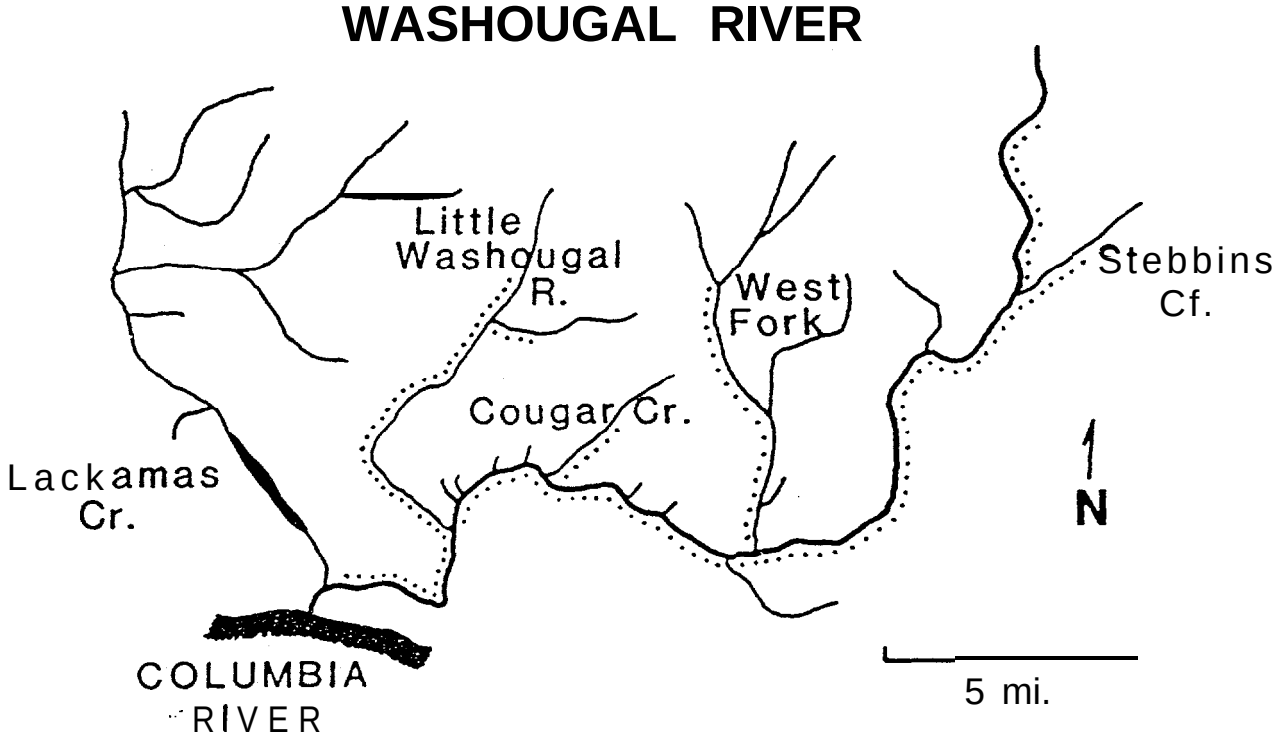

Figure 2 (TT). Freshwater life history Washougal summer steelhead.

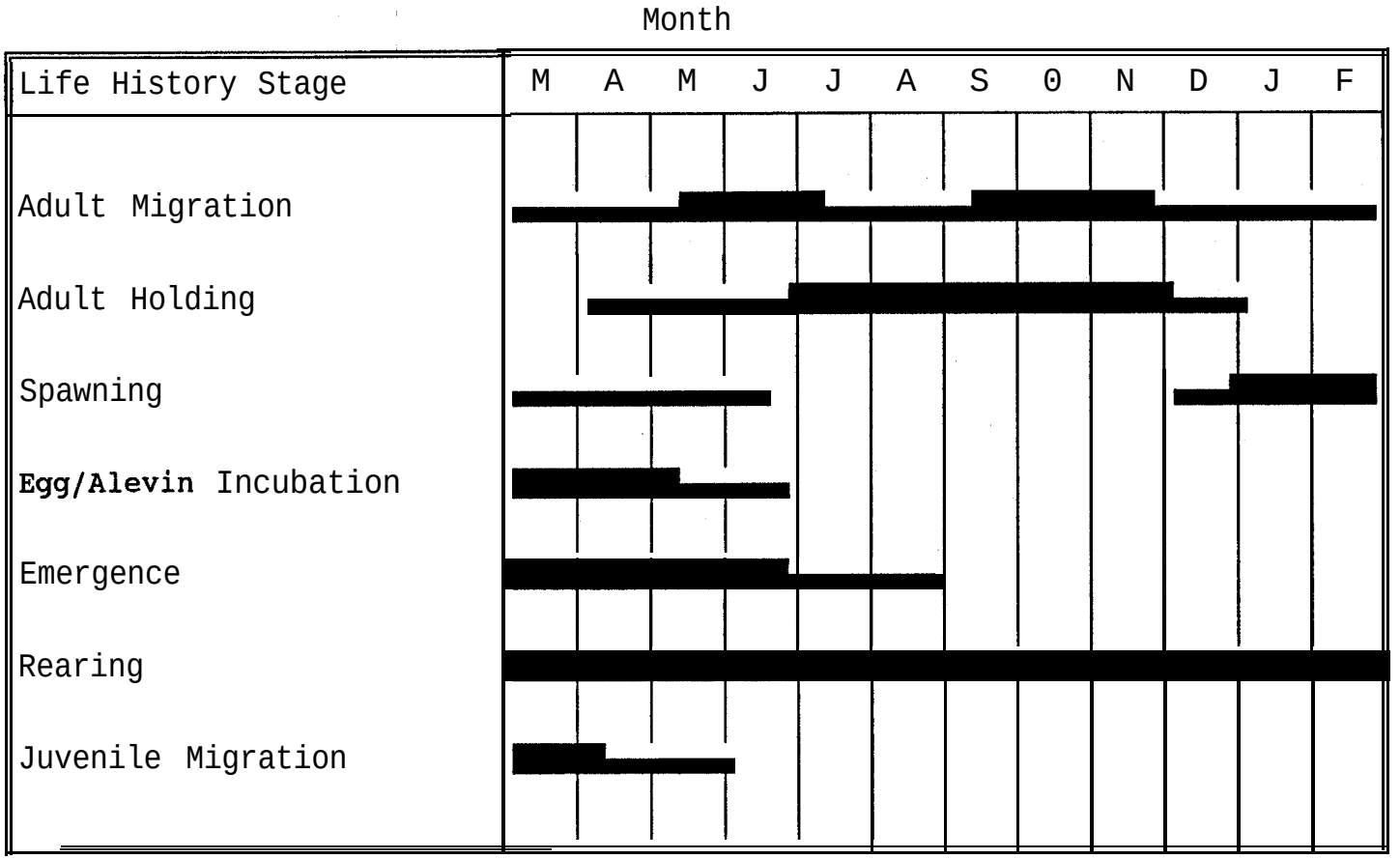

Table 1 (HB-1). Estimated* amount of rearing and spawning habitat, by quality, of Washougal River subbasin summer steelhead.

Area	Excellent	Good	Fair=	Poor[B]	Unknown	Total	Confidence
Miles	19.3%	78.7%	1.9%	0.0%		36.2	Unknown
Acres	9.4%	90.0%	0.6%	0.0%		223.4	Unknown

*Northwest Power Planning Council estimates based on limited observations.

[B]Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/absence database, NPPC 1991.

Table 2 (RB-a). Returns (sport catch and escapement) summer steelhead to the Washougal River subbasin.

Return Year	Escapement	Return to Hatchery[A]	Sport Catch[B]	Adult Total
1980	Unknown	3,494	2,321	Unknown
1981	Unknown	3,202	5,042	Unknown
1982	Unknown	3,478	1,673	Unknown
1983	Unknown	1,338	465	Unknown
1984	Unknown	3,384	1,578	Unknown
1985	Unknown	2,291	3,160	Unknown
1986	Unknown	2,405	1,977	Unknown
1987	Unknown	4,405	1,219	Unknown
1988	Unknown	2,398	1,436	Unknown
1989	Unknown	1,981	2,313	Unknown
1990	Unknown	3,072	5,699	Unknown

*Hatchery fish returning to Skamania Hatchery.

[B]Sport catch within subbasin only.

Source: Sport catch based on permit-card harvest estimates.

Skamania Hatchery Summer Steelhead

GEOGRAPHIC LOCATION

Skamania Hatchery is located on the North Fork Washougal River approximately one mile upstream from the confluence of the North Fork Washougal and the mainstem Washougal River and approximately 12 miles from the mouth of the mainstem Washougal River.

ORIGIN

The Skamania summer steelhead broodstock was developed in the late 1950's at the Skamania Hatchery. Skamania broodstock were originally developed from native Washougal and Klickitat River steelhead.

PRODUCTION

Production Facilities

Skamania hatchery is a major producer of summer and winter steelhead but also rears sea run cutthroat trout. Rearing areas consist of 32 10ft x 80ft raceways and 3 12ft x 100ft adult holding raceways. Incubation is by vertical stacks and hatchery troughs. Water from the Washougal River is used for all rearing except egg incubation where water is supplied from Vogel Creek (virus free water supply) a tributary to the North Fork Washougal River.

Production Summary

Skamania steelhead are artificially propagated in a hatchery environment. Skamania Hatchery annually produces approximately 800,000 smolts (summer and winter). Current summer production (1992) is approximately 340,000 smolts. Progeny of fish spawned at Skamania Hatchery are also reared at Beaver Creek and Vancouver hatcheries. Currently, Skamania Hatchery supplies Ringold Springs Rearing Ponds (located on the mid Columbia River above Tri-cities, Washington) with steelhead fry for grow-out and release.

ADULT LIFE HISTORY

Run Size and Escapement

Steelhead run size from 1970 through 1981, based on sport catch and hatchery returns, ranged from as low of 1,803 steelhead in 1983 to a high of 13,567 fish in 1990 (Table 1).

Time of migration

Steelhead first enter the Columbia River between mid-June and mid-July (based on angling data from the lower Columbia River which showed Skamania steelhead being harvested by sport anglers primarily between mid-June and mid-July). Skamania steelhead smolts released into the Kalama River returned to the river from mid-March through early February, peaking in June and July. Skamania steelhead return to the Skamania Hatchery primarily from May through October, peaking in June and July.

Harvest

Ocean catch of Skamania Hatchery steelhead are unknown.

The Columbia River commercial fisheries catch large numbers of steelhead and although the exact number of Skamania steelhead caught is not known, some Skamania hatchery fish are likely part of the Columbia River harvest.

Based on permit-card harvest estimates, sport catch from 1960 through 1990 ranged from 272 fish in the 1964-1965 to 5,042 in 1981-1982. Average annual sport catch from 1983 through 1990 was 1,560 fish. Table 1 outlines yearly sport catch from 1970 through 1989. As of 1986, fishing regulations allow legal harvest to hatchery fish only, with mandatory release of wild steelhead.

Spawning period

Spawning occurs from mid-December through February.

Spawning area

Spawning occurs at the Skamania Hatchery.

Fecundity

Skamania females spawned at Skamania Hatchery from 1976 through 1983 yielded an average of 4,024 eggs each (Table 2).

Age Composition

Age structure for Skamania summer steelhead is predominantly 2-ocean fish, with Skamania stock returning to the Skamania Hatchery and the Kalama and Klickitat Rivers, averaging 82.8%, 86.4% and 91.8% for 2-ocean fish, respectively (Tables 3, 4 and 5). Repeat spawners comprised an average of 3.6% of the Skamania stock returning to the Kalama River and 1.4 % for Klickitat River (Howell et al. 1985).

Size

Mean fork lengths for 2-ocean fish returning to the Kalama River between 1976 and 1979 was 73.5 cm, while 2-ocean fish returning to the Klickitat River in 1979 through 1980 averaged 71.8 cm (Howell et al. 1985). Fork lengths for individual classes for Skamania steelhead returning to the Kalama and Klickitat rivers is presented in Table 6.

Sex ratio

Sex ratio for Skamania steelhead returning to the Kalama and Klickitat Rivers between 1976 and 1980 ranged from a low of 42.5% females in 1978 to a high of 66.5% females in 1980 (Table 7).

Survival Rate

Smolt to adult returns, based on twelve years of data from 1970 through 1982, for Skamania steelhead returning to Skamania Hatchery ranged from a low of 2.3 percent return in 1973, to a high of 6.9 percent in 1981 (Table 8).

JUVENILE LIFE HISTORY

Egg

Egg production (total hatchery egg take) for the eight year period 1976 through 1983 averaged 4,169,375 eggs annually (Table 2). Egg to smolt survival rates for Skamania steelhead spawned at Skamania Hatchery average approximately 75-80 percent in-the absence of major disease outbreaks (Howell et al. 1985).

Juvenile rearing

Skamania steelhead smolts are typically reared to l-year old fish at which time they are released at a size of 4-7 fish per pound (65- 114 grams each). Skamania smolts are generally released in April and May with outmigration following shortly after release. Skamania smolts released into the Klickitat and Wind Rivers from April 17-30, 1980 were recovered in the Columbia River estuary from April 30 through June 3, with a median recapture date of May 10 (Dawley et al. 1982). Outmigration of Skamania smolts released into the Kalama occurs within a week of release, with residualism until the following October at approximately 0.3 - 1.2 percent (Howell et al. 1985).

Hatchery Releases

Skamania Hatchery smolt releases into the Washougal River are listed in Table 9.

Since 1970, Skamania smolts have been released into the following Washington streams, all of which drain into the Columbia River: Elochoman River, Toutle River (tributary to the Cowlitz), Kalama River, Lewis River (North and East Fork), Washougal River, Wind River, Big White Salmon River, Klickitat River, Walla Walla River, Snake River, Tucannon River, Grande Ronde River, Yakima River, mainstem Columbia River, Crab Creek, and the Wenatchee River. In addition, Skamania smolts have been transferred to the states of Oregon, Idaho, California, Indiana, Rhode Island, Vermont, Pennsylvania, South Carolina and North Carolina and the countries of Ireland and Korea (Howell et al. 1985).

Straying.

No data is available on Skamania steelhead.

BIOCHEMICAL-GENETIC CHARACTERISTICS

Thorgaard (1977) reported that Skamania steelhead had 58 chromosomes.

DISEASES

The major disease afflicting Skamania hatchery-stock steelhead has been infectious hematopoietic necrosis (IHN). Disease history, outlining all pathogens detected at Skamania Hatchery, for smolts reared at the Skamania Hatchery on the Washougal River is presented in Table 10.

REFERENCES

The references for this section appear at the end of the Skamania winter steelhead section.

Table 1 **(RH-a).** Returns (sport catch/hatchery returns) of Skamania summer steelhead to the Skamania Hatchery.

Return Year	Hatchery Returns[A]	Sport Catch	Total Return[B]	Skamania Hatchery Return[C]
1970	3,750	767	4,517	4,466
1971	3,924	1,049	4,973	4,904
1972	3,945	1,094	5,039	4,967
1973	1,857	1,024	2,881	2,813
1974	2,642	1,556	4,198	4,095
1975	2,967	1,536	4,503	4,402
1976	2,600	2,459	5,059	4.897
1977	14,008	2,560	6,568	6,399
1978	3,963	2,287	6,223	6,072
1979	2,693	1,338	4,081	3,989
1980	3,494	2,321	5,825	5,662
1981	3,202	5,042	8,244	7,911
1982	3,478	1,673	5,151	5,055
1983	1,338	465	1,803	1,380
1984	3,384	1,578	4,962	4,858
1985	2,291	3,160	5,451	5,091
1986	2.405	1,977	4,382	4.252
1987	2,398	1,219	3,617	3,537
1988	1,981	1,436	3,417	3,322
1989	3,072	2,313	5,385	5,232
1990	8,244	5,699	13,943	13,567
1991	1,671	2,039	3,710	3,575

*Fish trapped at Skamania Hatchery.
[B]Sport catch and hatchery returns combined.
'Hatchery return assumes 93.4% of run is hatchery origin (Howell et al. 1985).

Source: Stock assessment of Columbia River Anadromous Salmonids, Vol II., 1985. Sport catch from permit-card harvest estimates.

Table 2 (AF-a). Mean fecundity by return year for Skamania summer steelhead returning to the Skamania Hatchery on the Washougal River.

Return Year	Total Eggs	Total Females	Fecundity*
1976-77	3,753,392	950	3,951
1977-78	6,138,563	1,671	3,674
1978-79	6,567,486	1,597	4,112
1979-80	5,483,225	1,398	3,992
1980-81	6,640,309	1,733	3,832
1981-82	1,511,200	376	4,019
1982-83	1,830,211	398	4,599
1983-84	2,099,443	503	4,174
1984-85	2,166,996	404	5,364
1985-86	2,062,160	524	3,935
1986-87	2,631,538	644	4,084
1987-88	1,787,128	623	2,869
1988-89	2,734,600	Unknown	Unknown
1989-90	2,080,000	Unknown	Unknown
1990-91	2,593,421	685	3,786

*Fecundity determined by dividing total eggs by total females spawned.

Sources: Stock Assessment of Columbia River Anadromous Salmonids, Vol. II., 1985. Data for years 1986-1991 obtained from personal communication with Skamania Hatchery manager, Manuel Farrinas, 10-20-92.

Table 3 (AC-a). Age composition percentage (freshwater.ocean) by return year, for adult Skamania steelhead returning to the Kalama River, 1976 through 1979. The freshwater and ocean ages sum to the total age of the fish. The "s" indicates a spawning year, thus a 1.1s1 is a total of four years old.

Age Composition (%)

Return Year	N[A]	1.1	1.1s1	1.1s1s1	1.2	1.2s1	1.2s1s1	1.3
1976	873	7.3	0.5	0.3	74.6	8.8	0.2	8.2
1977	1,340	4.8	1.0	0.2	89.4	1.4		3.3
1978	1,429	6.4	0.1		90.1	1.0		2.3
1979	1,852	4.2			91.5	0.8		3.4

*Fish collected at Kalama Falls Hatchery.
Age determined from scale analysis.

Source: Stock assessment of Columbia River Anadromous Salmonids Vol II., 1985.

Table 4 (AC-b). Age composition percentage (freshwaterocean) by return year, for adult Skamania steelhead returning to the Klickitat River, 1979 and 1980. The freshwater and ocean ages sum to the total age of the fish. The "s" indicates a spawning year, thus a 1.1s1 is a total of four years old.

Age Composition (%)

Return Year	N	1.1	1.1s1	1.2	1.2s1	1.3
1979	107	6.5	0.9	87.9	0.9	3.7
1980	128	2.1		95.8	1.0	1.0

Source: Stock Assessment of Columbia River Anadromous Salmonids Vol II., 1985.

Table 5 (AC-c). Age composition percentage (freshwater.ocean) by return year, for adult Skamania steelhead returning to the Skamania Hatchery 1972 through 1977. The freshwater and ocean ages sum to the total age of the fish. The "s" indicates a spawning year, thus a 1. 1s1 is a total of four years old.

Age Composition (%)

Return Year	N[A]	X.1	X.2	X.3	X.4
1972	661	0.3	59.9	35.7	0.1
1973	1,599	0.2	85.9	11.1	0.1
1974	351	0.7	86.6	5.1	0.1
1975	1,194	0.2	93.6	3.9	
1976	2,344	0.7	85.8	5.9	0.1
1977	549	0.1	85.8	11.6	0.1

*Based on fish returning to Skamania Hatchery on the Washougal River.
Age determined by scale analysis.
x.1 = l-ocean fish.
x.2 = 2-ocean fish.
X.3 = 3-ocean fish.
X.4 = 4-ocean fish.

Source: Stock Assessment of Columbia River Anadromous Salmonids, Vol.II., 1985.

Table 6 (AL-a). Fork lengths by return year and age class (freshwaterocean) for Skamania summer steelhead returning to the Kalama and Klickitat Rivers.*

Return Year[B]	N[C]	1.1	1.1s1	1.1s2	1.2	1.2s1	1.2s1s1	1.3	1.3s1	1.4
1977	1,340	60.6	69.3	71.7	73.0	77.1		78.3		
1978	1,429	59.3	73.5		72.6	77.2		83.7	78.2	
1979	1,852	58.7			74.4	78.2		83.8		
1980	192	64.3			69.9	75.0		86.5		
1985	139	58.0			74.0	83.0	87.0	82.7		
1986	141	59.2			72.9	78.8		82.1		
1987	136	59.1			69.4	82.5		82.6		111.5
1988	122	58.9	80.0		69.1	84.3		82.3		86.0

[A]Skamania steelhead stock is routinely planted in Kalama and Klickitat Rivers.

[B]All fish captured at Kalama Falls Hatchery except return year 1980 which was from Klickitat River.

[C]Age data by scale analysis of a subsample for each return year.

Source: Stock Assessment of Columbia River Anadromous Salmonids Vol II., 1985.
Leider S. and P. Hulett. Kalama River Research Station. WDW spawner Recruitment Database, 1976-1990.

Table 7 (AS-a). Percent females by return year and age class for Skamania steelhead returning to the Kalama and Klickitat Rivers.

Return Year[A]	N	1.1	1.1s1	1. 1s1s1	1 . 2	1.2s1	1.2s1s1	1 . 3	Total % Female
1976	873	1.6	0.2	0.1	39.8	5.3	0.1	3.2	50.4
1977	1340	1.4	0.3		51.7	1.0		1.5	55.9
1978	1429	0.9			40.5	0.5		0.6	42.5
1979	107	3.7			55.1			0.9	59.4
1980	192	1.5			64.0	1.0			66.5

*Return years 1976, 1977 and 1978 from Skamania stock returning to Kalama River while return years 1979 and 1980 are from Skamania fish returning to the Klickitat River.

Source: Stock Assessment of Columbia River Anadromous Salmonids Vol II., 1985.

Table 8 (TS-a). Smolt to adult return for Skamania stock summer steelhead to Skamania Hatchery on the Washougal River.

Return Year	Smolts Planted[A]	Hatchery Return[B]	Percent Return[C]
1970	100,120	4,466	4.5
1971	97,700	4,904	5.0
1972	137,000	4,967	3.6
1973	120,517	2,813	2.3
1974	129,250	4,095	3.2
1975	100,200	4.402	4.4
1976	103,740	4,897	4.7
1977	99,320	6,399	6.4
1978	100,045	6,072	6.1
1979	116,349	3.989	3.4
1980	115,110	5,815	4.9
1981	114,896	8,244	6.9
1982	98,434	5.227	5.1

[A]Smolts reared at Skamania Hatchery and released into the Washougal River.

[B]Hatchery return includes steelhead harvested in Washougal River sport catch.

[C]Percent return does not include fish which may be harvested in the Columbia River treaty and sport fisheries or fish which may spawn in the Washougal River.

Source: Stock Assessment of Columbia River Anadromous Salmonids Vol II.

Table 9 (TR). Hatchery releases of summer steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1981	Washougal R	S kamania	Smolt	04/19/83	9.7	11,786	Washougal R	
1981	Washougal R	Skamania	Smolt	04/19/83	9.7	11,010	Washougal R	
1981	Washougal R	Skamania	Smolt	04/19/83	9.7	3,444	Washougal R	
1981	Washougal R	Skamania	Smolt	04/27/83	4.6	5,617	Washougal R	
1981	Washougal R	Skamania	Smolt	04/27/83	4.4	5,258	Washougal R	
1981	Washougal R	S kamania	Smolt	04/27/83	4.5	5,360	Washougal R	
1981	Washougal R	Skamania	Smolt	04/28/83	4.8	6,092	Washougal R	
1981	Washougal R	Skamania	Smolt	04/28/83	3.7	6,071	Washougal R	
1981	Washougal R	Skamania	Smolt	04/28/83	4.9	6,135	Washougal R	
1981	Washougal R	Skamania	Smolt	04/28/83	5.2	6,378	Washougal R	
1981	Washougal R	Skamania	Smolt	04/28/ 83	5.3	6,667	Washougal R	
1981	Washougal R	Skamania	Smolt	04/29/83	5.3	3,954	Washougal R	
1981	Washougal R	Skamania	Smolt	04/29/83	5.6	6,950	Washougal R	
1981	Washougal R	Skamania	Smolt	04/29/83	5.6	6,961	Washougal R	
1981	Washougal R	Skamania	Smolt	04/29/83	5.3	6,854	Washougal R	
1981	Washougal R	Skamania	Smolt	04/30/82	5.4	57,446	Washougal R	
1981	Washougal R	Skamania	Smolt	05/02/83	5.4	6,723	Washougal R	
1981	Washougal R	Skamania	Smolt	05/02/83	5.6	6,911	Washougal R	
1981	Washougal R	Skamania	Smolt	05/02/83	6.0	7,434	Washougal R	
1981	Washougal R	Skamania	Smolt	05/02/83	5.9	7,313	Washougal R	

Table 9 (cont.). Hatchery releases of summer steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1981	Washougal R	Skamania	Smolt	05/02/83	5.8	7,151	Washougal R	
1981	Washougal R	Skamania	Smolt	05/03/83	7.3	7,672	Washougal R	
1981	Washougal R	S kamania	Smolt	05/03/83	7.3	6,789	Washougal R	
1981	Washougal R	Skamania	Smolt	05114182	5.0	24,990	Washougal R	
1981	Washougal R	Vancouver	Smolt	04/26/83	4.8	5,904	Washougal R	
1981	Washougal R	Vancouver	Smolt	04/26/83	4.9	6,055	Washougal R	
1983	Washougal R - WF/NF	S kamania	Non-Smolt	08/24/83	62.0	47,926	Washougal R	
1983	Washougal R - WF/NF	Skamania	Non-Smolt	08125183	69.5	27,869	Washougal R	
1983	Washougal R - WF/NF	Skamania	Smolt	04/24/84	5.9	6,779	Washougal R	AD
1983	Washougal R - WF/NF	Skamania	Smolt	05/01/84	5.4	5,013	Washougal R	AD
1983	Washougal R - WF/NF	Skamania	Smolt	05/03/84	5.9	4,443	Washougal R	AD
1983	Washougal R - WF/NF	Skamania	Smolt	05/08/84	5.7	6,515	Washougal R	AD
1983	Washougal R - WF/NF	Skamania	Smolt	05/08/84	5.7	3,882	Washougal R	AD
1983	Washougal R - WF/NF	Skamania	Smolt	04/16/84	5.4	29,073	Washougal R - WF/NF	RV
1983	Washougal R - WF/NF	Skamania	Smolt	04/16/84	5.4	14,726	Washougal R - WF/NF	AD

Table 9 (cont.). Hatchery releases of summer steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1983	Washougal R - WF/NF	Skamania	Smolt	04/16/84	5.4	15,001	Washougal R - WF/NF	AD
1983	Washougal R - WFINF	Skamania	Smolt	05/01/84	5.4	9,693	Washougal R - WFINF	RV
1983	Washougal R - WFINF	Skamania	Smolt	05/01/84	5.4	9,693	Washougal R - WFINF	RV
1983	Washougal R - WFINF	Skamania	Smolt	05/01/84	5.4	4,907	Washougal R - WFINF	AD
1983	Washougal R - WF/NF	Skamania	Smolt	05/01/84	5.4	4,907	Washougal R - WFINF	AD
1983	Washougal R - WFINF	Skamania	Smolt	05/07/84	5.4	5,013	Washougal R - WFINF	AD
1983	Washougal R - WFINF	Skamania	Smolt	05/07/84	5.4	9,693	Washougal R - WF/NF	RV
1983	Washougal R - WFINF	Skamania	Smolt	05/07/84	5.4	4,907	Washougal R - WFINF	AD
1984	Washougal R - WFINF	Skamania	Smolt	04/22/85	6.8	7,895	Washougal R	AD
1984	Washougal R - WF/NF	Skamania	Smolt	04/22/85	6.6	3,887	Washougal R	AD
1984	Washougal R - WF/NF	Skamania	Smolt	04/22/85	6.8	7,895	Washougal R	AD
1984	Washougal R - WFINF	Skamania	Smolt	04/22/85	6.6	3,887	Washougal R	AD

Table 9 (cont.). Hatchery releases of summer steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ in Clip
1984	Washougal R - WF/NF	Skamania	Smolt	04/29/85	6.7	7,759	Washougal R	AD
1984	Washougal R - WF/NF	Skamania	Smolt	05/01/85	6.7	7,832	Washougal R	AD
1984	Washougal R - WF/NF	Skamania	Smolt	05/01/85	6.6	6,013	Washougal R	AD
1984	Washougal R - WFINF	Skamania	Smolt	05/02/85	7.8	9,181	Washougal R	AD
1984	Washougal R - WF/NF	Skamania	Smolt	05/02/85	7.4	8,569	Washougal R	AD
1984	Washougal R - WFINF	Skamania	Smolt	04/22/85	6.3	41,706	Washougal R - WF/NF	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/16/86	5.7	6,424	Washougal R	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/29/86	5.6	5,330	Washougal R	633445 LV AD
1985	Washougal R - WFINF	Skamania	Smolt	04/29/86	5.5	1,374	Washougal R	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/29/86	8.1	4,666	Washougal R	633446 LV AD
1985	Washougal R - WFINF	S kamania	Smolt	04/29/86	8.1	2,000	Washougal R	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/29/86	6.7	1,934	Washougal R	633447 LV AD

Table 9 (cont.). Hatchery releases of summer steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1985	Washougal R - WF/NF	Skamania	Smolt	04/29/86	6.8	705	Washougal R	AD
1985	Washougal R - WF/NF	Skamania	Smolt	04/29/86	6.5	1,028	Washougal R	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/29/86	6.5	1,747	Washougal R	633447 LV AD
1985	Washougal R - WFINF	Skamania	Smolt	04/29/86	6.6	637	Washougal R	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/29/86	5.5	3,651	Washougal R	633445 LV AD
1985	Washougal R - WFINF	Skamania	Smolt	04/29/86	5.5	942	Washougal R	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/29/86	8.0	5,376	Washougal R	633446 LV AD
1985	Washougal R - WFINF	Skamania	Smolt	04/29/86	8.0	2,304	Washougal R	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/29/86	6.6	2,964	Washougal R	633447 LV AD
1985	Washougal R - WFINF	Skamania	Smolt	05/08/86	7.1	4,636	Washougal R	AD
1985	Washougal R - WFINF	Skamania	Smolt	05/09/86	7.2	9,000	Washougal R	AD
1985	Washougal R - WFINF	Skamania	Smolt	05/09/86	7.0	9,317	Washougal R	AD

Table 9 (cont.). Hatchery releases of summer steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT. Codes/ Fin Clip
1985	Washougal R - WFINF	Skamania	Smolt	04/22/86	6.7	5,512	Washougal R - WFINF	633447 LV AD
1985	Washougal R - WFINF	Skamania	Smolt	04/22/86	6.8	2,008	Washougal R - WF/NF	AD
1985	Washougal R - WFINF	S kamania	Smolt	04/22/86	9.9	5,681	Washougal R - WFINF	633561 LV AD
1985	Washougal R - WFINF	Skamania	Smolt	04/22/86	9.9	1,853	Washougal R - WFINF	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/22/86	5.7	5,910	Washougal R - WF/NF	633445 L V A D
1985	Washougal R - WFINF	Skamania	Smolt	04/22/86	5.6	1,524	Washougal R - WF/NF	AD
1985	Washougal R - WF/NF	Skamania	Smolt	04/22/86	8.3	5,261	Washougal R - WFINF	633446 LV AD
1985	Washougal R - WF/NF	Skamania	Smolt	04/22/86	8.1	2,255	Washougal R - WFINF	AD
1986	Washougal R - WFINF	Skamania	Non-Smolt	08/11/86	100.0	60,400	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/20/87	6.3	6,243	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/23/87	5.9	6,915	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/23/87	5.9	6,720	Washougal R	AD

Table 9 (cont.). Hatchery releases of summer steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1986	Washougal R - WFINF	Skamania	Smolt	04/23/87	5.9	6,596	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/23/87	6.0	7,092	Washougal R	AD
1986	Washougal R - WF/NF	Skamania	Smolt	04124187	5.8	6,734	Washougal R	AD
1986	Washougal R - WF/NF	Skamania	Smolt	04/24/87	5.8	5,754	Washougal R	AD
1986	Washougal R - WF/NF	Skamania	Smolt	04124187	5.2	2,116	Washougal R	A D
1986	Washougal R - WFINF	Skamania	Smolt	04/24/87	5.2	5,990	Washougal R	AD
1986	Washougal R - WF/NF	Skamania	Smolt	04/24/87	5.3	6,146	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/24/87	5.6	6,586	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/24/87	5.8	6,554	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/24/87	5.8	6,838	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/24/87	5.8	4,211	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/27/87	5.7	6,623	Washougal R	AD

Table 9 (cont.). Hatchery releases of summer steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ in Clip
1986	Washougal R - WF/NF	Skamania	Smolt	04/27/87	5.8	6,730	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/27/87	5.7	6,547	Washougal R	AD
1986	Washougal R - WF/NF	Skamania	Smolt	04/27/87	5.6	6,479	Washougal R	AD
1986	Washougal R - WF/NF	Skamania	Smolt	04/28/87	5.4	6,145	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/28/87	5.7	6,654	Washougal R	A D
1986	Washougal R - WFINF	Skamania	Smolt	04/28/87	5.8	6,856	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/28/87	5.8	6,670	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/28/87	5.8	6,641	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/28/87	5.8	6,699	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/29/86	6.7	1,079	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/29/86	9.9	5,273	Washougal R	633561 LV AD
1986	Washougal R - WFINF	Skamania	Smolt	04/29/86	9.8	1,721	Washougal R	AD

Table 9 (cont.). Hatchery releases of summer steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1986	Washougal R - WFINF	Skamania	Smolt	04/29/86	9.6	4,423	Washougal R	63356 1 LV AD
1986	Washougal R - WFINF	Skamania	Smolt	04/29/86	9.6	1,443	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/29/86	6.5	2,823	Washougal R	633447 LV AD
1986	Washougal R - WFINF	Skamania	Smolt	05/04/87	5.4	1,879	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	05/04/87	5.8	2,042	Washougal R	AD
1986	Washougal R - WFINF	S kamania	Smolt	05/04/87	5.2	4,690	Washougal R	AD RV
1986	Washougal R - WFINF	Skamania	Smolt	05/04/87	5.2	4,716	Washougal R	AD RV
1986	Washougal R - WFINF	Skamania	Smolt	05/04/87	5.2	6,573	Washougal R	AD RV
1986	Washougal R - WFINF	Skamania	Smolt	05/04/87	5.4	6,907	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	05/04/87	5.7	7,190	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	05/05/87	5.0	6,035	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	05/05/87	5.0	6,255	Washougal R	AD

Table 9 (cont.). Hatchery releases of summer steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1986	Washougal R - WFINF	Skamania	Smolt	05/05/87	5.0	6,265	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	05/05/87	4.8	6,005	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	05105187	6.0	7,224	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	05/05/87	6.0	7,308	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	05/06/87	6.3	7,970	Washougal R	63375 1 ADLV
1986	Washougal R - WFINF	Skamania	Smolt	05/06/87	6.3	7,970	Washougal R	633752 AD LV
1986	Washougal R - WFINF	Skamania	Smolt	05/06/87	4.8	2,381	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	05/06/87	4.8	5,952	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	05/06/87	4.8	5,962	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	05/06/87	4.9	6,146	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	05/06/87	5.1	6,324	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	05/06/87	5.9	8,968	Washougal R	633749 AD LV

Table 9 (cont.). Hatchery releases of summer steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb	Number Released	Release Site	CWT Codes/ Fin Clip
1986	Washougal R - WFINF	Skamania	Smolt	05/06/87	5.9	89,68	Washougal R	633750 AD LV
1986	Washougal R - WFINF	Skamania	Smolt	05/07/87	6.7	7,759	Washougal R	633747 AD LV
1986	Washougal R - WFINF	S kamania	Smolt	05/07/87	6.7	7,765	Washougal R	633748 AD LV
1986	Washougal R - WFINF	Skamania	Smolt	05/07/87	5.1	8,435	Washougal R	633746 AD LV
1986	Washougal R - WFINF	Skamania	Smolt	05/07/87	5.1	8,435	Washougal R	633745 AD LV
1987	Washougal R - WFINF	Skamania	Non-Smolt	08/18/87	70.0	28,070	Washougal R	
1987	Washougal R - WF/NF	Skamania	Non-Smolt	08/18/87	68.0	5 1,340	Washougal R	
1987	Washougal R - WFINF	Skamania	Non-Smolt	08/19/87	43.0	5 1 , 3 4 2	W a s h o u g a l R	
1987	Washougal R - WFINF	Skamania	Non-Smolt	08/19/87	51.0	28,108	Washougal R	
1987	Washougal R - WFINF	Skamania	Non-Smolt	08/20/87	51.0	29,784	Washougal R	
1987	Washougal R - WFINF	Skamania	Non-Smolt	09/04/87	42.0	25,074	Washougal R	
1987	Washougal R - WFINF	Skamania	Non-Smolt	09/21/87	26.4	16,869	Washougal R	

Table 9 (cont.). Hatchery releases of summer steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1987	Washougal R - WFINF	Skamania	Smolt	04/15/88	5.9	21,269	Washougal R	634937 Lv AD.
1987	Washougal R - WFINF	Skamania	Smolt	04/15/88	6.1	15,707	Washougal R	634938 Lv AD
1987	Washougal R - WFINF	Skamania	Smolt	04/15/88	6.7	4,743	Washougal R	634938 LV AD
1987	Washougal R - WFINF	S kamania	Smolt	04/15/88	6.3	7,974	Washougal R	AD
1987	Washougal R - WFINF	Skamania	Smolt	04/19/88	6.2	9,331	Washougal R	AD
1987	Washougal R - WFINF	Skamania	Smolt	04/19/88	6.5	17,401	Washougal R	AD
1987	Washougal R - WFINF	Skamania	Smolt	04/19/88	6.4	18,086	Washougal R	AD
1987	Washougal R - WFINF	Skamania	Smolt	04/20/88	6.8	14,470	Washougal R	AD
1987	Washougal R - WFINF	Skamania	Smolt	04/20/88	5.8	16,941	Washougal R	AD
1987	Washougal R - WFINF	Skamania	Smolt	04/20/88	7.3	17,781	Washougal R	AD
1987	Washougal R - WFINF	Skamania	Smolt	04/20/88	6.2	7,626	Washougal R	AD
1987	Washougal R - WFINF	Skamania	Smolt	04/20/88	7.2	17,922	Washougal R	AD

Table 9 (cont.). Hatchery releases of summer steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Coded Fin Clip
1987	Washougal R - WFINF	Skamania	Smolt	04/15/88	7.1	16,826	Washougal R - WFINF	634935 LV AD
1987	Washougal R - WFINF	Skamania	Smolt	04/15/88	6.6	17,777	Washougal R - WF/NF	634932 LV AD
1987	Washougal R - WFINF	Skamania	Smolt	04/15/88	6.0	18,218	Washougal R - WFINF	634716 LV AD
1987	Washougal R - WFINF	Skamania	Smolt	04/15/88	6.5	16,926	Washougal R - WFINF	63493 1 LV AD
1988	Washougal R - WFINF	Skamania	Smolt	05/02/89	6.6	9,273	Washougal R	A D
1988	Washougal R - WFINF	Skamania	Smolt	05/02/89	6.6	9,240	Washougal R	AD
1988	Washougal R - WFINF	Skamania	Smolt	05/02/89	6.6	9,240	Washougal R	AD
1988	Washougal R - WFINF	Skamania	Smolt	05/05/89	6.6	7,887	Washougal R	AD
1988	Washougal R - WFINF	Skamania	Smolt	05/09/89	6.0	2,472	Washougal R	AD
1988	Washougal R - WF/NF	Skamania	Smolt	04/26/89	6.1	62,616	Washougal R - WFINF	AD
1988	Washougal R - WF/NF	Skamania	Smolt	04/15/90	5.4	176,191	Washougal R - WF/NF	AD
1990	Washougal R - WF/NF	Skamania	Smolt	05/14/91	5.6	14,400	Washougal R - WFINF	AD

Table 9 (cont.). Hatchery releases of summer steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ in Clip
1990	Washougal R - WFINF	Skamania	Smolt	05/15/91	5.2	64,300	Washougal R - WF/NF	AD
1990	Washougal R - WFINF	Skamania	Smolt	05/16/91	5.0	21,400	Washougal R - WFINF	AD

Source: Terry Lovgren, WDW Hatchery Stocking Database 1991.

Table 10 (TD). Parasites and diseases isolated at Skamania Hatchery located on the Washougal River.

Disease Type	Hatchery	Specific Pathogen
Bacterial	Skamania	*Renibacteriwn salmonarium* (BKD)
Bacterial	Skamania	*Flexibacter columnaris* (Columnaris)
Bacterial	Skamania	*Fkxibacter cytophaga* (Coldwater)
Bacterial	Skamania	*Renibacterium salmonarium* (BKD)
Parasite	Skamania	*Hexamita sp.*
Parasite	Skamania	*Ichthyophthirius multiflis* (Ich)
Parasite	Skamania	*Ichthyoboda sp.* (Costia)
Parasite	Skamania	*Trichodina sp.*
Viral	Skamania	*Infectious hematopoietic necrosis* (IHN)

Disease history represents pathogens isolated at these hatcheries and not necessarily a disease outbreak.

Source: WDW pathologist, Steve Roberts, 1991.

WASHOUGAL RIVER SUBBASIN

Naturally Produced Winter Steelhead

GEOGRAPHIC LOCATION

The Washougal River is located in southwest Washington, within Skamania and Clark counties. From its headwaters the Washougal River flows southwesterly approximately 33 miles entering the Columbia River at river mile (RM) 121 near the town of Camas. Major tributaries include the West Fork Washougal, Little Washougal, Stebbins Creek and Cougar Creek. Total drainage area encompasses approximately 240 square miles.

ORIGIN

The winter steelhead stock in the Washougal River is indigenous, although some genetic influence has probably been exerted by introduced Chambers Creek, Cowlitz and Elochoman hatchery-stock steelhead. In addition, steelhead which abandoned the Cowlitz system following the eruption of Mount St. Helens in 1980, may have strayed into the Washougal River and spawned with native Washougal stock.

DISTRIBUTION

Table 1 lists spawning and rearing habitat, by quality, for Washougal River steelhead based on estimates from the Northwest Power Planning Council. Winter steelhead are distributed throughout the mainstem Washougal River including the tributaries of the West Fork Washougal, Little Washougal River and Stebbins and Cougar creeks (Figure 1 of the first Washougal summer steelhead section). Dougan Falls located at RM 21 is considered a low water barrier to steelhead. Above Dougan Falls the stream gradient increases with numerous falls and cascades which limit the number of fish that can access the upper section of river.

PRODUCTION

Production Facilities

There are two hatcheries in the subbasin, the Washougal Hatchery located on the mainstem Washougal River 16 miles northeast of the town of Washougal and the Skamania Hatchery located on the North Fork Washougal River. The Washougal Hatchery is operated by Washington Department of Fisheries and is a major producer of coho and chinook salmon. Skamania Hatchery is operated by the Washington Department of Wildlife and produces summer and winter steelhead.

Production Summary

No data is available on wild smolt production although winter steelhead production is considered low. Production constraints would include gravel mining on the lower 20 miles of river, continued urbanization of the watershed which has created runoff fluctuations resulting in unstable stream flows, pollution from a pulp mill which releases its effluent near the mouth of the river and logging and forest fires which occurred earlier this century in the upper subbasin.

ADULT LIFE HISTORY

Run Size and Escapement

No data is available on wild winter steelhead run size or escapement. An interim escapement goal of 630 fish has been established for this stock.

Time of migration

Wild winter steelhead enter the Washougal River from January through May, peaking in March. The freshwater life history of winter steelhead in the Washougal River is illustrated in Figure 1.

Harvest

Ocean catch of Washougal River winter steelhead are unknown.

The Columbia River fisheries catch large numbers of steelhead and although the exact number of Washougal River steelhead caught is not known, some Washougal fish are likely part of the Columbia River harvest.

Based on permit-card harvest estimates, sport catch of winter steelhead from 1980 through 1990 ranged from 1,377 fish in 1982-1983 to 3,195 fish in 1984-1985 (Table 2). As of 1986, fishing regulations permit legal harvest to hatchery fish only, with mandatory release of wild steelhead.

Treaty Indian harvest does not occur in the Washougal subbasin.

Spawning period

Spawning occurs from March through June.

Spawning area

Wild winter steelhead spawn in the mainstem Washougal, the -West Fork Washougal and the Little Washougal Rivers and the tributaries of Stebbins and Cougar Creeks.

Fecundity

No data is available on Washougal steelhead.

Age Composition

No data is available on Washougal steelhead.

Size

No data is available on Washougal steelhead.

Sex ratio

No data is available on Washougal steelhead.

Survival Rate

No data is available on Washougal steelhead.

JUVENILE LIFE HISTORY

Egg

No data is available on egg production or egg to smolt survival.

Emergence

No data is available on Washougal steelhead.

Juvenile rearing

Juvenile rearing lasts approximately two years prior to ocean emigration. Juvenile steelhead outmigration generally occurs from April through May.

Hatchery Releases

The Washougal River receives hatchery smolts from the Skamania Hatchery which is located on the Washougal River. Hatchery releases into the Washougal River and associated data concerning the Skamania Hatchery stock is listed in the adjoining Washougal River hatchery produced winter steelhead report.

Straying

No data is available on Washougal steelhead.

BIOCHEMICAL-GENETIC CHARACTERISTICS

No data is available on Washougal steelhead.

DISEASES

No data is available on wild Washougal steelhead.

REFERENCES

The references for this section appear at the end of the following steelhead section.

Figure 1 (TT). Freshwater life history of Washougal River winter steelhead.

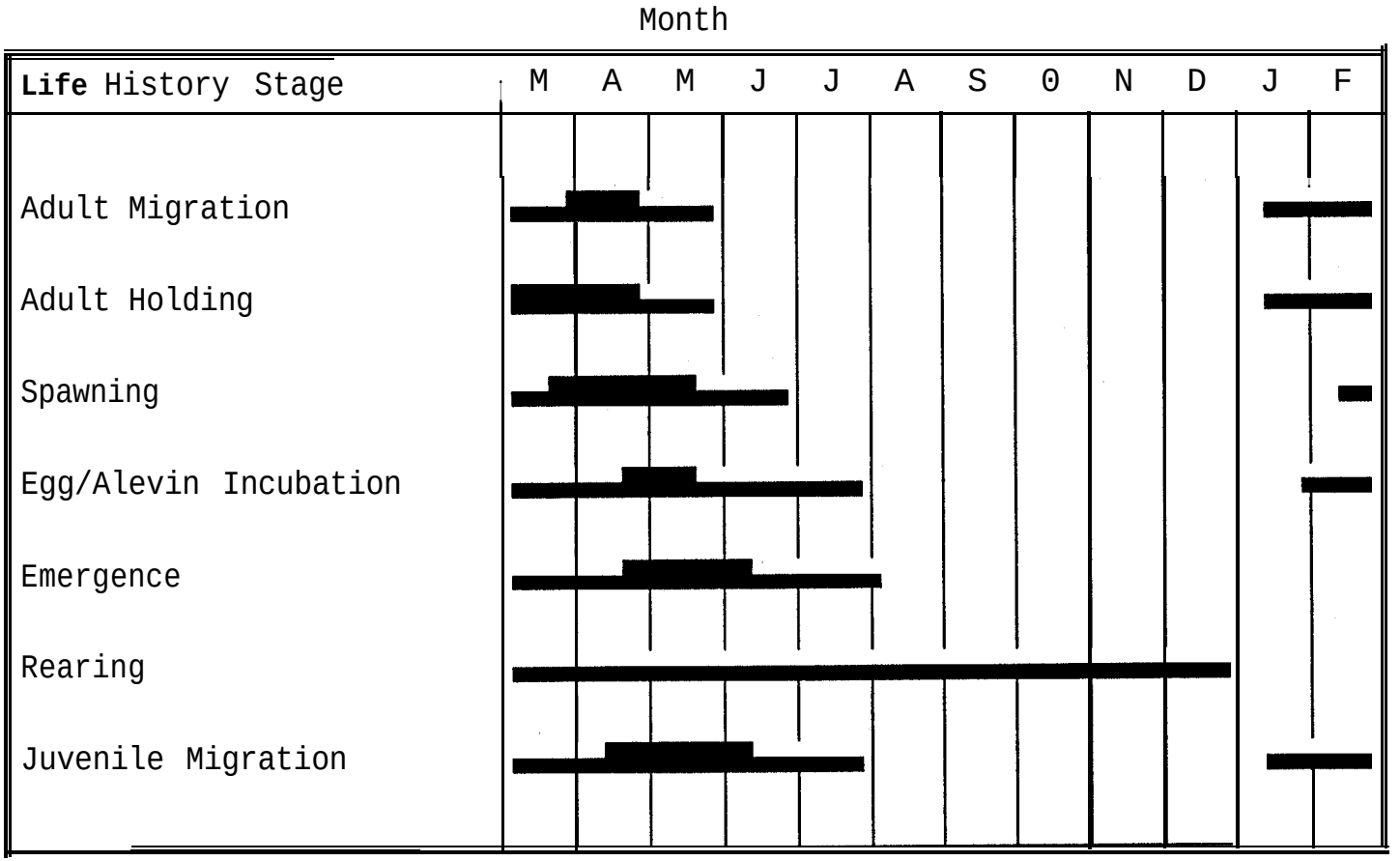

Table 1 (HB-1). Estimated* amount of rearing and spawning habitat, by quality, of Washougal River subbasin winter steelhead.

Area	Excellent	Good	Fair[B]	Poor[B]	Unknown	Total	Confidence
Miles	26.5 %	70.8%	2.7%	0.0%		26.4	Unknown
Acres	12.2%	87.0%	0.7%	0.0%		172.6	unknown

*Northwest Power Planning Council Estimates based on limited observations.

[B]Ratings of fair and poor may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/absence database, NPPC, 199 1.

Table 2 (RS-a). Returns (sport catch/escapement) winter steelhead to the Washougal River subbasin.

Return Year	Escapement	Sport Catch[A]	Adult Total
1980-81[B]	Unknown	2,461	Unknown
1981-82[B]	Unknown	1,952	Unknown
1982-83	Unknown	1,377	Unknown
1983-84	Unknown	1,927	Unknown
1984-85	Unknown	3,195	Unknown
1985-86	Unknown	1,901	Unknown
1986-87	Unknown	2,101	Unknown
1987-88	Unknown	2,005	Unknown
1988-89	Unknown	1,576	Unknown
1989-90	Unknown	2,577	Unknown

[A]Catch within subbasin only. Starting in 1986 sport catch comprised of entirely hatchery steelhead.

[B]Catch may include steelhead strays due to the eruption of Mount St. Helens.

Source: Washington Department of Wildlife permit-cards.

Skamania Hatchery Winter Steelhead

GEOGRAPHIC LOCATION

Skamania Hatchery is located on the North Fork Washougal River approximately one mile upstream from the confluence of the North Fork Washougal and the mainstem Washougal River and approximately 12 miles from the mouth of the mainstem Washougal River.

ORIGIN

The Skamania winter steelhead broodstock was developed from predominantly Elochoman and Cowlitz hatchery-stock steelhead with some native Washougal winter steelhead included in the breeding program.

PRODUCTION

Production Facilities

Skamania Hatchery is a major producer of summer and winter steelhead but also rears sea run cutthroat trout. Rearing areas consist of 32 10ft x 80ft raceways and 3 adult holding raceways 12ft x 100ft. Incubation is by vertical stacks and hatchery troughs. Water from the Washougal River is used for all rearing except egg incubation where water is supplied from Vogel Creek (virus free water supply) a tributary to the North Fork Washougal River..

Production Summary

Skamania steelhead are artificially propagated in a hatchery environment. Skamania Hatchery produces approximately 800,000 (summer and winter) smolts annually. Current production (1992) of winter steelhead is approximately 260,000 smolts. Progeny of fish spawned at Skamania Hatchery are also reared at Beaver Creek and Vancouver hatcheries.

ADULT LIFE HISTORY

Run Size and Escapement

No data is available on Skamania steelhead.

Time of migration

Skamania hatchery-stock steelhead return to Skamania Hatchery from December through March. From 296 steelhead returning to Skamania Hatchery in 1982-83, 11.4% arrived in December, 46.9% arrived in January, 35.8% arrived in February, 5.4% arrived in March and .3% (1 fish) arrived in April.

Harvest

Ocean catch of Slcamania Hatchery steelhead are unknown.

Large numbers of steelhead are harvested from the Columbia River and although the exact number of Skamania steelhead caught is not known, some Skamania hatchery fish are likely part of the Columbia River harvest.

Based on permit-card harvest estimates, sport catch from 1980 through 1990 ranged from 1,377 fish in 1982-83 to 3,195 fish in 1984-85. Average sport catch for the past ten seasons was estimated at 2,107 fish (Table 1). As of 1986, fishing regulations permit legal harvest to hatchery fish only, with mandatory release of wild steelhead.

Spawning period

Spawning occurs from mid-January through February. From 296 fish returning to Skamania Hatchery in 1982-83, winter steelhead were spawned January 13 through February 24.

Spawning Area

Spawning occurs at the Skamania Hatchery.

Fecundity

Limited data of fecundity. Skamania females spawned at Skamania Hatchery in 1983 yielded an average of 4,688 each (Table 2).

Age Composition

No data on age structure for Skamania winter steelhead.

Size

No data is available for Skamania winter steelhead.

Sex ratio

No data is available on Skamania winter steelhead.

Survival Rate

No data is available on Skamania winter steelhead.

JUVENILE LIFE HISTORY

Egg

No data is available on Skamania winter steelhead.

Juvenile rearing

Skamania steelhead smolts are typically reared to l-year old fish at which time they are released at a size of 4-7 fish per pound (65-l 14 grams each). Skamania Smolts are generally released in April and May.

Hatchery Releases

Skamania Hatchery smolt releases into the Washougal River are listed in Table 3.

Straying

No data is available on Skamania steelhead.

BIOCHEMICAL-GENETIC CHARACTERISTICS

No data is available on Skamania steelhead.

DISEASES

The major disease afflicting Skamania hatchery-stock steelhead have been infectious hematopoietic necrosis (IHN). Disease history, outlining all pathogens detected at Skamania Hatchery for smolts reared at the Skamania Hatchery on the Washougal River is presented in Table 4.

Table 1 (RS-a). Returns (sport catch/escapement) Skamania winter steelhead to the Skamania Hatchery.

Return Year	Hatchery Returns	Sport Catch[A]	Adult Total
1980-81[B]	330	2,461	2,791
1981-82[B]	67	1,952	2,019
1982-83	Unknown	1,377	Unknown
1983-84	1,111	1,927	3,038
1984-85	Unknown	3,195	Unknown
1985-86	Unknown	1,901	Unknown
1986-87	Unknown	2,101	Unknown
1987-88	Unknown	2,005	Unknown
1988-89	Unknown	1,576	Unknown
1989-90	Unknown	2,577	Unknown

[A]Catch within subbasin only.

[B]Catch may include steelhead strays due to the eruption of Mount St. Helens.

Source: Washington Department of Wildlife permit-cards.
1981, 1982, and 1984 obtained from personal communication with previous Skamania hatchery manager, Vince Jensen. 1992.

Table 2 (AF-a). Mean fecundity by return year Skamania hatchery-stock winter steelhead returning to the Washougal River subbasin.

Return Year	Number Females	Number Eggs	Average Fecundity*
1982-83	55	257,844	4,688

*Fecundity determined by total egg take divided by total females spawned.

Source: Stock Assessment of Columbia River Anadromous Salmonids Vol II., 1985.

Table 3 (TR). Hatchery releases of winter steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1981	Bogachiel R	Skamania	Smolt	04/18/83	4.2	4,795	Washougal R	
1981	Bogachiel R	Skamania	Smolt	04/19/83	4.2	5,046	Washougal R	
1981	Bogachiel R	Skamania	Smolt	04/19/83	4.2	5,019	Washougal R	
1981	Bogachiel R	Skamania	Smolt	04/19/83	3.8	4,639	Washougal R	
1981	Bogachiel R	Skamania	Smolt	04/20/83	3.9	4,703	Washougal R	
1981	Bogachiel R	Skamania	Smolt	04/22/83	4.4	5,206	Washougal R	
1981	Bogachiel R	Skamania	Smolt	04/25/83	4.5	5,352	Washougal R	
1981	Bogachiel R	Skamania	Smolt	04/25/83	4.2	4,914	Washougal R	
1981	Bogachiel R	Skamania	Smolt	04/25/83	3.9	4,723	Washougal R	
1981	Bogachiel R	Skamania	Smolt	04/25/83	4.0	4,716	Washougal R	
1981	Bogachiel R	Skamania	Smolt	04/25/83	4.4	5,526	Washougal R	
1981	Bogachiel R	Skamania	Smolt	04/25/83	4.2	4,284	Washougal R	
1981	Bogachiel R	Skamania	Smolt	04/27/83	4.8	5,506	Washougal R	
1981	Bogachiel R	Skamania	Smolt	04/27/ 83	4.5	4,851	Washougal R	
1981	Bogachiel R	Skamania	Smolt	04/30/83	4.0	25,100	Washougal R - WF/NF	
1981	Chambers Cr	Skamania	Smolt	04/21/82	6.3	8,127	Washougal R	
1981	Chambers Cr	Skamania	Smolt	04/21/82	6.4	8,095	Washougal R	
1981	Chambers Cr	Skamania	Smolt	04/30/82	4.3	8,720	Washougal R	
1981	Chambers Cr	Skamania	Smolt	05/06/82	6.1	7,420	Washougal R	
1981	Chambers Cr	Skamania	Smolt	05/12/82	5.4	7,047	Washougal R	

Table 3 (cont.), Hatchery releases of winter steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1981	Chambers Cr	Skamania	Smolt	05/12/82	5.3	7,447	Washougal R	
1981	Chambers Cr	Skamania	Smolt	05/12/82	5.4	6,561	Washougal R	
1981	Chambers Cr	Skamania	Smolt	05/13/82	7.2	9,128	Washougal R	
1981	Chambers Cr	Skamania	Smolt	05/13/82	7.4	9,102	Washougal R	
1981	Chambers Cr	Skamariia	Smolt	05/13/82	6.2	8,014	Washougal R	
1981	Chambers Cr	Skamania	Smolt	05/14/82	4.1	14,994	Washougal R	
1983	Elochoman R	Skamania	Smolt	04/17/84	4.7	5,522	Washougal R	' A D
1983	Elochoman R	Skamania	Smolt	04/17/84	4.7	6,072	Washougal R	AD
1983	Elochoman R	Skamania	Smolt	04/17/84	5.1	6,015	Washougal R	AD
1983	Elochoman R	Skamania	Smolt	04/17/84	5.2	6,167	Washougal R	AD
1983	Elochoman R	Skamania	Smolt	04/17/84	5.2	6,235	Washougal R	AD
1983	Elochoman R	Skamania	Smolt	04/18/84	5.4	6,467	Washougal R	AD
1983	Elochoman R	Skamania	Smolt	04/18/84	5.6	6,776	Washougal R	AD
1983	Elochoman R	Skamania	Smolt	04/18/84	5.6	5,746	Washougal R	AD
1983	Elochoman R	Skamania	Smolt	05/03/84	5.1	2,132	Washougal R	AD
1983	Unknown	Skamania	Smolt	05/01/84	4.9	5,728	Washougal R	AD
1983	Unknown	Skamania	Smolt	05/02/84	4.9	5,285	Washougal R	AD
1983	Unknown	Skamania	Smolt	05/02/84	5.1	6,151	Washougal R	AD
1983	Washougal R	Skamania	Non-Smolt	05/31/83	396.0	6,336	Little Washougal R	AD

Table 3 (cont.). Hatchery releases of winter steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1983	Washougal R	Skamania	Non-Smolt	05/31/83	396.0	6,336	Little Washougal R	AD
1983	Washougal R - WFINF	Skamania	Smolt	04/16/84	4.8	18,869	Washougal R - WF/NF	AD
1983	Washougal R - WFINF	Skamania	Smolt	05/01/84	4.8	6,288	Washougal R - WF/NF	AD
1983	Washougal R - WFINF	Skamania	Smolt	05/01/84	4.8	6,288	Washougal R - WF/NF	AD
1983	Washougal R - WFINF	Skamania	Smolt	05/07/84	4.8	6,288	Washougal R - WFINF	AD
1984	Chambers Cr	Skamania	Smolt	04/22/85	7.1	4,040	Washougal R	AD
1984	Chambers Cr	Skamania	Smolt	04/22/85	6.8	27,058	Washougal R	AD
1984	Cowlitz R	Skamania	Smolt	05/15/85	8.4	9,858	Washougal R	AD
1984	Cowlitz R	Skamania	Smolt	05/15/85	8.4	9,858	Washougal R	AD
1984	Cowlitz R	Skamania	Smolt	05/15/85	9.3	8,035	Washougal R	AD
1984	Elochoman R	Beaver Creek	Smolt	05/08/85	5.1	7,650	Washougal R	AD
1984	Elochoman R	Beaver Creek	Smolt	05/09/85	5.1	7,395	Washougal R	AD
1984	Elochoman R	Beaver Creek	Smolt	05/10/85	4.2	5,040	Washougal R	AD
1984	Elochoman R	Beaver Creek	Smolt	05/10/85	5.3	1,325	Washougal R	AD
1984	Elochoman R	Beaver Creek	Smolt	05/15/85	6.6	7,920	Washougal R	AD
1984	Washougal R	Skamania	Non-Smolt	05/15/85	10.1	1.697	Washougal R - WF/NF	AD RV

Table 3 (cont.). Hatchery releases of winter steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1984	Washougal R - WF/NF	Skamania	Smolt	04/22/85	5.5	4,292	Washougal R - WFINF	AD
1985	Cowlitz R	Skamania	Smolt	04/25/86	5.8	3,254	Washougal R	AD
1985	Cowlitz R	Skamania	Smolt	05/08/86	5.3	3,000	Washougal R	AD
1985	Cowlitz R	Skamania	Smolt	05/08/86	5.3	6,063	Washougal R	AD
1985	Cowlitz R	Skamania	Smolt	05/08/86	5.3	6,694	Washougal R	AD
1985	Cowlitz R	Skamania	Smolt	05/08/86	5.3	2,724	Washougal R	AD
1985	Washougal R - WF/NF	Skamania	Smolt	04/15/86	5.1	5,804	Washougal R	AD
1985	Washougal R - WF/NF	Skamania	Smolt	04/15/86	5.3	6,079	Washougal R	AD
1985	Washougal R - WFINF-	Skamania	Smolt	04/16/86	5.3	5,973	Washougal R	AD
1985	Washougal R - WF/NF	Skamania	Smolt	04/16/86	5.2	5,988	Washougal R	AD
1985	Washougal R - WF/NF	Skamania	Smolt	04/17/86	5.1	5,712	Washougal R ,	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/17/86	5.1	4,452	Washougal R	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/17/86	5.0	5,810	Washougal R	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/18/86	5.2	5,980	Washougal R	AD

Table 3 (cont.). Hatchery releases of winter steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1985	Washougal R - WFINF	Skamania	Smolt	04/18/86	5.2	6,874	Washougal R	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/14/86	4.3	4,300	Washougal R - WFINF	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/14/86	5.0	6,332	Washougal R - WF/NF	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/15/86	4.3	4,300	Washougal R - WFINF	AD
1985	Washougal R - WF/NF	Skamania	Smolt	04/16/86	4.3	4,300	Washougal R - WF/NF	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/17/86	4.3	4,470	Washougal R - WFINF	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/18/86	5.2	1,373	Washougal R - WFINF	AD
1986	Washougal R - WF/NF	Skamania	Non-Smolt	08/12/86	83.0	53,286	Washougal R	
1986	Washougal R - WF/NF	Skamania	Smolt	04/14/87	5.4	6,334	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/14/87	5.4	6,442	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/14/87	5.4	7,085	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/14/87	5.4	6,280	Washougal R	AD

Table 3 (cont.). Hatchery releases of winter steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1986	Washougal R - WFINF	Skamania	Smolt	04/14/87	5.4	6,334	Washougal R	AD
1986	Washougal R - WF/NF	Skamania	Smolt	04/14/87	5.4	6,901	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/14/87	5.5	6,974	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/15/87	5.5	6,969	Washougal R	AD
1986	Washougal R - WF/NF	Skamania	Smolt	04115187	5.5	6,584	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/15/87	5.3	6,614	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/15/87	5.3	6,614	Washougal R	AD
1986	Washougal R - WF/NF	Skamania	Smolt	04/15/87	5.3	6,874	Washougal R	AD
1986	Washougal R - WF/NF	Skamania	Smolt	04/15/87	5.4	6,809	Washougal R	AD
1986	Washougal R - WF/NF	Skamania	Smolt	04/20/87	5.5	6,858	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/20/87	5.5	6,930	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/20/87	6.9	6,941	Washougal R	AD

Table 3 (cont.). Hatchery releases of winter steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1986	Washougal R - WFINF	Skamania	Smolt	04/20/87	6.9	9,101	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/20/87	5.6	7,375	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/21/87	5.8	7,349	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/22/87	6.0	7,446	Washougal R	AD
1986	Washougal R - WFINF	Skamania	Smolt	04/22/87	6.0	2,010	Washougal R	AD
1987	Washougal R - WFINF	Skamania	Non-Smolt	09/04/87	46.0	38,364	Washougal R	AD
1987	Washougal R - WF/NF	Skamania	Smolt	04/18/88	6.3	51,818	Washougal R	AD
1987	Washougal R - WF/NF	Skamania	Smolt	04/19/88	6.3	30,001	Washougal R	AD
1987	Washougal R - WF/NF	Skamania	Smolt	04/20/88	6.1	2,379	Washougal R	AD
1987	Washougal R - WF/ NF	Skamania	Smolt	04/21/88	6.1	3,599	Washougal R	AD
1987	Washougal R - WF/ NF	Skamania	Smolt	04/15/88	5.8	50,720	Washougal R - WF/NF	AD
1987	Washougal R - WF/NF	Skamania	Smolt	04/16/88	6.3	7,276	Washougal R - WF/NF	AD

Table 3 (cont.). Hatchery releases of winter steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1987	Washougal R - WFINF	Skamania	Smolt	04/18/88	5.9	29,505	Washougal R - WF/NF	AD
1988	Washougal R - WFINF	Skamania	Smolt	04/21/89	5.9	4,956	Washougal R	AD
1988	Washougal R - WFINF	Skamania	Smolt	04/21/89	6.0	6,030	Washougal R	AD
1988	Washougal R - WFINF	Skamania	Smolt	05/02/89	5.6	8,400	Washougal R	AD
1988	Washougal R - WFINF	Skamania	Smolt	05/03/89	5.5	7,755	Washougal R	AD
1988	Washougal R - WFINF	Skamania	Smolt	05/03/89	6.1	9,668	Washougal R	AD
1988	Washougal R - WFINF	Skamania	Smolt	05/03/89	6.1	8,967	Washougal R	AD
1988	Washougal R - WF/NF	Skamania	Smolt	05/09/89	6.2	8,835	Washougal R	AD
1988	Washougal R - WF/NF	Skamania	Smolt	05/09/89	6.2	9,176	Washougal R	AD
1988	Washougal R - WF/NF	Skamania	Smolt	05/09/89	6.0	924	Washougal R	AD
1988	Washougal R - WF/NF	Skamania	Smolt	04/26/89	6.2	64,418	Washougal R - WF/NF	AD
1988	Washougal R - WF/NF	Skamania	Smolt	04/15/90	5.2	119,501	Washougal R - WF/NF	AD

Table 3 (cont.). Hatchery releases of winter steelhead into the Washougal River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1990	Elochoman R	Skamania	Smolt	04/18/91	5.0	1,200	Washougal R - WF/NF	AD
1990	Elochoman R	Skamania	Smolt	05/25/91	4.9	1,380	Washougal R - WF/NF	AD
1990	Elochoman R	Skamania	Smolt	05/25/91	4.6	2,796	Washougal R - WF/NF	AD
1990	Elochoman R	Skamania	Smolt	04/25/91	5.8	12,100	Washougal R - WFINF	AD
1990	Elochoman R	Skamania	Smolt	04/29/91	4.7	17,000	Washougal R - WFINF	AD
1990	Elochoman R	Skamania	Smolt	04/29/91	4.8	22,300	Washougal R - WFINF	AD
1990	Elochoman R	Skamania	Smolt	04/30/91	4.5	15,900	Washougal R - WF/NF	AD
1990	Elochoman R	Skamania	Smolt	04/30/91	4.5	15,700	Washougal R - WF/NF	AD
1990	Elochoman R	Skamania	Smolt	04/30/91	5.4	3,580	Washougal R - WF/NF	AD
1990	Elochoman R	Skamania	Smolt	04/46/91	4.5	22,300	Washougal R - WF/NF	AD
1990	Elochoman R	Skamania	Smolt	05/07/91	4.2	17,000	Washougal R - WF/NF	AD

Source: Terry Lovgren, WDW Stocking Database, 1991.

AD = Adipose clip.

Table 4 (TD). Parasites and diseases isolated at Skamania Hatchery located on the Washougal River.

Disease Type	Hatchery	Specific Pathogen
Bacterial	Skamania	*Renibacterium salmonarium* (BKD)
Bacterial	Skamania	*Flexibacter columnaris* (Columnaris)
Bacterial	Skamania	*Flexibacter cytophaga* (Coldwater)
Bacterial	Skamania	*Renibacterium salmonarium* (BKD)
Parasite	Skamania	*Hexamita sp.*
Parasite	Skamania	*Ichthyophthirius multiflis* (Ich)
Parasite	Skamania	*Ichthyoboda sp.* (Costia)
Parasite	Skamania	*Trichodina sp.*
Viral	Skamania	*Infectious hematopoietic necrosis* (IHN)

Disease history represents only pathogens isolated at this hatchery and not necessarily a disease outbreak.

Source: WDW pathologist, Steve Roberts, 1991.

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WIND RIVER SUBBASIN

Spring Chinook

GEOGRAPHIC LOCATION

The Wind River is located in southwestern Washington and-enters the Columbia River above Bonneville Dam at River Mile (RM) 154.5. The Wind River is about 30.5 miles long, drains about 225 square miles and lies within Skamania County. Much of the subbasin is within the Gifford Pinchot National Forest. Carson National Fish Hatchery is located at Tyee Springs (RM 18).

An Indian "in-lieu" fishing site has been set aside at the Wind River mouth in compensation for tribal fishing grounds inundated by Bonneville Dam.

ORIGIN

Historically, Shipperd Falls at RM 2 is a series of falls approximately 40 feet high that blocked spring chinook migration. Fulton (1968) indicated spring chinook spawning habitat was absent below the falls and a native run did not exist.

The Wind River spring chinook are managed as a hatchery stock. Carson National Fish Hatchery was constructed in 1938. Several early attempts were made to introduce spring chinook into the Wind River. From 1938 - 1940 between 91,700 to 96,500 fish were released. The first three groups of fish were eggs from spring chinook taken from the Clackamas River in Oregon. Incubation and rearing of all groups was at Carson Hatchery. Apparently those efforts were not successful, as no fish were observed returning as adults. The 7,600 fingerlings released in 1953 were from eggs provided by a Willamette River hatchery operated by the Fish Commission of Oregon; however attempts were again unsuccessful (Zimmer, Wahle, and Maltzeff, 1963). In 1945, an experimental transfer of 35,382 eggs from the Salmon River in Idaho was used to determine the feasibility of a full production program which was scheduled to begin in 195 1 (WDF, 195 1).

In 1955, agencies of the Columbia River Fishery Development Program began a program to introduce spring chinook to the Wind River. The program consisted of 1) construction of a ladder at Shipperd Falls, 2) transfer of adult spring chinook to Carson National Fish Hatchery and 3) rearing and releasing juvenile spring chinook into the Columbia River (WDW, 1990). The program eventually began in 1958 and 1959 using spring chinook collected at Bonneville Dam for broodstock. The release of 1,016,500 yearlings in 1960 and 260,700 yearlings in 1961 provided the basis for establishment of a permanent program at Carson Hatchery (Howell et al. 1985).

DISTRIBUTION

In 1956, Shipperd Falls were laddered permitting salmon access to the upper areas. The principal spawning area in the Wind River is from the mouth of Paradise Creek at RM 25 downstream approximately 10 miles.

PRODUCTION

Hatchery production is the dominant component in the Wind River although some natural production also occurs.

Tables 1 and 2 describe the amount of spawning and rearing habitat by quality, available in the Wind River. This data was derived from the Presence/Absence database of Northwest Power Planning Council, 199 1.

Carrying capacity was estimated at 157,533 smolts based on the Northwest Power Planning Council's model. However, spring chinook production may be limited by steep gradients and low summer flows.

The Wind River spring chinook natural spawn escapement from 1970 - 1990 return years averaged 305 with a low of 80 in 1982 and a peak of 2,352 in 1971. Wind River natural escapement by age and brood year is currently unavailable.

Carson Hatchery spring chinook returns from 1967 - 1984 brood years averaged 3,344 with a low of 222 for the 1972 brood and a peak of 9,939 for the 1971 brood. Carson Hatchery returns by age and brood year are presented in Table 3.

Wind River tributary sport catch estimates between 1967 - 1989 brood years excluding 1977 - 1980 averaged 898 with only 1 caught for the 1976 brood and a peak catch of 2,859 for the 1973 brood. Wind River tributary sport catches by age and brood year is listed in Table 4.

Wind River spring chinook tribal harvest from 1987 and 1990 return years were 9 and 29 fish, respectively. Wind River tribal harvest by age and brood year is currently unavailable.

Carson Hatchery spring chinook tribal donations from 1986, 1987, and 1990 return years were 1,408, 617, and 7,691 fish, respectively. Carson Hatchery tribal donations by age and brood year is currently unavailable.

The Wind River spring chinook total returns from 1968 - 1984 return years averaged 4,246 with a low of 265 in 1972 and a peak of 12,717 in 1971. Wind River total returns by age and brood year is currently unavailable.

ADULT LIFE HISTORY

Run size, catch and escapement

Ocean commercial and recreational fisheries from Alaska to Washington, in addition to Columbia River gill net and sport fisheries all harvest a portion of the Wind River origin spring chinook. Out-of-subbasin harvest which includes ocean and Columbia River harvests has averaged about 15 percent (WDW, 1990). Based on tag recoveries and genetic stock identification studies, most Carson spring chinook harvest occurs in freshwater. When Carson Hatchery is expected to achieve it's escapement goal, the Washington Department of Fisheries and the Yakima Indian Nation develop a harvest plan for sharing the harvestable surplus between the recreational fishery and the Yakima tribal members. Since 1970, sport fisheries have occurred annually except between 1980 - 1985. The subbasin recreational harvest rate averaged 20.8 percent from 1970 - 1990 return years excluding 1980 - 1985 (LeFleur and Pettit, 1991). Columbia River sport and commercial fisheries are managed to ensure attainment of hatchery egg-take requirements while minimizing other upriver stock impacts.

Strays from other hatcheries are relatively uncommon. Table 5 lists Carson Hatchery origin spring chinook stray coded wire tag recoveries beginning with the 1978 brood through to the 1988 brood, and Table 6 lists the coded wire tags recovered within the Wind River subbasin which originated outside the Wind River subbasin.

Time of Migration

Spring chinook destined for areas upstream of Bonneville Dam begin entering the Columbia River in large numbers in mid-March. Counts peak at Bonneville Dam usually between April 20 and April 28 but can be earlier during abnormally low flow years or later during high run-off. Adults return to the subbasin from mid-May to mid-August (Howell et al., 1985).

Spawning Period

Peak of natural spawning in the Wind River occurs during the latter part of August. At Carson Hatchery, spawning commences about August 10 and can extend to about September 7 (Howell et al., 1985).

Spawning Areas

The principle spawning area in the Wind River is from the mouth of Paradise Creek downstream approximately 10 miles.

Age Comuosition

Age ranges from three-year-old jacks to six-year-old adults with four-year-olds or five-year-olds usually the dominant age classes. Total age composition data is summarized in Tables 3 and 4. Table 7 lists the age composition percentages by brood year for spring chinook returning to the Carson Hatchery. The age composition percentages by brood year for spring chinook returning to Wind River spawning grounds is currently unavailable.

The mean fork length by brood year, sex, and freshwaterocean rearing ages for Carson Hatchery from 1977 - 1987 brood years are available in Tables 9 and 10. The mean fork length by brood year, sex, and freshwater.ocean rearing ages for spring chinook returning to the Wind River spawning grounds is currently unavailable.

Sex Ratio

Female spring chinook comprised 56 - 69 percent of the spring chinook returning to the Carson Hatchery between 1979 - 1984 brood years. The percent females by brood year and freshwater.ocean rearing ages for Carson Hatchery returns are presented in Table 9.
The percent females by brood year and freshwater.ocean rearing ages of the Wind River natural spawners is currently unavailable.

Fecundity

From 1968 - 1984, the number of eggs per female at Carson Hatchery ranged from 3,640 (1968) to 5,180 (1978) and averaged 4,300 (Howell et al., 1985). Wind River natural spawn and Carson Hatchery fecundity data by age and brood year is unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

No information is available on emergence on naturally produced fry. At Carson Hatchery, artificial emergence of nearly “buttoned-up” fry occurs primarily in early January to February after exposure to about 1,750 temperature units (Howell et al., 1985).

Time. age and size at migration

Smolt migration to the Columbia estuary is rapid. Coded wire tagged yearlings released on May 3, 1979 from the Carson Hatchery had a median date of recovery in the estuary (Columbia River Mile 47) on May 12 and May 19, 1979 for beach and purse seine samples, respectively. The final recoveries occurred on May 20, 1979 (Dawley et al., 1982).

Hatchery release information for the Wind River subbasin by brood year is presented in Table 11. Length data of natural spring chinook smolts from the Wind River is unavailable. The number of natural juvenile spring chinook salmon that migrate from the Wind River is also unavailable.

Survival Rate

Hatchery egg-to-smolt survival is now about 90 percent. Previous problems with Bacterial Kidney Disease reduced fry-to-smolt survival to 65 percent. In recent years, returning adults have been injected with erythromycin and the disease appears to be under control. Smolt-to-adult survival for Carson Hatchery spring chinook has averaged 0.3 percent (WDW, 1990). Survival rate has been low (< 0.1 percent) for coded wire tagged yearlings from Carson Hatchery (Howell et al., 1985).

BIOCHEMICAL-GENETIC CHARACTERISTICS

Schreck et. al. (1986) compared the electrophoretic profile from their analysis to the historical baseline data in Milner et al. (1983) in order to evaluate the genetic stability of the isozyme gene frequencies over time. Based on Carson Hatchery samples, isozyme gene frequencies were statistically different for three enzyme systems. The profiles of one of the dissimilar enzymes are normally difficult to interpret and may not reflect actual genetic differentiation.

DISEASE

In 1987, infectious hematopoietic necrosis (IHN) was detected in 70 percent of the returning adults; managers used only eggs from non-infected adults. A sample of adults tested positive for IHN in 1988, but the eggs were disinfected with iodophor and retained. The hatchery has subsequently not reported any unusual losses (WDW, 1990).

Bacteria and parasitic diseases found in the Carson Hatchery are listed in Table 12.

Table 1 (HB-1). Estimated amount of rearing and spawning habitat, by quality, of the Wind River spring chinook production area;

Distance/Area	Excellent	Good	Fair[a]	Poor"	Unknown-	Total	Confidence
Miles (%)	00	22	14	64		30	
Acres (%)	00	27	14	59		135.3	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC , 199 1.

Table 2 (HB-2). Estimated amount of rearing habitat, by quality, of the Wind River spring chinook production area.

Distance/Area	Excellent	Good	Fair[a]	Poor[a]	Unknown	Total	Confidence
Miles (%)	00	00	39	61		2.8	
Acres (%)	00	00	40	60		4.6	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 1991.

Table 3 (RH). Total hatchery returns of spring chinook to the Wind River subbasin by brood year.

Total Age

Brood Year	2	3	4	5	-6	Total	Adult Total
1967	0	184	2,580	2,469	0	5,233	5,049
1968	0	952	4,123	1,066	13	6,154	5,202
1969	0	49	1,022	261	0	1,332	1,283
1970	0	101	905	265	24	1,295	1,194
1971	0	384	4,530	5,025	0	9,939	9,555
1972	0	10	161	46	5	222	212
1973	0	288	2,907	2,361	0	5,556	5,268
1974	0	22	598	209	0	829	807
1975	0	12	2,328	2,730	35	5,105	5,093
1976	0	4	606	1,609	0	2,219	2,215
1977	0	32	901	550	0	1,483	1,451
1978	0	3	1,085	1,413	11	2,512	2,509
1979	0	21	1,072	789	0	1,882	1,861
1980	0	9	1,274	1,090	0	2,373	2,364
1981	0	79	3,591	1,536	0	5,206	5,127
1982	0	53	2,664	1,638	0	4,355	4,302
1983	0	48	2,116	1,786	8	3,958	3,910
1984	0	7	252	287	0	546	539
1985	0	72	1,883	361			
1986	0	118	2,578				
1987	0	7					
1988	0						

Age based on scale reading analysis by USF&WS.

Carson Hatchery returns excludes tribal donations.

Table 4 (RS). Total sport catches of spring-chinook in the Wind River subbasin by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1967	0	13	477	527	0	1,017	1,004
1968	0	134	911	225	2	1,272	1,138
1969	0	25	220	34	0	279	254
1970	0	16	173	134	1	324	308
1971	0	21	2,335	158	0	2,514	2,493
1972	0	5	5	25	3	38	33
1973	0	9	1,554	1,296	0	2,859	2,850
1974	0	5	328	64	0	397	392
1975	0	7	712	0	0	719	712
1976	0	1	0	0	0	1	0
1977	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0
1981	0	0	0	500	0	500	500
1982	0	0	1,297	210	0	1,507	1,507
1983	0	6	569	350	2	927	921
1984	0	2	131	75	7	215	213
1985	0	19	943	321			
1986	0	87	3,504				
1987	0	25					
1988	0						

Age composition prior to 1986 return year is possibly a product of extrapolation using the hatchery age composition. Age composition since 1986 brood is from analysis of scales taken during sport fishery sampling.

No sport fishery occurred from 1980 through 1985.

Table 5 (RB). Total returns of spring chinook to the Wind River subbasin by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1967	0	208	4,527	3,397	0	8,132	7,924
1968	0	1,502	5,727	1,383	15	8,627	7,125
1969	0	93	1,332	308	0	1,733	1,640
1970	0	124	1,141	404	25	1,694	1,570
1971	0	413	7,044	5,260	0	12,717	12,304
1972	0	15	169	73	8	265	250
1973	0	301	4,585	3,850	0	8,736	8,435
1974	0	27	976	286	0	1,289	1,262
1975	0	21	3,181	2,804	37	6,043	6,022
1976	0	5	623	1,707	0	2,335	2,330
1977	0	33	956	577	0	1,566	1,533
1978	0	3	1,137	1,500	11	2,651	2,648
1979	0	22	1,251	864	0	2,137	2,115
1980	0	9	1,412	1,146	0	2,567	2,558
1981	0	86	3,727	2,573	0	6,386	6,300
1982	0	53	4,943	2,132	0	7,128	7,075
1983	0	54	3,114	2,263	10	5,441	5,387
1984	0	20	420	415	7	862	842
1985	0	91	2,921	1,650			
1986	9	214	13,006				
1987	0	52					
1988	0						

Age based on scale reading analysis.

Table 5 (AE). Emigration of coded wire tagged spring chinook from the Wind River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Carson, NFH	Little White Salmon, 1982	Hatchery	2,544	3	3
Carson, NFH	Little White Salmon, 1982	Hatchery	2,544	1	1
Carson, NFH	Little White Salmon, 1983	Hatchery	2,608	12	12
Carson, NFH	Little White Salmon, 1983	Hatchery	2,608	3	3
Carson, NFH	Little White Salmon, 1985	Hatchery	1,357	2	2
Carson, NFH	Little White Salmon, 1986	Hatchery	1,144	2	2
Carson, NFH	Little White Salmon, 1986	Hatchery	1,144	2	2
Carson, NFH	Little White Salmon, 1986	Hatchery	1,144	2	2
Carson, NFH	Little White Salmon, 1986	Hatchery	1,144	4	4
Carson, NFH	Little White Salmon, 1986	Hatchery	1,144	2	2
Carson, NFH	Little White Salmon, 1986	Hatchery	1,144	4	4
Carson, NFH	Little White Salmon, 1986	Hatchery	1,144	1	1
Carson, NFH	Little White Salmon, 1986	Hatchery	1,144	1	1
Carson, NFH	Little White Salmon, 1986	Hatchery	1,144	1	1
Carson, NFH	Little White Salmon, 1986	Hatchery	1,144	1	1
Carson, NFH	Little White Salmon, 1986	Hatchery	1,144	2	2
Carson, NFH	Little White Salmon, 1986	Hatchery	1,144	5	5
Carson, NFH	Little White Salmon, 1986	Hatchery	1,144	1	1
Carson, NFH	Little White Salmon, 1986	Hatchery	1,144	2	2
Carson, NFH	Little White Salmon, 1986	Hatchery	1,144	3	3

Table 5. (cont.) Emigration of coded wire tagged spring chinook from the Wind River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Carson, NFH	Little White Salmon, 1987	Hatchery	4,566	1	1
Carson, NFH	Little White Salmon, 1987	Hatchery	4,566	1	1
Carson, NFH	Little White Salmon, 1987	Hatchery	4,566	1	1
Carson, NFH	Little White Salmon, 1987	Hatchery	4,566	1	1
Carson, NFH	Little White Salmon, 1987	Hatchery	4,566	2	2
Carson, NFH	Little White Salmon, 1987	Hatchery	4,566	3	3
Carson, NFH	Little White Salmon, 1987	Hatchery	4,566	1	1
Carson, NFH	Little White Salmon, 1987	Hatchery	4,566	2	2
Carson, NFH	Little White Salmon, 1987	Hatchery	4,566	3	3
Carson, NFH	Little White Salmon, 1987	Hatchery	4,566	2	2
Carson, NFH	Little White Salmon, 1987	Hatchery	4,566	4	4
Carson, NFH	Little White Salmon, 1987	Hatchery	4,566	1	1
Carson, NFH	Little White Salmon, 1987	Hatchery	4,566	1	1
Carson, NFH	Little White Salmon, 1987	Hatchery	4,566	2	2
Carson, NFH	Little White Salmon, 1987	Hatchery	4,566	2	2
Carson, NFH	Little White Salmon, 1987	Hatchery	4,566	2	2
Carson, NFH	Little White Salmon, 1989	Hatchery	1,887	1	1
Carson, NFH	Little White Salmon, 1989	Hatchery	1,887	1	1
Carson, NFH	Little White Salmon, 1989	Hatchery	1,887	1	1
Carson, NFH	Little White Salmon, 1990	Hatchery	2,362	1	1

Table 5. (cont.) Emigration of coded wire tagged spring chinook from the Wind River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Carson, NFH	Little White Salmon, 1990	Hatchery	2,362	1	1

Based on the following tag codes: 05-04-37, 05-04-38, 05-09-25, 05-08-58, 05-08-59, 05-08-61, 05-08-62, 05-08-63, 05-09-16, 05-09-17, 05-09-18, 05-09-19, 05-09-20, 05-09-22, 05-09-24, 05-09-25, 05-09-26, 05-09-27, 05-l l-53, 05-l l-54, 05-l l-56, 05-l l-57, 05-l l-58, 05-l l-59, 05-l l-60, 05-l l-61, 05-l l-63, 05-12-16, 05-12-18, 05-12-21, 05-12-22, 05-18-14, 05-18-26, 05-18-28, 05-18-25, and 05-18-29.

Table 6 (AI). Immigration of coded wire tagged spring chinook into the Wind River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Leavenworth Hatchery	Carson, 1983	Hatchery	2,494	1	1
Little White Salmon Hatchery	Carson, 1987	Hatchery	4,378	1	1

Based on the following tag codes: 03-52-02, and OS- 14-37.

Beginning with the 1978 brood.

Table 7 (AC). Age composition percentage -(freshwater.ocean) by brood year for spring chinook returning to the Carson National Fish Hatchery.

Age Composition (%)

Brood Year	N	2.1	2 . 2	2.3	2.4
1968		15.50	6 7 . 0 0	17.30	0.20
1969		3.70	76.70	19.60	0
1970		7.80	69.90	20.50	1.90
1971		3.80	46.10	50.10	0
1972		4.50	72.50	20.70	2.30
1973		5.20	52.30	42.50	0
1974		2.70	72.10	25.20	0
1975		0.20	45.60	53.50	0.70
1976		0.20	27.30	72.50	0
1977	153	2.20	60.80	37.10	0
1978	624	0.10	43.20	56.30	0.40
1979	406	1.10	57.00	41.90	0
1980	355	0.40	53.70	45.90	0
1981	606	1.50	69.00	29.50	0
1982	715	1.20	61.20	37.60	0
1983	779	1.20	53.50	45.10	0.20
1984	136	1.30	46.20	52.60	0
1985	615	3.10	81.30	15.60	0
1986					
1987					
1988					

Age based on scale reading analysis by USF&WS.

Table 8 (AS). Percent females by brood year and age class (freshwater.ocean) for spring chinook returning to the Carson National Fish Hatchery.

Females (%)

Brood Year	N	2.2	2.3	2.4	Total % Female
1975					
1976					
1977	81		52.94	0	
1978	364	68.32	48.90	50.00	
1979	280	82.73	49.01	0	68.97
1980	213	66.93	44.12	0	60.00
1981	339	58.98	55.04	0	55.94
1982	416	59.60	56.87	0	58.18
1983	497	68.93	60.74	50.00	63.80
1984	80	68.85	51.35	0	58.82
1985	347	58.98	54.21		
1986	518	66.58			
1987					
1988					

Age based on scale reading analysis by USF&WS.

Table 9 (AL-a). Mean fork length by brood year and age class (freshwater.ocean) for female spring chinook returning to Carson National Fish Hatchery.

Mean Fork Length (cm)

Brood Year	2.1	2.2	2.3	2.4
1977			89	
N			81	
St. Dev.			2.5	
1978		75	85	99
N		207	155	2
St. Dev.		5.3	4.9	1.4
1979		76	89	
N		206	74	
St. Dev.		3.1	4.5	
1980		77	91	
N		168	45	
St. Dev.		3.1	3.8	
1981		76	89	
N		197	142	
St. Dev.		3.4	4.07	
1982		76	88	
N		267	149	
St. Dev.		3.2	4.06	
1983		75	87	92
N		233	263	1
St. Dev.		3.53	4	---

Table 9 (cont.) Mean fork length by brood year and age class (freshwater.ocean) for female spring chinook returning to Carson National Fish Hatchery.

Brood Year	2.1	2.2	2.3	2.4
1984		76	89	
N		42	38	
St. Dev.		3.85	3.71	
1985		74	87	
N		289	58	
St. Dev.		3.61	5.24	
1986		75		
N		518		
St. Dev.		3.34		
1987				
N				
St. Dev.				

Age based on scale reading analysis.

Table 10 (AL-b). Mean fork length by brood year and age class (freshwater.ocean) for male spring chinook returning to the Carson National Fish Hatchery.

Mean Fork Length (cm)

Brood Year	2.1	2.2	2.3	2.4
1977			92	
N			72	
St. Dev.			3.4	
1978		78	90	99
N		96	162	2
St. Dev.		5.1	6.3	1.4
1979	57	79	96	
N	6	43	77	
St. Dev.	6.7	4.1	5.7	
1980	56	82	98	
N	2	83	57	
St. Dev.	4.2	3.8	5.7	
1981	54	81	96	
N	14	137	116	
St. Dev.	4.9	3.9	4.56	
1982	55	79	93	
N	5	181	113	
St. Dev.	6.1	4.12	5.37	
1983	52	78	93	108
N	6	105	170	1
St. Dev.	5.61	4.17	6.25	---

Table 10 (cont.) Mean fork length by brood year and age class (freshwater.ocean) for male spring chinook returning to the Carson National Fish Hatchery.

Brood Year	2.1	2.2	2.3	2.4
1984	61	74	95	
N	1	19	36	
St. Dev.	---	6.8	7.14	
1985	49	76	92	
N	18	201	49	
St. Dev.	3.39	4.58	6.2	
1986	53	77		
N	29	260		
St. Dev.	3.4	4.28		
1987	50			
N	2			
St. Dev.	9.19			

Age based on scale reading analysis.

Table 11 (TR). Hatchery releases of spring chinook salmon into the Wind River subbasin sorted by brood year, hatchery and life stage.

Brood Year	stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CUT Code
1970	UNKNOWN STOCK	CARSON NF HATCHERY	Smolt	04/23/72	04/23/72	18	1409370	WIND RIVER (29.0023)	UNTAGGED
1974	WIND R (CARSON NFH)	CARSON NF HATCHERY	Fingr	10/15/75	10/15/75	36	94800	WIND RIVER (29.0023)	141502
1974	WIND R (CARSON NFH)	CARSON NF HATCHERY	Fingr	10/15/75	10/15/75	36	102700	WIND RIVER (29.0023)	UNTAGGED
1974	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	03/17/76	03/17/76	19	50663	WIND RIVER (29.0023)	140203
1974	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	03; 17; 76	03/ 17/76	19	1100769	UIND RIVER (29.0023)	UNTAGGED
1974	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/19/76	04/19/76	23	46736	UIND RIVER (29.0023)	140103
1974	UIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/19/76	04/19/76	23	1040148	WIND RIVER (29.0023)	UNTAGGED
1974	ABERNATHY CREEK	CARSON NF HATCHERY	Smolt	04/19/76	04/19/76	19	53095	WIND RIVER (29.0023)	UNTAGGED
1975	WIND R (CARSON NFH)	CARSON NF HATCHERY	Fingr	09/15/76	09/15/76	45	89833	WIND RIVER (29.0023)	140303
1975	WIND R (CARSON NFH)	CARSON NF HATCHERY	Fingr	09/15/76	09/15/76	45	133632	WIND RIVER (29.0023)	UNTAGGED
1975	ABERNATHY CREEK	CARSON NF HATCHERY	PreSm	09/15/76	09/15/76	45	29602	WIND RIVER (29.0023)	UNTAGGED
1975	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	03/15/77	03/15/77	21	94519	WIND RIVER (29.0023)	141111
1975	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	03/15/77	03/15/77	21	1316212	UIND RIVER (29.0023)	UNTAGGED
1975	UNKNOWN-STOCK	CARSON NF HATCHERY	Smolt	03/15/77	03/15/77	22	1398705	UIND RIVER (29.0023)	UNTAGGED
1975	UIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/29/77	04/29/77	18	97886	WIND RIVER (29.0023)	141211
1975	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/29/77	04/29/77	18	1157063	WIND RIVER (29.0023)	UNTAGGED
1975	ABERNATHY CREEK	CARSON NF HATCHERY	Smolt	04/29/77	04/29/77	19	159199	UIND RIVER (29.0023)	UNTAGGED
1975	UNKNDUN STOCK	CARSON NF HATCHERY	Smolt	05/29/77	05/29/77	19	1414148	WIND RIVER (29.0023)	UNTAGGED
1976	ABERNATHY CREEK	CARSON NF HATCHERY	Smolt	05/05/78	05/05/78	17	2753175	WIND RIVER (29.0023)	UNTAGGED
1977	MIXED COLUMBIA	CARSON NF HATCHERY	Smolt	05/01/79	05/01/79		40963	UIND RIVER (29.0023)	LBGN
1977	MIXED COLUMBIA	CARSON NF HATCHERY	Smolt	05/01/79	05/01/79		4051	WIND RIVER (29.0023)	UNTAGGED
1977	UNKNOWN STDCK	CARSON NF HATCHERY	Smolt	05/03/79	05/03/79	20	45084	WIND RIVER (29.0023)	UNTAGGED
1977	ABERNATHY CREEK	CARSON NF HATCHERY	Smolt	05/03/79	05/07/79	16	1746801	WIND RIVER (29.0023)	UNTAGGED
1977	UNKNOWN STOCK	CARSON NF HATCHERY	Smolt	05/07/79	05/07/79	16	1746731	WIND RIVER (29.0023)	UNTAGGED
1978	ABERNATHY CREEK	CARSON NF HATCHERY	Fingr	10/16/79	10/18/79	45	460800	WIND RIVER (29.0023)	UNTAGGED
1978	UNKNDUN STOCK	CARSON NF HATCHERY	PreSm	10/16/79	10/16/79	44	378950	UIND RIVER (29.0023)	UNTAGGED
1978	UNKNOWN STOCK	CARSON NF HATCHERY	PreSm	10/18/79	10/18/79	56	81850	WIND RIVER (29.0023)	UNTAGGED
1978	UIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/02/80	04/02/80	29	245854	WIND RIVER (29.0023)	UNTAGGED
1978	ABERNATHY CREEK	CARSON NF HATCHERY	Smolt	04/02/80	04/28/80	23	2362652	UIND RIVER (29.0023)	UNTAGGED
1978	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/28/80	04/28/80	23	2295207	WIND RIVER (29.0023)	UNTAGGED
1978	UIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/30/80	04/30/80	19	82098	UIND RIVER (29.0023)	050437
1978	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/30/80	04/30/80	19	4049	WIND RIVER (29.0023)	UNTAGGED
1978	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/30/80	04/30/80	19	88848	WIND RIVER (29.0023)	050438
1978	UIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/30/80	04/30/80	19	3414	WIND RIVER (29.0023)	UNTAGGED
1978	ABERNATHY CREEK	CARSON NF HATCHERY	Smolt	05/12/80	05/12/80	24	37499	WIND RIVER (29.0023)	035702
1978	ABERNATHY CREEK	CARSON NF HATCHERY	Smolt	05/12/80	05/12/80	24	7051	UIND RIVER (29.0023)	UNTAGGED
1978	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	05/12/80	05/12/80	24	44550	WIND RIVER (29.0023)	UNTAGGED
1979	UIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	03/24/81	03/24/81	25	442835	WIND RIVER (29.0023)	UNTAGGED
1979	ABERNATHY CREEK	CARSON NF HATCHERY	Smolt	03/24/81	03/24/81	25	442835	WIND RIVER (29.0023)	UNTAGGED
1979	ABERNATHY CREEK	CARSON NF HATCHERY	Smolt	04/15/81	04/15/81	19	2156077	UIND RIVER (29.0023)	UNTAGGED
1979	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/81	04/15/81	19	2156077	WIND RIVER (29.0023)	UNTAGGED
1980	ABERNATHY CREEK	CARSON NF HATCHERY	Smolt	04/07/82	04/15/82	19	2578650	WIND RIVER (29.0023)	UNTAGGED
1980	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/10/82	04/10/82	20	98990	UIND RIVER (29.0023)	UNTAGGED
1980	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/82	04/15/82	19	2578650	WIND RIVER (29.0023)	UNTAGGED
1981	ABERNATHY CREEK	CARSON NF HATCHERY	Smolt	04/15/83	04/15/83	20	1722080	WIND RIVER (29.0023)	UNTAGGED
1981	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/83	04/15/83	20	1722080	WIND RIVER (29.0023)	UNTAGGED
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/12/84	04/12/84	16	2017670	UIND RIVER (29.0023)	UNTAGGED
1982	ABERNATHY CREEK	CARSON NF HATCHERY	Smolt	04/12/84	04/12/84	16	2017670	UIND RIVER (29.0023)	UNTAGGED
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	18172	UIND RIVER (29.0023)	050858
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	1580	WIND RIVER (29.0023)	UNTAGGED
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	19401	UIND RIVER (29.0023)	050859
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	396	WIND RIVER (29.0023)	UNTAGGED
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	19001	WIND RIVER (29.0023)	050860
1982	UINO R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	1124	WIND RIVER (29.0023)	UNTAGGED
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	18859	UIND RIVER (29.0023)	050861

Table 11 (cont.). Hatchery releases of spring chinook salmon into the Wind River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CUT Code
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	583	UINO RIVER (29.0023)	UNTAGGED
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	19148	WIND RIVER (29.0023)	050862
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	695	WIND RIVER (29.0023)	UNTAGGED
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	17	19471	WIND RIVER (29.0023)	050863
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	17	197	WIND RIVER (29.0023)	UNTAGGED
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	17	28462	WIND RIVER (29.0023)	050916
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	17	1063	WIND RIVER (29.0023)	UNTAGGED
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	28555	WIND RIVER (29.0023)	050917
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	672	WIND RIVER (29.0023)	UNTAGGED
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	29160	WIND RIVER (29.0023)	050918
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	387	WIND RIVER (29.0023)	UNTAGGED
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	28637	WIND RIVER (29.0023)	050919
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	1193	WIND RIVER (29.0023)	UNTAGGED
1982	WIND R (CARSON NFH)	CARSDN NF HATCHERY	Smolt	04/13/84	04/13/84	18	28601	WIND RIVER (29.0023)	050920
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	377	WIND RIVER (29.0023)	UNTAGGED
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	28275	WIND RIVER (29.0023)	050921
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	577	WIND RIVER (29.0023)	UNTAGGED
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	19	29132	WIND RIVER (29.0023)	050922
1982	UIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	19	595	UIND RIVER (29.0023)	UNTAGGED
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	19	29519	UINO RIVER (29.0023)	050923
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	19	299	WIND RIVER (29.0023)	UNTAGGED
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	29583	WIND RIVER (29.0023)	050924
1982	UIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	209	WIND RIVER (29.0023)	UNTAGGED
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	29584	UIND RIVER (29.0023)	050925
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	390	WIND RIVER (29.0023)	UNTAGGED
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	29498	WIND RIVER (29.0023)	050926
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	89	WIND RIVER (29.0023)	UNTAGGED
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	17	29301	UIND RIVER (29.0023)	050927
1982	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	17	507	UIND RIVER (29.0023)	UNTAGGED
1982	UIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	395598	WIND RIVER (29.0023)	UNTAGGED
1982	ABERNATHY CREEK	CARSON NF HATCHERY	Smolt	04/13/84	04/13/84	18	868890	WIND RIVER (29.0023)	UNTAGGED
1983	ABERNATHY CREEK	CARSON NF HATCHERY	Fingr	06/18/84	06/18/84	99	80046	TROUT CR (29.0075)	U N T A G G E D
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Fingr	06/20/84	06/20/84	100	65668	TROUT CR (29.0075)	UNTAGGED
1983	ABERNATHY CREEK	CARSON NF HATCHERY	Smolt	02/13/85	02/15/85	27	847040	WIND RIVER (29.0023)	UNTAGGED
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	02/15/85	02/15/85	27	847000	WIND RIVER (29.0023)	UNTAGGED
1983	UINO R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/11/85	04/11/85	17	17384	WIND RIVER (29.0023)	051153
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	smott	04/11/85	04/11/85	17	1110	WIND RIVER (29.0023)	UNTAGGED
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	smott	04/15/85	04/15/85	17	14053	WIND RIVER (29.0023)	051154
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	smott	04/15/85	04/15/85	17	1737	WIND RIVER (29.0023)	UNTAGGED
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	18	14175	UIND RIVER (29.0023)	OS1155
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	18	1317	WIND RIVER (29.0023)	UNTAGGED
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	smott	04/15/85	04/15/85	19	16377	UIND RIVER (29.0023)	051156
1983	UIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	19	1328	UINO RIVER (29.0023)	UNTAGGED
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	17	11618	WIND RIVER (29.0023)	051157
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	smott	04/15/85	04/15/85	17	676	UIND RIVER (29.0023)	UNTAGGED
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	17	12411	UINO RIVER (29.0023)	051158
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	smott	04/15/85	04/15/85	17	318	WIND RIVER (29.0023)	UNTAGGED
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	smott	04/15/85	04/15/85	17	25701	WIND RIVER (29.0023)	051159
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	smott	04/15/85	04/15/85	17	9342	UINO RIVER (29.0023)	UNTAGGED
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	smott	04/15/85	04/15/85	16	19737	UINO RIVER (29.0023)	051160
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	smott	04/15/85	04/15/85	16	6996	UINO RIVER (29.0023)	UNTAGGED
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	17	23967	WIND RIVER (29.0023)	051161
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	smott	04/15/85	04/15/85	17	9343	WIND RIVER (29.0023)	UNTAGGED
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	smott	04/15/85	04/15/85	18	25254	WIND RIVER (29.0023)	051162
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	18	8547	WIND RIVER (29.0023)	UNTAGGED

Table 11 (cont.). Hatchery releases of spring chinook salmon into the Wind River subbasin sorted by brood year, hatchery and life stage.

Brood Year	stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	16	13013	WIND RIVER (29.0023)	051163
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	16	16507	UINO RIVER (29.0023)	UNTAGGED
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	17	15011	WIND RIVER (29.0023)	051216
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	17	19057	WIND RIVER (29.0023)	UNTAGGED
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	17	20988	WIND RIVER (29.0023)	051217
1983	UINO R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	17	22328	WIND RIVER (29.0023)	UNTAGGED
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	17	21416	WIND RIVER (29.0023)	051218
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	17	23445	WIND RIVER (29.0023)	UNTAGGED
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	17	20732	UINO RIVER (29.0023)	051219
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	17	21658	WIND RIVER (29.0023)	UNTAGGED
1983	UINO R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	16	19437	WIND RIVER (29.0023)	051220
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	smott	04/15/85	04/15/85	16	21576	WIND RIVER (29.0023)	UNTAGGED
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	smott	04/15/85	04/15/85	17	18706	UIND RIVER (29.0023)	051221
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	17	7279	WIND RIVER (29.0023)	UNTAGGED
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	16	16302	WIND RIVER (29.0023)	051222
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	smott	04/15/85	04/15/85	16	7750	UIND RIVER (29.0023)	UNTAGGED
1983	ABERNATHY CREEK	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	19	1037335	WIND RIVER (29.0023)	UNTAGGED
1983	UINO R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/85	04/15/85	18	1037335	WIND RIVER (29.0023)	UNTAGGED
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	03/06/86	03/06/86	25	443000	WIND RIVER (29.0023)	UNTAGGED
1984	ABERNATHY CREEK	CARSON NF HATCHERY	Smolt	03/06/86	03/06/86	25	443000	WIND RIVER (29.0023)	UNTAGGED
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	19	17009	WIND RIVER (29.0023)	051608
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	19	1828	WIND RIVER (29.0023)	UNTAGGED
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	smott	04/15/86	04/15/86	19	la438	WIND RIVER (29.0023)	051609
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	19	435	WIND RIVER (29.0023)	UNTAGGED
1984	UIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	20	18259	WIND RIVER (29.0023)	051610
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	20	326	WIND RIVER (29.0023)	UNTAGGED
1984	UINO R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	20	16270	UIND RIVER (29.0023)	051611
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	20	2094	WIND RIVER (29.0023)	UNTAGGED
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	19	15804	UIND RIVER (29.0023)	051612
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	19	1319	UIND RIVER (29.0023)	UNTAGGED
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	20	16398	WIND RIVER (29.0023)	051613
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	20	1504	UIND RIVER (29.0023)	UNTAGGED
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	20	26403	WIND RIVER (29.0023)	051614
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	20	9028	WIND RIVER (29.0023)	UNTAGGED
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	20	25233	UIND RIVER (29.0023)	051615
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	20	10537	WIND RIVER (29.0023)	UNTAGGED
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	19	22900	WIND RIVER (29.0023)	051616
1984	UIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	19	25460	WIND RIVER (29.0023)	UNTAGGED
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	19	22602	UIND RIVER (29.0023)	051617
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	19	24579	WIND RIVER (29.0023)	UNTAGGED
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	19	20288	WIND RIVER (29.0023)	051618
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	19	28912	UIND RIVER (29.0023)	UNTAGGED
1984	UINO R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	20	21631	WIND RIVER (29.0023)	051619
1984	UIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	20	27826	WIND RIVER (29.0023)	UNTAGGED
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	20	23190	UINO RIVER (29.0023)	051620
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	20	10000	UINO RIVER (29.0023)	UNTAGGED
1984	UINO R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	20	24804	UINO RIVER (29.0023)	051621
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	20	8184	WIND RIVER (29.0023)	UNTAGGED
1984	UINO R (CARSON NFH)	CARSON NF HATCHERY	smott	04/15/86	04/15/86	20	24627	WIND RIVER (29.0023)	051622
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	smott	04/15/86	04/15/86	20	27145	UIND RIVER (29.0023)	UNTAGGED
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	19	23715	WIND RIVER (29.0023)	051623
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	19	26656	WIND RIVER (29.0023)	UNTAGGED
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	19	26417	WIND RIVER (29.0023)	051624
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	19	9245	WIND RIVER (29.0023)	UNTAGGED
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	19	25866	WIND RIVER (29.0023)	051625

Table 11 (cont.). Hatchery releases of spring chinook salmon into the Wind River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1984	UINO R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	19	10412	WIND RIVER (29.0023)	UNTAGGED
1984	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	19	1334124	WIND RIVER (29.0023)	UNTAGGED
1984	ABERNATHY CREEK	CARSON NF HATCHERY	Smolt	04/15/86	04/15/86	19	1334124	WIND RIVER (29.0023)	UNTAGGED
1985	ABERNATHY CREEK	CARSON NF HATCHERY	Fingr	06/25/86	06/25/86	99	80000	PANTHER CR (29.0040)	UNTAGGED
1985	ABERNATHY CREEK	CARSON NF HATCHERY	Fingr	06/25/86	06/25/86	99	80000	TROUT CR (29.00751	UNTAGGED
1985	ABERNATHY CREEK	CARSON NF HATCHERY	Fingr	06/23/86	06/23/86	102	140000	WIND RIVER (29.0023)	UNTAGGED
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	PreSm	11/26/86	11/26/86	35	185000	WIND RIVER (29.0023)	UNTAGGED
1985	ABERNATHY CREEK	CARSON NF HATCHERY	PreSm	11/26/86	11/26/86	35	185000	WIND RIVER (29.0023)	UNTAGGED
1985	ABERNATHY CREEK	CARSON NF HATCHERY	Smolt	04/10/87	04/16/87	19	1627013	WIND RIVER (29.0023)	UNTAGGED
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	19	26345	UIND RIVER (29.0023)	051813
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	19	33258	UIND RIVER (29.0023)	UNTAGGED
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	19	28158	WIND RIVER (29.0023)	051814
1985	UINO R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	19	31220	UINO RIVER (29.0023)	UNTAGGED
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	17	27250	WIND RIVER (29.00231	051815
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	17	31400	WIND RIVER (29.0023)	UNTAGGED
1985	UIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	19	26194	UIND RIVER (29.0023)	051816
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	19	33441	WIND RIVER (29.0023)	UNTAGGED
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	18	26971	WIND RIVER (29.0023)	051817
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	la	32425	WIND RIVER (29.0023)	UNTAGGED
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	18	28368	UINO RIVER (29.0023)	051818
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	18	30827	WIND RIVER (29.0023)	UNTAGGED
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	la	26996	UIND RIVER (29.0023)	051819
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	18	12730	WIND RIVER (29.0023)	UNTAGGED
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	la	28812	WIND RIVER (29.0023)	051820
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	18	10825	WIND RIVER (29.0023)	UNTAGGED
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	18	27051	WIND RIVER (29.0023)	051821
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	18	12849	WIND RIVER (29.0023)	UNTAGGED
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	18	28450	WIND RIVER (29.0023)	051822
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	18	11332	WIND RIVER (29.0023)	UNTAGGED
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	18	27878	WIND RIVER (29.0023)	051823
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	18	12181	WIND RIVER (29.0023)	UNTAGGED
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	la	29035	WIND RIVER (29.00231	051824
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	18	10281	WIND RIVER (29.00231	UNTAGGED
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	18	16691	UIND RIVER (29.0023)	051825
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	18	2888	WIND RIVER (29.0023)	UNTAGGED
1985	UINO R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	18	19070	WIND RIVER (29.0023)	051826
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	18	539	WIND RIVER (29.00231	UNTAGGED
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	17	18842	WIND RIVER (29.0023)	051827
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	17	992	WIND RIVER (29.0023)	UNTAGGED
1985	UINO R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	17	18557	WIND RIVER (29.0023)	051828
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	17	1185	WIND RIVER (29.0023)	UNTAGGED
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	18	18931	WIND RIVER (29.0023)	051829
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	18	765	UIND RIVER (29.0023)	UNTAGGED
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	la	18690	WIND RIVER (29.0023)	051830
1985	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/87	04/15/87	18	724	WIND RIVER (29.0023)	UNTAGGED
1986	WIND R (CARSON NFH)	CARSON NF HATCHERY	Fingr	06/12/87	06/12/87	104	65000	TROUT CR (29.0075)	UNTAGGED
1986	ABERNATHY CREEK	CARSON NF HATCHERY	Fingr	06/12/87	06/15/87	103	80000	TROUT CR (29.0075)	UNTAGGED
1986	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/14/88	04/14/88	19	833420	WIND RIVER (29.0023)	UNTAGGED
1986	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/14/88	04/14/88	19	833420	WIND RIVER (29.0023)	UNTAGGED
1986	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/88	04/15/88	19	1122800	WIND RIVER (29.0023)	UNTAGGED
1986	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/15/88	04/15/88	19	1122800	WIND RIVER (29.0023)	UNTAGGED
1987	WIND R (CARSON NFH)	CARSON NF HATCHERY	EmFry	01/21/88	01/21/88	1296	206610	WIND RIVER (29.0023)	UNTAGGED
1987	WIND R (CARSON NFH)	CARSON NF HATCHERY	FeFry	01/21/88	01/21/88	1296	206610	WIND RIVER (29.0023)	UNTAGGED
1987	WIND R (CARSON NFH)	CARSON NF HATCHERY	Fingr	07/12/88	07/12/88	66	237995	WIND RIVER (29.0023)	UNTAGGED
1987	WIND R (CARSON NFH)	CARSON NF HATCHERY	Fingr	07/12/88	07/12/88	66	237995	WIND RIVER (29.0023)	UNTAGGED

Table 11 (cont.). Hatchery releases of spring chinook salmon into the Wind River subbasin sorted by brood year, hatchery & life stage - CONTINUED.

Brood Year	stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CUT Code
1987	WIND R (CARSON NFH)	CARSON NF HATCHERY	Fingr	07/13/88	07/13/88	75	173197	WIND RIVER (29.0023)	UNTAGGED
1987	WIND R (CARSON NFH)	CARSON NF HATCHERY	Fingr	07/13/88	07/13/88	75	173197	WIND RIVER (29.0023)	UNTAGGED
1987	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/19/89	04/19/89	18	437998	WIND RIVER (29.0023)	UNTAGGED
1987	UINO R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/19/89	04/27/89	18	1983639	WIND RIVER (29.0023)	UNTAGGED
1987	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/20/89	04/20/89	la	328890	WIND RIVER (29.0023)	UNTAGGED
1987	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/20/89	04/20/89	18	677008	WIND RIVER (29.0023)	UNTAGGED
1987	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/20/89	04/20/89	18	439743	WIND RIVER (29.0023)	UNTAGGED
1987	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/27/89	04/27/89	la	100000	WIND RIVER (29.0023)	UNTAGGED
1988	UINO R (CARSON NFH)	CARSON NF HATCHERY	EmFry	01/13/89	01/13/89	1260	307000	WIND RIVER (29.0023)	UNTAGGED
1988	UIND R (CARSON NFH)	CARSON NF HATCHERY	EmFry	01/13/89	01/13/89	1260	307000	WIND RIVER (29.0023)	UNTAGGED
1988	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/12/90	04/12/90	19	22877	UIND RIVER (29.0023)	052219
1988	UIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/12/90	04/12/90	19	1029764	WIND RIVER (29.0023)	UNTAGGED
1988	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/90	04/13/90	19	22381	WIND RIVER (29.0023)	052220
1988	UINO R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/13/90	04/13/90	19	1030259	WIND RIVER (29.0023)	UNTAGGED

Table 12 (TD). Parasites and diseases of spring chinook at the Carson National Fish Hatchery .

Disease type	Hatchery	Specific Pathogen
Bacteria	Carson NFH	*Aeromonas salmonicida* (Furunculosis)
Bacteria	Carson NFH	*Renibacteruim salmoninarum*[a]
Bacteria	Carson NFH	Myxobacteria
Parasite	Carson NFH	*Ichytyobodo*
Parasite	Carson NFH	*Epistylis*
Parasite	Carson NFH	*Ambiphrya*
Parasite	Carson NFH	*Ceratomyxa shasta*
Parasite	Carson NFH	*Qstidicola stigmatura*
Parasite	Carson NFH	*Hexamita*
Virus	Carson NFH	EIBS
Virus	Carson NFH	IHN

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

[a] This disease occurred at the hatchery prior to 1981, but has not recurred since.

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WIND -RIVER SUBBASIN

Fall Chinook

GEOGRAPHIC LOCATION

The Wind River is located in southwestern Washington and enters the Columbia River above Bonneville Dam at River Mile (RM) 154.5. The Wind is about 30.5 miles long, drains about 225 square miles and lies within Skamania County. Much of the subbasin is within the Gifford Pinchot National Forest. Carson National Fish Hatchery is located at Tyee Springs.

ORIGIN

Historically, Bryant (1949) noted a small run of fall chinook below Shipperd Falls. Shipperd Falls at RM 2 is a series of falls approximately 40 feet high that blocked fall chinook migration. Fall chinook in the Columbia are managed as a large aggregate stock and the Wind River stock is part of the Bonneville Pool Hatchery (BPH) "tule" stock (WDW, 1990).

The State of Washington established a salmon hatchery near the mouth of the Wind River in 1899. In 1926, the U.S. Fish and Wildlife Service took over operation for two years, rebuilt the hatchery and gave back operations to Washington Fisheries until the area was inundated in 1938 by the completion of Bonneville Dam (WDF, 1951). The hatchery was solely for the purpose of production of fall chinook stock taken from the Wind River. In 1937, Carson National Fish Hatchery was constructed at Tyee Springs on the Wind River. In the 1940's and early 1950's , operation of the racks at the mouth of the Wind River provided means for counting spawning escapement and egg collection (WDF, 1951). When the Carson Hatchery was built its production was primarily fall chinook. Over time the emphasis has switched to the production of spring chinook with no hatchery production of fall chinook. The last known hatchery release of fall chinook in the Wind River was in 1976.

DISTRIBUTION

In 1956, Shipperd Falls were laddered permitting salmon access to the upper areas. Fall chinook have been observed up to Carson Hatchery but the majority of spawning occurs in the lower river.

PRODUCTION

No fall chinook hatchery production has occurred in the Wind River in recent years, and natural production is the dominant component in the Wind River. These fall chinook are managed with the aggregate BPH "tule" stock. Both "tule" and "bright" stocks are present in the Wind River.

Tables 1 and 2 describe the amount of spawning and rearing habitat by quality, available in the Wind River. This data was derived from the Presence/Absence database of Northwest Power Planning Council, 199 1.

Carrying capacity was estimated at 206,608 smolts, based on the Northwest Power Planning Council's model. Production of fall chinook may be limited by low water flows.

The Wind River fall chinook natural spawn escapement from 1986 - 1990 averaged 502 adults with a low of 11 for 1990 and a high of 1,206 in 1988. Wind River natural escapement by age and brood year for tule fall chinook are presented in Table 4. Total returns of bright fall chinook to the Wind River by age and brood year is presented in Table 3.

Wind River tributary sport catch estimates for tule fall chinook between 1984 - 1986 brood years

averaged 1 adult fall chinook, ranging from a low of zero in 1986 to a high of 2 in 1984, based on punch card data. Wind River tributary sport catches by age and brood year is listed in Table 2.

ADULT LIFE HISTORY

Run size. catch and escapement

Life history data is unavailable for the Wind River fall chinook but is assumed to be similar to Spring Creek Hatchery fish. Ocean commercial and recreational fisheries from Alaska to Washington, in addition to Columbia River gill net and sport fisheries, all harvest a portion of the Wind River origin fall chinook.

From 1970 through 1979, the BPH fall chinook run averaged about 104,000 adults (Howell et al. 1985). In 1980 - 1984, natural and hatchery escapements were adjusted, based on coded-wire tag recoveries, for chinook straying to non-origin areas.

Strays from other hatcheries are common. Strays of bright and tule fall chinook are presented in Tables 5 and 6, respectively.

Time of Migration

BPH fall chinook enter the Columbia in August and migrate until October. BPH stock counts peak at Bonneville Dam around September 4, and September 9 (Howell et al. 1985). About 90 percent of the run has migrated past Bonneville Dam by September 20 (Howell et al. 1985).

Spawning Period

Natural spawning occurs in the Wind River in late September and October.

Spawning Areas

Fish have been observed up to the Carson Hatchery but most spawning occurs in the lower two miles below Shipperd Falls.

Age Comoosition

Assuming similarities with Spring Creek stock, BPH fall chinook mature primarily as three-year-old adults (Howell et al. 1985). Ages also range from two-year-old jacks to five-year-old adults. Age composition percent by brood year for fall chinook spawning naturally is presented in Table 7.

The mean ‘fork length by brood year and age class (freshwater-ocean) for female and male tule fall chinook spawning naturally are presented in Tables 9 and 10, respectively.

Sex Ratio

Female fall chinook comprised 48-100 percent of the fall chinook returning to the Wind River for the 1978 - 1984 brood years. The percent females by brood year and freshwater.ocean rearing ages for the Wind River natural spawners are presented in Table 8.

Fecundity

Fecundity averaged 4,700 eggs per female in the Wind River, based on similarities with Spring Creek Hatchery stock. Specific percent fecundity of natural spawning fall chinook by age and brood year is unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

Fry emerge in January through March (WDW, 1990).

Time, age and size at migration

As fingerlings, fall chinook emigrate from the Wind River subbasin in spring and early summer. Length data of natural fall chinook smolts is unavailable. The number of natural fall chinook salmon that migrate from the Wind River is unavailable.

Hatchery release information for the Wind River by brood year is presented in Table 11.

Survival Rate

A general survival rate of 2.0 percent may be appropriate based on the survival rate of Spring Creek juvenile study by TAC (1984).

DISEASE

Data not available.

BIOCHEMICAL-GENETIC CHARACTERISTICS

Data not available.

Table 1 (HB). Estimated amount of rearing and spawning habitat, by quality, of the Wind River fall chinook production area.

Distance/Area	Excellent	Good	Fair[a]	Poof	Unknown.	Total	Confidence
Miles (%)	100	0	0	0		3.9	
Acres (%)	100	0	0	0		28.4	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 1991.

Table 2 (RN-l). Total age of natural spawner escapement of tule fall chinook returning to the Wind River subbasin by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974							
1975							
1976							
1977				0	0		
1978			101	27	0		
1979	59	260	360	1	0	680	621
1980	4	55	50	1	0	110	106
1981	53	165	37	0	0	255	202
1982	14	130	144	0	0	288	274
1983	2	259	267	0	0	528	526
1984	19	509	1,193	77	0	1,798	1,779
1985	0	13	26	0			
1986	0	9	11				
1987	0	0					
1988	0						

Age composition based on scale reading analysis except:

1981 return year - Spring Creek National Fish Hatchery jack proportion applied, as no jacks were observed in surveys.

1982 return year - Spring Creek National Fish Hatchery age composition used.

1983 return year - Spring Creek National Fish Hatchery jack proportion used.

1984 return year - Age composition from Spring Creek and Little White Salmon National Fish hatcheries combined.

1985 return year - Spring Creek National Fish Hatchery age composition used.

Table 3 (RN-2). Total age of natural spawner escapement of bright fall chinook returning to the Wind River subbasin by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974							
1975							
1976							
1977							
1978							
1979							
1980							
1981							
1982					0		
1983				98	0		
1984			508	521	52		
1985		58	268	42			
1986	0	17	83				
1987	10	0					
1988	7						

1988 return year - population estimate based on live and dead counts in October and November, water visibility, survey efficiency, and bright stock timing.

1989 - 1990 return years - tule expansion factor was applied to peak bright fall chinook count.

No bright fall chinook surveys in the Wind River before 1988.

Age based on scale reading analysis.

Table 4 (AI-l). Immigration of coded wire tagged tule fall chinook into the Wind River subbasin.

Hatchery/Release Site	Recovery Site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Spring Creek National Fish Hatchery/released below Bonneville	Wind River, 198 1	Spawning Ground	20	1	13
Spring Creek National Fish Hatchery/released below Bonneville	Wind River, 1983	Spawning Ground	50	1	10

Based on the following tag codes: 05-4 l-01 and 05-06-49.

Beginning with the 1978 brood.

Table 5 (AI-2). Immigration of coded wire tagged bright fall chinook into the Wind River subbasin.

Hatchery/Release Site	Recovery Site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Little White Salmon/ Drano Lake pens	Wind River, 1989	Spawning Ground	163	2	10
Little White Salmon/ Drano Lake pens	Wind River, 1989	Spawning Ground	163	1	5
Little White Salmon/ Drano Lake pens	Wind River, 1989	Spawning Ground	163	1	5
Little White Salmon/ Drano Lake pens	Wind River, 1990	Spawning Ground	17	1	11

Based on the following tag codes: 05-12-51, 05-12-53, 05-18-07, and B5-01-01

Beginning with the 1978 brood.

No bright fall chinook surveys made prior to 1988 on the Wind River.

Table 6 (AC). Age composition percentage (freshwater.ocean) by brood year for tule fall chinook spawning naturally in the Wind River.

Age Composition (%)

Brood Year	N	1.1	1.2	1.3	1.4
1978					
1979					
1980					
1981	4	0	75.00	25.00	0
1982	13	0	0	100.00	0
1983	48	2.08	56.25	41.67	0
1984	142	1.41	28.87	63.38	6.34
1985					
1986					
1987					
1988					

Age based on scale reading analysis.

Table 7 (AS). Percent females by brood year and age class (freshwater.ocean) for tule fall chinook spawning naturally in the Wind River.

Females (%)

Brood Year	N	1.1	1.2	1.3	1.4	Total % Female
1978					50.00	
1979				50.00		
1980			0	0		
1981	4	0	100.00	100.00	0	100.00
1982	10	0	0	76.92	0	76.92
1983	41	0	88.89	85.00	0	85.42
1984	68	0	41.46	46.67	100.00	47.89
1985						
1986						
1987						
1988						

Age based on scale reading analysis.

Table 8 (AL-a). Mean fork length by brood year and age class (freshwater.ocean) for female tule fall chinook spawning naturally in the Wind River.

Mean Fork Length (cm)

Brood Year	1 . 1	1.2	1.3	1.4
1978				87
N				1
St. Dev.				---
1979			87	
N			13	
St. Dev.			5.20	
1980			80	
N			3	
St. Dev.			8.02	
1981		70	95	
N		3	1	
St. Dev.		2.31	---	
1982			90	
N			10	
St. Dev.			6.18	
1983		78		
N		24		
St. Dev.		4.49		
1984				
N				
St. Dev.				

Age based on scale reading analysis.

Table 9 (AL-b). Mean fork length by brood year and age class (freshwater.ocean) for male tule fall chinook spawning naturally in the Wind River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4
1978				
N				
St. Dev.				
1979			99	
N			1	
St. Dev.			---	
1980		94		
N		13		
St. Dev.		9.11		
1981				
N				
St. Dev.				
1982			102	
N			3	
St. Dev.			1.53	
1983	49	86		
N	1	3		
St. Dev.	---	5.51		
1984	45			
N	2			
St. Dev.	1.41			

Age based on scale reading analysis.

Table 10 (TR). Hatchery releases of fall chinook salmon into the Wind River subbasin sorted by brood year, hatchery and life stage.

Brood Year	stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish Number /lb.	Number Released	Release Site	CWT Code
1975	ABERNATHY CREEK	CARSON NF HATCHERY	Fingr	05/18/76	05/18/76	208	668692	WIND RIVER	UNTAGGED

REFERENCES

Bryant, F. G. 1949. A survey of the Columbia and its tributaries with special reference to its fishery resource. U.S. Fish and Wildlife Service, Special Scientific Report #62.

Howell, P. J., K. Jones, D. Scarnecchia, L. LaVoy, W. Kendra, and D. Ortmann. 1985. Stock Assessment of Columbia River Anadromous Salmonids, Volumes I & II. Final Report of Oregon Department of Fish and Wildlife, Washington Department of Fisheries, Washington Department of Game, and Idaho Department of Fish and Game (Project 83-335, Contract DE-AI79-84BP12737) to Bonneville Power Administration, Portland, Oregon.

TAC (Technical Advisory Committee). 1984. Report to Columbia River Management Plan Renegotiation Committee concerning hatchery reprogramming.6/28/84.

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Washington Department of Wildlife. 1990. Wind River Subbasin, Salmon and Steelhead Production Plan.

WIND SUBBASIN

Coho

GEOGRAPHIC LOCATION

The Wind River is located in southwestern Washington and enters the Columbia above Bonneville Dam at River Mile (RM) 154.5. The Wind River is about 30.5 miles long, drains about 225 square miles and lies within Skamania County. Much of the subbasin is within the Gifford Pinchot National Forest. Carson National Fish Hatchery is located at Tyee Springs (RM 18).

An Indian "in-lieu" fishing site has been set aside near the Wind River mouth in compensation for tribal fishing grounds inundated by Bonneville Dam.

ORIGIN

Limited surveys indicate no evidence of natural spawning coho in the Wind River.

For 1973 through 1984, at least 75 percent of the coho migrating past Bonneville Dam can be accounted for in catches and at hatchery facilities. The remaining escapement of approximately 11,000 adults probably entered tributaries between Bonneville and McNary Dams. On the Washington side of the Columbia River these tributaries include the Wind, Little White Salmon, Klickitat, and Yakima Rivers (WDW, 1990).

Biological data for the Wind River subbasin is assumed to be similar to coho returning to the Little White Salmon National Fish Hatchery.

DISTRIBUTION

Very limited surveys and electroshocker sampling by Washington Department of Fisheries indicate no evidence of coho above Shipperd Falls.

PRODUCTION

No significant coho hatchery production currently exists at the Carson Hatchery and none is anticipated (WDW, 1990). Potential was identified for early and late returning coho in surveys for the Columbia River Fisheries Development Program. In 1944 and 1973, the Carson Hatchery did raise coho for release in the Wind River. Other hatchery releases have also occurred in the Wind River. Table 2 shows hatchery releases by brood year into the Wind River.

The Northwest Power Planning Council's carrying capacity model estimated that 146,380 smolts could be produced (WDW, 1990).

Table 1 describes the amount of spawning and rearing habitat, by quality, available in the Wind River. This data was derived from the Presence/Absence database of the Northwest Power Planning Council, 1991.

Wind River tributary sport catch estimates between 1977 - 1988 return years averaged 17 adult coho, with none caught for the 1982 - 1985 return years and a peak of 103 in 1986 (WDW, 1990). However, specific age and brood year analysis for Wind River sport catch is unavailable.

ADULT LIFE HISTORY

Run size. catch and escapement

Ocean commercial and recreational fisheries off the Oregon coast are the primary harvesters of early coho. The Oregon troll fishery accounts for the highest percentage of the overall catch. Most of the freshwater recreational harvest occurs in the Washington tributaries (Howell et al. 1985).

Based on coded-wire tagged releases of 1976 - 1978 brood late coho, most of the harvest occurs in the Washington and Oregon ocean fisheries. Late coho have a more northerly migration pattern than early coho (WDF, 1990). This is reflected in the catch distribution where the Washington coastal catch comprised 40 percent of the total harvest compared to 20 percent for early coho during 1979 - 1981. Late coho also contribute significantly to the lower Columbia River commercial gill net fishery (Howell et al. 1985).

Harvest rates have averaged 79 percent and 85 percent for Type-S and N stocks, respectively, between 1983 and 1987. Harvest of Type-S coho is occasionally constrained by one or more of the fall chinook stocks. Harvest of Type-N coho is generally not constrained by weak stocks, with hatchery escapement being the only management constraint (WDF, 1990).

Time of Migration

Migration is assumed to be similar to that of the coho from the Little White Salmon River, which return from September through the first week of November (WDW, 1990).

Spawning Period

Assuming biological similarity to that of the Little White Salmon stock coho, spawning occurs in late November.

Spawning Areas

Natural spawning occurs in most areas accessible to coho.

Age composition

Assuming biological similarities between the Wind River coho and the Little White Salmon coho, an average of 10.8 percent return as two-year-old jacks and 89.2 (WDW, 1990) percent of these coho return as three-year-old adults. Specific age composition percentages by brood year for coho spawning naturally are unavailable.

Sex Ratio

All one-year-old ocean fish were males and 38 percent of two-year-olds were female (WDW, 1990).

Accounting for the differential harvest of adult males and females in the gill net fishery, the adult run entering the Columbia River was estimated to be 46 percent females in 1982 and 30 percent females in 1983. Hatchery adult returns were 33 percent females in 1982 and 34 percent females in 1983 (Howell et al. 1985). Specific percent females by brood year and age class for coho spawning naturally are unavailable.

Fecundity

Assuming natural spawning occurs and assuming the Wind River coho are similar to the coho stock returning to the Little White Salmon River, the Wind River natural spawn fecundity averaged 2,100 eggs per female (WDW, 1990). Wind River natural spawn fecundity by freshwater.ocean rearing and brood year is unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

The juvenile life history for Wind subbasin coho is similar to that of other stocks in the region with an early spring emergence in mid-January to February (WDW, 1990).

Time. age and size at migration

Based on coded-wire tag recovery studies by Dawley et al. (1982), arrival in the Columbia River estuary occurs soon after hatchery release (Howell et al. 1985). Length data of natural coho smolts from the Wind River is unavailable. The number of natural juvenile coho salmon that migrate from the Wind River is also unavailable.

Survival Rate

A generalized recent year smolt to adult survival rate for coho was estimated to be 2.5 percent (TAC 1983, Howell et al. 1985).

BIOCHEMICAL-GENETIC CHARACTERISTICS

Data has not been compiled.

DISEASE

Data has not been compiled.

Table 1 (HB). Estimated amount of rearing and spawning habitat, by quality, of wind River coho production area.

Distance/Area	Excellent	Good	Fair"	Poor"	Unknown.	Total	Confidence
Miles (%)	00	32	2	66		31.7'	
Acres (%)	00	00	5	1	94	432.1	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 199 1.

Table 2 (TR). hatchery releases of COHO salmon into the WIND RIVER subbasin sorted by brood year, hatchery and life stage.

Brood Year	stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /Lb.	Number Released	Release Site	CUT Code
1966	WASHOUGAL R TYPE-S	UASHOUCAL HATCHERY	EmFry	02/08/67	02/08/67	1163	250128	TROUT CR (29.0075)	UNTAGGED
1967	WASHOUGAL R TYPE-S	WASHCUCAL HATCHERY	Fingr	02/20/68	02/20/68	986	249480	TROUT CR (29.0075)	UNTAGGED
1970	WASHOUGAL R TYPE-S	UASHCUGAL HATCHERY	EmFry	02/10/71	02/10/71	1296	183300	BEAR CREEK (29.0029)	UNTAGGED
1970	UASHOUGAL R TYPE-S	WASHOUGAL HATCHERY	EmFry	02/09/71	02/09/71	1296	122200	PANTHER CR (29.0040)	UNTAGGED
1970	UASHWGAL R TYPE-S	WASHOUGAL HATCHERY	EmFry	02/09/71	02/09/71	1296	122200	TROUT CR (29.0075)	UNTAGGED
1970	UASHCUGAL R TYPE-S	UASHOUGAL HATCHERY	Fingr	05/11/71	05/11/71	405	1186'144	TROUT CR (29.0075)	UNTAGGED
1971	WIND R (CARSON NFH)	CARSON NF HATCHERY	Smolt	04/23/73	04/23/73	19	1540600	WIND RIVER (29.0023)	UNTAGGED
1972	WASHOUGAL R TYPE-S	WASHOUGAL HATCHERY	EmFry	02/06/73	02/06/73	1260	358976	BEAR CREEK (29.0029)	UNTAGGED
1972	WASHOUGAL R TYPE-S	UASHWGAL HATCHERY	EmFry	02/07/73	02/07/73	'1260	358976	PANTHER CR (29.0040)	UNTAGGED
1981	COWLITZ TYPE-N STOCK	COWLITZ HATCHERY	Fingr	08/18/82	08/18/82	92	59064	TROUT CR (29.0075)	UNTAGGED
1986	WILLARD (L UHT SALM)	WILLARD NF HATCHERY	Fingr	02/08/88	02/08/88	31	1050500	WIND RIVER (29.0023)	UNTAGGED
1986	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	05/24/88	05/24/88	15	1659908	WIND RIVER (29.0023)	UNTAGGED
1987	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Fingr	06/03/88	06/03/88	140	220059	WIND RIVER (29.0023)	UNTAGGED

REFERENCES

Dawley, E. R. Ledgerwood, T. Blahm, and J. Jensen. 1982. Migrational characteristics of juvenile salmonids entering the Columbia River estuary in 1981. National-Marine Fisheries Service.

Howell, P. J., K. Jones, D. Scamecchia, L. LaVoy, W. Kendra, and D. Ortmann. 1985. Stock Assessment of Columbia River Anadromous Salmonids, Volumes I & II. Final Report of Oregon Department of Fish and Wildlife, Washington Department of Fisheries, Washington Department of Game, and Idaho Department of Fish and Game (Project 83-335, Contract DE-AI79-84BP12737) to Bonneville Power Administration, Portland, Oregon.

TAC (Technical Advisory Committee). 1984. Report to Columbia River Management Plan Renegotiation Committee concerning hatchery reprogramming. 6/28/84.

Washington Department of Fisheries. 195 1. Lower Columbia Fiver fisheries development program. Wind River area, Washington. Washington Department of Fisheries and U.S. Fish and Wildlife Service.

Washington Department of Wildlife. 1990. Wind River Subbasin, Salmon and Steelhead Production Plan.

WIND RIVER SUBBASIN

Naturally -Produced Summer Steelhead

GEOGRAPHIC LOCATION

The Wind River is located in southwest Washington and flows approximately 30.5 miles before entering the Columbia River above Bonneville Dam at river mile (RM) 154.5. The Wind flows through varying terrain starting with the steep narrow canyons which surround the headwaters, to the wide floodplain which is characteristic of the mid-river ending with the lower 10 miles of river plunging through a series of steep, rapidly descending chutes. The watershed drains approximately 225 square miles mostly within the Gifford Pinchot National Forest.

ORIGIN

The wild summer steelhead stock in the Wind River is native, although interbreeding with introduced Skamania hatchery stock has likely occurred.

DISTRIBUTION

Summer steelhead are distributed throughout the mainstem Wind River and within most tributaries including the Little Wind River (RM 1.1), Panther Creek (RM 4.3), Bear Creek (RM 4.3), Trout Creek (RM 10.8), Trapper Creek (RM 18.9), Dry Creek (19.1), and Paradise Creek (RM 25.1). High drop-offs and waterfalls are in some of these streams, some have been modified to permit fish passage while others continue to prevent or impede fish passage. Shipherd Falls, located on the mainstem Wind river at RM 2.1, consisted of a series of cascading falls approximately 40 feet high and although access over the falls was difficult, steelhead were known to negotiate the stair-step falls under favorable conditions. In 1956, Shipherd Falls was laddered allowing all anadromous fish access to the upper basin.

PRODUCTION

Production Facilities

One hatchery operates in the subbasin, Carson National Fish Hatchery under the direction of the U.S. Fish and Wildlife Service. Carson Hatchery rears and releases spring chinook into the Wind River. No hatchery steelhead production occurs within the Wind River basin.

Production Summary

No data are available on smolt production. Smolt capacity for summer steelhead was estimated at 62,273 fish based on Northwest Power Planning Council smolt production model (1990). The Washington Department of Wildlife developed a methodology for estimating smolt production based on stream gradient and known densities of parr in Washington streams. Using this method Lucas and Nawa (1986) calculated 23,498 smolts could be produced in the subbasin.

Production constraints are primarily from logging in the upper watershed which has resulted in increased sediment deposits, destruction of riparian habitat, log or debris jams and high summer water temperatures. In addition, construction of Bonneville Dam inundated the lower one mile of river destroying spawning and rearing habitat.

ADULT LIFE HISTORY

Run Size and Escapement

Limited data on run size and escapement. Escapement from- 1985 through 1991 averaged 478 fish (Tables 2 and 3). Historically, the Wind River was renowned for a large run of summer steelhead, which according to estimates obtained from angler surveys, numbered 2,500 to 5,000 fish prior to 1950 (Howell et al. 1985). In addition, reports stated that large numbers of steelhead were seen congregating below Shipherd Falls in June waiting to migrate into the upper river.

Time of migration

Adult time of entry for summer steelhead into the Wind River is generally from March through December with peak returns occurring between July and October.

Harvest

Ocean catch of Wind River steelhead is unknown. Harvest of returning adult summer steelhead within the Columbia River is estimated at 7.7 percent above Bonneville Dam and 2.4 percent below Bonneville Dam based on the System Planning Model.

Since 1982, Wind River sport fishing regulations require release of all wild steelhead caught between June 1 and November 30. Since 1990, the Wind River has had wild fish release regulations year round and only adipose-clipped hatchery fish may be retained. In addition, restrictions on access to fish Shipherd Falls were implemented to protect wild returning summer steelhead which tend to congregate in these areas. To protect juveniles, a 12 inch minimum size and two fish bag limit for trout was also imposed. Harvest of Wind River steelhead averaged 1,373 fish from 1977 through 1982 but declined to 421 fish from 1983 through 1991 after wild release regulations were imposed and plants halted for a couple of years. Harvest also remained low during the mid 1980's due to cancellation of hatchery smolt releases into the river. Harvest has increased in recent years as hatchery releases resumed in 1986 (Table 2).

The Wind River subbasin is part of Yakima Indian Nation lands and thus entitles the tribe to legally catch an equal portion of the harvestable fishery resources.

Spawning period

Spawning usually occurs from February through May with March through April being the peak time.

Spawning areas

Spawning occurs in the mainstem Wind River and its major tributaries.

Fecundity

No data are available for the Wind River.

Age Comnosition

Limited data on adult age structure. Based on 19 wild fish collected in 1981, 58 percent were 2.2

age class and 26 percent were 2.3 age class (Table 4).

Size

Mean fork lengths from wild summer steelhead caught in 1981 ranged from 65 cm to 84 cm. Table 6 presents lengths for individual age classes.

Sex ratio

Sex ratio for 19 wild steelhead caught in 1981 was 63 percent female (Table 5).

Survival Rate

No data are available on Wind River steelhead.

JUVENILE LIFE HISTORY

Egg

No data on egg production or egg to smolt survival.

Emergence

Emergence occurs from May through June.

Juvenile rearing

Juvenile rearing lasts approximately two years prior to ocean emigration, although some juveniles emigrate after one or three years (Loch et al. 1985). Juvenile migration generally occurs from April through May with peak migration in early May.

Hatchery Releases

Skamania hatchery stock is the exclusive hatchery stock planted in the Wind River. Data relating to Skamania stock returning to the Wind River is unknown. However, Leider has intensively studied and recorded information on the Skamania stock on the Kalama River and that information is presented in the Kalama River summer steelhead report. Table 7 listed hatchery releases into the Wind River from 1981 through 1990.

BIOCHEMICAL-GENETIC CHARACTERISTICS

No direct data on Wind River stocks, although Schreck (1986) studied stock identification of various Columbia River steelhead, including Wind River stock, using cluster analysis of meristic and electrophoretic characteristics and determined that geographical proximal stocks tend to be like each other.

DISEASES

Disease history for smolts planted in the Wind River is presented in Table 8.

REFERENCES

The references for this section appear at the end of the following steelhead section.

Table 1 (HB-1). Estimated* amount -of rearing and spawning habitat, by quality, of Wind River subbasin summer steelhead.

Area	Excellent	Good	Fair[B]	Poor[B]	Unknown	Total	Confidence
Miles	11.4%	70.0%	18.6%	0.0%		79.0	Unknown
Acres	13.2%	73.6%	13.2%	0.0%		226.8	Unknown

*Northwest Power Planning Council estimates base on limited observations.

[B]Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by man.

Source: Presence/absence database, NPPC, 1991.

Table 2 (RB-a). Returns (escapement and sport catch) summer steelhead to the Wind River subbasin.

Return Year	Escapement*[A]	Sport Catch[B]	Total
1980		1,038	Unknown
1981		1,471	Unknown
1982		1,277	Unknown
1983		213	Unknown
1985	434	94	528
1986	428	104	532
1987	608	714	1322
1988	826	670	1496
1989	464	713	1238
1990	228	460	668
1991	294	403	697
1992	286		

*Escapement mostly wild fish.
*Escapement based on redd counts.
[B]Sport catch within subbasin only.

Source: Columbia Basin System Planning, Wind River Subbasin Plan, 1990.
Lucas, B. and K. Pointer, 1987. WDW report # 87-6.
John Weinheimer, unpublished WDW data.
Sport catch based on WDW permit-card harvest estimates.

Table 3 (RN-a). Wind River subbasin steelhead spawning escapement, 1985-1988.

Section	1985[A]	1986[B]	1987[C]	1988[D]	1989[D]	1990[D]	1991[D]	1992[D]
Wind River	208	190	206	376	204	74	96	172
Tributaries	30	26	44	88	46	24	63	18
Trout Creek	48	88	96	92	58	34	49	40
Tributaries	114	98	234	156	93	65	60	12
Panther Creek	18 16	22	6 22	68	63+	18 13	26+	44
Tributaries		4		46				0
Totals	434	428	608	826	464	228	294	286

*Combined total
*Lucas and Nawa 1986.
[B]Chilcote M. and T. Willson. Unpublished WDW report.
'Lucas B. and K. Ponter. WDW report # 87-6.
[D]Weinheimer J., Unpublished WDW data.

Table 4 (AC-a). Age composition percentage (freshwater.ocean) by return year, for wild adult summer steelhead originating in the Wind River.

Return Year	1.2	2.1s	2.2	2.3	3.2
1981-82	5.2	5.2	57.8	26.3	5.2

Based on 19 wild fish sampled for Wind River sport catch.

Age data based on scale analysis.

Source: Wind River Subbasin Production Plan, 1990.

Table 5 (AS-a). Percent females by return year and age class for adult wild summer steelhead originating in the Wind River.

Return Year.	x.1	x.2	x.3	All ages
1981-82				63.1%

Based on 19 fish sampled from Wind River sport catch.

Source: Wind River Subbasin Production Plan, 1990.

Table 6 (AL-a). Mean fork length by return year and age class for wild adult summer steelhead originating in the Wind River.

Mean Fork length (cm)

Return Year	1.2	2.1s	2.2	2.3	3.2
1981-82	65	76	70	84	74

Based on 19 wild fish sampled for Wind River sport catch.

Age data based on scale analysis.

Source: Stock Assessment of Columbia River Anadromous Salmonids, Vol II., 1985.

Table 7 (TR). Hatchery releases of summer steelhead into the Wind river by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish \ lb.	Number Released	Release Site	CWT Code/ Fin Clip
1983	Washougal R WF/NF	Skamania	Smolt	04/25/ 84	5.2	6,011	Wind R	AD
1983	Washougal R WF/NF	Skamania	Smolt	04/25/84	5.2	6,063	Wind R	AD
1983	Washougal R WF/NF	Skamania	Smolt	04/26/84	5.2	6,032	Wind R	AD
1983	Washougal R WF/NF	Skamania	Smolt	04/26/84	5.2	6,100	Wind R	AD
1983	Washougal R WF/NF	Skamania	Smolt	04/26/84	5.2	5,060	Wind R	AD
1983	Washougal R WF/NF	Skamania	Smolt	04/26/84	5.0	5,780	Wind R	AD
1983	Washougal R WF/NF	Skamania	Smolt	04/27/84	5.1	5,095	Wind R	AD
1983	Wind R	Skamania	Non-smolt	04/14/83	170.2	4,988	Unknown	
1983	Wind R	Skamania	Non-smolt	06/01/83	2000.0	6,000	Unknown	
1983	Wind R	S kamania	Smolt	04/14/83	0.0	4,988	Unknown	
1984	Washougal R	Vancouver	Smolt	05/02/85	4.5	5,625	Wind R	AD
1984	Washougal R	Vancouver	Smolt	05/02/85	4.5	5,625	Wind R	AD
1984	Washougal R	Vancouver	Smolt	05/03/85	4.5	5,625	Wind R	AD
1984	Washougal R	Vancouver	Smolt	05/03/85	4.8	6,096	Wind R	AD
1984	Washougal R WF/NF	Vancouver	Smolt	04/09/85	4.8	7,224	Wind R	AD
1985	Washougal R WF/NF	Vancouver	Non-smolt	10/01/85	58.0	2,900	Wind R	
1985	Washougal R WF/NF	Vancouver	Non-smolt	10/01/85	58.0	1,740	Wind R	
1985	Washougal R WF/NF	Vancouver	Non-smolt	10/13/85	58.0	2,900	Wind R	
1985	Washougal R WF/NF	Vancouver	Non-smolt	10/15/85	58.0	2,900	Wind R	
1985	Washougal R WF/NF	Vancouver	Non-smolt	10/20/85	58.0	5,568	Wind R	
1985	Washougal R WF/NF	Vancouver	Smolt	04/22/86	5.2	8,840	Wind R	AD
1985	Washougal R WF/NF	Vancouver	Smolt	04/23/86	5.2	8,580	Wind R	AD

Table 7 (cont.). Hatchery releases of summer steelhead into the Wind River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish \ lb.	Number Released	Release Site	CWT Code/ Fin Clip
1985	Washougal R WFINF	Vancouver	Smolt	04/25/86	5.2	7,800	Wind R	AD
1985	Washougal R WFINF	Vancouver	Smolt	04/25/86	5.2	2,730	Wind R	AD
1986	Washougal R	Vancouver	Smolt	04/17/87	5.0	14,500	Wind R	AD
1986	Washougal R	Vancouver	Smolt	04/18/87	5.0	5,500	Wind R	AD
1987	Washougal R	Vancouver	Smolt	04116188	5.5	9,020	Wind R	(A D
1987	Washougal R	Vancouver	Smolt	04/19/88	5.6	8,456	Wind R	AD
1987	Washougal R	Vancouver	Smolt	04/20/88	5.6	2,800	Wind R	AD
1988	Washougal R	Vancouver	Smolt	04/16/89	5.3	7,791	Wind R	AD
1988	Washougal R	Vancouver	Smolt	04/18/89	5.3	8,056	Wind R	AD
1988	Washougal R	Vancouver	Smolt	04/19/89	5.3	16,085	Wind R	AD
1988	Washougal R	Vancouver	Smolt	04/20/89	5.3	8,480	Wind R	AD
1989	Washougal R	Vancouver	Smolt	04/16/90	4.6	6,233	Wind R	
1989	Washougal R	Vancouver	Smolt	04/17/90	4.6	6,900	Wind R	
1989	Washougal R	Vancouver	Smolt	04/18/90	4.6	6,992	Wind R	
1990	Washougal R	Vancouver	Smolt	04/22/9 1	5.3	7,844	Wind R	AD
1990	Washougal R	Vancouver	Smolt	04/24/9 1	5.5	8,277	Wind R	AD
1990	Washougal R	Vancouver	Smolt	04/25/9 1	5.6	8,372	Wind R	AD
1990	Washougal R	Vancouver	Smolt	04/25/9 1	5.6	8,540	Wind R	AD
1990	Washougal R	Vancouver	Smolt	04/25/91	5.6	8.512	Wind R	AD

Source: Terry Lovgren, WDW Hatchery Stocking Database, 1991.

Table 8 (TD). Parasites and diseases isolated at-hatcheries which reared Wind River summer steelhead smolts.

Disease Type	H a t c h e r y	Specific Pathogen
Bacterial	Skamania[A]	*Renibacterium salmonarium* (BKD)
Bacterial	Skamania	*Flexibacter columnaris* (Columnar-is)
Bacterial	Skamania	*Flexibacter cytophaga* (Coldwater)
Bacterial	Skamania	*Renibacterium salmonarium* (BKD)
Parasite	Skamania	*Hexamita sp.*
Parasite	Skamania	*Ichthyophthirius multiflis* (Ich)
Parasite	Skamania	*Ichthyoboda sp.* (Costia)
Parasite	Skamania	*Trichodina sp.*
Viral	Skamania	*Infectious hematopoietic necrosis* (IHN)
Bacterial	Vancouver[B]	*Aeromonas salmonicida* (Furunculosis)
Bacterial	Vancouver	*Flexibacter cytophaga* (Coldwater)
Bacterial	Vancouver	*Flavobacterium sp.*
Bacterial	Vancouver	*Renibacterium salmonarium* (BKD)
Parasite	Vancouver	*Gyrodactylus sp.*
Parasite	Vancouver	*Hexamita sp.*
Parasite	Vancouver	*Zchthyoboda sp.* (Costia)
Parasite	Vancouver	*Ichthyophthirius multiflis* (Ich)
Parasite	Vancouver	*Trichodina sp.*

*Vancouver Hatchery is located adjacent to the Lower Columbia River at the City of Vancouver.

[B]Skamania Hatchery is located on the Washougal River.

Disease history represents pathogens isolated at these hatcheries and not necessarily a disease outbreak.

Source: WDW pathologist, Steve Roberts, 199 1.

WIND RIVER SUBBASIN

Naturally Produced Winter Steelhead

GEOGRAPHIC LOCATION

The Wind River is located in southwest Washington and flows approximately 30.5 miles before entering the Columbia River above Bonneville Dam at river mile (RM) 154.5. The Wind flows through varying terrain starting with the steep narrow canyons which surround the headwaters, to the wide floodplain which is characteristic of the mid-river ending with the lower 10 miles of river plunging through a series of steep, rapidly descending chutes. The watershed drains approximately 225 square miles mostly within the Gifford Pinchot National Forest.

ORIGIN

The wild winter steelhead stock in the Wind River is native, although interbreeding with introduced Chambers Creek hatchery stock during the 1950's may have occurred.

DISTRIBUTION

Wind River winter steelhead are distributed throughout the mainstem Wind River with fish distributed above Shipherd Falls up to Trout Creek (Howell et al. 1985) and probably throughout the system.

PRODUCTION

Production Facilities

One hatchery operates in the subbasin, Carson National Fish Hatchery under the direction of the U.S. Fish and Wildlife Service. Carson Hatchery rears and releases spring chinook into the Wind River. No steelhead production occurs within the Wind River basin.

Production Summary

No data are available on smolt production. Smolt capacity for winter steelhead was estimated at 3,764 fish based on Northwest Power Planning Council (1990) smolt production model. Production constraints are primarily from logging in the upper watershed which has resulted in increased sediment deposits, destruction of riparian habitat, log or debris jams and high summer water temperatures. In addition, construction of Bonneville Dam inundated the lower one mile of river destroying spawning and rearing habitat.

ADULT LIFE HISTORY

Run Size and Escapement

No data on run size and escapement. Currently, the wild winter steelhead run size is considered small at an estimated 60 fish (Howell et al. 1985). Historically, the winter steelhead run size was thought to be small with summer steelhead comprising the vast majority of steelhead returns. No life history information exists for this stock.

Time of migration

Adult time of entry for winter steelhead into the Wind River is probably from January through May with peak returns occurring in March.

Harvest

Ocean catch of Wind River steelhead are unknown.

Harvest of returning adult winter steelhead within the Columbia River is unknown, However, the Columbia River treaty Indian and sport fishery catches large numbers of steelhead with some Wind River steelhead likely being part of the Columbia River harvest. The sport fishery also results in the harvest of an unknown (but presumed smaller) number of steelhead.

Wind River sport fishing regulations require release of all wild steelhead, only adipose-clipped hatchery fish may be retained. In addition, restrictions on access to fish Shipherd Falls were implemented to protect wild returning steelhead which tend to congregate in these areas. To protect juveniles, a 12 inch minimum size and two fish bag limit for trout was also imposed. Sport catch of winter fish is unknown, although using a December through May catch period, as reported on angler permit cards, winter catch averaged 84 fish from 1977 through 1988.

The Wind River subbasin is part of the Yakima Indian Nations lands and thus entitles the tribe to legally catch a equal portion of the harvestable fishery resources.

Spawning period

Spawning is primarily from March through June.

Spawning area

Winter steelhead have been documented spawning as far upstream as Trout Creek.

Fecundity

No data are available for Wind River steelhead.

Age Comnosition

No data are available for Wind River steelhead.

Size

No data are available for Wind River steelhead.

Sex ratio

No data are available for Wind River steelhead.

Survival Rate

No data are available for Wind River Steelhead.

JUVENILE LIFE HISTORY

Egg

No data on egg production or egg to smolt survival.

Emergence

Emergence data unknown.

Juvenile rearing

Juvenile rearing lasts approximately two years prior to ocean emigration.

Juvenile migration generally occurs from April through May with peak migration in early May.

Hatchery Releases

Currently, no hatchery produced winter steelhead are planted in the Wind basin, Hatchery releases of Chambers Creek stock were conducted in the 1950's and early 1960's. Adult returns from these releases were poor and hatchery releases were discontinued.

Straying

No data are available on Wind River steelhead.

BIOCHEMICAL-GENETIC CHARACTERISTICS

No data are available on Wind River steelhead.

DISEASES

No data are available on Wind River steelhead.

REFERENCES

Howell, P. J., K. Jones, D. Scamecchia, L. LaVoy, W. Kendra, and D. Ortmann. 1985. Stock assessment of Columbia River anadromous salmonids, volumes I & II. Final report of Oregon Department of Fish and Wildlife, Washington Department of Fisheries, Washington Department of Game, and Idaho Department of Fish and Game (Project 831335, Contract DE-AI79-84BP12737) to Bonneville Power Administration, Portland, Oregon.

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Weinheimer J., unpublished WDW data.

WDW Columbia Basin System Planning, Wind River Subbasin Production Plan 1990.

WHITE SALMON SECTION CONTENTS

The White Salmon River chapter is composed of three sections: the White Salmon (sometimes called the Big White Salmon), the Little White Salmon, and the Spring Creek National Fish Hatchery.

The Little White Salmon River enters the Columbia about six miles below the mouth of the Big White Salmon River. Reporting for the Little White Salmon River follows after the Big White Salmon section.

The Spring Creek National Fish Hatchery is located on the Columbia River, about a mile below the mouth of the Big White Salmon River. Reporting for this facility follows that of the Little White Salmon.

WHITE SALMON SUBBASIN

Spring Chinook

GEOGRAPHIC LOCATION

The White Salmon (also commonly called the Big White Salmon) River is located in south central Washington in Klickitat and Skamania counties. The river begins on the southwest slope of Mount Adams and flows south about 45 miles into Bonneville Pool on the Columbia River (RM 168.3). Drainage area is approximately 386 square miles. Approximately 47 percent of the subbasin is in the Gifford Pinchot National Forest. The White Salmon rearing ponds are located at RM 1.5.

The U. S. Army Corps of Engineers has established an "in-lieu" site for tribal fishing access at the mouth of the river. The site has been set aside in compensation for tribal fishing grounds inundated by the Bonneville Dam reservoir.

ORIGIN

Spring chinook were formerly present in the subbasin and Indians fished for salmon (probably spring chinook) at the falls near Husum (Fulton 1968). However, with exception of returns from recent hatchery fingerling plants above Condit, spring chinook are not present in the subbasin. Cowlitz (1982), Little White Salmon (1986) and Carson (1984-86, and 1988 and 1990) stocks have been released into the White Salmon River subbasin (WDW, 1990).

DISTRIBUTION

Historical distribution was probably confined below the falls at RM 16.3. Condit Dam has blocked all migration past RM 3.3 since 1917. Two attempts to ladder the dam failed.

PRODUCTION

Between 1982 through 1986, hatchery juvenile spring chinook have been periodically released into the upper mainstem and Trout Lake Creek above RM 16.3. The White Salmon rearing ponds released juvenile spring chinook in 1988 and 1990.

The White Salmon rearing ponds, located at RM 1.5, were originally constructed to as adult brood stock facilities. The ponds were used for rearing fall chinook until 1984. The ponds are susceptible to flooding and in January 1990 about 1 million fry were released early during high water. Disposition of the ponds for rearing is presently uncertain. Rearing capacity of the facility could be expanded to accommodate 1,450,000 smolts, which is recognized as a long-term program need in United Stated vs. Oregon. The U.S. Fish and Wildlife Service owns 40 acres of land at the site, however funds are not presently available for hatchery expansion (WDW, 1990).

The Northwest Planning Council's habitat capacity model indicated 297,437 smolts could be produced above Condit Dam, including 113,685 between Condit Dam and the falls at RM 16.3. Young and Rybak (1987) estimated 35,000 smolts could be produced above Condit. Chapman (1981) estimated the White Salmon could produce 625 adult chinook (springs and falls) under pristine conditions.

In 1988 and 1989, the Washington Department of Fisheries recorded a peak spawning count of 73 and 40 adult fish, respectively, below Condit Dam. White Salmon River spring chinook natural spawn escapement by age and brood year is unavailable. White Salmon River spring chinook sport catch estimates has been near zero from 1977 through 1986 but 51 adults were caught in 1987 (WDW, 1990). White Salmon River sport catches by age and brood year is unavailable.

ADULT LIFE HISTORY

Run size. catch and escapement

Ocean commercial and recreational fisheries from Alaska to Washington, in addition to Columbia River gill net and sport fisheries all harvest a portion of the White Salmon River origin spring chinook. Out-of-basin harvest on Bonneville Pool stocks, which includes ocean and Columbia River harvest, has averaged about 15 percent (WDW, 1990). Columbia River sport and commercial fisheries are managed to minimize harvest of depressed upriver stocks.

Strays from other hatcheries are uncommon. Table 1 lists the coded wire tags from the 1978 brood through the 1988 brood recovered within the White Salmon subbasin which originated outside the White Salmon subbasin. White Salmon River spring chinook releases have been generally untagged.

Time of Migration

Spring chinook destined for areas upstream of Bonneville Dam begin entering the Columbia River in large numbers in mid-March. Counts peak at Bonneville Dam usually between April 20 and April 28 but can be earlier during abnormally low flow years or later during high run-off. Adult spring chinook enter the subbasin from April to July.

Spawning Period

Natural spawning occurs during the latter part of August and early September.

Spawning Areas

Natural spawning occurs in the three mile stretch downstream from Condit Dam.

Age Comnosition

White Salmon River data are unavailable. However, Carson stock typically ranges from three-year-old jacks to six-year-old adults with four-year-olds or five-year-olds the dominant age classes. Carson stock has been the recent egg source for White Salmon releases.

Sex Ratio

White Salmon River data are unavailable. However in adjacent Carson Hatchery, females comprised 56 - 69 percent of the spring chinook returning to the Carson Hatchery between 1979 - 1984 brood years.

Fecundity

Fecundity data are not available for White Salmon spring chinook. From 1968 - 1984, the number of eggs per female at Carson Hatchery ranged from 3,640 (1968) to 5,180 (1978) and averaged 4,300 (Howell et al. 1985).

JUVENILE LIFE HISTORY

Time of Emergence

No information is available on the naturally produced population. At Carson and Little White Salmon hatcheries, artificial emergence of nearly "buttoned-up" fry occurs primarily in early January to February after exposure to about 1,750 temperature units (Howell et al. 1985).

Time, age and size at migration

Hatchery release information for the White Salmon subbasin by brood year is presented in Table 2. Length data of natural spring chinook smolts from the White Salmon River is unavailable. The number of natural juvenile spring chinook salmon that migrate from-the White Salmon River is also unavailable.

Survival Rate

White Salmon River survival rate is not available. Smolt-to-adult survival for Carson Hatchery spring chinook has averaged 0.3 percent (WDW, 1990).

BIOCHEMICAL-GENETIC CHARACTERISTICS

No data available.

DISEASE

Bacteria and parasitic diseases found in the White Salmon River are unavailable.

REFERENCES

The references for this section appear at the end of the following chinook section.

Table 1 (AE). Emigration of coded wire tagged spring chinook from the White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Big White Salmon	Little White Salmon, 1985	Hatchery	1.357	1	1

Based on the following tag codes: 05- 11-16.

Beginning with the 1978 brood.

Table 2 (TR). Hatchery releases of spring chinook salmon into the White Salmon River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1981	COWLITZ RIVER	BIG WHITE SALMON PND	Fingr	11/21/82	11/21/82	30	40557	BIG WHITE SALMON RIV	050952
1981	COWLITZ RIVER	BIG WHITE SALMON PND	Fingr	11/21/82	11/21/82	30	1254	BIG WHITE SALMON RIV	UNTAGGED
1981	COWLITZ RIVER	BIG WHITE SALMON PND	Fingr	11/21/82	11/21/82	30	38681	BIG WHITE SALMON RIV	050953
1981	COWLITZ RIVER	BIG WHITE SALMON PND	Fingr	11/21/82	11/21/82	30	1196	BIG WHITE SALMON RIV	UNTAGGED
1981	COWLITZ RIVER	BIG WHITE SALMON PND	Fingr	11/21/82	11/21/82	30	45215	BIG WHITE SALMON RIV	051116
1981	COWLITZ RIVER	BIG WHITE SALMON PND	Fingr	11/21/82	11/21/82	30	1398	BIG WHITE SALMON RIV	UNTAGGED
1981	COWLITZ RIVER	LTL WHITE SALMON NFH	PreSm	11/21/82	11/21/82	30	171460	BIG WHITE SALMON RIV	UNTAGGED
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Fingr	06/19/84	06/19/84	98	153121	BIG WHITE SALMON RIV	UNTAGGED
1983	ABERNATHY CREEK	CARSON NF HATCHERY	Fingr	06/19/84	06/21/84	99	284491	BIG WHITE SALMON RIV	UNTAGGED
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Fingr	06/21/84	06/21/84	98	131370	BIG WHITE SALMON RIV	UNTAGGED
1983	WIND R (CARSON NFH)	CARSON NF HATCHERY	Fingr	06/18/84	06/18/84	99	80046	TROUT LAKE CR (29)	UNTAGGED
1983	ABERNATHY CREEK	CARSON NF HATCHERY	Fingr	06/20/84	06/20/84	100	65668	TROUT LAKE CR (29)	UNTAGGED
1985	WIND R (CARSON NFH)	LTL WHITE SALMON NFH	Fingr	06/18/86	06/18/86	56	500000	BIG WHITE SALMON RIV	UNTAGGED
1985	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	06/18/86	06/18/86	56	500000	BIG WHITE SALMON RIV	UNTAGGED
1986	WIND R (CARSON NFH)	BIG WHITE SALMON PND	Smolt	04/11/88	04/11/88	20	335662	BIG WHITE SALMON RIV	UNTAGGED
1986	WIND R (CARSON NFH)	BIG WHITE SALMON PND	Smolt	04/11/88	04/11/88	20	335662	BIG WHITE SALMON RIV	UNTAGGED
1986	WIND R (CARSON NFH)	CARSON NF HATCHERY	Fingr	06/11/87	06/11/87	100	67500	BIG WHITE SALMON RIV	UNTAGGED
1986	ABERNATHY CREEK	CARSON NF HATCHERY	Fingr	06/11/87	06/15/87	100	135000	BIG WHITE SALMON RIV	UNTAGGED
1986	WIND R (CARSON NFH)	CARSON NF HATCHERY	Fingr	06/15/87	06/15/87	100	67500	BIG WHITE SALMON RIV	UNTAGGED
1986	WIND R (CARSON NFH)	CARSON NF HATCHERY	Fingr	06/12/87	06/12/87	104	40000	TROUT LAKE CR (29)	UNTAGGED
1986	ABERNATHY CREEK	CARSON NF HATCHERY	Fingr	06/12/87	06/12/87	104	65000	TROUT LAKE CR (29)	UNTAGGED
1986	WIND R (CARSON NFH)	CARSON NF HATCHERY	Fingr	06/15/87	06/15/87	103	40000	TROUT LAKE CR (29)	UNTAGGED
1989	WIND R (CARSON NFH)	BIG WHITE SALMON PND	FeFry	01/08/90	01/08/90	1375	1053000	BIG WHITE SALMON RIV	UNTAGGED
1989	WIND R (CARSON NFH)	BIG WHITE SALMON PND	FeFry	02/15/90	02/15/90	872	100000	BIG WHITE SALMON RIV	UNTAGGED
1989	WIND R (CARSON NFH)	BIG WHITE SALMON PND	Fingr	01/08/90	01/08/90	1375	1053000	BIG WHITE SALMON RIV	UNTAGGED
1989	WIND R (CARSON NFH)	BIG WHITE SALMON PND	Fingr	02/15/90	02/15/90	872	100000	BIG WHITE SALMON RIV	UNTAGGED

WHITE SALMON SUBBASIN

Fall Chinook

GEOGRAPHIC LOCATION

The White Salmon (also commonly called the Big White Salmon River) is located in south central Washington in Klickitat and Skamania counties. The river begins on the southwest slope of Mount Adams and flows south about 45 miles into Bonneville Pool on the Columbia River (RM 168.3). Drainage area is approximately 386 square miles. Approximately 47 percent of the subbasin is in the Gifford Pinchot National Forest. The White Salmon rearing ponds are located at RM 1.5.

The U. S. Army Corps of Engineers has established an "in-lieu" site for tribal fishing access at the mouth of the river. The site has been set aside in compensation for tribal fishing grounds inundated by the Bonneville Dam reservoir.

ORIGIN

Fall chinook are native to the White Salmon River and some natural production presently occurs below Condit Dam.

In addition to the historically abundant tule fall chinook, the White Salmon River has supported a substantial population of upriver bright fall chinook in recent years. Significant numbers of fall chinook spawning occurred in the White Salmon during October and November in 1987 and 1988. Coded wire tag recoveries from carcasses sampled during late fall 1987 and 1988 revealed those fish were primarily stray Upriver Bright stock from Bonneville and Little White Salmon Hatcheries. Over 59 percent of the late natural spawning fall chinook in the White Salmon River in 1989 were estimated to be of hatchery origin, primarily Little White Salmon Hatchery upriver brights (Hymer, 1991).

DISTRIBUTION

Historical distribution was probably confined below the falls at RM 16.3. Condit Dam was built in 1913 at RM 3 and blocked upstream migration of anadromous fish. Two attempts to ladder the dam failed.

PRODUCTION

Bonneville Pool Hatchery (BPH) "tule" brood stock was originally taken from the White Salmon River and other nearby rivers. In 1901, fall chinook eggs collected from the White Salmon River were transferred to facilities on Spring Creek. In 1986 and 1987, tule fall chinook returns were trapped at the White Salmon weir and the eggs transferred to Spring Creek National Fish Hatchery for incubation and rearing. No fall chinook have been trapped at the White Salmon weir since 1987.

Rearing ponds on the White Salmon River at RM 1.5 were used to rear fall chinook fingerlings through 1984. Fish were reared from early March until a May release. However, poor adult returns resulted in discontinuation of the program.

Table 1 describes the amount of spawning and rearing habitat, by quality, available in the White Salmon River.

The Northwest Power Planning Councils smolt capacity model estimated 127,426 fall chinook fingerlings could be produced below Condit Dam. However, production may be limited by gravel

quantity. Potential production between Condit Dam and RM 16.3 was estimated to be 32,000 smolts by Young and Rybak (1987). Evidence suggests bright fall chinook natural production may be occurring (Hymer, 1991). Chapman (1981) estimated the White Salmon could produce 625 natural chinook (springs and falls) under pristine conditions.

The White Salmon tule fall chinook natural spawn escapement from 1980 - 1984 brood years averaged 267 with a low return of 135 in 1983 and a peak of 439 in 1984. The White Salmon tule chinook natural spawn escapements by age and brood year are presented in Table 2.

The White Salmon River upriver bright fall chinook natural escapement for 1989 and 1990 return years was 2,997 and 1,182 fish, respectively (Hymer, 1991). The White Salmon upriver bright fall chinook natural spawn escapements by age and brood year are presented in Table 3. There were no upriver bright fall chinook stream surveys on the White Salmon River before 1987; therefore, brood year return information is incomplete.

From 1977 through 1987, an average of 48 fish were sport caught in the subbasin (WDW, 1990). However, stock specific age and brood year analysis for the White Salmon River sport catch is unavailable.

The tule fall chinook trapped at the White Salmon weir in 1986 and 1987 and upriver brights trapped in 1987 by age and brood year are presented in Tables 4 and 5, respectively.

ADULT LIFE HISTORY

Run size. catch and escapement

Ocean commercial and recreational fisheries from Alaska to Washington, in addition to Columbia River gill net and sport fisheries all harvest a portion of the White Salmon River origin fall chinook. Out-of-basin harvest may approach 80 percent on Bonneville Pool Hatchery stocks with fish contributing to ocean and mainstem Columbia River fisheries (WDW, 1990). Based primarily on Spring Creek Hatchery 1971 and 1972 brood coded wire tag releases, about 38 percent of the overall BPH harvest occurred off the Washington coast and 20 percent in the Columbia River commercial fisheries . Recreational catch upstream of the Megler-Astoria Bridge is negligible (Howell et al. 1985). From 1977 through 1987, the White Salmon River subbasin sport harvest rate was 8.5 percent (WDW, 1990). Columbia River sport and commercial fisheries are managed to ensure attainment of hatchery egg-take requirements.

Strays from other hatcheries are not unusual. Tables 6 and 7 list the coded wire tags beginning with the 1978 brood through the 1988 brood recovered within the White Salmon subbasin which originated outside the White Salmon subbasin. However, federal hatchery origin coded wire tags recovered during spawning ground surveys after 1983 are currently unavailable. White Salmon releases have been generally untagged.

Time of Migration

Tule fall chinook upstream migration occurs in early August and September with greatest abundance in the Columbia River estuary in late August and early September. Counts of BPH fall chinook at Bonneville Dam generally peak between September 4 and September 9. Approximately 90 percent of the run has migrated past Bonneville by September 20 (Howell et al. 1985),

Upriver bright fall chinook migration curve is more prolonged and gradual compared to tule fall chinook passing Bonneville Dam. Upriver bright fall chinook migration occurs through November.

Spawning Period

Tule fall chinook natural spawning peaks in late September to early October while upriver bright fall chinook natural spawning peaks in early to mid November.

Spawning Areas

Spawning occurs in the three mile stretch below Condit Dam.

Age Comnosition

Age ranges from two-year-old jacks to five-year-old adults with three-year-olds and four-year-olds usually the dominant age classes for tule fall chinook. Total age composition data for both tule and upriver bright fall chinook are summarized in Tables 2 through 5. Table 8 lists the age composition percentages by brood year and freshwater.ocean rearing for tule fall chinook returning to the White Salmon River spawning grounds.

Sex Ratio

Female tule fall chinook comprised 47 - 62 percent of the tule fall chinook natural spawners in the White Salmon River for the 1983 and 1984 brood years. The percent females by brood year and freshwater.ocean rearing ages for the White Salmon tule fall chinook natural spawners are presented in Table 9.

Percent females by brood year and age class (freshwaterocean) for tule fall chinook trapped at the White Salmon weir in 1986 and 1987 are presented in Table 10.

The mean fork length by brood year, sex, and freshwaterocean rearing ages of the White Salmon River tule fall chinook natural spawners for 1980 - 1984 brood years are available in Tables 11 and 12.

The mean fork length by brood year, sex, and freshwaterocean rearing ages of the tule fall chinook trapped at the White Salmon weir in 1986 and 1987 are presented in Tables 13 and 14.

Fecundity

Fecundity data are not available for White Salmon fall chinook. However, Spring Creek Hatchery tule fall chinook fecundity are probably similar. Fecundity averaged 4,700 eggs per female at Spring Creek Hatchery from 1978 - 1982.

Fecundity of upriver bright fall chinook at Bonneville Hatchery is 4,503 eggs per female (Howell et al. 1985)

JUVENILE LIFE HISTORY

Time of Emergence

Emergence probably occurs in February and fish rear for a few months prior to spring or early summer ocean migration (WDW, 1990).

Time. age and size at migration

Based on recoveries of tagged tule Spring Creek juveniles, migration to the Columbia River estuary is rapid and generally occurs within 1 - 3 weeks after release (Howell et al. 1985). Length data of

natural fall chinook smolts from the White Salmon River is unavailable. The number of natural juvenile fall chinook salmon that migrate from the White Salmon River is also unavailable. Hatchery release information for the White Salmon subbasin by brood year is presented in Table 15.

Survival Rate

BPH fall chinook reared and released from Spring Creek Hatchery are noted for their generally high survival rate. Spring Creek substock fall chinook reared at other stations do not experience the same high survival. A minimum survival rate (partial catch and escapement) of four groups of coded wire tagged Spring Creek Hatchery releases ranged between 0 - 1.9 percent (1978 brood) and 0.3 - 2.1 percent (1979). Survival of the 1979 brood releases was based on only two years of catches. These rates were much higher than the average of 0.2 percent for the 1978 and 1979 brood tule releases from other stations (Howell et al. 1985). TAC (1984) estimated a general survival rate of Spring Creek Hatchery releases at 2.0 percent which did not include mortality on juvenile outmigrants caused by Bonneville Dam.

BIOCHEMICAL-GENETIC CHARACTERISTICS

Schreck et al. (1986) compared isozyme gene frequencies for 11 enzyme systems from samples collected at Bonneville and Spring Creek Hatcheries. No statistically significant differences were found for any of the enzymes. They did not, however, analyze fall chinook from the White Salmon basin.

DISEASE

Bacteria and parasitic diseases found in the White Salmon are unavailable.

Table 1 (HB-1). Estimated amount of rearing and spawning habitat, by quality, of the Big White Salmon River fall chinook production area.

Distance/Area	Excellent	Good	Fair[a]	Poor[a]	Unknown	Total	Confidence
Miles (%)	100	0	0	0		3.3	
Acres (%)	100	0	0	0		17.5	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 199 1.

Table 2 (RN-l). Total age of natural spawner escapement of tule fall chinook returning to the White Salmon River subbasin, by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974							
1975							
1976					0		
1977				2	0		
1978			434	1	0		
1979		1,126	143	1	0		1,270
1980	17	106	86	1	0	210	193
1981	30	282	34	0	0	346	316
1982	24	117	64	0	0	205	181
1983	1	32	98	4	0	135	134
1984	19	63	356	1	0	439	420
1985	0	6	39	0			
1986	16	165	83				
1987	38	41					
1988	21						

Age based on scale reading analysis except:

No data are available for 1980-81 return years.

1982, 1983, and 1985 return years used the Spring Creek National Fish Hatchery age composition.

1984 return year used Spring Creek and Little White Salmon National Fish hatcheries age composition.

Table 3 (RN-2). Total age of natural spawner escapement of upriver bright fall chinook returning to the White Salmon River subbasin, by brood year.

Brood Year	Total Age 2	3	4	5	6	Total	Adult Total
1974							
1975							
1976							
1977							
1978							
1979							
1980							
1981					38		
1982				302	0		
1983			1,211	303	6		
1984		786	2,469	823	51		4,129
1985	38	159	173	346			
1986	75	125	253				
1987	55	138					
1988	206						

Age based on scale reading analysis.

No bright fall chinook surveys on White Salmon River before 1987.

Table 4 (RH-1). Total age of tule fall chinook returning to the White Salmon River weir, by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974							
1975							
1976							
1977							
1978							
1979							
1980					0		
1981				1	0		
1982			33	4			
1983		136	97				
1984	88	70					
1985	17						
1986							
1987							
1988							

Age composition based on scale reading analysis performed by the USF&WS.

1987 return year does not include 4 one-year-old minijacks.

No fall chinook trapped at the White Salmon River weir since 1987.

Table 5 (RH-2). Total age of upriver bright fall chinook returning to the White Salmon River weir, by brood year.

	Total Age						
Brood Year	2	3	4	5	6	Total	Adult Total
1974							
1975							
1976							
1977							
1978							
1979							
1980							
1981					0		
1982				10			
1983			18				
1984		14					
1985	0						
1986							
1987							
1988							

Age composition based on scale reading analysis by USF&WS.

No bright fall chinook trapped at the White Salmon River weir since 1987.

Table 6 (AI-l). Immigration of coded wire tagged tule fall chinook into the White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Little White Salmon Hatchery	Big White Salmon River, 1981	Spawning Ground	228	1	4
Spring Creek	Big White Salmon River, 1981	Spawning Ground	228	2	7
Spring Creek	Big White Salmon River, 1982	Spawning Ground	510	1	11
Spring Creek	Big White Salmon River, 1982	Spawning Ground	510	2	22
Trinity River (Calif.)	Big White Salmon River, 1987	Weir	186	1	1
Cole River, released Rogue River	Big White Salmon River, 1987	Weir	186	1	1

Based on the following tag codes: 05-04-48, 05-04-33, 05-06-39, 05-06-40, 06-61-43, and 07-31-10.

Beginning with the 1978 brood.

Table 7 (AI-2). Immigration of coded wire tagged upriver bright fall chinook into the White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Little White Salmon Hatchery	Big White Salmon River, 1987	Weir	42	1	1
Spring Creek	Big White Salmon River, 1987	Weir	42	1	1
Spring Creek	Big White Salmon River, 1987	Weir	42	1	1
Spring Creek	Big White Salmon River, 1987	Weir	42	1	1

Based on the following tag codes: 05-12-55, 05-12-57, 05-13-37, and 07-31-25.

Beginning with 1978 brood.

Table 8 (AC). Age composition percentage (freshwater.ocean) by brood year for tule fall chinook spawning naturally in the White Salmon River.

Age Composition (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5
1978						
1979						
1980						
1981						
1982						
1983	19	15.79	26.32	57.89	0	0
1984	26	11.54	34.61	53.85	0	0
1985						
1986						
1987						
1988						

Age based on scale reading analysis.

Table 9 (AS- 1). Percent females by brood year and age class (freshwaterocean) for tule fall chinook spawning naturally in the White Salmon River.

Females (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	Total % Female
1976							
1977							
1978							
1979							
1980					100.00		
1981				66.67			
1982			33.33	70.00			
1983	9	0	40.00	63.64	0	0	47.37
1984	16	0	55.56	78.57	0	0	61.54
1985							
1986							
1987							
1988							

Age based on scale reading analysis.

Table 10 (AS-2). Percent females by brood- year and age class (freshwater.ocean) for tule fall chinook trapped at the White Salmon River weir.

Females (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	Total % Female
1976							
1977							
1978							
1979							
1980							
1981					0		
1982				48.48	11.54		
1983			52.94	60.47			
1984		0	61.90				
1985		0					
1986							
1987							
1988							

Age based on scale reading analysis by USF&WS.

Table 11 (AL-a). Mean fork length by brood year and age class (freshwater.ocean) for female tule fall chinook spawning naturally in the White Salmon River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5
1980				95	
N				1	
St. Dev.				---	
1981			87		
N			4		
St. Dev.			1.91		
1982		73	88		
N		1	7		
St. Dev.		---	8.49		
1983		81			
N		2			
St. Dev.		2.12			
1984					
N					
St. Dev.					

Age based on scale reading analysis.

Table 12 (AL-b). Mean fork length by brood year and age class (freshwater.ocean) for male tule fall chinook spawning naturally in the White Salmon River.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5
1980					
N					
St. Dev.					
1981			93		
N			2		
St. Dev.			14.14		
1982		59	98		
N		2	3		
St. Dev.		0.71	8.00		
1983	56	79.33			
N	3	3			
St. Dev.	5.86	9.29			
1984	46				
N	3				
St. Dev.	10.39				

Age based on scale reading analysis.

Table 13 (AL-c). Mean fork length by brood year and age class (freshwater.ocean) for female tule fall chinook trapped at the White Salmon River weir.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5
1981					
N					
St. Dev.					
1982			89	96	
N			16	3	
St. Dev.			5.25	---	
1983		79	91		
N		72	52		
St. Dev.		5.78	5.49		
1984		77			
N		26			
St. Dev.		4.63			
1985					
N					
St. Dev.					

Age based on scale reading analysis by USF&WS.

Table 14 (AL-d). Mean fork length by brood year and age class (freshwater.ocean) for male tule fall chinook trapped at the White Salmon River weir.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5
1981				104	
N				1	
St. Dev.				---	
1982			92		
N			17		
St. Dev.			7.49		
1983		78	98		
N		64	23		
St. Dev.		8.51	9.14		
1984	46	71			
N	88	34			
St. Dev.	5.96	8.99			
1985	56				
N	16				
St. Dev.	3.63				

Age based on scale reading analysis by USF&WS.

Table 15 (TR). Hatchery releases of fall chinook salmon into the White Salmon River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1975	ABERNATHY CREEK	SPRING CR NF HATCHRY	Fingr	05/20/76	05/20/76	61	1960400	BIG WHITE SALMON RIV	UNTAGGED
1976	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/18/77	04/18/77	82	91438	BIG WHITE SALMON RIV	UNTAGGED
1976	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/18/77	04/18/77	79	2720297	BIG WHITE SALMON RIV	UNTAGGED
1976	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/18/77	04/18/77	77	87707	BIG WHITE SALMON RIV	UNTAGGED
1977	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	05/01/78	05/01/78	61	144278	BIG WHITE SALMON RIV	UNTAGGED
1977	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	05/01/78	05/01/78	61	2994680	BIG WHITE SALMON RIV	UNTAGGED
1978	MIXED COLUMBIA	BIG WHITE SALMON PND	Smolt	06/26/79	06/26/79		28542	BIG WHITE SALMON RIV	035501
1978	MIXED COLUMBIA	BIG WHITE SALMON PND	Smolt	06/26/79	06/26/79		852	BIG WHITE SALMON RIV	UNTAGGED
1978	MIXED COLUMBIA	BIG WHITE SALMON PND	Smolt	06/26/79	06/26/79		34779	BIG WHITE SALMON RIV	035601
1978	MIXED COLUMBIA	BIG WHITE SALMON PND	Smolt	06/26/79	06/26/79		746	BIG WHITE SALMON RIV	UNTAGGED
1978	MIXED COLUMBIA	BIG WHITE SALMON PND	Smolt	06/26/79	06/26/79		36348	BIG WHITE SALMON RIV	035701
1978	MIXED COLUMBIA	BIG WHITE SALMON PND	Smolt	06/26/79	06/26/79		629	BIG WHITE SALMON RIV	UNTAGGED
1978	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/18/79	05/18/79	69	141393	BIG WHITE SALMON RIV	050443
1978	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/18/79	05/18/79	69	2887294	BIG WHITE SALMON RIV	UNTAGGED
1978	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	05/21/79	05/21/79	70	2887294	BIG WHITE SALMON RIV	UNTAGGED
1978	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	05/21/79	05/21/79	69	141393	BIG WHITE SALMON RIV	UNTAGGED
1978	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	06/01/79	06/01/79	50	100000	BIG WHITE SALMON RIV	UNTAGGED
1978	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	03/28/79	03/31/79		42419	BIG WHITE SALMON RIV	034701
1978	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	03/28/79	03/31/79		7662	BIG WHITE SALMON RIV	UNTAGGED
1978	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	05/17/79	05/22/79		47788	BIG WHITE SALMON RIV	035201
1978	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	05/17/79	05/22/79		728	BIG WHITE SALMON RIV	UNTAGGED
1979	ABERNATHY CREEK	BIG WHITE SALMON PND	Fingr	05/12/80	05/12/80	68	2199090	BIG WHITE SALMON RIV	UNTAGGED
1979	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/12/80	05/12/80	68	2199090	BIG WHITE SALMON RIV	UNTAGGED
1980	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	05/06/81	05/06/81	183	1084839	BIG WHITE SALMON RIV	UNTAGGED
1980	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/06/81	05/06/81	183	1084839	BIG WHITE SALMON RIV	UNTAGGED
1982	ABERNATHY CREEK	BIG WHITE SALMON PND	Fingr	06/02/83	06/02/83	98	1202881	BIG WHITE SALMON RIV	UNTAGGED
1982	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	06/02/83	06/02/83	98	1202881	BIG WHITE SALMON RIV	UNTAGGED
1983	TULE STOCK -COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/18/84	04/18/84	109	1569723	BIG WHITE SALMON RIV	UNTAGGED
1983	ABERNATHY CREEK	SPRING CR NF HATCHRY	Fingr	04/18/84	04/18/84	109	1569723	BIG WHITE SALMON RIV	UNTAGGED
1983	ABERNATHY CREEK	SPRING CR NF HATCHRY	Fingr	05/17/84	05/17/84	75	1299451	BIG WHITE SALMON RIV	UNTAGGED
1983	TULE STOCK -COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/17/84	05/17/84	75	1299451	BIG WHITE SALMON RIV	UNTAGGED

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LITTLE WHITE SALMON

Spring Chinook

GEOGRAPHIC LOCATION

The Little White Salmon River, located in Skamania County in south central Washington, drains approximately 134 square miles. The river originates in the Gifford Pinchot National Forest, west of Monte Cristo Peak, and travels south for about 19 miles before entering Bonneville Pool on the Columbia River at River Mile (RM) 162, about six miles below the confluence of the White Salmon River and the Columbia. A railroad embankment and highway about one-half mile below the original mouth of the river cuts off a shallow embayment from the Columbia River and forms 212 acre Drano Lake. Two federal fish hatcheries are located on the river, the Little White Salmon National Fish Hatchery (NFH) at RM 1 and Willard NFH at RM 5.

ORIGIN

Spring chinook may have been historically present in small numbers below the barrier falls in the lower river (Bryant 1949). However, since Bonneville Pool inundated the lower river, only hatchery fish are present.

Spring chinook releases began in the late 1960's using Eagle Creek NFH stock plus strays returning to the Little White Salmon River. Those strays were probably the returns from off station releases of Willard and Carson Hatcheries. South Santiam (1974 brood) and Klickitat (1968 and 1974 broods) stock spring chinook were also reared and released at Little White Salmon Hatchery. Recently, the Little White Salmon Hatchery began to use it's own returns and/or received eggs from Carson Hatchery. Spring chinook raised at the Little White Salmon Hatchery are considered a Carson stock derivative (Howell et al. 1985).

DISTRIBUTION

Anadromous fish migration is completely blocked by a series of waterfalls approximately 37 feet high located about two miles upstream of the Columbia River. When Bonneville Dam was completed in 1938, this area was inundated and any natural salmon production ceased.

PRODUCTION

Currently, spring chinook in the Little White Salmon River are from hatchery production.

The Northwest Power Planning Councils habitat capacity model indicated that a total of 32,350 spring chinook smolts could be produced using all subbasin habitat. Constraints included the basin size, steep gradients, low summer flows, and lack of spawning habitat.

Little White Salmon Hatchery spring chinook returns from 1967 - 1984 brood years averaged 1,495 with a low return of 239 for the 1970 brood and a high of 5,051 for the 1973 brood. Little White Salmon Hatchery returns by age and brood year are presented in Table 1.

Little White Salmon River tributary sport catches for the 1971, 1973, 1974, and 1978 return years averaged 5 jack spring chinook. Only jacks were allowed in the sport catch prior to 1979. Little White Salmon sport catch estimates for 1979 through 1990 (without 1980 and 1984) return years averaged 682 spring chinook, and ranged from a low of 7 in 1981 to a high of 1,800 in 1988 (based on punchcard and actual sampling data). Little White Salmon River spring chinook sport catches by age class and brood year are presented in Table 2.

Little White Salmon River tribal harvest (including hatchery donations) for 1982 - 1990 (without 1983 and 1984) return years averaged 1,174 spring chinook, and ranged from a low 410 in 1985 to a high of 1,897 in 1987. Surplus spring chinook from the hatchery were donated to the tribes up until 1989. In 1989, a tribal commercial fishery harvested 877 spring chinook from Drano Lake. In 1990, 386 fish were donated to the Yakima Indian Nation and 296 were from a tribal subsistence fishery in Drano Lake. Little White Salmon River spring chinook tribal harvest (including hatchery donations) by age class and brood year are listed in Table 3.

The Little White Salmon River spring chinook total returns from 1967 - 1984 brood years averaged 2,055 with a low of 158 for the 1969 brood and a high of 9,056 for the 1983 brood. Little White Salmon River spring chinook total returns by brood year and age are presented in Table 4.

ADULT LIFE HISTORY

Run size. catch and escapement

Ocean commercial and recreational fisheries from Alaska to Washington, in addition to Columbia River gill net and sport fisheries all harvest a portion of the Little White Salmon River origin spring chinook. When the Little White Salmon Hatchery is expected to achieve it's escapement goal, the Washington Department of Fisheries and the Yakima Indian Nation develop a harvest plan for sharing the harvestable surplus between the recreational fishery and the Yakima tribal members. The sport fishery occurs in Drano Lake. When the sport fishery was open for 1977 through 1986, overall subbasin harvest was 8.4 percent (WDW, 1990). The Yakima Indian tribal members usually receive hatchery donations but in 1989 had a set net fishery in Drano Lake at the conclusion of the sport fishery. In 1990, a tribal subsistence set net fishery occurred in Drano Lake. Columbia River sport and commercial fisheries are managed to ensure attainment of hatchery egg-take requirements while minimizing other upriver stocks impacts.

Strays from other lower river hatcheries are not unusual. Table 5 lists coded wire tagged Little White Salmon spring chinook that were non-harvest recovered outside of the subbasin (beginning with the 1978 brood through to the 1988 brood). Table 6 lists the coded wire tags recovered within the Little White Salmon River subbasin which originated outside the Little White Salmon River subbasin.

Time of Migration

Spring chinook destined for areas upstream of Bonneville Dam begin entering the Columbia River in large numbers in mid-March. Counts high at Bonneville Dam usually between April 20 and April 28 but can be earlier during abnormally low flow years or later during high run-offs.

Adult spring chinook return to the hatchery from April to July. At Little White Salmon Hatchery, approximately 50 percent of the escapement has been collected by the end of May (Howell et al. 1985).

Spawning Period

Fish are held from mid-April through August and spawned from mid-July to August. Since 1982, adults have been held indoors and exposed to lights to advance the photoperiod and induce earlier spawning (Nelson and Bodle, 1988).

Spawning Areas

Little White Salmon Hatchery.

Age Composition

Age ranges from three-year-old jacks to six-year-old adults with four-year-olds usually the dominant age class. Spring chinook released as subyearlings occasionally contribute significantly to the returns to the Little White Salmon River. Age composition is summarized in Tables 1 through 4. Table 7 lists the age composition percentages by brood year and age class for spring chinook returning to the Little White Salmon Hatchery.

Sex Ratio

Female spring chinook comprised 58 - 75 percent of the spring chinook returning to the Little White Salmon Hatchery between 1981 - 1984 brood years. The percentage of females by brood year and age class for Little White Salmon Hatchery spring chinook returns are presented in Table 8.

The mean fork lengths by brood year, sex and age classes for spring chinook returning to the Little White Salmon NFH for the 1978 - 1987 brood years are presented in Tables 9 and 10.

Fecundity

During 1978 - 1982, spring chinook fecundity at Little White Salmon Hatchery averaged 4,000 eggs per female and ranged from about 3,800 - 4,800. Little White Salmon Hatchery fecundity data by age class and brood year is unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

Incubation runs from mid-July to mid-December and fry emerge from October to December at Little White Salmon Hatchery.

Time. age and size at migration

Hatchery release information for the Little White Salmon River subbasin by brood year is presented in Table 11.

Survival Rate

Egg-to-smolt survival has been about 87.9 percent (WDW, 1990).

BIOCHEMICAL-GENETIC CHARACTERISTICS

Schreck et al. (1986) compared the electrophoretic profiles from their analysis to the historical baseline data in Milner et al. (1983) in order to evaluate the genetic stability of the isozyme gene frequencies over time. In the comparison of current verses historical profiles for Little White Salmon spring chinook, there were no instances of statistically different isozyme gene frequencies.

DISEASE

Infectious hematopoietic necrosis (IHN) was detected in the adults returning to the Little White Salmon in 1981. Bacteria and parasitic diseases found in the Little White Salmon and Willard Hatcheries are listed in Tables 12 and 13.

Table 1 (RH-a). Total hatchery returns of spring chinook to the Little White Salmon River subbasin by brood year. 1/

Age Class

Brood Year	1.2	1.3	1.4	2.1	2.2	2.3	2.4	Total	Adult Total 2/
1967	0	0	0	38	688	175	3	904	866
1968	0	0	0	96	200	81	6	383	287
1969	0	0	0	24	86	36	12	158	134
1970	0	0	0	9	16	214	0	239	230
1971	0	0	0	14	1,154	1,321	11	2,500	2,486
1972	0	0	0	27	1,067	308	22	1,424	1,397
1973	0	0	0	664	3,103	1,275	9	5,051	4,387
1974	0	0	0	69	353	114	0	536	467
1975	0	0	0	206	766	374	0	1,346	1,140
1976	0	0	0	21	600	128	1	750	729
1977	0	0	0	115	2,466	682	0	3,263	3,148
1978	0	0	0	1	109	1,655	0	1,765	1,764
1979	0	0	0	37	939	275	0	1,251	1,214
1980	0	0	0	14	249	77	0	340	326
1981	9	2	8	44	824	217	0	1,104	1,060
1982	31	163	6	12	536	178	7	933	921
1983	48	114	0	172	2,039	1,347	0	3,720	3,548
1984	305	557	2	26	248	112	0	1,250	1,224
1985	40	57	8	69	1,640	265			
1986	24	49		51	1,629				
1987	7			18					
1988									

1/ Excludes tribal donations.
2/ Adult totals include 1.2's.

Age composition based on scale reading analysis except 1980 and 1981 return years.
Scale reading analysis performed by USFWS.

Table 2 (RS-a). Total sport catches of spring chinook in the Little White Salmon River (Drano Lake) subbasin by brood year.

Brood Year	Age Class 1.2	1.3	1.4	2.1	2.2	2.3	2.4	Total	Adult Total 1/
1967	0	0	0	0	0	0	0	0	0
1968	0	0	0	2	0	0	0	2	0
1969	0	0	0	0	0	0	0	0	0
1970	0	0	0	3	0	0	0	3	0
1971	0	0	0	2	0	0	0	2	0
1972	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	11	0	11	11
1975	0	0	0	13	109	0	0	122	109
1976	0	0	0	0	0	3	6	9	9
1977	0	0	0	0	4	500	0	504	504
1978	0	0	0	0	67	65	0	132	132
1979	0	0	0	0	46	0	0	46	46
1980	0	0	0	0	0	17	0	17	17
1981	0	3	0	0	137	37	0	177	177
1982	0	35	0	3	47	102	0	187	184
1983	2	49	0	17	1,108	1,312	9	2,497	2,480
1984	36	283	3	0	178	54	0	554	554
1985	9	16	0	18	1,179	159			
1986	3	16		30	1,141				
1987	0			5					
1988									

1/ Adult totals include 1.2's.

Sport fisheries prior to the 1979 return year were jack only fisheries.

Age composition based on scale reading analysis.

Table 3 (RT-a). Total tribal harvest and hatchery donations of spring chinook in the Little White Salmon River subbasin by brood year.

Age Class -

Brood Year	1.2	1.3	1.4	2.1	2.2	2.3	2.4	Total	Adult Total 1/
1976							1		
1977			0			1,469	0		
1978		0	0		235	0	0		
1979	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	35	0	35	35
1981	0	1	8	0	374	216	0	1	598
1982	0	156	5	0	512	144	6	156	661
1983	0	93	0	0	1,655	1,091	0	93	2,746
1984	0	453	0	0	202	37	0	453	239
1985	0	0	2	0	840	92			
1986	0	17		0	562				
1987	2			7					
1988									

1/ Adult totals include 3.1's.
All tribal harvest was provided by hatchery donations except:
1988 return year - harvest from Drano Lake tribal commercial fishery.
1990 return year - includes Drano Lake tribal subsistence fishery.
Tribal harvest age composition is a combination of scale samples from the Little White Salmon Hatchery and the Drano Lake sport fishery.

Table 4 (RB-a). Total returns of spring chinook to the Little White Salmon River by brood year.

Age Class

Brood Year	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4	Total	Adult Total 1/
1967	0	0	0	0	38	688	175	3	904	866
1968	0	0	0	10	98	200	81	6	385	287
1969	0	0	0	0	24	86	36	12	158	134
1970	0	0	0	0	12	16	214	0	242	230
1971	0	0	0	0	16	1,154	1,321	11	2,502	2,486
1972	0	0	0	0	27	1,067	308	22	1,424	1,397
1973	0	0	0	0	664	3,103	1,275	9	5,051	4,387
1974	0	0	0	0	69	353	125	0	547	178
1975	0	0	0	0	219	875	374	0	1,468	1,249
1976	0	0	0	0	21	600	131	8	760	739
1977	0	0	0	0	115	2,470	2,651	0	5,236	5,121
1978	0	0	0	0	1	411	1,720	0	2,132	2,131
1979	0	0	0	0	37	985	275	0	1,297	1,260
1980	0	0	0	0	14	249	129	0	392	378
1981	9	6	8	0	44	1,335	254	0	1,656	1,603
1982	31	198	11	0	15	583	424	13	1,275	1,229
1983	50	256	0	0	189	4,802	3,750	9	9,056	8,817
1984	341	1,293	5	0	26	628	203	0	2,496	2,129
1985	49	73	10		87	3,659	516			
1986	27	82			81	3,332				
1987	9				30					
1988										

1/ Adult totals include 1.2's.

Age composition based on scale reading analysis.

Table 5 (AE). Emigration of coded wire tagged spring chinook from the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Little White Salmon Hatchery	Carson, 1987	Hatchery	4,378	1	1

Based on the following tag code: 05- 14-37.

Beginning with the 1978 brood.

Table 6 (AI). Immigration of coded wire tagged spring chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Carson Hatchery	Little White Salmon, 1982	Hatchery	2,544	3	3
Carson Hatchery	Little White Salmon, 1982	Hatchery	2,544	1	1
Carson Hatchery	Little White Salmon, 1983	Hatchery	2,608	1 2	12
Carson Hatchery	Little White Salmon, 1983	Hatchery	2,608	3	3
Spring Creek Hatchery 1/	Little White Salmon, 1983	Hatchery	2,608	1	1
Carson Hatchery	Little White Salmon, 1985	Hatchery	1,357	2	2
Big White Salmon River	Little White Salmon, 1985	Hatchery	1,357	1	1.
Carson Hatchery	Little White Salmon, 1986	Hatchery	1,144	2	2
Carson Hatchery	Little White Salmon, 1986	Hatchery	1,144	2	2
Carson Hatchery	Little White Salmon, 1986	Hatchery	1,144	2	2
Carson Hatchery	Little White Salmon, 1986	Hatchery	1,144	4	4
Carson Hatchery	Little White Salmon, 1986	Hatchery	1,144	2	2
Carson Hatchery	Little White Salmon, 1986	Hatchery	1,144	4	4
Carson Hatchery	Little White Salmon, 1986	Hatchery	1,144	1	1
Carson Hatchery	Little White Salmon, 1986	Hatchery	1,144	1	1
Carson Hatchery	Little White Salmon, 1986	Hatchery	1,144	1	1
Carson Hatchery	Little White Salmon, 1986	Hatchery	1,144	1	1
Carson Hatchery	Little White Salmon, 1986	Hatchery	1,144	2	2
Carson Hatchery	Little White Salmon, 1986	Hatchery	1,144	5	5
Carson Hatchery	Little White Salmon, 1986	Hatchery	1,144	1	1

Table 6 (cont.) Immigration of coded wire tagged spring chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Carson Hatchery	Little White Salmon, 1986	Hatchery	1,144	2	2
Carson Hatchery	Little White Salmon, 1986	Hatchery	1,144	3	3
Carson Hatchery	Little White Salmon, 1987	Hatchery	4,566	1	1
Carson Hatchery	Little White Salmon, 1987	Hatchery	4,566	1	1
Carson Hatchery	Little White Salmon, 1987	Hatchery	4,566	1	1
Carson Hatchery	Little White Salmon, 1987	Hatchery	4,566	1	1.
Carson Hatchery	Little White Salmon, 1987	Hatchery	4,566	2	2
Carson Hatchery	Little White Salmon, 1987	Hatchery	4,566	3	3
Carson Hatchery	Little White Salmon, 1987	Hatchery	4,566	1	1
Carson Hatchery	Little White Salmon, 1987	Hatchery	4,566	2	2
Carson Hatchery	Little White Salmon, 1987	Hatchery	4,566	3	3
Carson Hatchery	Little White Salmon, 1987	Hatchery	4,566	2	2
Carson Hatchery	Little White Salmon, 1987	Hatchery	4,566	4	4
Carson Hatchery	Little White Salmon, 1987	Hatchery	4,566	1	1
Carson Hatchery	Little White Salmon, 1987	Hatchery	4,566	1	1
Carson Hatchery	Little White Salmon, 1987	Hatchery	4,566	2	2
Carson Hatchery	Little White Salmon, 1987	Hatchery	4,566	2	2
Carson Hatchery	Little White Salmon, 1987	Hatchery	4,566	2	2
Trinity River	Little White Salmon, 1987	Hatchery	4,566	1	1

Table 6 (cont.) Immigration of coded wire tagged spring chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Lookingglass Hatchery, released Imnaha	Little White Salmon, 1987	Hatchery	4,566	1	1
Carson Hatchery	Little White Salmon, 1988	Hatchery	4,020	1	1
Carson Hatchery	Little White Salmon, 1988	Hatchery	4,020	2	2
Carson Hatchery	Little White Salmon, 1988	Hatchery	4,020	2	2
Carson Hatchery	Little White Salmon, 1988	Hatchery	4,020	1	1
Carson Hatchery	Little White Salmon, 1988	Hatchery	4,020	2	2
Carson Hatchery	Little White Salmon, 1988	Hatchery	4,020	1	1
Carson Hatchery	Little White Salmon, 1988	Hatchery	4,020	1	1
Carson Hatchery	Little White Salmon, 1988	Hatchery	4,020	1	1
Carson Hatchery	Little White Salmon, 1988	Hatchery	4,020	1	1
Carson Hatchery	Little White Salmon, 1988	Hatchery	4,020	1	1
Lookingglass Hatchery	Little White Salmon, 1988	Hatchery	4,020	1	1
Lookingglass Hatchery, released Imnaha	Little White Salmon, 1988	Hatchery	4,020	2	2
Dworshak Hatchery	Little White Salmon, 1988	Hatchery	4,020	1	1
Carson Hatchery	Little White Salmon, 1989	Hatchery	1,887	1	1
Carson Hatchery	Little White Salmon, 1989	Hatchery	1,887	1	1
Carson Hatchery	Little White Salmon, 1989	Hatchery	1,887	1	1
Carson Hatchery	Little White Salmon, 1990	Hatchery	2,362	1	1
Carson Hatchery	Little White Salmon, 1990	Hatchery	2,362	1	1

Table 6 (cont.) Immigration of coded wire tagged spring chinook into the Little White Salmon River subbasin.

Based on the following tag codes: 05-04-37, 05-04-38, 05-06-49, 05-09-25, 05-11-16, 05-08-58, 05-08-59, 05-08-61, 05-08-62, 05-08-63, 05-09-16, 05-09-17, 05-09-18, 05-09-19, 05-09-20, 05-09-22, 05-09-24, 05-09-25, 05-09-26, 05-09-27, 05-11-53, 05-11-54, 05-l l-56, 05-l l-57, 05-l l-58, 05-l l-59, 05-1 l-60, 05-l 1-61, 05-l l-63,05-12-16, 05-12-18, 05-12-21, 05-12-22, 06-61-43, 07-33-63, 05-11-62, 05-12-19, 05-12-22, 05-16-08, 05-16-18, 07-31-55, 07-33-63, 10-28-43, 05-18-14, 05-18-26, 05-18-28, 05-18-25, and 05-18-29.

Beginning with the 1978 brood.

1/ Fall chinook spawned as a spring chinook.

Table 7 (AC). Age composition percentage (freshwater.ocean) by brood year for spring chinook returning to the Little White Salmon Hatchery.

Age Composition (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1978										
1979										
1980										
1981	554		0.72	0.18			2.89	69.49	26.72	
1982	329		3.04		0.61		1.22	74.77	19.45	0.91
1983	1,387			2.95			4.47	53.57	39.01	
1984	441		13.83	50.34	0.23		1.13	22.68	11.79	
1985	956		0.94	2.83	0.31		1.57	83.05	11.3	
1986										
1987										
1988										

Age based on scale reading analysis by USFWS.

Table 8 (AS). Percent females by brood year and age class (freshwaterocean) for spring chinook returning to the Little White Salmon National Fish Hatchery.

Females (%)

Brood Year	N	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4	Total % Female
1978								57.06		
1979							91.04	59.83		
1980		75.00	100.00			33.33	75.89	50.00		
1981	356	40.00		50.00		6.67	68.05	60.14		64.26
1982	246					0	82.11	59.38		74.77
1983	922		53.66			3.33	75.64	62.11		66.47
1984	257	68.85	54.95	100.00		0	74.00	34.62		58.28
1985	680	55.56	51.85	33.33		0	75.57	55.56		71.13
1986		83.33	60.00			0	77.33			
1987		66.67				0				
1988										

Age based on scale reading analysis.

Table 9 (AL-a). Mean fork length by brood year and age class (freshwater.ocean) for female spring chinook returning to the Little White Salmon National Fish Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1978								86	
N								194	
St. Dev.								4.6	
1979							75	88	
N							193	70	
St. Dev.							2.4	3.64	
1980						63	75	87	
N						1	85	18	
St. Dev.						---	3.9	4.5	
1981		71	83			57	76	88	
N		3	1			1	262	89	
St. Dev.		2.52	---			---	3.2	3.77	
1982				89		69	76	88	102
N				1		4	202	38	1
St. Dev.				---		3.1	4.27	4.35	---
1983			83			66	74	88	
N			22			2	562	336	
St. Dev.			6.41			10.61	3.3	4.18	
1984		73	86	89			76	86	
N		42	122	1			74	18	
St. Dev.		3.06	4.15	---			3.32	4.95	

Table 9 (cont.) Mean fork length by brood year and age class (freshwater.ocean) for female spring chinook returning to the Little White Salmon National Fish Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1985		71	82	93			76	87	
N		5	14	1			600	60	
St. Dev.		5.36	6.54	---			3.11	4.93	
1986		72	82				75		
N		10	12				532		
St. Dev.		5.02	5.69				3.15		
1987		73							
N		2							
St. Dev.		3.53							

Age based on scale reading analysis.

Table 10 (AL-b). Mean fork length by brood year and age class (freshwater.ocean) for male spring chinook returning to the Little White Salmon National Fish Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1978								90	
N								156	
St. Dev.								7.3	
1979							76	96	
N							19	47	
St. Dev.							4	4.37	
1980						60	78	94	104
N						2	27	18	1
St. Dev.						5.7	5.04	4.98	---
1981		70				53	79	93	
N		1				15	123	59	
St. Dev.		---				4.9	4.63	5.31	
1982		73		98		55	79	91	105
N		6				4	44	26	2
St. Dev.		4.89		---		1.73	5.33	4.72	15.56
1983			93			56	77	94	
N			19			60	181	205	
St. Dev.			4.55			6.21	4.61	5.26	
1984		74	94			54	78	91	
N		19	102			5	26	34	
St. Dev.		4.5	4.81			4.56	4.21	6.4	

Table 10. (cont.) Mean fork length by brood year and age class (freshwater.ocean) for male spring chinook returning to the Little White Salmon National Fish Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4
1985		76	86			53	78	92	
N		4	13			15	194	48	
St. Dev.		1.73	5.31			3.5	4.37	5.27	
1986		77	89	91		55	78		
N		2	8	2		23	156		
St. Dev.		7.07	3.73	0.7		3.85	4.31		
1987		72				53			
N		1				7			
St. Dev.		---				2.81			

Age based on scale reading analysis.

Table 11 (TR). Hatchery releases of spring chinook salmon into the Little White Salmon River subbasin sorted by brood year, hatchery & life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1972	UNKNOWN STOCK	LTL WHITE SALMON NFH	Smolt	01/15/74	01/15/74	6	1063895	LTL WHITE SALMON RIV	UNTAGGED
1974	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	04/20/76	04/20/76	20	571747	LTL WHITE SALMON@NFH	UNTAGGED
1975	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	05/02/77	05/02/77	16	693990	LTL WHITE SALMON@NFH	UNTAGGED
1976	UNKNOWN STOCK	LTL WHITE SALMON NFH	Smolt	04/20/78	04/20/78	19	621116	LTL WHITE SALMON RIV	UNTAGGED
1976	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	04/20/78	04/20/78	19	621116	LTL WHITE SALMON@NFH	UNTAGGED
1977	UNKNOWN STOCK	LTL WHITE SALMON NFH	Smolt	04/26/79	04/26/79	19	790401	LTL WHITE SALMON RIV	UNTAGGED
1977	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	04/26/79	04/26/79	20	790401	LTL WHITE SALMON@NFH	UNTAGGED
1978	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	10/18/79	10/18/79	36	223988	LTL WHITE SALMON@NFH	UNTAGGED
1978	UNKNOWN STOCK	LTL WHITE SALMON NFH	PreSm	10/18/79	10/18/79	36	223988	LTL WHITE SALMON RIV	UNTAGGED
1978	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/16/80	04/16/80	21	510802	LTL WHITE SALMON RIV	UNTAGGED
1978	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	04/16/80	04/16/80	22	510802	LTL WHITE SALMON@NFH	UNTAGGED
1979	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/20/81	04/20/81	19	645680	LTL WHITE SALMON RIV	UNTAGGED
1979	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	04/20/81	04/20/81	19	645680	LTL WHITE SALMON@NFH	UNTAGGED
1980	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	PreSm	10/28/81	10/28/81	16	100000	LTL WHITE SALMON RIV	UNTAGGED
1980	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	02/20/82	02/20/82	17	583682	LTL WHITE SALMON RIV	UNTAGGED
1980	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	10/28/81	10/28/81	16	100000	LTL WHITE SALMON@NFH	UNTAGGED
1980	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	02/20/82	02/20/82	17	583682	LTL WHITE SALMON@NFH	UNTAGGED
1981	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	03/16/82	03/16/82	188	210521	LTL WHITE SALMON RIV	UNTAGGED
1981	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	03/16/82	03/16/82	188	210521	LTL WHITE SALMON@NFH	UNTAGGED
1981	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/15/83	04/15/83	15	750262	LTL WHITE SALMON RIV	UNTAGGED
1981	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	04/15/83	04/15/83	15	750262	LTL WHITE SALMON@NFH	UNTAGGED
1982	UNKNOWN STOCK	LTL WHITE SALMON NFH	FeFry	05/04/83	05/04/83		375252	LTL WHITE SALMON@NFH	UNTAGGED
1982	UNKNOWN STOCK	LTL WHITE SALMON NFH	FeFry	06/24/83	06/24/83		81067	LTL WHITE SALMON@NFH	UNTAGGED
1982	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	03/15/83	03/15/83	597	130800	LTL WHITE SALMON RIV	UNTAGGED
1982	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/04/83	05/04/83	68	426307	LTL WHITE SALMON RIV	UNTAGGED
1982	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/04/83	05/04/83	68	48000	LTL WHITE SALMON RIV	UNTAGGED
1982	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/24/83	06/24/83	44	46000	LTL WHITE SALMON RIV	051139
1982	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	03/15/83	03/15/83	597	29851	LTL WHITE SALMON@NFH	UNTAGGED
1982	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/04/83	05/04/83	68	48145	LTL WHITE SALMON@NFH	051141
1982	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/04/83	05/04/83	68	2910	LTL WHITE SALMON@NFH	UNTAGGED
1982	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/19/84	04/19/84	12	89737	LTL WHITE SALMON RIV	UNTAGGED
1982	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/19/84	04/19/84	12	44575	LTL WHITE SALMON@NFH	051140
1982	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/19/84	04/19/84	12	78682	LTL WHITE SALMON@NFH	UNTAGGED
1982	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	04/19/84	04/19/84	11	89737	LTL WHITE SALMON@NFH	UNTAGGED
1983	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/07/84	05/07/84	66	107785	LTL WHITE SALMON RIV	UNTAGGED
1983	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/07/84	05/07/84	65	47836	LTL WHITE SALMON@NFH	051457
1983	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/07/84	05/07/84	65	109867	LTL WHITE SALMON@NFH	UNTAGGED
1983	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/07/84	05/07/84	65	49799	LTL WHITE SALMON@NFH	051458
1983	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/07/84	05/07/84	65	108065	LTL WHITE SALMON@NFH	UNTAGGED
1983	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	05/07/84	05/07/84	66	423352	LTL WHITE SALMON@NFH	UNTAGGED
1983	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/22/84	06/22/84	39	47795	LTL WHITE SALMON@NFH	051459
1983	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/22/84	06/22/84	39	102474	LTL WHITE SALMON@NFH	UNTAGGED
1983	WILLARD (L WHT SALM)	LTL WHITE SALMON NFH	Smolt	04/17/85	04/17/85	17	946959	LTL WHITE SALMON RIV	UNTAGGED
1983	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/17/85	04/17/85	10	47849	LTL WHITE SALMON@NFH	051460
1983	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/17/85	04/17/85	10	360151	LTL WHITE SALMON@NFH	UNTAGGED
1983	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	04/17/85	04/17/85	17	946959	LTL WHITE SALMON@NFH	UNTAGGED
1984	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/06/85	05/06/85	66	101937	LTL WHITE SALMON RIV	UNTAGGED
1984	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/06/85	05/06/85	60	22905	LTL WHITE SALMON@NFH	051433
1984	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/06/85	05/06/85	60	52319	LTL WHITE SALMON@NFH	UNTAGGED
1984	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/06/85	05/06/85	60	24116	LTL WHITE SALMON@NFH	051434
1984	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/06/85	05/06/85	60	52424	LTL WHITE SALMON@NFH	UNTAGGED
1984	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/06/85	05/06/85	64	24115	LTL WHITE SALMON@NFH	051437
1984	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/06/85	05/06/85	64	51019	LTL WHITE SALMON@NFH	UNTAGGED
1984	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/06/85	05/06/85	64	24523	LTL WHITE SALMON@NFH	051438
1984	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/06/85	05/06/85	64	51012	LTL WHITE SALMON@NFH	UNTAGGED

Table 11 (cont.). Hatchery releases of spring chinook salmon into the Little White Salmon River subbasin sorted by brood year, hatchery & life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1984	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/06/85	05/06/85	60	101937	LTL WHITE SALMON@NFH	UNTAGGED
1984	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	43	24619	LTL WHITE SALMON@NFH	051435
1984	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	43	106015	LTL WHITE SALMON@NFH	UNTAGGED
1984	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	43	24916	LTL WHITE SALMON@NFH	051436
1984	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	43	106029	LTL WHITE SALMON@NFH	UNTAGGED
1984	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/14/86	04/14/86	11	24368	LTL WHITE SALMON@NFH	051439
1984	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/14/86	04/14/86	11	181738	LTL WHITE SALMON@NFH	UNTAGGED
1984	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/14/86	04/14/86	11	24005	LTL WHITE SALMON@NFH	051440
1984	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/14/86	04/14/86	11	182101	LTL WHITE SALMON@NFH	UNTAGGED
1985	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/14/86	05/14/86	67	803736	LTL WHITE SALMON RIV	UNTAGGED
1985	WIND R (CARSON NFH)	LTL WHITE SALMON NFH	Fingr	06/20/86	06/20/86	54	628354	LTL WHITE SALMON RIV	UNTAGGED
1985	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	05/14/86	05/14/86	67	803736	LTL WHITE SALMON@NFH	UNTAGGED
1985	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	06/20/86	06/20/86	54	628354	LTL WHITE SALMON@NFH	UNTAGGED
1985	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	03/10/87	03/10/87	17	3000	LTL WHITE SALMON RIV	UNTAGGED
1985	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/15/87	04/15/87	14	516252	LTL WHITE SALMON RIV	UNTAGGED
1985	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	04/15/87	04/15/87	14	516252	LTL WHITE SALMON@NFH	UNTAGGED
1986	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	02/13/87	02/13/87	381	902338	LTL WHITE SALMON RIV	UNTAGGED
1986	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	03/16/87	03/16/87	125	3000	LTL WHITE SALMON RIV	UNTAGGED
1986	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/01/87	06/01/87	42	512526	LTL WHITE SALMON RIV	UNTAGGED
1986	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	02/13/87	02/13/87	381	902338	LTL WHITE SALMON@NFH	UNTAGGED
1986	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	06/01/87	06/01/87	42	512526	LTL WHITE SALMON@NFH	UNTAGGED
1986	TULE STOCK -COLUMBIA	LTL WHITE SALMON NFH	Smolt	04/15/88	04/15/88	13	517446	LTL WHITE SALMON RIV	UNTAGGED
1986	TULE STOCK -COLUMBIA	LTL WHITE SALMON NFH	Smolt	04/15/88	04/15/88	13	517446	LTL WHITE SALMON@NFH	UNTAGGED
1987	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	EmFry	12/18/87	12/18/87	1680	1101914	LTL WHITE SALMON RIV	UNTAGGED
1987	TULE STOCK -COLUMBIA	LTL WHITE SALMON NFH	EmFry	01/05/88	01/05/88	1620	779855	LTL WHITE SALMON RIV	UNTAGGED
1987	ABERNATHY CREEK	LTL WHITE SALMON NFH	FeFry	12/18/87	12/18/87	1680	1101914	LTL WHITE SALMON@NFH	UNTAGGED
1987	TULE STOCK -COLUMBIA	LTL WHITE SALMON NFH	FeFry	01/05/88	01/05/88	1620	779855	LTL WHITE SALMON@NFH	UNTAGGED
1987	TULE STOCK -COLUMBIA	LTL WHITE SALMON NFH	Fingr	06/20/88	06/20/88	34	558098	LTL WHITE SALMON RIV	UNTAGGED
1987	TULE STOCK -COLUMBIA	LTL WHITE SALMON NFH	Fingr	06/20/88	06/20/88	34	558098	LTL WHITE SALMON@NFH	UNTAGGED
1987	WIND R (CARSON NFH)	LTL WHITE SALMON NFH	Smolt	04/17/89	04/17/89	13	499796	LTL WHITE SALMON RIV	UNTAGGED
1987	WIND R (CARSON NFH)	LTL WHITE SALMON NFH	Smolt	04/17/89	04/17/89	13	499796	LTL WHITE SALMON@NFH	UNTAGGED
1988	TULE STOCK -COLUMBIA	LTL WHITE SALMON NFH	EmFry	11/10/88	11/10/88	1512	238081	LTL WHITE SALMON RIV	UNTAGGED
1988	TULE STOCK -COLUMBIA	LTL WHITE SALMON NFH	EmFry	11/18/88	11/18/88	1512	273841	LTL WHITE SALMON RIV	UNTAGGED
1988	TULE STOCK -COLUMBIA	LTL WHITE SALMON NFH	EmFry	11/25/88	11/25/88	1564	140133	LTL WHITE SALMON RIV	UNTAGGED
1988	TULE STOCK -COLUMBIA	LTL WHITE SALMON NFH	EmFry	12/02/88	12/02/88	1417	562417	LTL WHITE SALMON RIV	UNTAGGED
1988	TULE STOCK -COLUMBIA	LTL WHITE SALMON NFH	EmFry	12/08/88	12/08/88	1375	980104	LTL WHITE SALMON RIV	UNTAGGED
1988	TULE STOCK -COLUMBIA	LTL WHITE SALMON NFH	EmFry	12/16/88	12/16/88	1375	208959	LTL WHITE SALMON RIV	UNTAGGED
1988	TULE STOCK -COLUMBIA	LTL WHITE SALMON NFH	FeFry	11/10/88	11/10/88	1512	238081	LTL WHITE SALMON@NFH	UNTAGGED
1988	TULE STOCK -COLUMBIA	LTL WHITE SALMON NFH	FeFry	11/18/88	11/18/88	1512	273841	LTL WHITE SALMON@NFH	UNTAGGED
1988	TULE STOCK -COLUMBIA	LTL WHITE SALMON NFH	FeFry	11/25/88	11/25/88	1564	140133	LTL WHITE SALMON@NFH	UNTAGGED
1988	TULE STOCK -COLUMBIA	LTL WHITE SALMON NFH	FeFry	12/02/88	12/02/88	1417	562417	LTL WHITE SALMON@NFH	UNTAGGED
1988	TULE STOCK -COLUMBIA	LTL WHITE SALMON NFH	FeFry	12/08/88	12/08/88	1375	980104	LTL WHITE SALMON@NFH	UNTAGGED
1988	TULE STOCK -COLUMBIA	LTL WHITE SALMON NFH	FeFry	12/16/88	12/16/88	1375	208959	LTL WHITE SALMON@NFH	UNTAGGED
1988	WIND R (CARSON NFH)	LTL WHITE SALMON NFH	Fingr	06/22/89	06/22/89	33	574191	LTL WHITE SALMON RIV	UNTAGGED
1988	WIND R (CARSON NFH)	LTL WHITE SALMON NFH	Fingr	06/22/89	06/22/89	33	574191	LTL WHITE SALMON@NFH	UNTAGGED
1988	WIND R (CARSON NFH)	LTL WHITE SALMON NFH	Smolt	04/18/90	04/18/90	15	25006	LTL WHITE SALMON@NFH	052234
1988	WIND R (CARSON NFH)	LTL WHITE SALMON NFH	Smolt	04/18/90	04/18/90	15	205717	LTL WHITE SALMON@NFH	UNTAGGED
1988	WIND R (CARSON NFH)	LTL WHITE SALMON NFH	Smolt	04/18/90	04/18/90	15	24897	LTL WHITE SALMON@NFH	052235
1988	WIND R (CARSON NFH)	LTL WHITE SALMON NFH	Smolt	04/18/90	04/18/90	15	205826	LTL WHITE SALMON@NFH	UNTAGGED
1989	WIND R (CARSON NFH)	LTL WHITE SALMON NFH	EmFry	11/29/89	11/29/89	1512	163409	LTL WHITE SALMON RIV	UNTAGGED
1989	WIND R (CARSON NFH)	LTL WHITE SALMON NFH	EmFry	12/08/89	12/08/89	1512	545884	LTL WHITE SALMON RIV	UNTAGGED
1989	WIND R (CARSON NFH)	LTL WHITE SALMON NFH	EmFry	12/28/89	12/28/89	1512	339416	LTL WHITE SALMON RIV	UNTAGGED
1989	WIND R (CARSON NFH)	LTL WHITE SALMON NFH	EmFry	01/12/90	01/12/90	1463	384706	LTL WHITE SALMON RIV	UNTAGGED
1989	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	EmFry	11/29/89	11/29/89	1512	163409	LTL WHITE SALMON@NFH	UNTAGGED
1989	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	EmFry	12/08/89	12/28/89	1512	885300	LTL WHITE SALMON@NFH	UNTAGGED

Table 11 (cont.). Hatchery releases of spring chinook salmon into the Little White Salmon River subbasin sorted by brood year, hatchery & life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1989	WIND R (CARSON NFH)	LTL WHITE SALMON NFH	FeFry	01/12/90	01/12/90	1463	384706	LTL WHITE SALMON@NFH	UNTAGGED
1989	WIND R (CARSON NFH)	LTL WHITE SALMON NFH	Fingr	06/25/90	06/25/90	36	1050126	LTL WHITE SALMON RIV	UNTAGGED
1989	WIND R (CARSON NFH)	LTL WHITE SALMON NFH	Fingr	06/25/90	06/25/90	36	1050126	LTL WHITE SALMON@NFH	UNTAGGED

Table 12 (CID-l). Parasites and diseases of spring chinook at Willard Hatchery located on the Little White Salmon River.

Disease type	Hatchery	Specific Pathogen
Bacteria	Willard	*Renibacterium salmoninarum* (Bacterial Kidney Disease)
Parasite	Willard	*Epistylis*
Parasite	Willard	*Ampiphrya*
Parasite	Willard	*Hexamita*
Virus	Willard	IHN

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

Table 13 (TD-2). Parasites and diseases of spring chinook at Little White Salmon Hatchery located on the Little White Salmon River.

Disease type	Hatchery	Specific Pathogen
Bacteria	Little White Salmon	*Renibacterium salmoninarum* (Bacterial Kidney Disease)
Bacteria	Little White Salmon	*Yersinia ruckeri* (Enteric Redmouth Disease)
Bacteria	Little White Salmon	*Cytophaga pschrophila* (Cold Water Disease)
Bacteria	Little White Salmon	*Myxobacteria*
Bacteria	Little White Salmon	*Aeromonas salmonicida* (Furunculosis)
Parasite	Little White Salmon	*Costia necatrix* (Costia = Ichytyobodo)
Parasite	Little White Salmon	*Ampiphrya*
Parasite	I Little White Salmon	*Epistylis*
Parasite	Little White Salmon	*Salmincola edwardsi*
Parasite	Little White Salmon	*Dermocestidium*
Parasite	Little White Salmon	*Myxobolus spp*
Parasite	Little White Salmon	*Gyrodactylus*
Parasite	Little White Salmon	*Hexamita*
Parasite	Little White Salmon	*Ceratomyxa shasta*
virus	Little White Salmon	IHN

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

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LITTLE WHITE SALMON

Fall Chinook

GEOGRAPHIC LOCATION

The Little White Salmon River, located in Skamania County in south central Washington, drams approximately 134 square miles. The river originates in the Gifford Pinchot National Forest, west of Monte Cristo Peak, and travels south for about 19 miles before entering Bonneville Pool on the Columbia River at River Mile (RM) 162, about six miles below the confluence of the White Salmon River and the Columbia. A railroad embankment and highway about one-half mile below the original mouth of the river cuts off a shallow embayment from the Columbia River and forms 212 acre Drano Lake. Two federal hatcheries are located on the river, the Little White Salmon National Fish Hatchery (NFH) at RM 1 and the Willard NFH at RM 5.

ORIGIN

Fall chinook were historically present in small numbers below the barrier falls in the lower river (Bryant 1949). The chinook salmon run consisted of fish known as "tules." However, fish were unable to pass above the barrier falls and when Bonneville Pool flooded the lower river area, natural production ceased in the subbasin. Hatchery production began in 1896 from eggs collected in the river. Over the years, the hatchery has received eggs from other strains of tule fall chinook (WDW, 1990). Nelson and Bodle (1988) indicated that from 1968 to 1983, 51 percent of the fall chinook released in the Little White Salmon River were not indigenous. Low returns, coupled with little contribution to commercial or sport harvest, led managers to discontinue production of this stock.

In 1984, the hatchery received upriver bright fall chinook eggs from Bonneville Hatchery (WDW, 1990). Brood stock for Bonneville Hatchery and other upriver bright production started from upriver-bound fall chinook trapped at Bonneville Dam and is a mixture of fish from several different production areas above Bonneville (Howell et. al., 1985).

DISTRIBUTION

Anadromous fish migration was completely blocked by a series of waterfalls approximately 37 feet high located about two miles upstream of the Columbia River. Before Bonneville Dam was completed, this short reach supported chinook salmon. When Bonneville Dam was completed in 1938, this area was inundated and natural salmon production ceased.

PRODUCTION

Currently, the Little White Salmon NFH produces bright fall chinook. Fingerlings are released at the hatchery to maintain brood stock for John Day Dam mitigation. Additional fingerlings have also been planted into the Yakima River (WDW, 1990). Slightly more than one-half million 1986 brood upriver bright fall chinook fingerlings were reared in net pens and released into Drano Lake.

The Northwest Power Planning Council's smolt capacity model indicated that a total of 73,652 fall chinook fingerlings could be produced using all subbasin habitat.

Little White Salmon NFH tule fall chinook returns from 1979 - 1983 brood years averaged 981 with a low return of 238 for the 1981 brood and a peak of 2,653 for the 1979 brood. There have been no tule fall chinook returns to the Little White Salmon NFH since 1988. Little White Salmon NFH

tule fall chinook returns by age and brood year are presented in Table 1.

Little White Salmon NFH upriver bright fall chinook returns from 1982 - 1984 brood years were 2,989 (1982 brood), 2,582 (1983 brood), and 3,214 (1984 brood) fish, respectively. There were no upriver bright fall chinook returns before 1984. Little White Salmon NFH upriver bright fall chinook returns by age and brood year are presented in Table 2.

Little White Salmon tributary fall chinook sport catch estimates between 1985 - 1987 return years averaged 45 fish (WDW, 1990). However, stock specific age and brood year analysis for the Little White Salmon River sport catch is unavailable.

ADULT LIFE HISTORY

Run size, catch and escapement

Ocean commercial and recreational fisheries from Alaska to Washington, in addition to Columbia River gill net and sport fisheries all harvest a portion of the Little White Salmon River origin fall chinook. Harvest rate within the subbasin averaged 2.6 percent for 1985 through 1987 (WDW, 1990). Columbia River sport and commercial fisheries are managed to ensure attainment of hatchery egg-take requirements.

Strays from other hatcheries are common. Tule and upriver bright fall chinook tagged and released from the Little White Salmon NFH, and recovered in other subbasins, are presented in Tables 3 and 4 (beginning with the 1978 brood through to the 1988 brood). Little White Salmon tag recoveries from spawning ground surveys after 1983 are currently unavailable. Coded wire tag recoveries from carcasses sampled from the Big White Salmon River during the fall 1987 through 1990 revealed those fish were primarily strays from the Little White Salmon NFH (Hymer, 1991).

The tule and upriver bright fall chinook coded wire tags recovered within the Little White Salmon subbasin which originated outside the Little White Salmon subbasin are presented in Tables 5 and 6, respectively.

Time of Migration

Tule fall chinook upstream migration occurs in early August and September with greatest abundance in the Columbia River estuary in late August and early September. Counts of tule fall chinook at Bonneville Dam generally peak between September 4 and September 9. Approximately 90 percent of the run has migrated past Bonneville Dam by September 20 (Howell et al. 1985).

Bright fall chinook migration curve is more prolonged and gradual compared to tule fall chinook passing Bonneville Dam. Adult bright fall chinook migration continues through November. Adult upriver brights return to the hatchery from mid-September to November.

Spawning Period

Upriver bright adults are held from mid-October to November and spawned in November.

Spawning Areas

Little White Salmon NFH.

Ane Composition

The age composition of Little White Salmon tule fall chinook ranges from two-year-old jacks to five-year-old adults with three-year-olds or four-year-olds usually thedominant age classes. Little White Salmon NFH tule fall chinook age composition data is summarized in Table 1. Table 7 lists the age composition percentages by brood year for tule fall chinook returning to the Little White Salmon NFH.

The age composition of Little White Salmon upriver bright fall chinook ranges from two-year-old jacks to six-year-old adults with four-year-olds or five-year-olds usually the dominant age classes. Little White Salmon upriver bright fall chinook age composition data is summarized in Table 2. Table 8 lists the age composition percentages by brood year for upriver bright fall chinook returning to the Little White Salmon NFH.

Sex Ratio

Female tule fall chinook comprised 51 - 71 percent of the tule fall chinook returning to the Little White Salmon NFH between 1979 - 1983 brood years. The percentage of females by brood year and age class for Little White Salmon NFH tule fall chinook returns are presented in Table 9.

Female upriver bright fall chinook comprised 44 and 59 percent of the upriver bright fall chinook returning to the Little White Salmon NFH for 1983 and 1984 brood years, respectively. The percent females by brood year and freshwaterocean rearing ages for Little White Salmon NFH upriver bright fall chinook returns are presented in Table 10.

The mean fork length by brood year, sex, and age class for tule fall chinook returning to the Little White Salmon NFH are presented in Tables 11 and 12.

The mean fork length by brood year, sex, and age class for upriver bright fall chinook returning to the Little White Salmon NFH are presented in Tables 13 and 14.

Fecundity

Fecundity for Little White Salmon River upriver bright fall chinook averaged 4,618 during 1987 - 1990 (USFWS, unpublished).

JUVENILE LIFE HISTORY

Time of Emergence

Incubation usually occurs from November to February and fry emerge in March.

Time, age and size at migration

Currently, the Little White Salmon River fall chinook are from hatchery production. Hatchery release information for the Little White Salmon River subbasin by brood year is presented in Table 15.

Survival Rate

Data unavailable.

BIOCHEMICAL-GENETIC CHARACTERISTICS

The upriver bright stock at Bonneville Hatchery (a brood stock source for Little White Salmon upriver brights) originated from upriver bound fall chinook trapped at Bonneville Dam. Since 1981 adult returns to the Bonneville Hatchery and additional fish trapped at the dam have been used as brood stock. These fish may be from several different production areas above Bonneville. Consequently, the genetic characteristics of this stock may be quite mixed (Howell et al. 1985).

DISEASE

IHN was detected in adults in 1981 and common bacterial diseases are bacterial kidney disease (BKD) and furunculosis. Bacteria and parasitic diseases found in the Little White Salmon NFH are listed in Tables 16 and 17.

Table 1 **(RH-1).** Total hatchery returns of tule fall chinook to the Little White Salmon NFH by brood year.

	Total Age						
Brood Year	2	3	4	5	6	Total	Adult Total
1974							
1975					0		
1976				25	0		
1977			501	19	0		
1978		715	550	22	0		1,287
1979	256	1,524	863	10	0	2,653	2,397
1980	55	278	430	5	0	768	713
1981	29	124	79	6	0	238	209
1982	13	117	123	13	0	266	253
1983	43	448	259	7			
1984	153	703	675				
1985	7	12					
1986	1						
1987							
1988							

Age composition based on scale reading analysis by USFWS.

1987 return year does not include 1 one-year-old mini jack.

No tule fall chinook returns to Little White Salmon NFH since 1988.

Table 2 (RH-2). Total hatchery returns of upriver bright fall chinook to the Little White Salmon NFH by brood year.

Brood Year	Total Age 2	3	4	5	6	Total	Adult Total
1974							
1975							
1976							
1977							
1978							
1979				18	0		
1980			18	33	0		
1981		32	62	56	0		150
1982	164	196	1,402	1,220	7	2,989	2,825
1983	562	339	1,267	398	16	2,582	2,020
1984	30	596	1,472	1,041	75	3,214	3,184
1985	8	132	457	782			
1986	83	228	657				
1987	76	246					
1988	370						

Age composition based on scale reading analysis by USFWS.

1990 return year does not include 108 adult male and 318 female upriver brights transferred from Bonneville Hatchery and spawned at Little White Salmon NFH.

No upriver bright fall chinook returned before 1984.

Table 3 (AE-1). Emigration of coded wire tagged tule fall chinook from the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Little White Salmon NFH	Big White Salmon River, 1981	Spawning Ground	228	1	4
Little White Salmon NFH	Spring Creek, 1981	Hatchery	1,172	1	1
Little White Salmon NFH	Spring Creek, 1984	Hatchery	9,507	1	1
Willard Hatchery	Abernathy Creek, 1984	Hatchery	2,025	1	1

Based on the following tag code: 05-04-48, 05-04-49, 05-07-47, and 05-03-57.

Beginning with the 1978 brood.

Little White Salmon NFH origin coded wire tag spawning ground recoveries after 1983 are currently unavailable.

Table 4 (AE-2). Emigration of code wire tagged upriver bright fall chinook from the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Little White Salmon NFH	Big White Salmon, 1987	Weir	42	1	1
Little White Salmon NFH	Big White Salmon, 1987	Weir	42	1	1
Little White Salmon NFH	Big White Salmon, 1987	Weir	42	1	1
Little White Salmon NFH	Spring Creek, 1987	Hatchery	78	1	1
Little White Salmon NFH	Spring Creek, 1987	Hatchery	78	3	3
Little White Salmon NFH	Spring Creek/Dam Trap, 1988	Hatchery	2,884	1	1
Little White Salmon NFH	Spring Creek/Dam Trap 1988	Hatchery	2,884	1	1
Little White Salmon NFH	Spring Creek, 1990	Hatchery	11,434		
Drano Lake Net Pens	Spring Creek, 1990	Hatchery	11,434	1	1

Based on the following tag code: 05-12-55, 05-12-57, 05-13-37, 05-12-54, 05-13-37, 05-12-54, 05-12-57, B5-07-14, and 05-18-10.

Beginning with the 1978 brood.

Little White Salmon NFH origin coded wire tag spawning ground recoveries after 1983 are currently unavailable.

Table 5 (AI-l). Immigration of coded wire tagged tule fall chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Klickitat Hatchery	Little White Salmon, 1981	Hatchery	1,497	1	1
Spring Creek Hatchery, released Big White Salmon	Little White Salmon, 1981	Hatchery	1,497	4	4
Spring Creek Hatchery, released Big White Salmon	Little White Salmon, 1981	Hatchery	1,497	9	9
Spring Creek Hatchery	Little White Salmon, 1981	Hatchery	1,497	2	2
Spring Creek Hatchery, released Big White Salmon	Little White Salmon, 1981	Hatchery	1,497	6	6
Spring Creek Hatchery	Little White Salmon, 1981	Hatchery	1,497	1	1
Abernathy Hatchery	Little White Salmon, 1981	Hatchery	1,497	1	1
Hagerman Hatchery	Little White Salmon, 1981	Hatchery	1,497	1	1
Spring Creek Hatchery	Little White Salmon, 1981	Hatchery	1,497	1	1
Spring Creek Hatchery, released Big White Salmon	Little White Salmon, 1981	Hatchery	1,497	4	4
Spring Creek Hatchery	Little White Salmon, 1981	Hatchery	1,497	1	1
Spring Creek Hatchery, released Big White Salmon	Little White Salmon, 1982	Hatchery	2,148	2	2
Spring Creek Hatchery, released Staveboldt Creek	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery, released Staveboldt Creek	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery, released Big White Salmon	Little White Salmon, 1982	Hatchery	2,148	6	6
Spring Creek Hatchery	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery	Little White Salmon, 1982	Hatchery	2,148	2	2

Table 5 (cont.) Immigration of coded wire tagged tule fall chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Spring Creek Hatchery, released below Bonneville	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery, released below Bonneville	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery, released Big White Salmon	Little White Salmon, 1982	Hatchery	2,148	2	2
Spring Creek Hatchery, released Big White Salmon	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery, released Big White Salmon	Little White Salmon, 1982	Hatchery	2,148	6	6
Spring Creek Hatchery, released Stavebolt Creek	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery	Little White Salmon, 1982	Hatchery	2,148	2	2
Spring Creek Hatchery	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery, released Big White Salmon	Little White Salmon, 1983	Hatchery	1,192	1	1
Spring Creek Hatchery	Little White Salmon, 1983	Hatchery	1,192	1	1
Spring Creek Hatchery	Little White Salmon, 1983	Hatchery	1,192	1	1
Bonneville Hatchery	Little White Salmon, 1984	Hatchery	30	1	1
Bonneville Hatchery	Little White Salmon, 1984	Hatchery	30	1	1
Spring Creek Hatchery	Little White Salmon, 1984	Hatchery	577	1	1
Washougal Hatchery	Little White Salmon, 1985	Hatchery	853	1	1
Spring Creek Hatchery	Little White Salmon, 1985	Hatchery	234	1	1

Table 5 (cont.) Immigration of coded wire tagged tule fall chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Spring Creek Hatchery	Little White Salmon, 1986	Hatchery	730	1	1
Bonneville Hatchery	Little White Salmon, 1986	Hatchery	730	1	1
Bonneville Hatchery	Little White Salmon, 1986	Hatchery	730	1	1
Washougal Hatchery	Little White Salmon, 1986	Hatchery	730	1	1
Bonneville Hatchery	Little White Salmon, 1987	Hatchery	983	1	1
Bonneville Hatchery	Little White Salmon, 1987	Hatchery	983	1	1
Bonneville Hatchery	Little White Salmon, 1987	Hatchery	983	3	3
McCall Hatchery, released Salmon River	Little White Salmon, 1987	Hatchery	983	1	1
Washougal Hatchery	Little White Salmon, 1988	Hatchery	2,092	1	1
Bonneville Hatchery	Little White Salmon, 1988	Hatchery	695	1	1
Bonneville Hatchery	Little White Salmon, 1988	Hatchery	695	1	1

Based on the following tag codes: 05-04-46, 05-04-5 1, 05-55-01, 05-60-01, 63-19-47, 03-47-01, 03-49-01, 03-52-01, 05-04-34, 05-04-43, 05-06-39, 05-06-40, 05-06-48, 05-06-49, 05-06-41, 07-21-42, 07-24-07, 07-24-08, 05-10-56, 05-10-51, 05-11-45, 07-33-22, 07-33-23, 63-24-61, 07-33-24, 07-33-25, 10-27-38, 63-24-61, and 63-34-28.

Beginning with the 1978 brood. Some tule fall chinook were spawned as brights.

Table 6 (AI-2). Immigration of coded wire tagged upriver bright fall chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery	Little White Salmon, 1981	Hatchery	1,497	12	12
Spring Creek Hatchery	Little White Salmon, 1981	Hatchery	1,497	1	1
Bonneville Hatchery	Little White Salmon, 1982	Hatchery	2,148	28	28
Bonneville Hatchery	Little White Salmon, 1982	Hatchery	2,148	7	7
Bonneville Hatchery	Little White Salmon, 1982	Hatchery	2,148	2	2
Bonneville Hatchery	Little White Salmon, 1982	Hatchery	2,148	1	1
Bonneville Hatchery	Little White Salmon, 1982	Hatchery	2,148	7	7
Bonneville Hatchery	Little White Salmon, 1982	Hatchery	2,148	9	9
Bonneville Hatchery	Little White Salmon, 1982	Hatchery	2,148	3	3
Bonneville Hatchery	Little White Salmon, 1982	Hatchery	2,148	1	1
Bonneville Hatchery	Little White Salmon, 1982	Hatchery	2,148	2	2
Bonneville Hatchery	Little White Salmon, 1982	Hatchery	2,148	1	1
Bonneville Hatchery	Little White Salmon, 1982	Hatchery	2,148	7	7
Bonneville Hatchery	Little White Salmon, 1982	Hatchery	2,148	28	2 8
Bonneville Hatchery	Little White Salmon, 1982	Hatchery	2,148	7	7
Bonneville Hatchery	Little White Salmon, 1982	Hatchery	2,148	9	9
Bonneville Hatchery	Little White Salmon, 1983	Hatchery	1,192	1	1
Bonneville Hatchery	Little White Salmon, 1983	Hatchery	1,192	13	13
Bonneville Hatchery	Little White Salmon, 1983	Hatchery	1,192	3	3
Bonneville Hatchery	Little White Salmon, 1983	Hatchery	1,192	2	2
Bonneville Hatchery	Little White Salmon, 1983	Hatchery	1,192	1	1
Hagerman Hatchery	Little White Salmon, 1983	Hatchery	1,192	1	1
Bonneville Hatchery	Little White Salmon, 1984	Hatchery	30	2	2
Bonneville Hatchery	Little White Salmon, 1984	Hatchery	30	1	1

Table 6 (cont.) Immigraton of coded wire tagged upriver bright fall chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery	Little White Salmon, 1984	Hatchery	30	4	4
Bonneville Hatchery	Little White Salmon, 1984	Hatchery	30	7	7
Bonneville Hatchery	Little White Salmon, 1984	Hatchery	30	1	1
Bonneville Hatchery	Little White Salmon, 1984	Hatchery	30	6	6
Bonneville Hatchery	Little White Salmon, 1984	Hatchery	30	1	1
Bonneville Hatchery	Little White Salmon, 1984	Hatchery	30	4	4
Bonneville Hatchery	Little White Salmon, 1984	Hatchery	30	2	2
Bonneville Hatchery	Little White Salmon, 1985	Hatchery	224	1	1
Hagerman Hatchery	Little White Salmon, 1985	Hatchery	853	1	1
Spring Creek Hatchery, released Yakima River	Little White Salmon, 1985	Hatchery	853	1	1
Bonneville Hatchery	Little White Salmon, 1985	Hatchery	853	2	2
Bonneville Hatchery	Little White Salmon, 1985	Hatchery	853	4	4
Bonneville Hatchery	Little White Salmon, 1985	Hatchery	853	4	4
Bonneville Hatchery	Little White Salmon, 1985	Hatchery	853	7	7
Bonneville Hatchery	Little White Salmon, 1985	Hatchery	853	1	1
Bonneville Hatchery	Little White Salmon, 1985	Hatchery	853	4	4
Bonneville Hatchery	Little White Salmon, 1985	Hatchery	853	2	2
Bonneville Hatchery	Little White Salmon, 1985	Hatchery	853	5	5
Bonneville Hatchery	Little White Salmon, 1985	Hatchery	853	2	2
Bonneville Hatchery	Little White Salmon, 1985	Hatchery	853	16	16
Bonneville Hatchery	Little White Salmon, 1985	Hatchery	853	4	4
Bonneville Hatchery, released Tanner Creek	Little White Salmon, 1986	Hatchery	1,827	7	7

Table 6 (cont.) Immigraton of coded wire tagged upriver bright fall chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery, released Tanner Creek	Little White Salmon, 1986	Hatchery	1,827	4	4
Bonneville Hatchery, released Tanner Creek	Little White Salmon, 1986	Hatchery	1,827	1	1
Hagerman Hatchery	Little White Salmon, 1987	Hatchery	3,091	1	1
Bonneville Hatchery	Little White Salmon, 1987	Hatchery	3,091	8	8
Bonneville Hatchery	Little White Salmon, 1987	Hatchery	3,091	9	9
Bonneville Hatchery	Little White Salmon, 1987	Hatchery	3,091	2	2
Bonneville Hatchery	Little White Salmon, 1987	Hatchery	3,091	1	1
Bonneville Hatchery	Little White Salmon, 1987	Hatchery	3,091	12	12
Bonneville Hatchery	Little White Salmon, 1987	Hatchery	3,091	4	4
Bonneville Hatchery	Little White Salmon, 1987	Hatchery	3,091	1	1
Bonneville Hatchery	Little White Salmon, 1988	Hatchery	2,092	1	1
Bonneville Hatchery	Little White Salmon, 1988	Hatchery	2,092	7	7
Bonneville Hatchery	Little White Salmon, 1988	Hatchery	2,092	3	3
Bonneville Hatchery	Little White Salmon, 1988	Hatchery	2,092	1	1
Bonneville Hatchery	Little White Salmon, 1988	Hatchery	2,092	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	1	1

Table 6 (cont.) Immigraton of coded wire tagged upriver bright fall chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	2	2
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	2	2
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	1	
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	1	1

Table 6 (cont.) Immigraton of coded wire tagged upriver bright fall chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1988	Hatchery	2,092	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	2	2
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1

Table 6 (cont.) Immigraton of coded wire tagged upriver bright fall chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	2	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	I
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	2	2
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1

Table 6 (cont.) Immigraton of coded wire tagged upriver bright fall chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	2	2
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	2	2
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1

Table 6 (cont.) Immigraton of coded wire tagged upriver bright fall chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	2	2
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	2	2
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	2	2
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	2	2
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	2	2
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1

Table 6 (cont.) Immigraton of coded wire tagged upriver bright fall chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Dam Bypass Study	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery, released Umatilla River	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery	Little White Salmon, 1989	Hatchery	1,818	2	2
Bonneville Hatchery	Little White Salmon, 1989	Hatchery	1,818	4	4
Bonneville Hatchery	Little White Salmon, 1989	Hatchery	1,818	2	2
Bonneville Hatchery	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery	Little White Salmon, 1989	Hatchery	1,818	2	2
Bonneville Hatchery	Little White Salmon, 1989	Hatchery	1,818	2	2
Bonneville Hatchery	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery	Little White Salmon, 1989	Hatchery	1,818	1	1

Table 6 (cont.) Immigraton of coded wire tagged upriver bright fall chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery	Little White Salmon, 1989	Hatchery	1,818	1	1
Eagle Creek Hatchery	Little White Salmon, 1989	Hatchery	1,818	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	3	3
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	5	5
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	3	3
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1

Table 6 (cont.) Immigraton of coded wire tagged upriver bright fall chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	3	3
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	3	3
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	3	3
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1

Table 6 (cont.) Immigraton of coded wire tagged upriver bright fall chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	3	3
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	5	5
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	4	4
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	3	3
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1

Table 6 (cont.) Immigraton of coded wire tagged upriver bright fall chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	4	4
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130		
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130		
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130		
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130		
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130		
Bonneville Hatchery	Little White Salmon. 1990	Hatchery	2,130		

Table 6 (cont.) Immigraton of coded wire tagged upriver bright fall chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	2	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1

Table 6 (cont.) Immigraton of coded wire tagged upriver bright fall chinook into the Little White Salmon River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	1	1
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	?	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	?	2
Bonneville Hatchery	Little White Salmon, 1990	Hatchery	2,130	?	?
Rock Creek Net Pens	Little White Salmon, 1990	Hatchery	2,130	1	

Based on the following tag codes: **05-10-22, 05-15-26,** 07-21-41, 07-21-43, 07-24-24, 07-24-26, 07-25-47, 07-25-07, 07-28-27, 07-28-28, 07-30-07, 07-31-25, 07-31-26, 07-33-17, 05-13-54, 07-30-08, 07-33-18, 07-37-54, 23-20-58, 23-20-59, 23-21-03, 23-21-07, 23-21-16, 23-21-17, 23-21-23, 23-21-25, 23-21-35, 23-21-44, 23-21-45, 23-21-48, 23-21-52, 23-21-56, 23-21-59, 23-21-60, 23-22-03, **23-22-04, 23-22-05, 23-22-07,** 23-22-14, 23-22-17, **23-22-18, 23-22-19, 23-22-22,** 23-22-24, 23-22-25, 23-25-31, 23-25-37, 23-25-49, 23-26-11, 23-26-21, 23-26-38, 23-20-57, **23-20-60,** 23-20-61, 23-21-01, **23-21-04,** 23-21-08, 23-21-10, 23-21-11, 23-21-14, 23-21-15, 23-21-20, 23-21-25, 23-21-27, 23-21-30, 23-21-36, 23-21-43, 23-21-47, 23-21-49, 23-21-50, 23-21-51, 23-21-53, 23-21-54, 23-21-55, 23-21-57, 23-21-58, 23-21-61, 23-21-62, 23-22-06, 23-22-08, 23-22-10, 23-22-11, 23-22-12, 23-22-13, 23-22-16, 07-33-26, 07-36-34, 07-36-35, 07-36-36, 07-37-52, 07-37-53, 07-37-55, 07-43-16, 07-47-22, 07-47-32, 07-47-37, 07-47-37, 07-47-38, **07-47-41,** 07-47-42, 10-26-41, 07-33-18, 07-42-54, 07-43-03, 07-43-17, 07-43-20, 07-47-19, 07-47-19, 07-47-21, 07-47-21, 07-47-25, 07-47-32, 07-47-38, 07-47-41, 07-47-42, 07-50-30, 23-20-55, 23-20-63, 23-21-06, 23-21-09, **23-21-13, 23-21-19,** 23-21-22, 23-21-24, **23-21-31, 23-21-33,** 23-21-34, 23-21-37, 23-21-38, 23-21-39, 23-21-41, 23-21-42, 23-22-01, 23-22-02, 23-22-15, 23-22-20, 23-22-21, 23-25-16, 23-25-28, 23-25-44, 23-25-47, 23-25-56, 23-26-19, 23-26-52, 23-26-62, **23-28-21, 23-28-25,** 23-28-32, 23-28-37, 23-28-41, 23-28-44, 23-28-50, 23-28-52, 23-28-62, 23-31-11, 23-31-16, 23-31-21, 23-31-25, 23-31-26, 23-31-37, 23-31-38, 23-31-41, 23-31-42, 23-31-44, 23-31-47, 23-31-61, 23-31-62, 23-32-01, 23-32-04, 23-32-04, 23-32-07, **B5-03-09, 05-05-28, 07-22-07,** 07-25-06, 07-17-33, 07-17-35, 07-21-43, 07-25-07, 07-16-38, 07-16-61, 07-17-34, 10-22-l 1, 07-24-24, 07-24-26, 07-25-47, 07-28-27, 07-28-28, and 07-24-25.

Beginning with the 1978 brood.
Some upriver bright coded wire tagged fail chinook were spawned as **tules.**

Table 7 (AC-l). Age composition percentage (freshwater.ocean) by brood year for tule fall chinook returning to the Little White- Salmon NFH.

Age Composition (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3
1978									
1979	1,185	8.19	34.85	56.20	0.76	0	0	0	0
1980	616	2.44	34.74	62.01	0.81	0	0	0	0
1981	204	8.33	53.43	35.79	2.45	0	0	0	0
1982	233	4.72	45.07	45.92	3.86	0	0	0	0.43
1983	617	6.00	62.40	30.79	0.81	0	0	0	0
1984									
1985									
1986									
1987									
1988									

Age based on scale reading analysis by USFWS.

Table 8 (AC-2). Age composition percentage (freshwater.ocean) by brood year for upriver bright fall chinook returning to the Little White Salmon NFH.

Brood Year	N	Age Composition (%) 1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3
1978									
1979									
1980									
1981									
1982									
1983	546	29.12	10.44	38.46	14.10	1.65	0	3.66	2.57
1984	1,072	0.37	9.52	31.06	54.95	2.33	0	0.37	1.40
1985									
1986									
1987									
1988									

Age based on scale reading analysis by USFWS.

Table 9 (AS-l). Percent females by brood year and age class (freshwaterocean) for tule fall chinook returning to the Little White Salmon NFH.

Females (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	Total % Female
1974										
1975										
1976					54.55					
1977				73.16	60.00					
1978			60.00	77.18	40.00					
1979	747	4.12	67.31	68.77	77.78	0	0	0	0	63.04
1980	440	0	68.22	76.18	60.00	0	0	0	0	71.43
1981	123	5.88	60.55	69.86	100.00	0	0	0	0	60.29
1982	116	9.10	35.24	66.36	66.67	0	0	0	100.00	49.79
1983	317	0	49.35	69.44	40.00	0	0	0	0	51.14
1984		1.56	37.96	62.78						
1985		0	55.56							
1986		0								
1987										
1988										

Age based on scale reading analysis by USFWS.

Table 10 (AS-2). Percent females by brood year and age class (freshwater.ocean) for upriver bright fall chinook returning to the Little White Salmon NFH.

Females (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	Total % Female
1978										
1979										
1980					60.00					
1981				68.42	40.00					
1982			44.83	75.88	64.65	0			100.00	
1983	238	0	33.33	65.24	59.74	88.89	0	85.00	78.57	43.59
1984	632	0	57.84	63.36	57.56	44.00	0	50.00	66.67	58.96
1985		0	10.34	55.14	62.66			31.82	54.55	
1986		0	12.88	61.32						
1987		2.27	12.36							
1988		0								

Age based on scale reading analysis by USFWS.

Table 11 (AL-a). Mean fork length by brood year and age class (freshwater-ocean) for female tule fall chinook returning to the Little White Salmon NFH.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3
1977			90	96				
N			139	3				
St. Dev.			5.70	0.60				
1978		81	90	98				
N		159	115	6				
St. Dev.		5.90	5.60	4.70				
1979	62	82	88	90				
N	4	278	458	7				
St. Dev.	4.40	5.40	5.80	6.60				
1980		76	87	89				
N		146	291	3				
St. Dev.		4.20	4.80	3.1				
1981	52	77	87	93				
N	1	66	51	5				
St. Dev.	---	5.10	6.10	3.16				
1982	57	80	90	95				87
N	1	37	71	6				1
St. Dev.	---	4.90	7.23	3.50				---
1983		79	90	88				
N		190	125	2				
St. Dev.		4.20	5.02	4.95				

Table 11 (cont.) Mean fork length by brood year and age class (freshwater.ocean) for female tule fall chinook returning to the Little White Salmon Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3
1984	47	78	90					
N	2	194	307					
St. Dev.	5.66	4.58	5.14					
1985		78						
N		5						
St. Dev.		8.41						
1986								
N								
St. Dev.								

Age based on scale reading analysis by USFWS.

Table 12 (AL-b). Mean fork length by brood year and age class (freshwater.ocean) for male tule fall chinook returning to the Little White Salmon NFH.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4
1977			94	100
N			51	2
St. Dev.			7.50	2.80
1978		82	93	103
N		106	34	9
St. Dev.		6.50	6.80	4.80
1979	57	84	90	91
N	93	135	208	2
St. Dev.	7.10	7.40	8.20	2.80
1980	58	75	92	102
N	15	68	91	2
St. Dev.	8.90	7.20	6.30	5.70
1981	57	76	93	
N	16	43	22	
St. Dev.	6.90	7.40	6.00	
1982	49	78	93	100
N	10	68	36	3
St. Dev.	7.40	6.10	9.98	2.65
1983	58	81	94	107
N	37	195	65	3
St. Dev.	2.40	6.15	6.62	7.00

Table 12 (cont.) Mean fork length by brood year and age class (freshwater.ocean) for male tule fall chinook returning to the Little White Salmon Hatchery.

-Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4
1984	56	80	96	
N	126	317	182	
St. Dev.	5.87	5.43	6.3	
1985	46	76		
N	5	4		
St. Dev.	6.58	10.4		
1986	58			
N	1			
St. Dev.	- -			

Age based on scale reading analysis by USFWS.

Table 13 (AL-c). Mean fork length by brood year and age class (freshwater.ocean) for female upriver bright fall chinook returning to the Little White Salmon NFH.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3
1980				103				
N				6				
St. Dev.				12.43				
1981			86	95				
N			13	4				
St. Dev.			4.79	3.32				
1982		71	87	96				92
N		26	258	139				4
St. Dev.		3.97	4.92	5.42				5.29
1983		73	87	93	99		82	93
N		19	137	46	8		17	11
St. Dev.		6.76	6.08	5.04	2.41		6.31	6.05
1984		75	89	97	98		85	95
N		59	211	339	11		2	10
St. Dev.		4.87	7.80	4.98	3.71		6.36	5.25
1985		75	88	96			81	85
N		3	134	151			7	6
St. Dev.		3.00	5.07	4.49			2.76	13.96
1986		73	87					
N		17	130					
St. Dev.		3.70	5.34					

Table 13 (cont.) Mean fork length by brood year and age class (freshwater.ocean) for female upriver bright chinook returning to the Little White Salmon Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3
1987	62	72						
N	1	11						
St. Dev.	---	3.07						
1988								
N								
St. Dev.								

Age based on scale reading analysis by USFWS.

Table 14 (AL-d). Mean fork length by brood year and age class (freshwaterocean) for male upriver bright fall chinook returning to the Little White Salmon NFH.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3
1980				108				
N				4				
St. Dev.				6.86				
1 9 8 1			91	100				
N			6	6				
St. Dev.			12.88	10.68				
1982		66	93	105	112			
N		32	82	76	2			
St. Dev.		7.89	7.65	8.17	5.66			
1983	47	68	89	103	118		88	100
N	159	38	73	31	1		3	3
St. Dev.	4.7	6.98	7.28	6.68	---		4.04	8.08
1984	48	73	95	106	104		74	10
N	4	43	122	250	14		2	5
St. Dev.	5.12	7.40	8.21	6.38	13.12		0.71	4.71
1985	51	67	88	104		58	73	90
N	1	26	109	90		4	15	5
St. Dev.	---	5.14	7.44	6.15		4.27	6.43	6.96
1986	46	69	90					
N	21	115	82					
St. Dev.	3.65	4.48	7.46					

Table 14 (cont.) Mean fork length by brood year and age class (freshwater.ocean) for male upriver bright fall chinook returning to the Little White Salmon Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3
1987	47	69						
N	43	78						
St. Dev.	2.74	5.78						
1988	49							
N	138							
St. Dev.	4.34							

Age based on scale reading analysis by USFWS.

Table 15 (TR). Hatchery releases of fall chinook salmon into Little White Salmon subbasin, sorted by brood year, hatchery & life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1975	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	04/27/76	04/27/76	102	1500000	LTL WHITE SALMON@NFH	UNTAGGED
1975	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	05/20/76	05/20/76	98	12242267	LTL WHITE SALMON@NFH	UNTAGGED
1976	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/01/77	06/01/77	122	280391	DRANO LAKE (29.0131)	054701
1976	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/01/77	06/01/77	122	11290120	DRANO LAKE (29.0131)	UNTAGGED
1976	UNKNOWN STOCK	LTL WHITE SALMON NFH	Fingr	06/01/77	06/01/77	120	11570511	LTL WHITE SALMON RIV	UNTAGGED
1977	UNKNOWN STOCK	LTL WHITE SALMON NFH	Fingr	06/25/78	06/25/78	117	12566661	LTL WHITE SALMON RIV	UNTAGGED
1977	UNKNOWN STOCK	LTL WHITE SALMON NFH	Fingr	07/00/78	07/00/78	104	529213	LTL WHITE SALMON RIV	UNTAGGED
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/25/78	05/25/78	123	50536	LTL WHITE SALMON@NFH	050342
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/25/78	05/25/78	123	350856	LTL WHITE SALMON@NFH	UNTAGGED
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/25/78	05/25/78	135	49549	LTL WHITE SALMON@NFH	050343
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/25/78	05/25/78	135	228802	LTL WHITE SALMON@NFH	UNTAGGED
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/25/78	05/25/78	139	51314	LTL WHITE SALMON@NFH	050344
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/25/78	05/25/78	139	215678	LTL WHITE SALMON@NFH	UNTAGGED
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/25/78	05/25/78	131	52160	LTL WHITE SALMON@NFH	050345
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/25/78	05/25/78	131	207802	LTL WHITE SALMON@NFH	UNTAGGED
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/25/78	05/25/78	109	49883	LTL WHITE SALMON@NFH	050346
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/25/78	05/25/78	109	144975	LTL WHITE SALMON@NFH	UNTAGGED
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/25/78	05/25/78	113	49430	LTL WHITE SALMON@NFH	050347
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/25/78	05/25/78	113	150055	LTL WHITE SALMON@NFH	UNTAGGED
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/25/78	05/25/78	122	49522	LTL WHITE SALMON@NFH	050348
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/25/78	05/25/78	122	155858	LTL WHITE SALMON@NFH	UNTAGGED
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/25/78	05/25/78	118	48427	LTL WHITE SALMON@NFH	056101
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/25/78	05/25/78	118	352424	LTL WHITE SALMON@NFH	UNTAGGED
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/25/78	05/25/78	117	52284	LTL WHITE SALMON@NFH	056301
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/25/78	05/25/78	117	348586	LTL WHITE SALMON@NFH	UNTAGGED
1977	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	05/25/78	05/25/78	117	9960520	LTL WHITE SALMON@NFH	UNTAGGED
1977	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	07/12/78	07/12/78	55	529213	LTL WHITE SALMON@NFH	UNTAGGED
1977	UNKNOWN STOCK	LTL WHITE SALMON NFH	PreSm	11/14/78	11/14/78	34	545375	LTL WHITE SALMON RIV	UNTAGGED
1977	UNKNOWN STOCK	LTL WHITE SALMON NFH	Smolt	04/19/79	04/19/79	22	729977	LTL WHITE SALMON RIV	UNTAGGED
1977	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	11/14/78	11/14/78	34	545375	LTL WHITE SALMON@NFH	UNTAGGED
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/30/79	04/30/79	23	31146	LTL WHITE SALMON@NFH	050349
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/30/79	04/30/79	23	218091	LTL WHITE SALMON@NFH	UNTAGGED
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/30/79	04/30/79	21	31212	LTL WHITE SALMON@NFH	050350
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/30/79	04/30/79	21	209135	LTL WHITE SALMON@NFH	UNTAGGED
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/30/79	04/30/79	24	32972	LTL WHITE SALMON@NFH	050351
1977	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/30/79	04/30/79	24	205821	LTL WHITE SALMON@NFH	UNTAGGED
1977	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/12/78	05/12/78	61	144278	LTL WHITE SALMON@NFH	055501
1977	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/12/78	05/12/78	61	2994680	LTL WHITE SALMON@NFH	UNTAGGED
1977	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Fingr	07/12/78	07/12/78	100	39357	LTL WHITE SALMON@NFH	050355
1977	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Fingr	07/12/78	07/12/78	100	137028	LTL WHITE SALMON@NFH	UNTAGGED
1977	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Fingr	07/12/78	07/12/78	109	40154	LTL WHITE SALMON@NFH	050356
1977	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Fingr	07/12/78	07/12/78	109	135551	LTL WHITE SALMON@NFH	UNTAGGED
1977	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Fingr	07/12/78	07/12/78	104	39170	LTL WHITE SALMON@NFH	050357
1977	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Fingr	07/12/78	07/12/78	104	137102	LTL WHITE SALMON@NFH	UNTAGGED
1977	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Fingr	11/14/78	11/14/78	34	35552	LTL WHITE SALMON@NFH	050352
1977	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Fingr	11/14/78	11/14/78	34	148527	LTL WHI TE SALMON@NFH	UNTAGGED
1977	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Fingr	11/14/78	11/14/78	34	35703	LTL WHITE SALMON@NFH	050353
1977	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Fingr	11/14/78	11/14/78	34	146345	LTL WHITE SALMON@NFH	UNTAGGED
1977	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Fingr	11/14/78	11/14/78	34	36963	LTL WHITE SALMON@NFH	050354
1977	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Fingr	11/14/78	11/14/78	34	143040	LTL WHITE SALMON@NFH	UNTAGGED
1978	UNKNOWN STOCK	LTL WHITE SALMON NFH	Fingr	06/22/79	06/22/79	110	11408648	LTL WHITE SALMON RIV	UNTAGGED
1978	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/22/79	06/22/79	105	177815	LTL WHITE SALMON@NFH	050448
1978	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/22/79	06/22/79	105	5664370	LTL WHITE SALMON@NFH	UNTAGGED
1978	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/22/79	06/22/79	123	264808	LTL WHITE SALMON@NFH	050449
1978	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/22/79	06/22/79	123	5303840	LTL WHITE SALMON@NFH	UNTAGGED

Table 15. Hatchery releases of fall chinook salmon into the Little White Salmon River subbasin sorted by brood year, hatchery & life stage - CONTINUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1978	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	05/19/79	05/19/79	70	250000	DRANO LAKE (29.0131)	UNTAGGED
1979	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/10/80	06/10/80	101	8724047	LTL WHITE SALMON RIV	UNTAGGED
1979	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/10/80	06/16/80	101	164448	LTL WHITE SALMON@NFH	050643
1979	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/10/80	06/16/80	101	8611548	LTL WHITE SALMON@NFH	UNTAGGED
1979	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	04/21/80	04/21/80	226	700032	ROCK CR (31.0114)	UNTAGGED
1980	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/05/81	06/05/81	94	9215733	LTL WHITE SALMON RIV	UNTAGGED
1 980	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/05/81	06/05/81	94	183444	LTL WHITE SALMON@NFH	050747
1980	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/05/81	06/05/81	94	6591967	LTL WHITE SALMON@NFH	UNTAGGED
1980	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/05/81	06/05/81	94	52403	LTL WHITE SALMON@NFH	050849
1980	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/05/81	06/05/81	94	1884744	LTL WHITE SALMON@NFH	UNTAGGED
1980	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/05/81	06/05/81	94	13339	LTL WHITE SALMON@NFH	050850
1980	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/05/81	06/05/81	94	489840	LTL WHITE SALMON@NFH	UNTAGGED
1 981	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/03/82	06/03/82	93	8038498	LTL WHITE SALMON RIV	UNTAGGED
1981	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/03/82	06/03/82	93	101333	LTL WHITE SALMON@NFH	050435
1981	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/03/82	06/03/82	93	3934622	LTL WHITE SALMON@NFH	UNTAGGED
1 981	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/03/82	06/03/82	93	98475	LTL WHITE SALMON@NFH	050436
1981	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/03/82	06/03/82	93	3904214	LTL WHITE SALMON@NFH	UNTAGGED
1982	TULE STOCK -COLUMBIA	LTL WHITE SALMON NFH	Fingr	06/03/83	06/03/83	91	8430082	LTL WHITE SALMON RIV	UNTAGGED
1 982	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	07/01/83	07/01/83	85	1070249	LTL WHITE SALMON RIV	UNTAGGED
1982	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	06/03/83	06/03/83	91	8430082	LTL WHITE SALMON@NFH	UNTAGGED
1982	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	07/01/83	07/01/83	85	1070249	LTL WHITE SALMON@NFH	UNTAGGED
1983	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	FeFry	06/05/84	07/09/84		831687	LTL WHITE SALMON@NFH	UNTAGGED
1983	UNDETERMINED MIXED	LTL WHITE SALMON NFH	Fingr	06/05/84	06/05/84	79	6849023	LTL WHITE SALMON RIV	UNTAGGED
1983	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	07/09/84	07/09/84	101	831687	LTL WHITE SALMON RIV	UNTAGGED
1983	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	07/09/84	07/09/84	101	831687	LTL WHITE SALMON RIV	UNTAGGED
1983	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	06/05/84	06/05/84	79	6849023	LTL WHITE SALMON@NFH	UNTAGGED
1983	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	07/09/84	07/09/84	98	94847	LTL WHITE SALMON@NFH	051337
1983	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	07/09/84	07/09/84	98	3237	LTL WHITE SALMON@NFH	UNTAGGED
1983	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Smolt	04/02/85	04/02/85	16	91549	LTL WHITE SALMON@NFH	051527
1983	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Smolt	04/02/85	04/02/85	16	3815	LTL WHITE SALMON@NFH	UNTAGGED
1983	COLUMBIA RIV BRIGHTS	SPRING CR NF HATCHRY	Fingr	06/14/84	06/14/84	124	848071	LTL WHITE SALMON@NFH	UNTAGGED
1984	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/23/85	05/23/85	110	1600008	LTL WHITE SALMON RIV	UNTAGGED
1984	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/23/85	05/23/85	110	1600008	LTL WHITE SALMON@NFH	UNTAGGED
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	87	22393	LTL WHITE SALMON@NFH	051250
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	87	3645	LTL WHITE SALMON@NFH	UNTAGGED
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	87	23100	LTL WHITE SALMON@NFH	051251
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	87	3760	LTL WHITE SALMON@NFH	UNTAGGED
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	87	20075	LTL WHITE SALMON@NFH	051252
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	87	3268	LTL WHITE SALMON@NFH	UNTAGGED
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	87	21158	LTL WHITE SALMON@NFH	051253
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	87	3444	LTL WHITE SALMON@NFH	UNTAGGED
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	87	25467	LTL WHITE SALMON@NFH	051254
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	87	979	LTL WHITE SALMON@NFH	UNTAGGED
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	87	25505	LTL WHITE SALMON@NFH	051255
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	87	980	LTL WHITE SALMON@NFH	UNTAGGED
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	87	21864	LTL WHITE SALMON@NFH	051256
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	87	840	LTL WHITE SALMON@NFH	UNTAGGED
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	87	26499	LTL WHITE SALMON@NFH	051257
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	87	1019	LTL WHITE SALMON@NFH	UNTAGGED
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/20/85	06/20/85	87	841762	LTL WHITE SALMON@NFH	UNTAGGED
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Smolt	04/14/86	04/14/86	18	18941	LTL WHITE SALMON@NFH	051441
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Smolt	04/14/86	04/14/86	18	2602	LTL WHITE SALMON@NFH	UNTAGGED
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Smolt	04/14/86	04/14/86	18	19217	LTL WHITE SALMON@NFH	051442
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Smolt	04/14/86	04/14/86	18	2670	LTL WHITE SALMON@NFH	UNTAGGED
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Smolt	04/14/86	04/14/86	18	17860	LTL WHITE SALMON@NFH	051443

Table 15. Hatchery releases of fall chinook salmon into the Little White Salmon River subbasin sorted by brood year, hatchery & life stage - CONTINUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Smolt	04/14/86	04/14/86	18	2482	LTL WHITE SALMONaNFH	UNTAGGED
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Smolt	04/14/86	04/14/86	18	19367	LTL WHITE SALMONaNFH	051444
1984	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Smolt	04/14/86	04/14/86	18	2691	LTL WHITE SALMONaNFH	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/18/86	06/18/86	165	190462	LTL WHITE SALMON RIV	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/18/86	06/18/86	107	777805	LTL WHITE SALMON RIV	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/18/86	06/18/86	108	49443	LTL WHITE SALMONaNFH	051807
1985	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/18/86	06/18/86	108	1009	LTL WHITE SALMONaNFH	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/18/86	06/18/86	108	49573	LTL WHITE SALMONaNFH	051808
1985	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/18/86	06/18/86	108	1012	LTL WHITE SALMONaNFH	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/18/86	06/18/86	108	48147	LTL WHITE SALMONaNFH	051809
1985	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/18/86	06/18/86	108	2163	LTL WHITE SALMONaNFH	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/18/86	06/18/86	108	48147	LTL WHITE SALMONaNFH	051810
1985	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/18/86	06/18/86	108	2163	LTL WHITE SALMONaNFH	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/18/86	06/18/86	107	968168	LTL WHITE SALMONaNFH	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	LTL UHJTE SALMON NFH	Smolt	04/15/87	04/15/87	17	41299	LTL WHITE SALMONaNFH	051811
1985	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Smolt	04/15/87	04/15/87	17	5267	LTL WHITE SALMONaNFH	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Smolt	04/15/87	04/15/87	17	41833	LTL WHITE SALMONaNFH	051812
1985	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Smolt	04/15/87	04/15/87	17	5335	LTL WHITE SALMONaNFH	UNTAGGED
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/20/87	05/20/87	99	49947	DRANO LAKE (29.0131)	B50103
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/20/87	05/20/87	99	4765	DRANO LAKE (29.0131)	UNTAGGED
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/20/87	05/20/87	111	47400	DRANO LAKE (29.0131)	B50104
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/20/87	05/20/87	111	5926	DRANO LAKE (29.0131)	UNTAGGED
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/21/87	05/21/87	99	47731	DRANO LAKE (29.0131)	B50101
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/21/87	05/21/87	99	4223	DRANO LAKE (29.0131)	UNTAGGED
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/21/87	05/21/87	97	49839	DRANO LAKE (29.0131)	B50102
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/21/87	05/21/87	97	4650	DRANO LAKE (29.0131)	UNTAGGED
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/21/87	05/21/87	99	31671	DRANO LAKE (29.0131)	850105
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/21/87	05/21/87	99	5221	DRANO LAKE (29.0131)	UNTAGGED
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/21/87	05/21/87	a9	34209	DRANO LAKE (29.0131)	850106
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/21/87	05/21/87	89	2550	DRANO LAKE (29.0131)	UNTAGGED
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/21/87	05/21/87	93	59682	DRANO LAKE (29.0131)	B50201
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/21/87	05/21/87	93	14786	DRANO LAKE (29.0131)	UNTAGGED
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/21/87	05/21/87	253	6341	DRANO LAKE (29.0131)	UNTAGGED
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/22/87	05/22/87	113	62157	DRANO LAKE (29.0131)	B50202
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/22/87	05/22/87	113	12092	DRANO LAKE (29.0131)	UNTAGGED
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/22/87	05/22/87	108	49720	DRANO LAKE (29.0131)	850713
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/22/87	05/22/87	108	4593	DRANO LAKE (29.0131)	UNTAGGED
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/22/87	05/22/87	108	48285	DRANO LAKE (29.0131)	850714
1986	COLUMBIA RIV BRIGHTS	DRANO LAKE PENS -FWS	Fingr	05/22/87	05/22/87	108	6163	DRANO LAKE (29.0131)	UNTAGGED
1986	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	FeFry	03/20/87	03/20/87	1134	303900	LTL WHITE SALMONaNFH	UNTAGGED
1986	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	03/20/87	03/20/87	1134	303900	LTL WHITE SALMON RIV	UNTAGGED
1986	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	04/15/87	04/15/87	381	24358	LTL WHITE SALMON RIV	UNTAGGED
1987	COLUMBIA (N BONNEVL)	LTL WHITE SALMON NFH	Fingr	06/30/88	06/30/88	123	3063497	LTL WHITE SALMON RIV	UNTAGGED
1987	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/30/88	06/30/88	123	3063497	LTL WHITE SALMONaNFH	UNTAGGED
1988	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/22/89	06/22/89	92	1456852	LTL WHITE SALMON RIV	UNTAGGED
1988	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/22/89	06/22/89	92	1456852	LTL WHITE SALMONaNFH	UNTAGGED
1989	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/25/90	06/25/90	111	22444	LTL WHITE SALMONaNFH	052337
1989	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/25/90	06/25/90	111	696742	LTL WHITE SALMONaNFH	UNTAGGED
1989	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/25/90	06/25/90	111	22360	LTL WHITE SALMONaNFH	052338
1989	COLUMBIA RIV BRIGHTS	LTL WHITE SALMON NFH	Fingr	06/25/90	06/25/90	111	696826	LTL WHITE SALMONaNFH	UNTAGGED

Table 16 (TD-1). Parasites and diseases of tule fall chinook at Little White Salmon National Fish Hatchery.

Disease type	Hatchery	Specific Pathogen
Bacteria	Little White Salmon	*Renibacterium salmoninarum* (Bacterial Kidney Disease)
Bacteria	Little White Salmon	*Yersinia ruckeri* (Enteric Redmouth Disease)
Bacteria	Little White Salmon	*Cytophaga pschrophila* (Cold Water Disease)
Bacteria	Little White Salmon	*Myxobacteria*
Bacteria	Little White Salmon	*Aeromonas salmonicida* (Furunculosis)
Parasite	Little White Salmon	*Costia necatrix* (Costia = Ichytyobodo)
Parasite	Little White Salmon	*Ampiphrya*
Parasite	Little White Salmon	*Epistylis*
Parasite	Little White Salmon	*Salmincola edwardsi*
Parasite	Little White Salmon	*Dermocestidium*
Parasite	Little White Salmon	*Myxobolus spp*
Parasite	Little White Salmon	*Gyrodactylus*
Parasite	Little White Salmon	*Hexamita*
Parasite	Little White Salmon	*Ceratomyxa shasta*
Virus	Little White Salmon	IHN
Virus	Little White Salmon	EIBS

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

Table 17 (TD-2). Parasites and diseases of upriver bright fall chinook at Little White Salmon Hatchery.

Disease type	Hatchery	Specific Pathogen
Bacteria	Little White Salmon	*Renibacterium salmoninarum* (Bacterial Kidney Disease)
Parasite	Little White Salmon	*Costia necatrix* (Costia = Ichytyobodo)
virus	Little White Salmon	IHN
virus	Little White Salmon	EIBS

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

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LITTLE WHITE SALMON

Coho

GEOGRAPHIC LOCATION

The Little White Salmon River, located in Skamania County in south central Washington, drains approximately 134 square miles. The river originates in the Gifford Pinchot National Forest, west of Monte Cristo Peak, and travels south for about 19 miles before entering Bonneville Pool an the Columbia River at River Mile (RM) 162, about six miles below the confluence of the White Salmon River and the Columbia. A railroad embankment and highway about one-half-mile below the original mouth of the river cuts off a shallow embayment from the Columbia River and forms 212 acre Drano Lake. Two federal fish hatcheries are located on the river, the Little White Salmon National Fish Hatchery at RM 1 and the Willard National Fish Hatchery at RM 5.

ORIGIN

Coho may have been historically present in small numbers below the barrier falls in the lower river (Bryant 1949). However, after Bonneville Pool inundated the lower river, only hatchery fish have been present.

Subbasin hatchery coho rearing presently occurs exclusively at the Willard National Fish Hatchery. Adults and eggs are collected at the Little White Salmon Hatchery, but rearing and release occur at Willard NFH (Little White Salmon Hatchery produces mainly sprmg chinook). Willard Hatchery was built in 1952 and occupies 80 acres. Early returning coho are used at the hatchery. Most existing early coho (Type-S) hatchery programs are considered linked to native Toutle River stock who. Washington stations either received Toutle stock eggs or utilized local native early run coho (Howell et al. 1985).

DISTRJBUTION

Anadromous fish migration was completely blocked by a series of water falls approximately 37 feet high located about two miles upstream of the Columbia River. Before Bonneville Dam was completed, this short reach supported coho salmon. When Bonneville Dam was completed in 1938, this area was inundated and natural salmon production ceased.

PRODUCTION

The Willard National Fish Hatchery produces the only coho on the Little White Salmon. The Northwest Power Planning Council's smolt capacity model indicated that a total of 18,709 smolts could be produced using all subbasin habitat.

Plants for 1977 through 1986 averaged 2,851,000 smolts and 155,000 fingerlings, although fingerling plants are not annual (WDW, 1990). During 1986 - 1990, 81 percent of the juvenile coho releases above Bonneville Dam were into the Little White Salmon and Klickitat Rivers (TAC, 1991).

The Little White Salmon River tributary (Drano Lake) sport catch estimates between 1977 - 1986 return years averaged 158 adult coho, ranging from a low of 3 in 1977 and a high of 733 in 1982, with a harvest rate of 1.8 percent (WDW, 1990). Estimates are based on punch card totals and limited sampling data. Specific age composition and brood year analyses for the Little White

Salmon River sport catch are unavailable.

Willard Hatchery returns to the Little White Salmon Hatchery rack for the 1984 -1988 brood years averaged 6,057 adults with a low of 2,079 in 1987 and a peak of 10,909 in 1986 based on scale reading analysis performed by U.S. Fish and Wildlife Service. Specific age and brood year analysis for the Little White Salmon are presented in Table 1.

ADULT LIFE HISTORY

Run size. catch and escapement

Little White Salmon coho are primarily harvested in the ocean and Columbia River by commercial and sport fisheries. Total harvest rate is about 80 percent.

Ocean commercial and recreational fisheries off the Oregon coast are the primary harvesters of early coho. The Oregon troll fishery accounts for the highest percentage of the overall catch (Howell et al. 1985).

Based on coded-wire tagged releases of 1976 - 1978 brood late coho, most of the harvest occurs in the Washington and Oregon ocean fisheries. Late coho have a more northerly migration pattern than early coho (WDF, 1990). This is reflected in the catch distribution where the Washington coastal catch comprised 40 percent of the total harvest compared to 20 percent for early coho during 1979 - 1981. Late coho also contribute significantly to the lower Columbia River commercial gill net fishery (Howell et al. 1985).

Straying from other hatcheries does occur but is rare. Table 2 lists Willard National Fish Hatchery Hatchery origin coho stray coded-wire tag recoveries beginning with the 1978 brood through to the 1988 brood. Table 3 lists the coded-wire tags recovered within the Little White Salmon Hatchery which originated outside the Little White Salmon subbasin.

Harvest rates have averaged 79 percent for Type-S coho between 1983 and 1987. Harvest of Type-S coho is occasionally constrained by one or more of the fall chinook stocks.

Time of Migration

Early coho enter the Columbia River by mid-August and begin returning to the Little White Salmon hatchery in September through the first week of November. In the mainstem Columbia River early coho predominate from August to mid-September. Stock composition shifts to late coho in late September and October.

Spawning Period

Adults are held from late September to late November when the are spawned (WDW, 1990).

Spawning Areas

Willard National Fish Hatchery.

Age composition

An average of 90.4 percent of Willard National Fish Hatchery coho return as adults and an average

of 9.6 percent return as jacks. Table 4 shows the age composition percentage (freshwaterocean) by brood year for coho rack returns to the Little White Salmon National Fish Hatchery.

Sex Ratio

Female coho comprised 37 to 46 percent of the coho returning to the Little White Salmon Fish Hatchery between 1985 and 1987 brood years. The percent females by brood year and freshwater-ocean rearing ages for the Little White Salmon Hatchery returns is presented in Table 5.

The fork length of coho returning to the Little White Salmon Hatchery by brood year and age class (freshwater.ocean) is presented in Table 6.

Fecundity

Fecundity was once estimated to average 2,100 eggs per female (USFWS, unpublished), but a time series of fecundity data for coho from the Willard Fish Hatchery by age and brood year is unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

Fry emerge from mid- January to February (WDW, 1990).

Time, age and size at migration

Freshwater rearing generally lasts for about 14 months. Hatchery release information for the Little White Salmon subbasin by brood year is presented in Table 7. Based on coded-wire tag recovery studies by Dawley et al. (1982), arrival in the Columbia River estuary occurs soon after hatchery release (Howell et al. 1985).

Survival Rate

A survival rate for natural coho from the Little White Salmon subbasin is unavailable.

BIOCHEMICAL-GENETIC CHARACTERISTICS

Data has not been compiled.

DISEASE

Bacteria and parasitic diseases found in the Willard National Fish Hatchery and Little White Salmon National Fish Hatchery are listed in Table 8 and 9 (WDF Salmon Culture, Olympia).

Table 1 (RH). Total hatchery returns of coho to the Little White Salmon Hatchery by brood year.

Brood Year	Total Age 2	3	4	5	6	Total	Adult Total
1974							
1975							
1976							
1977							
1978							
1979							
1980							
1981							
1982							
1983							
1984		8,047					
1985	1,038	3,193				4,231	3,193
1986	128	10,909				11,037	10,909
1987	280	2,079				2,359	2,079
1988	6,309						

Age based on scale reading analysis performed by USFWS.

Little White NFH is the collection facility for Willard NFH coho.

Table 2 (AE). Emigration of coded wire tagged coho from the Little White Salmon subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Willard, released below Bonneville	Washougal, 1981	Hatchery	14,680	1	1
Willard, released below Bonneville	Hamilton Creek, 1981	Spawning Ground	5	1	1
Willard, released Clatskanie	Kalama, 1981	Spawning Ground	65	1	1
Willard, released Hammond	Grays, 1981	Hatchery	1,843	1	1

Based on the following tag codes, 05-06-5 1, 05-06-52, and 05-06-53.

Beginning with the 1978 brood.

Table 3 (AI). Immigration of coded wire tagged coho into the Little White Salmon subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Eagle Creek Hatchery	Little White Salmon, 1983	Hatchery	1,113	1	1
Washougal Hatchery	Little White Salmon, 1984	Hatchery	1,052	1	1
Cascade/Umatilla	Little White Salmon, 1988	Hatchery	3,321	1	1

Based on the following tag codes: 05-10-39, 63-30-02, and 07-36-25.

Beginning with the 1978 brood.

Table 4 (AC). Age composition percentage (freshwater.ocean) by brood year for coho returning to the Little White Salmon National Fish Hatchery.

		Age Composition (%)			
Brood Year	N	2.0	2.1	2.2	2.3
1978					
1979					
1980					
1981					
1982					
1983					
1984					
1985	546	12.1	87.9		
1986	811	2	98		
1987	101	14.8	85.2		
1988					

Age based on scale reading analysis.

Little White NFH is the collection facility for Willard NFH coho.

Table 5 (AS). Percent females by brood year and age class (freshwater.ocean) for coho returning to the Little White Salmon National Fish Hatchery.

Females (%)

Brood Year	N	2.0	2.1	2.2	2.3	2.4	Total % Female
1978							
1979							
1980							
1981							
1982							
1983							
1984							
1985			52.00				46.00
1986			38.00				37.00
1987			48.00				41.00
1988							

Age based on scale reacimg analysis.

Little White NFH is the collection facility for Willard NFH coho.

Table 6 (AL-a). Mean fork length by brood year and age class (freshwater.ocean) for coho returning to the Little White Salmon Hatchery.

Mean Fork Length (cm)

Brood Year	2.0	2.1	2.2	2.3	2.4
1985	36	64			
N	66	480			
St. Dev.	3.2	- -			
1986	36	62			
N	16	795			
St. Dev.	7.4	- -			
1987	37	63			
N	15	86			
St. Dev.	3.5	- -			

Age based on scale reading analysis.

Little White NFH is the collection facility for Willard NFH coho.

Table 7 (TR). Hatchery releases of coho salmon into the Little White Salmon River subbasin sorted by brood year, hatchery & life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1971	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/20/73	04/20/73	26	607707	LTL WHITE SALMON RIV	UNTAGGED
1971	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	smott	05/17/73	05/17/73	26	2766016	LTL WHITE SALMON RIV	UNTAGGED
1974	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/30/76	04/30/76	25	95901	LTL WHITE SALMON@NFH	051202
1974	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/30/76	04/30/76	25	2810190	LTL WHITE SALMON@NFH	UNTAGGED
1974	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	05/31/76	05/31/76	22	93429	LTL WHITE SALMON@NFH	051102
1974	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	05/31/76	05/31/76	22	60490	LTL WHITE SALMON@NFH	UNTAGGED
1975	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	04/12/76	04/12/76	630	218100	LTL WHITE SALMON@NFH	UNTAGGED
1975	UNKNOWN STOCK	LTL WHITE SALMON NFH	Smolt	04/18/77	04/18/77	22	216573	LTL WHITE SALMON RIV	UNTAGGED
1975	UNKNOWN STOCK	LTL WHITE SALMON NFH	Smolt	04/22/77	04/22/77	24	21777	LTL WHITE SALMON RIV	UNTAGGED
1975	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	04/18/77	04/18/77	22	216573	LTL WHITE SALMON@NFH	UNTAGGED
1975	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Smolt	04/ /77	04/ /77	22	0	LTL WHITE SALMON@NFH	055204
1975	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Smolt	04/18/77	04/18/77	22	13939	LTL WHITE SALMON@NFH	055101
1975	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Smolt	04/18/77	04/18/77	22	132787	LTL WHITE SALMON@NFH	UNTAGGED
1975	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Smolt	04/18/77	04/18/77	22	6686	LTL WHITE SALMON@NFH	055201
1975	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Smolt	04/18/77	04/18/77	22	63693	LTL WHITE SALMON@NFH	UNTAGGED
1975	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Smolt	05/02/77	05/04/77	22	88339	LTL WHITE SALMON@NFH	052004
1975	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Smolt	05/02/77	05/04/77	22	2084328	LTL WHITE SALMON@NFH	UNTAGGED
1975	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Smolt	05/02/77	05/04/77	21	93815	LTL WHITE SALMON@NFH	052104
1975	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Smolt	05/02/77	05/04/77	21	2205725	LTL WHITE SALMON@NFH	UNTAGGED
1976	UNKNOWN STOCK	CARSON NF HATCHERY	Fingr	09/26/77	09/26/77	54	145800	DRANO LAKE (29.0131)	UNTAGGED
1976	ABERNATHY CREEK	CARSON NF HATCHERY	Fingr	09/26/77	09/26/77	54	145800	DRANO LAKE (29.0131)	UNTAGGED
1976	UNKNOWN STOCK	CARSON NF HATCHERY	Fingr	08/19/77	08/19/77	825	3000000	LTL WHITE SALMON RIV	UNTAGGED
1976	UNKNOWN STOCK	CARSON NF HATCHERY	Fingr	08/23/77	08/23/77	73	300000	LTL WHITE SALMON RIV	UNTAGGED
1976	ABERNATHY CREEK	CARSON NF HATCHERY	Fingr	08/19/77	08/23/77	77	600000	LTL WHITE SALMON@NFH	UNTAGGED
1976	UNKNOWN STOCK	LTL WHITE SALMON NFH	Smolt	04/25/78	04/25/78	24	4008772	LTL WHITE SALMON RIV	UNTAGGED
1976	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	05/08/78	05/23/78	24	3593865	LTL WHITE SALMON@NFH	UNTAGGED
1976	MIXED COLUMBIA TYP-S	WILLARD NF HATCHERY	Smolt	06/01/78	06/01/78		19781	LTL WHITE SALMON RIV	ORLBYW
1976	MIXED COLUMBIA TYP-S	WILLARD NF HATCHERY	Smolt	06/01/78	06/01/78		99	LTL WHITE SALMON RIV	UNTAGGED
1976	MIXED COLUMBIA TYP-S	WILLARD NF HATCHERY	Smolt	06/01/78	06/01/78		19943	LTL WHITE SALMON RIV	RDLB*2
1976	MIXED COLUMBIA TYP-S	WILLARD NF HATCHERY	Smolt	06/01/78	06/01/78		219	LTL WHITE SALMON RIV	UNTAGGED
1976	MIXED COLUMBIA TYP-S	WILLARD NF HATCHERY	Smolt	06/01/78	06/01/78		19908	LTL WHITE SALMON RIV	RDXY*3
1976	MIXED COLUMBIA TYP-S	WILLARD NF HATCHERY	Smolt	06/01/78	06/01/78		378	LTL WHITE SALMON RIV	UNTAGGED
1977	UNKNOWN STOCK	LTL WHITE SALMON NFH	smott	05/22/79	05/22/79	25	1636244	LTL WHITE SALMON RIV	UNTAGGED
1977	ABERNATHY CREEK	LTL WHITE SALMON NFH	smott	05/22/79	05/22/79	25	1636244	LTL WHITE SALMON@NFH	UNTAGGED
1978	LTL WHITE SALM TYP-S	LTL WHITE SALMON NFH	Smolt	04/16/80	04/16/80	32	208586	LTL WHITE SALMON RIV	UNTAGGED
1978	LTL WHITE SALM TYP-S	LTL WHITE SALMON NFH	Smolt	05/14/80	05/14/80	21	220867	LTL WHITE SALMON RIV	UNTAGGED
1978	LTL WHITE SALM TYP-S	LTL WHITE SALMON NFH	Smolt	05/18/80	05/18/80	19	2693116	LTL WHITE SALMON RIV	UNTAGGED
1978	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	04/16/80	04/16/80	32	208586	LTL WHITE SALMON@NFH	UNTAGGED
1978	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	05/18/80	05/18/80	19	2590621	LTL WHITE SALMON@NFH	UNTAGGED
1978	ABERNATHY CREEK	WILLARD NF HATCHERY	Smolt	05/14/80	05/14/80	21	220867	L WHITE SALMON@WILRD	UNTAGGED
1978	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Smolt	05/14/80	05/14/80	21	44035	LTL WHITE SALMON@NFH	050358
1978	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Smolt	05/14/80	05/14/80	21	945	LTL WHITE SALMON@NFH	UNTAGGED
1978	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Smolt	05/14/80	05/14/80	19	43354	LTL WHITE SALMON@NFH	050359
1978	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Smolt	05/14/80	05/14/80	19	930	LTL WHITE SALMON@NFH	UNTAGGED
1978	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Smolt	05/14/80	05/14/80	19	52473	LTL WHITE SALMON@NFH	050654
1978	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Smolt	05/14/80	05/14/80	19	907	LTL WHITE SALMON@NFH	UNTAGGED
1979	COLUMBIA R - TYPE-S	CARSON NF HATCHERY	Fingr	01/16/81	01/16/81	26	213325	DRANO LAKE (29.0131)	UNTAGGED
1979	ABERNATHY CREEK	CARSON NF HATCHERY	Smolt	01/14/81	01/16/81	26	213325	DRANO LAKE (29.0131)	UNTAGGED
1979	COLUMBIA R - TYPE-S	LTL WHITE SALMON NFH	Smolt	05/15/81	05/15/81	21	1422425	LTL WHITE SALMON RIV	UNTAGGED
1979	COLUMBIA R - TYPE-S	LTL WHITE SALMON NFH	Smolt	06/15/81	06/15/81	17	1367710	LTL WHITE SALMON RIV	UNTAGGED
1979	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	05/15/81	05/15/81	21	1422425	LTL WHITE SALMON@NFH	UNTAGGED
1979	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	06/15/81	06/15/81	17	1367760	LTL WHITE SALMON@NFH	UNTAGGED
1980	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	03/26/82	03/26/82	42	513041	LTL WHITE SALMON RIV	UNTAGGED
1980	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	05/24/82	05/24/82	19	1097491	LTL WHITE SALMON RIV	UNTAGGED
1980	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	06/01/82	06/01/82	18	803401	LTL WHITE SALMON RIV	UNTAGGED

Table 7. Hatchery releases of coho salmon into the Little White Salmon River subbasin sorted by brood year, hatchery & life stage - CONTINUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1980	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	05/24/82	05/24/82	19	1097491	LTL WHITE SALMON@NFH	UNTAGGED
1980	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	06/01/82	06/01/82	18	803401	LTL WHITE SALMON@NFH	UNTAGGED
1981	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	07/27/82	07/27/82	65	105938	LTL WHITE SALMON RIV	UNTAGGED
1981	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	03/26/82	03/26/82	42	513041	LTL WHITE SALMON@NFH	UNTAGGED
1981	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	07/27/82	07/27/82	65	105938	LTL WHITE SALMON@NFH	UNTAGGED
1981	COLUMBIA R - TYPE-S	LTL WHITE SALMON NFH	Smolt	04/26/83	04/26/83	18	254953	LTL WHITE SALMON RIV	UNTAGGED
1981	COLUMBIA R - TYPE-S	LTL WHITE SALMON NFH	Smolt	05/10/83	05/10/83	16	1625400	LTL WHITE SALMON RIV	UNTAGGED
1981	COLUMBIA R - TYPE-S	LTL WHITE SALMON NFH	Smolt	06/07/83	06/07/83	10	969215	LTL WHITE SALMON RIV	UNTAGGED
1981	ABERNATHY CREEK	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	19	551392	L WHITE SALMON@WILRD	UNTAGGED
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	20	22542	LTL WHITE SALMON RIV	050928
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	20	939	LTL WHITE SALMON RIV	UNTAGGED
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	21	22245	LTL WHITE SALMON RIV	050929
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	21	1073	LTL WHITE SALMON RIV	UNTAGGED
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	20	21945	LTL WHITE SALMON RIV	050930
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	20	820	LTL WHITE SALMON RIV	UNTAGGED
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	20	22467	LTL WHITE SALMON RIV	050931
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	20	695	LTL WHITE SALMON RIV	UNTAGGED
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	20	23345	LTL WHITE SALMON RIV	050932
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	20	331	LTL WHITE SALMON RIV	UNTAGGED
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	20	23676	LTL WHITE SALMON RIV	050933
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	20	216	LTL WHITE SALMON RIV	UNTAGGED
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	20	22126	LTL WHITE SALMON RIV	050934
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	20	614	LTL WHITE SALMON RIV	UNTAGGED
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	19	22217	LTL WHITE SALMON RIV	050935
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	19	454	LTL WHITE SALMON RIV	UNTAGGED
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	20	22673	LTL WHITE SALMON RIV	050936
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	20	369	LTL WHITE SALMON RIV	UNTAGGED
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	20	23171	LTL WHITE SALMON RIV	050937
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	20	473	LTL WHITE SALMON RIV	UNTAGGED
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	19	22151	LTL WHITE SALMON RIV	050938
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	19	971	LTL WHITE SALMON RIV	UNTAGGED
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	19	21911	LTL WHITE SALMON RIV	050939
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	19	1178	LTL WHITE SALMON RIV	UNTAGGED
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	21	20526	LTL WHITE SALMON RIV	050940
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	21	292	LTL WHITE SALMON RIV	UNTAGGED
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	19	22995	LTL WHITE SALMON RIV	050941
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	19	327	LTL WHITE SALMON RIV	UNTAGGED
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	19	23330	LTL WHITE SALMON RIV	050942
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	19	283	LTL WHITE SALMON RIV	UNTAGGED
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	19	22791	LTL WHITE SALMON RIV	050943
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	19	632	LTL WHITE SALMON RIV	UNTAGGED
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	19	23198	LTL WHITE SALMON RIV	050944
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	19	866	LTL WHITE SALMON RIV	UNTAGGED
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	18	23267	LTL WHITE SALMON RIV	050945
1981	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	06/07/83	06/07/83	18	720	LTL WHITE SALMON RIV	UNTAGGED
1981	ABERNATHY CREEK	WILLARD NF HATCHERY	Smolt	04/26/83	04/26/83	18	254953	LTL WHITE SALMON@NFH	UNTAGGED
1981	ABERNATHY CREEK	WILLARD NF HATCHERY	Smolt	05/10/83	05/10/83	16	1625400	LTL WHITE SALMON@NFH	UNTAGGED
1982	COLUMBIA R - TYPE-S	LTL WHITE SALMON NFH	EmFry	01/25/83	01/25/83	1375	247500	LTL WHITE SALMON RIV	UNTAGGED
1982	COLUMBIA R - TYPE-S	LTL WHITE SALMON NFH	Fingr	07/11/83	07/11/83	77	326026	LTL WHITE SALMON RIV	UNTAGGED
1982	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	04/18/84	04/18/84	18	225692	LTL WHITE SALMON RIV	UNTAGGED
1982	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Smolt	05/16/84	05/16/84	15	1619764	LTL WHITE SALMON RIV	UNTAGGED
1982	WILLARD (L WHT SALM)	LTL WHITE SALMON NFH	Smolt	06/08/84	06/08/84	19	360480	LTL WHITE SALMON RIV	UNTAGGED
1982	WILLARD (L WHT SALM)	LTL WHITE SALMON NFH	Smolt	06/08/84	06/08/84	19	360480	LTL WHITE SALMON RIV	UNTAGGED
1982	ABERNATHY CREEK	LTL WHITE SALMON NFH	Smolt	05/16/84	05/16/84	15	1619764	LTL WHITE SALMON@NFH	UNTAGGED
1982	ABERNATHY CREEK	WILLARD NF HATCHERY	EmFry	01/25/83	01/25/83	1375	247500	LTL WHITE SALMON@NFH	UNTAGGED

Table 7 (cont.). Hatchery releases of coho salmon into the Little White Salmon River subbasin sorted by brood year, hatchery & life stage - CONTINUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1982	ABERNATHY CREEK	WILLARD NF HATCHERY	Fingr	07/11/83	07/11/83	77	326026	L WHITE SALMON@WILRD	UNTAGGED
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	20	18943	LTL WHITE SALMON RIV	051224
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	20	3291	LTL WHITE SALMON RIV	UNTAGGED
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	20	22042	LTL WHITE SALMON RIV	051225
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	20	991	LTL WHITE SALMON RIV	UNTAGGED
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	18	14562	LTL WHITE SALMON RIV	051226
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	18	2371	LTL WHITE SALMON RIV	UNTAGGED
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	19	16246	LTL WHITE SALMON RIV	051227
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	19	1092	LTL WHITE SALMON RIV	UNTAGGED
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	18	17826	LTL WHITE SALMON RIV	051228
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	18	2047	LTL WHITE SALMON RIV	UNTAGGED
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	18	19637	LTL WHITE SALMON RIV	051229
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	18	259	LTL WHITE SALMON RIV	UNTAGGED
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	19	16453	LTL WHITE SALMON RIV	051230
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	19	686	LTL WHITE SALMON RIV	UNTAGGED
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	19	16238	LTL WHITE SALMON RIV	051231
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	19	909	LTL WHITE SALMON RIV	UNTAGGED
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	20	18715	LTL WHITE SALMON RIV	051232
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	20	1132	LTL WHITE SALMON RIV	UNTAGGED
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	19	19598	LTL WHITE SALMON RIV	051233
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	19	1704	LTL WHITE SALMON RIV	UNTAGGED
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	19	16354	LTL WHITE SALMON RIV	051234
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	19	2021	LTL WHITE SALMON RIV	UNTAGGED
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	19	18590	LTL WHITE SALMON RIV	051235
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	19	634	LTL WHITE SALMON RIV	UNTAGGED
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	20	20056	LTL WHITE SALMON RIV	051236
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	20	771	LTL WHITE SALMON RIV	UNTAGGED
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	18	19856	LTL WHITE SALMON RIV	051237
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	18	467	LTL WHITE SALMON RIV	UNTAGGED
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	18	21546	LTL WHITE SALMON RIV	051238
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	18	598	LTL WHITE SALMON RIV	UNTAGGED
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	18	21143	LTL WHITE SALMON RIV	051239
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	18	950	LTL WHITE SALMON RIV	UNTAGGED
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	19	20174	LTL WHITE SALMON RIV	051240
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	19	907	LTL WHITE SALMON RIV	UNTAGGED
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	18	21201	LTL WHITE SALMON RIV	051241
1982	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	18	588	LTL WHITE SALMON RIV	UNTAGGED
1982	ABERNATHY CREEK	WILLARD NF HATCHERY	Smolt	04/18/84	04/18/84	18	225692	LTL WHITE SALMON@NFH	UNTAGGED
1982	ABERNATHY CREEK	WILLARD NF HATCHERY	Smolt	06/08/84	06/08/84	19	360486	LTL WHITE SALMON@NFH	UNTAGGED
1983	WILLARD (L WHT SALM)	LTL WHITE SALMON NFH	Smolt	05/30/85	05/30/85	16	999358	LTL WHITE SALMON RIV	UNTAGGED
1983	ABERNATHY CREEK	WILLARD NF HATCHERY	Smolt	05/30/85	05/30/85	16	999358	L WHITE SALMON@WILRD	UNTAGGED
1984	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	06/12/85	06/12/85	108	244914	L WHITE SALMON@WILRD	UNTAGGED
1984	WILLARD (L WHT SALM)	LTL WHITE SALMON NFH	Fingr	06/12/85	06/12/85	108	244914	LTL WHITE SALMON RIV	UNTAGGED
1984	WILLARD (L WHT SALM)	LTL WHITE SALMON NFH	Smolt	03/06/86	03/06/86	20	1208535	LTL WHITE SALMON RIV	UNTAGGED
1984	WILLARD (L WHT SALM)	LTL WHITE SALMON NFH	Smolt	04/18/86	04/18/86	18	105927	LTL WHITE SALMON RIV	UNTAGGED
1984	WILLARD (L WHT SALM)	LTL WHITE SALMON NFH	Smolt	05/14/86	05/14/86	15	2457168	LTL WHITE SALMON RIV	UNTAGGED
1984	ABERNATHY CREEK	WILLARD NF HATCHERY	Fingr	10/25/85	10/25/85	28	2000	L WHITE SALMON@WILRD	UNTAGGED
1984	ABERNATHY CREEK	WILLARD NF HATCHERY	Smolt	03/06/86	03/06/86	20	1208535	L WHITE SALMON@WILRD	UNTAGGED
1984	ABERNATHY CREEK	WILLARD NF HATCHERY	Smolt	04/18/86	04/18/86	18	105927	L WHITE SALMON@WILRD	UNTAGGED
1984	ABERNATHY CREEK	WILLARD NF HATCHERY	Smolt	05/14/86	05/14/86	15	2457168	L WHITE SALMON@WILRD	UNTAGGED
1985	WILLARD (L WHT SALM)	LTL WHITE SALMON NFH	Fingr	06/19/86	06/19/86	123	515404	LTL WHITE SALMON RIV	UNTAGGED
1985	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	09/30/86	09/30/86	25	1224820	LTL WHITE SALMON RIV	UNTAGGED
1985	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	09/30/86	09/30/86	25	1224820	LTL WHITE SALMON@NFH	UNTAGGED
1985	ABERNATHY CREEK	WILLARD NF HATCHERY	Fingr	06/09/86	06/09/86	123	515404	L WHITE SALMON@WILRD	UNTAGGED
1985	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	04/24/87	04/24/87	15	1005	LTL WHITE SALMON RIV	UNTAGGED

Table 7 (*cont.*) Hatchery releases of coho salmon into the Little White Salmon River subbasin sorted by brood year, hatchery & life stage - CONTINUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1985	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	05/01/87	05/01/87	15	1023680	LTL WHITE SALMON RIV	UNTAGGED
1985	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	05/01/87	05/01/87	15	1023681	LTL WHITE SALMON RIV	UNTAGGED
1985	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Smolt	05/01/87	05/01/87	15	2047361	LTL WHITE SALMON@NFH	UNTAGGED
1986	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	FeFry	02/13/87	02/13/87	1814	114000	L WHITE SALMON@WILRD	UNTAGGED
1986	MIXED COLUMBIA	WILLARD NF HATCHERY	Fingr	02/08/88	02/08/88	31	1050500	L WHITE SALMON@WILRD	UNTAGGED
1986	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Fingr	02/13/87	02/13/87	1814	114000	LTL WHITE SALMON RIV	UNTAGGED
1986	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Fingr	06/10/87	06/10/87	171	330048	LTL WHITE SALMON RIV	UNTAGGED
1986	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Fingr	06/10/87	06/10/87	140	12040	LTL WHITE SALMON RIV	UNTAGGED
1986	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Fingr	09/15/87	09/15/87	37	7030	LTL WHITE SALMON RIV	UNTAGGED
1986	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Fingr	12/21/87	12/21/87	31	1000	LTL WHITE SALMON RIV	UNTAGGED
1986	TOUTLE (GREEN RIVER)	WILLARD NF HATCHERY	Fingr	06/10/87	06/10/87	171	330048	LTL WHITE SALMON@NFH	UNTAGGED
1986	MIXED COLUMBIA	WILLARD NF HATCHERY	Smolt	05/24/88	05/24/88	15	1659908	L WHITE SALMON@WILRD	UNTAGGED
1987	WILLARD (L WHT SALM)	LTL WHITE SALMON NFH	EmFry	02/29/88	02/29/88	1512	610200	LTL WHITE SALMON RIV	UNTAGGED
1987	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	EmFry	02/24/88	02/24/88	1512	330000	LTL WHITE SALMON RIV	UNTAGGED
1987	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	EmFry	02/25/88	02/25/88	1564	240000	LTL WHITE SALMON RIV	UNTAGGED
1987	WILLARD (L WHT SALM)	WILLARD NF HATCHERY	EmFry	02/26/88	02/26/88	1512	650000	LTL WHITE SALMON RIV	UNTAGGED
1987	MIXED COLUMBIA	WILLARD NF HATCHERY	FeFry	02/24/88	02/24/88	1512	330000	LTL WHITE SALMON@NFH	UNTAGGED
1987	MIXED COLUMBIA	WILLARD NF HATCHERY	FeFry	02/25/88	02/25/88	1512	240000	LTL WHITE SALMON@NFH	UNTAGGED
1987	MIXED COLUMBIA	WILLARD NF HATCHERY	FeFry	02/26/88	02/26/88	1512	650000	LTL WHITE SALMON@NFH	UNTAGGED
1987	MIXED COLUMBIA	WILLARD NF HATCHERY	FeFry	02/29/88	02/29/88	1512	610200	LTL WHITE SALMON@NFH	UNTAGGED
1987	MIXED COLUMBIA	WILLARD NF HATCHERY	Fingr	06/03/88	06/03/88	140	220059	L WHITE SALMON@WILRD	UNTAGGED
1987	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Smolt	04/17/89	04/17/89	14	1800156	L WHITE SALMON@WILRD	UNTAGGED
1987	COLUMBIA R - TYPE-S	WILLARD NF HATCHERY	Smolt	04/17/89	04/17/89	14	1800156	LTL WHITE SALMON RIV	UNTAGGED
1988	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	05/30/89	05/30/89	169	77043	L WHITE SALMON@WILRD	UNTAGGED
1988	COLUMBIA R - TYPE-S	LTL WHITE SALMON NFH	Fingr	05/30/89	05/30/89	169	77043	LTL WHITE SALMON RIV	UNTAGGED
1988	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Smolt	04/18/90	04/18/90	14	22526	L WHITE SALMON@WILRD	052225
1988	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Smolt	04/18/90	04/18/90	14	1426569	L WHITE SALMON@WILRD	UNTAGGED
1988	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Smolt	04/18/90	04/18/90	14	22714	L WHITE SALMON@WILRD	052226
1988	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Smolt	04/18/90	04/18/90	14	1426331	L WHITE SALMON@WILRD	UNTAGGED
1989	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	EmFry	01/24/90	01/24/90	1512	254500	LTL WHITE SALMON RIV	UNTAGGED
1989	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	FeFry	01/24/90	01/24/90	1512	254500	LTL WHITE SALMON@NFH	UNTAGGED
1989	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Fingr	05/14/90	05/14/90	218	831776	L WHITE SALMON@WILRD	UNTAGGED
1989	LTL WHITE SALMON-NFH	WILLARD NF HATCHERY	Fingr	05/14/90	05/14/90	218	831776	LTL WHITE SALMON RIV	UNTAGGED

Table 8 (TD-1). Parasites and diseases of coho at Willard Hatchery located on the Little White Salmon River.

Disease type	Hatchery	Specific Pathogen
Bacteria	Willard	*Renibacterium salmoninarum* (Bacterial Kidney Disease)
Bacteria	Willard	*Cytophaga psychrophila* (Cold Water Disease)
Bacteria	Willard	*Aeromonas salmonicida* (Purunculosis)
Bacteria	Willard	*Yersinia ruckeri* (Enteric Redmouth Disease)
Bacteria	Willard	*Myxobacteria*
Parasite	Willard	*Costia necatrix* (Costia = Ichtyobodo)
Parasite	Willard	*Epistylis*
Parasite	Willard	*Ampiphrya*
Parasite	Willard	*Hexamita*
Parasite	Willard	*Myxobolus kisutchi*
Parasite	Willard	*Chloromyxum wardi*
Parasite	Willard	*Myxosoma squamalis*
Virus	Willard	IHN

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

Table 9 (TD-2). Parasites and diseases of coho at Little White Salmon Hatchery located on the Little White Salmon River.

Disease type	Hatchery	Specific Pathogen
Bacteria	Little White Salmon	*Aeromonas salmonicida* (Purunculosis)
Parasite	Little White Salmon	*Ceratomyxa shasta*
virus	Little White Salmon	IHN
virus	Little White Salmon	EIBS

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

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SPRING CREEK NATIONAL FISH HATCHERY

Fall Chinook Salmon

GEOGRAPHIC LOCATION

Spring Creek National Fish Hatchery is located in Skamania County on the Bonneville Pool of the Columbia River at River Mile (RM) 167, about a mile below the mouth of the White Salmon River.

ORIGIN

Of the tributaries of the Bonneville Pool, fall chinook were historically native to the Wind, Little White Salmon, Big White Salmon, and Hood Rivers (Fulton, 1968). Now the aggregate upriver fall chinook run is composed of two large stocks, the upriver brights (URB) and Bonneville Pool Hatchery stocks (BPH). Both stocks pass over Bonneville Dam. The BPH stock was brought into hatchery production with the first egg-take in 1896 and BPH fall chinook are produced almost entirely by artificial propagation (Howell et al. 1985).

DISTRIBUTION

Some natural production exists in the Klickitat, Wind, Big White Salmon, and Hood Rivers. BPH fall chinook are reared at Klickitat, Little White Salmon, and Spring Creek Hatcheries (Howell et al. 1985).

PRODUCTION

Completion of Bonneville Dam inundated all of the spawning area in the Little White Salmon River and Condit Dam blocked the Big White Salmon.

Hatchery production began in 1896 from eggs collected in the Little White Salmon River (WDF, USFWS 1951). Little White Salmon fall chinook were intermittently planted in many tributaries from the Sandy to the Deschutes River. Within several years of the establishment of the Little White Salmon Hatchery program, other hatchery and egg-take facilities were constructed on the Wind River and Big White Salmon Rivers.

In 1901, fall chinook eggs collected from the Big White Salmon River were transferred to the Spring Creek facility. The initial adult return in 1904 provided the basis for subsequent production. The Spring Creek Hatchery program has been very successful, with surplus eggs transferred to other stations in most years. During the years eggs were transferred to Spring Creek, they came from lower river hatchery (LRH) fall chinook stocks (Howell et al. 1985).

Klickitat Hatchery has had a chronic problem of meeting escapement and has utilized stock from Spring Creek Hatchery. BPH fall chinook programs at Little White Salmon and Klickitat Hatcheries have either received eggs directly from Spring Creek or have utilized local returns that are considered to be derivatives of Spring Creek stock (Howell et al. 1985).

Spring Creek Hatchery returns of tule fall chinook "swim-ins" from 1987 through 1984 brood years averaged 10,467 adults with and low of 408 in 1983 and a high of 27,200 in 1978. Hatchery returns of tule fall chinook to Spring Creek Hatchery by age and brood year is presented in Table 1.

Tule fall chinook trapped at Bonneville Dam and trucked to Spring Creek Hatchery totaled 1,547

adults for 1983 and 2,379 adults for 1984. Total hatchery returns of tule fall chinook trapped at Bonneville Dam and trucked to Spring Creek Hatchery by age and brood year are presented in Table 2.

Upriver Bright (URB) fall chinook were released from Spring Creek on a experimental basis in 1984 and 1985 brood years. Total age of hatchery returns of bright fall chinook to Spring Creek Hatchery by brood year is presented in Table 3.

ADULT LIFE HISTORY

Run size, catch and escapement

Based primarily on the success of Spring Creek Hatchery, BPH fall chinook are a major contributor to the Washington troll, net, and sport ocean fisheries. Coded wire tag recoveries of 1971 and 1972 brood year fmgerling releases from Spring Creek Hatchery showed that 38 percent were caught off the Washington coast and 20 percent were caught in the Columbia River sport and commercial harvest (Howell et al. 1985).

From 1979 - 1984 the harvest of BPH fall chinook in freshwater was determined primarily by expansion of coded wire tags collected during fisheries sampling. In 1980 -1984, natural and hatchery escapements were adjusted, based on coded wire tag recoveries for fall chinook straying to non-origin areas. Prior to 1979, catch was determined by applying the 1979 stock specific pre-escapement proportion in the fisheries to the particular stock for each year (Howell et al. 1985).

Strays from other hatcheries are quite common. Spring Creek Hatchery origin tule and upriver bright fall chinook stray coded wire tag recoveries beginning with the 1978 brood through the 1990 brood are listed in Table 4. Tables 5 and 6 list coded wire tags of tule and bright fall chinook recovered within the Spring Creek Hatchery, respectively, which originated outside of the Spring Creek Hatchery. Table 7 list coded wire tags of tule and bright fall chinook trapped at Bonneville Dam that originated outside the Spring Creek Hatchery and were trucked to the Spring Creek Hatchery.

Time of Migration

Tule fall chinook upstream migration begins in early August with greatest abundance in the Columbia River estuary in late August and early September. Counts of tule fall chinook at Bonneville Dam generally peak between September 4 and September 9. Approximately 90 percent of the run has migrated past Bonneville Dam by September 20 (Howell et al. 1985).

Upriver bright fall chinook migration curve is more prolonged and gradual compared to tule fall chinook passing Bonneville Dam. Adult upriver bright migration occurs through November.

Spawning Period

Tule and upriver bright fall chinook spawning ground peak index counts are usually made during early October and November, respectively. Peak spawning at the Spring Creek Hatchery is mid-September.

Spawning Areas

Spring Creek National Fish Hatchery.

Some natural production of BPH fall chinook occurs in the Wind, Big White Salmon and Klickitat River. A small amount also occurs in Rock Creek and Collins Creek (WDF, 1990).

Age Composition

Ages of tule fall chinook range from two-year-old jacks to five-year-old adults with three-year-olds usually the dominant age classes (Howell et al. 1985). Tables 8 and 9, respectively, present total age composition percentages by brood year and age class for tule fall chinook trapped at Bonneville Dam then trucked to Spring Creek Hatchery, and for tule fall chinook returning to Spring Creek Hatchery.

Although Spring Creek Hatchery adult returns are incomplete, upriver bright fall chinook total ages generally range from two-year-old jacks to six-year-old adult.

Sex Ratio

There is an occurrence of female jacks at Spring Creek Hatchery. Females returning to Spring Creek Hatchery averaged 59.90 percent for the 1979 through 1984 brood years with a low of 50.14 percent for 1979 and a high of 66.37 for 1980. Table 11 presents the percent females by brood year and age (freshwater.ocean) for tule fall chinook returning to Spring Creek Hatchery.

The total percent of tule fall chinook females by brood and age class (freshwater.ocean) trapped at Bonneville Dam and trucked to the Spring Creek Hatchery is presented in Table 10.

Table 12 presents the percent females by brood year and age class (freshwater.ocean) for upriver bright fall chinook returning to the Spring Creek Hatchery.

The mean fork length by brood year, sex, tule, bright, and freshwater.ocean rearing ages of Bonneville Dam trapped and Spring Creek Hatchery returns is presented in Tables 13 through 18.

Fecundity

Fecundity averaged 4,700 eggs per female at Spring Creek Hatchery from 1978 - 1982 (Howell et al. 1985).

JUVENILE LIFE HISTORY

Time of Emergence

At Spring Creek Hatchery, water temperatures during incubation are set at approximately 52 degrees Fahrenheit. Newly absorbed yolk-sac fry are prevalent in mid-December (Howell et al. 1985).

Time. aee and size at migration

Hatchery release information for the Spring Creek Hatchery by brood year is presented in Table 19. BPH fall chinook are released as fingerlings primarily in March through June. Because of the controlled water temperatures at Spring Creek Hatchery, growth is rapid. Most of Spring Creek production is liberated in March and April, earlier than other hatchery releases of fall chinook. Releases at the Klickitat and Little White Salmon hatchery releases occurs from May through mid-June (Howell et al. 1985).

Based on recoveries of tagged Spring Creek juveniles, -migration to the Columbia River estuary is rapid and generally occurs within 1 - 3 weeks after release. From scale readings, juveniles enter the ocean in the first year of life and are considered "sub - 1" age migrants. Size at release varies between 70 - 100 mm in length (Howell et al. 1985).

Survival Rate

BPH fall chinook reared and released from Spring Creek Hatchery are noted for their generally high survival rate. Spring Creek substock fall chinook reared at other stations do not experience the same high survival rate. A minimum survival rate (partial catch and escapement) of four groups of coded wire tagged Spring Creek Hatchery releases ranged between zero and 1.9 percent (1978 brood) and 0.3 -2.1 percent (1979 brood) (Vreeland, 1984). Survival of the 1979 brood releases were based on only two years of catch. These rates were much higher than the average of 0.2 percent for the 1978 and 1979 brood tule releases from other stations. TAC (1984) estimated a general survival rate of Spring Creek Hatchery releases at 2.0 percent which did not include mortality on juvenile out-migrants caused by Bonneville Dam (Howell et al. 1985).

BIOCHEMICAL-GENETIC CHARACTERISTICS

Schreck et al. (1984) compared isozyme gene frequencies for 11 enzyme systems from samples collected at Bonneville and Spring Creek Hatcheries. No statistically significant differences in gene frequencies were determined for any of the enzymes.

DISEASE

Common diseases at Spring Creek Hatchery includes: Bacterial kidney disease, enteric redmouth, cold water disease, and furunculosis. A complete list of bacteria and parasitic diseases found at Spring Creek Hatchery is presented in Table 20 (WDF Salmon Culture, Olympia).

Figure 1 (TT). Freshwater life history Bonneville Pool Hatchery fall chinook (tules).

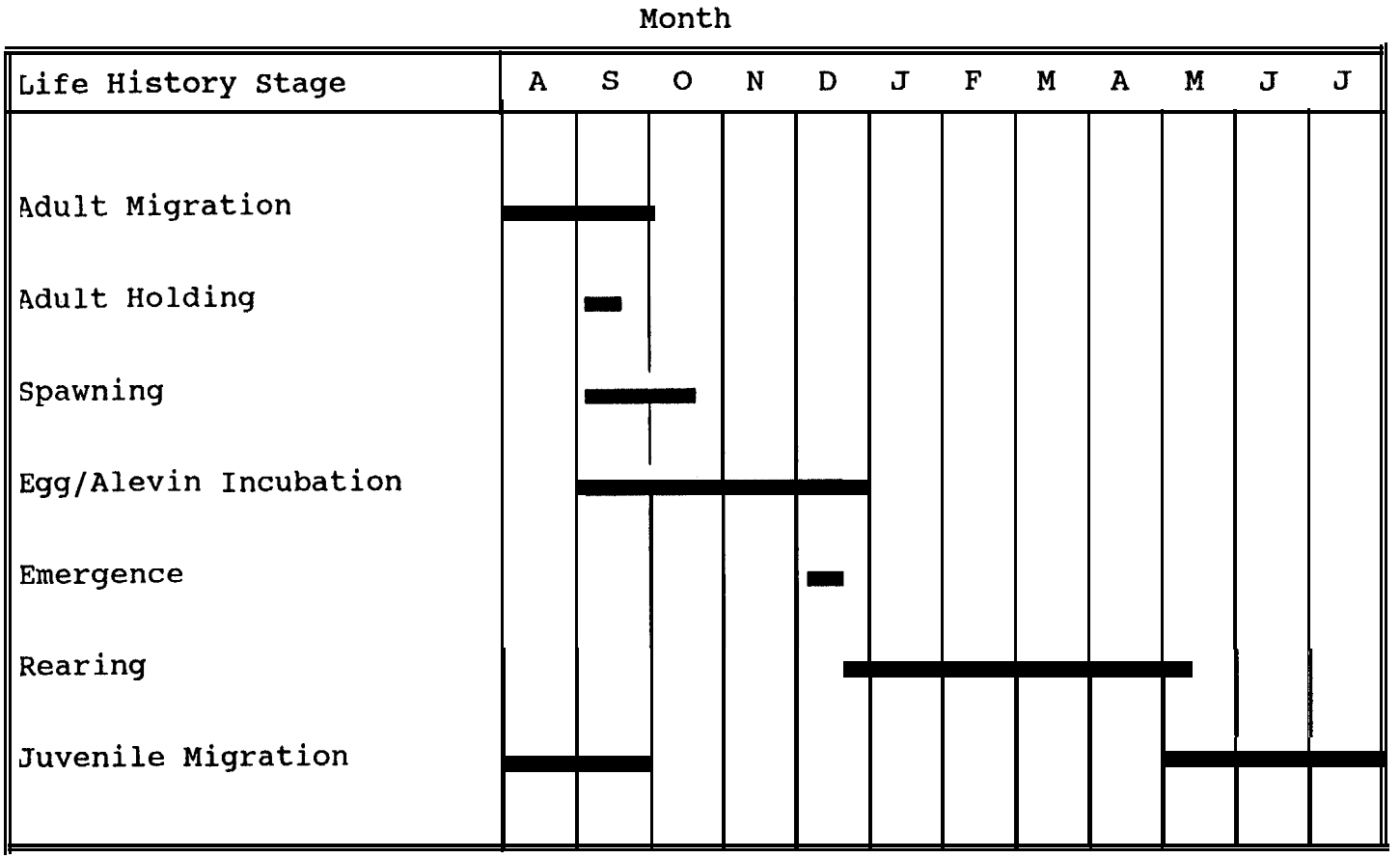

Table 1 (RH-1). Total hatchery returns of tule fall chinook swim-ins" to the Spring Creek National Fish Hatchery, by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974							
1975					0		
1976				68	0		
1977			3,148	32	0		
1978		20,646	6,500	54	0		27,200
1979	6,662	20,625	5,318	11	0	32,616	25,954
1980	290	3,934	1,784	28	0	6,036	5,746
1981	1,102	7,116	1,208	17	0	9,443	8,341
1982	596	4,192	861	9	0	5,658	5,062
1983	53	300	108	0	0	461	408
1984	104	382	163	14	0	663	559
1985	95	857	483	56			
1986	563	2,279	2,057				
1987	561	3,360					
1988	2,565						
1989							

[a] The swim-in label is used to denote rack returns to Spring Creek National Fish Hatchery, as opposed to those trapped at Bonneville Dam in years of low predicted run size.

1987 return year does not include 1 one year old minijack and 1,473 female tule chinook transported from Bonneville Hatchery.
1988 return year does not include 2,981 female fall chinook transferred from Bonneville Hatchery.
1990 return year age composition based on Spring Creek Bonneville Dam trapping and swim-ins.
Age composition by scale reading analysis by USFWS.

Table 2 (RH-2). Total hatchery returns of tule fall chinook trapped at Bonneville Dam and trucked to Spring Creek Hatchery, by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1979							
1980					0		
1981				36	0		
1982			1,070	26	0		
1983		968	538	41	0		1,547
1984	33	923	1,433	23	0	2,412	2,379
1985	0	1,166	552	23			
1986	244	944	1,150				
1987	37	1,561					
1988	662						
1989							

1987 return year does not include 1,473 tule fall chinook transported from Bonneville Hatchery.
1986 was the first year of Spring Creek National Fish Hatchery fall chinook broodstock collection from Bonneville Dam.
1990 return year composition based on Spring Creek Bonneville Dam trapping and swim-ins.
Age composition by scale reading by USFWS.

Table 3 (RH-3). Total age of hatchery returns of bright fall chinook to the Spring Creek National Fish Hatchery, by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1979							
1980					0		
1981				3	0		
1982			10	12			
1983		1	57				
1984	0	9					
1985	0						
1986							

No bright fall chinook returns to Spring Creek National Fish Hatchery since 1987. Age composition by scale reading analysis by USFWS.

Table 4 (AE). Emigration of coded wire tagged fall chinook from the Spring Creek NFH.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Spring Creek Hatchery, released Big White Salmon River	Cowlitz, 1981	Hatchery	5,673	1	1
Spring Creek Hatchery, released Hammond	Cowlitz, 1981	Hatchery	567	1	1
Spring Creek Hatchery, released Hammond	Kalama, 1981	Hatchery	5,987	2	2
Spring Creek Hatchery, released Hammond	Elochoman River, 1981	Spawning Ground	22	1	6
Spring Creek Hatchery, released Hammond	Skamokawa Creek, 1981	Spawning Ground	87	1	4
Spring Creek Hatchery, released Stavebolt Creek	Kalama River, 1981	Spawning Ground	490	1	4
Spring Creek Hatchery, released Hammond	Kalama, 1981	Hatchery	5,987	1	1
Spring Creek Hatchery	Big Salmon Creek, 1981	Spawning Ground	228	2	7
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1980	Hatchery	27,432	4	4
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1980	Hatchery	27,432	5	5
Spring Creek Hatchery	Big Salmon Creek, 1982	Spawning Ground	510	1	11
Spring Creek Hatchery	Big Salmon Creek, 1982	Spawning Ground	510	2	22
Spring Creek Hatchery	Kalama River, 1982	Spawning Ground	1,263	1	3

Table 4. (cont.) Emigration of coded wire tagged fall chinook from the Spring Creek subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Spring Creek Hatchery, released Rock Creek	John Day Pool, 1982	Spawning Ground	42	1	5
Spring Creek Hatchery, released Big White Salmon River	Little White Salmon, 1982	Hatchery	2,148	2	2
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1982	Hatchery	27,447	13	13
Spring Creek Hatchery, released Stavebolt Creek	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery, released Stavebolt Creek	Spring Creek, 1982	Hatchery	27,447	2	2
Spring Creek Hatchery, released Big White Salmon River	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery, released Big White Salmon River	Little White Salmon, 1982	Hatchery	2,148	6	6
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1982	Hatchery	27,447	9	‘9
Spring Creek Hatchery	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery	Little White Salmon, 1982	Hatchery	2,148	2	2
Spring Creek Hatchery, released below Bonneville	Little White Salmon, 1982	Hatchery	2,148	1	1

Table 4. (cont.) Emigration of coded wire tagged fall chinook from the Spring Creek subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Spring Creek Hatchery, released below Bonneville	Spring Creek, 1982	Hatchery	27,447	90	90
Spring Creek Hatchery, released below Bonneville	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery, released below Bonneville	Spring Creek, 1982	Hatchery	27,447	66	66
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 198 1	Hatchery	1,172	33	33
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1981	Hatchery	1,172	15	1 5
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1981	Hatchery	1,172	1	1
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1981	Hatchery	1,172	12	12
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1981	Hatchery	1,172	3	3
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1981	Hatchery	1,497	4	4
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1981	Hatchery	1,497	9	9
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1981	Hatchery	1,497	6	6

Table 4. (cont.) Emigration of coded wire tagged fall chinook from the Spring Creek subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1981	Hatchery	1,497	4	4
Spring Creek Hatchery	Little White Salmon, 1981	Hatchery	1,497	2	2
Spring Creek Hatchery	Little White Salmon, 1981	Hatchery	1,497	1	1
Spring Creek Hatchery	Little White Salmon, 1981	Hatchery	1,497	1	1
Spring Creek Hatchery	Little White Salmon, 1981	Hatchery	1,497	1	1
Spring Creek Hatchery	Little White Salmon, 1981	Hatchery	1,497	1	1
Spring Creek Hatchery	Abernathy, 1981	Hatchery	2,025	1	1
Spring Creek Hatchery	Abernathy, 1981	Hatchery	2,025	1	1
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1982	Hatchery	27,447	13	13
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1982	Hatchery	27,447	9	9
Spring Creek Hatchery, released Big White Salmon River	Little White Salmon, 1982	Hatchery	2,148	2	2
Spring Creek Hatchery, released Big White Salmon River	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery, released Big White Salmon River	Little White Salmon, 1982	Hatchery	2,148	6	6
Spring Creek Hatchery, released Staveboldt Creek	Spring Creek, 1982	Hatchery	27,447	2	2

Table 4. (cont.) Emigration of coded wire tagged fall chinook from the Spring Creek subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Spring Creek Hatchery, released Staveboldt Creek	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery	Little White Salmon. 1982	Hatchery	2,148	2	2
Spring Creek Hatchery	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery	Little White Salmon, 1982	Hatchery	2,148	1	1
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1983	Hatchery	10,408	1	1
Spring Creek Hatchery, released Big White Salmon River	Little White Salmon, 1983	Hatchery	1,192	1	1
Spring Creek Hatchery, released Rock Creek	Spring Creek, 1983	Hatchery	10,408	1	1
Spring Creek Hatchery, released Rock Creek	Spring Creek, 1983	Hatchery	10,408	5	5
Spring Creek Hatchery	Little White Salmon, 1983	Hatchery	1,192	1	
Spring Creek Hatchery	Little White Salmon. 1983	Hatchery	1.192	1	
Spring Creek Hatchery	Little White Salmon, 1983	Hatchery	2,608	1	
Spring Creek Hatchery	Little White Salmon. 1984	Hatcher-v	577	1	1
Spring Creek Hatchery	Little White Salmon, 1985	Hatchery	224	1	1

Table 4. (cont.) Emigration of coded wire tagged fall chinook from the Spring Creek subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Spring Creek Hatchery, released Yakima River	Little White Salmon, 1985	Hatchery	853	1	1
Spring Creek Hatchery	Little White Salmon, 1986	Hatchery	730	1	1
Spring Creek Hatchery, released Umatilla River	Spring Creek, 1986	Hatchery	2,107	1	1
Spring Creek Hatchery, released Yakima River	Little White Salmon, 1986	Hatchery	853	1	1

Based on the following tag codes: 03-47-01, 03-48-01, 03-49-01, 03-54-01, 05-04-43, 05-06-39, 05-06-40, 05-06-41, 05-07-46, 03-52-01, 05-04-34, 05-06-48, 05-06-49, 03-56-01, 05-55-01, 05-04-46, 05-60-01, 05-07-43, 05-10-56, 05-10-51, 05-15-26, 05-l l-45, and 05- 10-57.

Beginning with the 1978 brood.

Table 5 (AI-l). Immigration of coded wire tagged fall chinook into the Spring Creek NFH.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Abernathy Hatchery	Spring Creek, 1982	Hatchery	27,447	2	2
Bonneville Hatchery	Spring Creek, 1982	Hatchery	27,447	3	3
Bonneville Hatchery	Spring Creek, 1982	Hatchery	27,447	1	1
Bonneville Hatchery	Spring Creek, 1982	Hatchery	27,447	2	2
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1980	Hatchery	27,447	4	4.
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1980	Hatchery	27,447	5	5
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1982	Hatchery	27,447	13	13
Spring Creek Hatchery, released Staveboldt Creek	Spring Creek, 1982	Hatchery	27,447	2	2
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1982	Hatchery	27,447	9	9
Spring Creek Hatchery, released below Bonneville	Spring Creek, 1982	Hatchery	27,447	90	90
Spring Creek Hatchery, released below Bonneville	Spring Creek, 1982	Hatchery	27,447	66	66
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1981	Hatchery	1,172	33	33
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1981	Hatchery	1,172	15	15

Table 5. (cont.) Immigration of coded wire tagged fall chinook into the Spring Creek subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1981	Hatchery	1,172	1	1
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1981	Hatchery	1,172	12	12
Little White Salmon Hatchery	Spring Creek, 1981	Hatchery	1,172	1	1
Abernathy Hatchery	Spring Creek, 1981	Hatchery	1,172	1	1
Abernathy Hatchery	Spring Creek, 1981	Hatchery	1,172	1	1
Warm Springs Hatchery 1/	Spring Creek, 1981	Hatchery	1,172	1	1
Spring Creek Hatchery, released Big White Salmon	Spring Creek, 198 1	Hatchery	1,172	3	3
Bonneville Hatchery	Spring Creek, 1981	Hatchery	1,172	1	1
Bonneville Hatchery	Spring Creek, 1981	Hatchery	1,172	1	1
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1982	Hatchery	27,447	13	13
Spring Creek Hatchery, released Big White Salmon River	Spring Creek, 1982	Hatchery	27,447	9	9
Spring Creek Hatchery, released Stavebolt Creek	Spring Creek, 1982	Hatchery	27,447	2	2
Abernathy Hatchery	Spring Creek, 1982	Hatchery	27,447	2	2
Bonneville Hatchery	Spring Creek, 1982	Hatchery	27,447	3	3

Table 5. (cont.) Immigration of coded wire tagged fall chinook into the Spring Creek subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery	Spring Creek, 1982	Hatchery	27,447	1	1
Bonneville Hatchery	Spring Creek, 1982	Hatchery	27,447	2	2
Spring Creek Hatchery, released Big White Salmon	Spring Creek, 1983	Hatchery	10,408	1	1
Abernathy Hatchery	Spring Creek, 1983	Hatchery	10,408	1	1
Spring Creek Hatchery, released Rock Creek	Spring Creek, 1983	Hatchery	10,408	1	1
Spring Creek Hatchery, released Rock Creek	Spring Creek, 1983	Hatchery	10,408	5	5
Bonneville Hatchery	Spring Creek, 1983	Hatchery	10,408	1	1
Bonneville Hatchery	Spring Creek, 1983	Hatchery	10,408	1	1
Bonneville Hatchery	Spring Creek, 1983	Hatchery	10,408	1	1
Little White Salmon Hatchery	Spring Creek, 1984	Hatchery	9,507	1	1
Bonneville Hatchery	Spring Creek, 1984	Hatchery	9,507	1	1
Bonneville Hatchery	Spring Creek, 1984	Hatchery	9,507	2	2
Bonneville Hatchery	Spring Creek, 1984	Hatchery	9,507	2	2
Bonneville Hatchery, released Umatilla River	Spring Creek, 1984	Hatchery	9,507	1	1
Bonneville Hatchery	Spring Creek, 1985	Hatchery	5,481	1	1

Table 5. (cont.) Immigration of coded wire tagged fall chinook into the Spring Creek subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery	Spring Creek, 1985	Hatchery	5,481	1	1
Bonneville Hatchery	Spring Creek, 1985	Hatchery	5,481		
Bonneville Hatchery, released Tanner Creek	Spring Creek, 1986	Hatchery	1,282	1	1
Bonneville Hatchery, released Tanner Creek	Spring Creek, 1986	Hatchery	1,282	1	1
Big Creek Hatchery	Spring Creek, 1987	Bonneville Dam Trap	1,487	1	1
Bonneville Hatchery, released Tanner Creek	Spring Creek, 1987	Bonneville Dam Trap	1,487	4	4
Bonneville Hatchery, released Tanner Creek	Spring Creek, 1987	Bonneville Dam Trap	1,487	8	8
Bonneville Hatchery, released Tanner Creek	Spring Creek, 1987	Bonneville Dam Trap	1,487	8	8
Bonneville Hatchery, released Tanner Creek	Spring Creek, 1987	Bonneville Dam Trap	1,487	6	6
Reared Stayton Pond, released Stayton Pond and Bonneville	Spring Creek, 1987	Bonneville Dam Trap	1,487	1	1
Reared Stayton Pond, released Stayton Pond and Bonneville	Spring Creek, 1987	Bonneville Dam Trap	1,487	1	1
Washougal Hatchery	Spring Creek, 1987	Bonneville Dam Trap	1,487	1	1

Table 5. (cont.) Immigration of coded wire tagged fall chinook into the Spring Creek subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Washougal Hatchery	Spring Creek, 1987	Bonneville Dam Trap	1,487	1	1
Bonneville Hatchery, released Tanner Creek	Spring Creek, 1987	Hatchery	595	6	6
Bonneville Hatchery, released Tanner Creek	Spring Creek, 1987	Hatchery	595	4	4
Bonneville Hatchery, released Tanner Creek	Spring Creek, 1987	Hatchery	595	2	2
Bonneville Hatchery, released Tanner Creek	Spring Creek, 1987	Hatchery	595	2	2
Reared Stayton Pond, released Stayton Pond and Bonneville	Spring Creek, 1987	Hatchery	595	1	1
Bonneville Hatchery	Spring Creek, 1988	Hatchery	1,583	2	2
Bonneville Hatchery	Spring Creek, 1988	Hatchery	1.583	3	3
Bonneville Hatchery	Spring Creek, 1988	Hatchery	1,583		
Bonneville Hatchery	Spring Creek, 1988	Hatchery	1,583	1	1
Bonneville Hatchery	Spring Creek, 1988	Hatchery	1,583	1	1
Washougal Hatchery	Spring Creek, 1988	Hatchery	2,981	1	1
Bonneville Hatchery	Spring Creek, 1989	Hatchery	3,337	1	1
Bonneville Hatchery	Spring Creek, 1989	Hatchery	3,337	1	1

Table 5. (cont.) Immigration of coded wire tagged fall chinook into the Spring Creek subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery	Spring Creek, 1989	Hatchery	3,337	1	1
Bonneville Hatchery	Spring Creek, 1989	Hatchery	3,337	1	1
Little White Salmon Hatchery	Spring Creek, 1990	Hatchery	11,434	1	1
Bonneville Hatchery	Spring Creek, 1990	Hatchery	11,434	1	1
Big Creek Hatchery, released Rogue River	Spring Creek, 1990	Hatchery	11,434	1	1
Bonneville Hatchery	Spring Creek, 1990	Hatchery	11,434	1	1
Bonneville Hatchery	Spring Creek, 1990	Hatchery	11,434	1	1
Bonneville Hatchery	Spring Creek, 1990	Hatchery	11,434	1	1
Bonneville Hatchery	Spring Creek, 1990	Hatchery	11,434	2	2
Bonneville Hatchery	Spring Creek, 1990	Hatchery	11,434	1	1
Bonneville Hatchery	Spring Creek, 1990	Hatchery	11,434	1	1
Bonneville Hatchery	Spring Creek, 1990	Hatchery	11,434	1	1
Bonneville Hatchery	Spring Creek, 1990	Hatchery	11,434	1	1
Bonneville Hatchery	Spring Creek, 1990	Hatchery	11,434	1	1
Bonneville Hatchery	Spring Creek, 1990	Hatchery	11,434	1	1
Bonneville Hatchery	Spring Creek, 1990	Hatchery	11,434	1	1
Bonneville Hatchery	Spring Creek, 1990	Hatchery	11,434	1	1

Table 5. (cont.) Immigration of coded wire tagged fall chinook into the Spring Creek subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery	Spring Creek, 1990	Hatchery	11,434	1	1
Washougal Hatchery	Spring Creek, 1990	Hatchery	11,434	1	1
Lyons Ferry Hatchery	Spring Creek, 1990	Hatchery	11,434	1	1
Rock Creek Net Pens	Spring Creek, 1990	Hatchery	11,434	1	1
Drano Lake Net Pens	Spring Creek, 1990	Hatchery	11,434	1	1

Based on the following tag codes: 05-06-46, 07-22-07, 07-25-06, 07-25-07, 03-47-01, 05-04-43, 03-49-01, 05-06-48, 05-06-49, 03-52-01, 03-56-01, **05-04-49, 05-04-51,** 05-06-27, 05-55-01, 07-16-58, 07-18-42, 05-07-43, 05-07-46, **07-23-29, 05-07-47,** 07-24-07, 07-24-24, 07-26-63, 07-27-27, 07-31-22, 07-28-28, 07-33-24, 07-31-40, 07-33-22, 07-33-23, 07-33-25, 07-33-52, 07-33-53, 63-31-16, 63-31-18, 23-22-23, 63-31-19, 07-36-33, **07-47-22R2, 07-47-32R2, 07-47-37R2, 05-18-10, 07-29-53,** 07-34-63, 07-36-35, 07-37-16, 07-37-17, 07-37-53, 07-43-17, 07-43-18, **07-49-19R1,** 23-21-16, 23-21-50, 23-22-16, 23-22-20, 63-38-32, **63-41-56R1, B5-02-15,** and **B5-07-14.**

Beginning with the 1978 brood.

1/ Spring chinook spawned as a fall chinook.

Table 6 (AI-2). Immigration of coded wire tagged bright fall chinook into the Spring Creek NFH.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery, released Tanner Creek	Spring Creek, 1986	Hatchery	14	2	2
Bonneville Hatchery, released Tanner Creek	Spring Creek, 1986	Hatchery	14	1	1
Bonneville Hatchery, released Tanner Creek	Spring Creek, 1986	Hatchery	14	2	2
Little White Salmon	Spring Creek, 1987	Hatchery	78	1	1
Little White Salmon	Spring Creek, 1987	Hatchery	78	3	3
Bonneville Hatchery, released Tanner Creek	Spring Creek, 1987	Hatchery	78	1	1
Bonneville Hatchery, released Tanner Creek	Spring Creek, 1987	Hatchery	78	1	1
Bonneville Hatchery, released Tanner Creek	Spring Creek, 1987	Hatchery	78	1	1
Bonneville Hatchery, released Tanner Creek	Spring Creek, 1987	Hatchery	78	3	3
Bonneville Hatchery, released Tanner Creek	Spring Creek, 1987	Hatchery	78	1	1
Rocky Reach Hatchery, released Columbia River	Spring Creek, 1987	Hatchery	78	3	3

Based on the following tag codes: 07-24-26, 07-25-47, 07-28-27, 05-12-54, 05-13-37, 07-28-28, 07-30-07, 07-30-08, 07-31-25, 07-3 l-26, and 63-28-57.
Beginning with 1978 brood.

Table 7 (AI-3). Immigration of coded wire tagged tule fall chinook into the Bonneville Dam Trap.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Spring Creek Hatchery, released Umatilla River	Spring Creek, 1986	Hatchery	2,107	1	1
Washougal Hatchery	Spring Creek, 1986	Hatchery	2,107	1	1
Washougal Hatchery	Spring Creek, 1986	Hatchery	2,107	1	1
Bonneville Hatchery, released Tanner Creek	Spring Creek, 1986	Hatchery	2,107	1	1
Bonneville Hatchery, released Tanner Creek	Spring Creek, 1986	Hatchery	2,107	1	1
Little White Salmon Hatchery	Spring Creek, 1988	Hatchery	2,884	1	1
Little White Salmon Hatchery	Spring Creek, 1988	Hatchery	2,884	1	1
Bonneville Hatchery	Spring Creek, 1988	Hatchery	2,884	3	3
Bonneville Hatchery	Spring Creek, 1988	Hatchery	2.884	14	1 14
Bonneville Hatchery	Spring Creek, 1988	Hatchery	2,884	4	4
Bonneville Hatchery	Spring Creek, 1988	Hatchery	2,884	3	3
Reared Stayton Pond, released Bonneville	Spring Creek, 1988	Hatchery	2,884		1
Reared Stayton Pond, released Bonneville	Spring Creek, 1988	Hatchery	2,884	1	1
Bonneville Hatchery	Spring Creek, 1988	Hatchery	2,884	1	1

Table 7. (cont.) Immigration of coded wire tagged bright fall chinook into the Bonneville Dam Trap.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Bonneville Hatchery, released Umatilla River	Spring Creek, 1988	Hatchery	2,884	1	1
Rocky Reach Hatchery	Spring Creek, 1988	Hatchery	2,884	1	1
Washougal Hatchery	Spring Creek, 1988	Hatchery	2,884	1	1
Bonneville Hatchery	Spring Creek, 1989	Hatchery	1,556	1	1
Washougal Hatchery	Spring Creek, 1989	Hatchery	1,556	1	1

Based on the following tag codes: 05-10-57, 63-31-16, 63-31-17, 07-27-28, 07-33-23, 05-12-54, 05-12-57, 07-33-22, 07-33-23, 07-33-24, 07-33-25, 07-33-52, 07-33-55, 07-36-33, 07-38-29, 63-28-57, 63-38-28, 07-47-41R2, and 63-38-27.

Beginning with 1978 brood year.

Table 8 (AC-l). Age composition percentage (freshwater.ocean) by brood year for tule fall chinook trapped at Bonneville Dam and spawned at Spring Creek Hatchery.

Age Composition (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5
1983						
1984	577	1.73	50.78	46.62	0.87	
1985						
1986						

Table 9 (AC-2). Age composition percentage (freshwaterocean) by brood year for tule fall chinook returning to the Spring Creek Hatchery.

Age Composition (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5
1977						
1978						
1979	1,464	20.49	43.85	35.59	0.07	
1980	562	1.6	68.86	28.83	0.71	
1981	924	10.82	69.48	19.27	0.43	
1982	881	5.68	67.08	26.22	1.02	
1983	187	3.21	40.64	56.15	0	
1984	449	4.45	83.52	11.36	0.67	
1985						
1986						

Does not include 1.0 mini-jacks.

Table 10 (AS-l). Percent females by brood year and age class (freshwater.ocean) for tule fall chinook trapped at Bonneville Dam and spawned at Spring Creek Hatchery.

Females (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	Total % Female
1980							
1981					77.78		
1982				80.88	50.00		
1983			53.85	59.88	87.50		
1984	270	0	37.88	57.62	80.00		46.79
1985			39.53	67.50			
1986		0	50.73				
1987		0					

Table 11 (AS-2). Percent females by brood year and age class (freshwater.ocean) for tule fall chinook returning to the Spring Creek Hatchery.

Females (%)

Brood Year	N	1.1	1.2	1.3	1.4	1.5	Total % Female
1975							
1976					33.33		
1977				65.63	100.00		
1978			52.61	69.15	20.00		
1979	734	0	61.68	64.68	100.00		50.14
1980	373	0	67.96	66.05	75.00		66.37
1981	535	4.00	61.06	76.97	50.00		57.90
1982	569	0	65.31	77.06	55.56		64.59
1983	114	0	65.79	60.95			60.96
1984	267	0	58.93	84.31	100.00		59.47
1985		0	51.15	75.49			
1986		0.60	60.25				
1987		0					
1988							

Table 12 (AS-3). Percent females by brood year and age class (freshwater.ocean) for upriver bright fall chinook returning to the Spring Creek Hatchery.

Females (%)

Brood Year	N	1.1	1.2	1.3	1.4	2.2	Total % Female
1980							
1981					100.00		
1982				80.00	66.67		
1983			0	62.00		25.00	
1984			25.00				

Table 13 (AL-l). Mean fork length by brood year and age class (freshwater.ocean) for female tule fall chinook trapped at Bonneville Dam and spawned at Spring Creek Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5
1981				90	
N				7	
St. Dev.				3.15	
1982			88	91	
N			220	4	
St. Dev.			5.28	6.85	
1983		79	88	94	
N		140	100	7	
St. Dev.		4.32	5.39	2.94	
1984		78	89	94	
N		111	155	4	
St. Dev.		3.72	4.84	6.80	
1985		78	89		
N		85	81		
St. Dev.		4.10	5.17		
1986		79			
N		104			
St. Dev.		3.73			

Table 14 (AL-2). Mean fork length by brood year and age class (freshwater.ocean) for male tule fall chinook trapped at Bonneville Dam and spawned at Spring Creek Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1
1981				99		
N				2		
St. Dev.				8.49		
1982			88	96		
N			52	4		
St. Dev.			7.19	9.74		
1983		81	92	95		
N		120	67	1		
St. Dev.		5.63	7.10	---		
1984	61	81	94	99		
N	10	182	114	1		
St. Dev.	4.90	5.98	7.82	---		
1985		80	91			53
N		130	39			1
St. Dev.		5.93	6.75			---
1986	59	81				
N	44	101				
St. Dev.	3.65	5.15				
1987	60					
N	8					
St. Dev.	4.49					

Table 15 (AL-3). Mean fork length by brood year and age class (freshwater.ocean) for female tule fall chinook returning to the Spring Creek Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5
1977			92	95	
N			84	1	
St. Dev.			5.00	---	
1978		81	90	103	
N		454	139	1	
St. Dev.		5.60	5.80	---	
1979		82	90	90	
N		396	337	1	
St. Dev.		4.50	4.60	---	
1980		78	89	82	
N		263	107	3	
St. Dev.		5.30	5.00	2.60	
1981	60	76	87	90	
N	4	392	137	2	
St. Dev.	3.90	5.00	5.20	1.41	
1982		79	89	88	
N		386	178	5	
St. Dev.		4.70	5.54	4.85	
1983		80	88		
N		50	64		
St. Dev.		5.52	6.08		

Table 15. (cont.) Mean fork length by brood year and age class (freshwater.ocean) for female tule fall chinook returning to the Spring Creek Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5
1984		79	90	94	
N		221	43	3	
St. Dev.		4.65	5.20	4.50	
1985		77	85		
N		136	77		
St. Dev.		4.97	6.82		
1986	57	78			
N	1	285			
St. Dev.	---	5.04			

Table 16 (AL-4). Mean fork length by brood year and age class (freshwater.ocean) for male tule fall chinook returning to the Spring Creek Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5
1977			97		
N			44		
St. Dev.			6.50		
1978		84	95	105	
N		4.09	62	4	
St. Dev.		7.60	5.90	1.90	
1979	62	86	91		
N	300	246	184		
St. Dev.	4.60	7.20	5.50		
1980	62	79	94	94	
N	9	124	55	1	
St. Dev.	5.50	5.90	6.60	---	
1981	59	81	94	97	
N	96	250	41	2	
St. Dev.	4.30	6.70	8.00	2.12	
1982	58	82	92	94	
N	50	205	53	4	
St. Dev.	3.70	6.60	7.18	12.78	
1983	57	84	94		
N	6	26	41		
St. Dev.	3.00	4.13	6.47		

Table 16. (cont.) Mean fork length by brood year and age class (freshwater.ocean) for male tule fall chinook returning to the Spring Creek Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5
1984	60	82	96		
N	20	154	8		
St. Dev.	5.52	5.48	3.66		
1985	58	81	93		
N	94	128	25		
St. Dev.	4.95	6.42	6.33		
1986	58				
N	166				
St. Dev.	4.38				
1987	59				
N	109				
St. Dev.	4.20				

Table 17 (AL-5). Mean fork length by brood year and age class (freshwater.ocean) for male upriver bright fall chinook returning to. the Spring Creek Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1
1982			89	100		
N			2	4		
St. Dev.			6.36	8.87		
1983		78	89			79
N		1	19			3
St. Dev.		---	13.74			5.29
1984		75				
N		6				
St. Dev.		8.31				

Table 18 (AL-6). Mean fork length by brood year and age class (freshwater.ocean) for female upriver bright fall chinook returning to. the Spring Creek Hatchery.

Mean Fork Length (cm)

Brood Year	1.1	1.2	1.3	1.4	1.5	2.1	2.2
1981				90			
N				3			
St. Dev.				3.51			
1982			85	94			
N			8	8			
St. Dev.			7.25	5.63			
1983			87				83
N			31				1
St. Dev.			5.83				---
1984		79					
N		2					
St. Dev.		3.54					

Table 19 (TR). Hatchery releases of fall chinook salmon into the Mid Columbia Mainstem sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1971	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	05/05/72	05/05/72	105	2867400	COLUMBIA RIVER	UNTAGGED
1971	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	05/15/72	05/15/72	105	4301100	COLUMBIA RIVER	UNTAGGED
1971	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	05/30/72	05/30/72	110	3476000	COLUMBIA RIVER	UNTAGGED
1972	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/30/73	04/30/73	78	253269	SPRING CR (29.0159)	050101
1972	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/30/73	04/30/73	78	4596020	SPRING CR (29.0159)	UNTAGGED
1972	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/31/73	05/31/73	58	229093	SPRING CR (29.0159)	050201
1972	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/31/73	05/31/73	58	3539100	SPRING CR (29.0159)	UNTAGGED
1972	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/31/73	05/31/73	58	251837	SPRING CR (29.0159)	050301
1973	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/31/74	03/31/74	90	231012	SPRING CR (29.0159)	050401
1973	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/31/74	03/31/74	90	3363210	SPRING CR (29.0159)	UNTAGGED
1973	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/31/74	03/31/74	91	231148	SPRING CR (29.0159)	050501
1973	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/31/74	03/31/74	91	3573016	SPRING CR (29.0159)	UNTAGGED
1973	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/30/74	04/30/74	91	241287	SPRING CR (29.0159)	050601
1973	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/30/74	04/30/74	130	220573	SPRING CR (29.0159)	050701
1973	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/30/74	04/30/74	130	229022	SPRING CR (29.0159)	050801
1973	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/30/74	04/30/74	130	2551634	SPRING CR (29.0159)	UNTAGGED
1974	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/30/75	04/30/75	105	98698	SPRING CR (29.0159)	050901
1974	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/30/75	04/30/75	105	5280010	SPRING CR (29.0159)	UNTAGGED
1974	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/30/75	04/30/75	137	94527	SPRING CR (29.0159)	051001
1974	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/30/75	04/30/75	137	4234538	SPRING CR (29.0159)	UNTAGGED
1974	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/31/75	05/31/75	62	100631	SPRING CR (29.0159)	051101
1974	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/31/75	05/31/75	62	3631878	SPRING CR (29.0159)	UNTAGGED
1974	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/31/75	05/31/75	62		SPRING CR (29.0159)	051201
1974	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/31/75	05/31/75	57	915939722	SPRING CR (29.0159)	051301
1974	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/31/75	05/31/75	57	4323789	SPRING CR (29.0159)	UNTAGGED
1974	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/31/75	05/31/75	57	98104	SPRING CR (29.0159)	051401
1974	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	08/31/75	08/31/75	12	96564	SPRING CR (29.0159)	051501
1974	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	08/31/75	08/31/75	12	878954	SPRING CR (29.0159)	UNTAGGED
1975	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/18/76	03/18/76	89	96753	SPRING CR (29.0159)	050102
1975	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/18/76	03/18/76	115	100608	SPRING CR (29.0159)	050202
1975	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/18/76	03/18/76	115	10083087	SPRING CR (29.0159)	UNTAGGED
1975	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/12/76	04/12/76	79	96016	SPRING CR (29.0159)	050302
1975	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/12/76	04/12/76	79	2758540	SPRING CR (29.0159)	UNTAGGED
1975	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/12/76	04/12/76	87	99647	SPRING CR (29.0159)	050402
1975	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/12/76	04/12/76	80	101080	SPRING CR (29.0159)	050502
1975	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/12/76	04/12/76	72	94137	SPRING CR (29.0159)	050602
1975	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/07/76	05/07/76	57	100653	SPRING CR (29.0159)	050702
1975	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/07/76	05/07/76	57	2967054	SPRING CR (29.0159)	UNTAGGED
1975	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/07/76	05/07/76	57	96964	SPRING CR (29.0159)	050802
1975	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	08/25/76	08/25/76	11	49860	SPRING CR (29.0159)	050902
1975	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	08/25/76	08/25/76	11	428198	SPRING CR (29.0159)	UNTAGGED
1975	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	09/30/76	09/30/76	9	47929	SPRING CR (29.0159)	051002
1975	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	09/30/76	09/30/76	9	394091	SPRING CR (29.0159)	UNTAGGED
1976	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	03/18/77	03/18/77	112	146460	COLUMBIA RIVER	UNTAGGED
1976	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	03/18/77	03/18/77	101	10271921	COLUMBIA RIVER	UNTAGGED
1976	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/05/77	04/05/77	95	50160	COLUMBIA RIVER	UNTAGGED
1976	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/08/77	04/08/77	88	1686922	COLUMBIA RIVER	UNTAGGED
1976	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/08/77	04/08/77	85	96767	COLUMBIA RIVER	UNTAGGED
1976	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/08/77	04/08/77	80	95813	COLUMBIA RIVER	UNTAGGED
1976	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/08/77	04/08/77	79	75822	COLUMBIA RIVER	UNTAGGED
1976	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/11/77	04/11/77	85	935939	COLUMBIA RIVER	UNTAGGED
1976	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/11/77	04/11/77	83	76057	COLUMBIA RIVER	UNTAGGED
1976	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/12/77	04/12/77	88	999575	COLUMBIA RIVER	UNTAGGED
1976	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	05/24/77	05/24/77	45	3770627	COLUMBIA RIVER	UNTAGGED
1976	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	05/24/77	05/24/77	42	145059	COLUMBIA RIVER	UNTAGGED

Table 19 (cont.). Hatchery releases of fall chinook salmon into the Mid Columbia Mainstem sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1976	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/18/77	03/18/77	101	146403	SPRING CR (29.0159)	054301
1976	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/18/77	03/18/77	101	10271921	SPRING CR (29.0159)	UNTAGGED
1976	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/08/77	04/08/77	86	96767	SPRING CR (29.0159)	054401
1976	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/08/77	04/08/77	80	95813	SPRING CR (29.0159)	054501
1976	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/08/77	04/08/77	80	941640	SPRING CR (29.0159)	UNTAGGED
1976	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/08/77	04/08/77	79	75822	SPRING CR (29.0159)	054901
1976	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/08/77	04/08/77	79	745282	SPRING CR (29.0159)	UNTAGGED
1976	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/18/77	04/18/77	77	87707	SPRING CR (29.0159)	054101
1976	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/18/77	04/18/77	77	1376816	SPRING CR (29.0159)	UNTAGGED
1976	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/18/77	04/18/77	82	91438	SPRING CR (29.0159)	054201
1976	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/18/77	04/18/77	82	1343481	SPRING CR (29.0159)	UNTAGGED
1976	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/24/77	05/24/77	42	141161	SPRING CR (29.0159)	054601
1976	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/24/77	05/24/77	42	3915686	SPRING CR (29.0159)	UNTAGGED
1977	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	06/29/78	07/14/78		15092	COL.RIV.@ MCNARY DAM	PUGNBL
1977	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/17/78	09/01/78		23045	COL.RIV.@ MCNARY DAM	YWXYGN*3
1977	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/18/78	04/18/78	84	2039374	COLUMBIA RIVER	UNTAGGED
1977	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/18/78	04/18/78	68		COLUMBIA RIVER	UNTAGGED
1977	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/18/78	04/18/78	64	8901896444	COLUMBIA RIVER	UNTAGGED
1977	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/20/78	04/20/78	87	2036127	COLUMBIA RIVER	UNTAGGED
1977	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/20/78	04/20/78	79	99674	COLUMBIA RIVER	UNTAGGED
1977	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	05/01/78	05/01/78	56	155177	COLUMBIA RIVER	UNTAGGED
1977	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	05/01/78	05/01/78	52	3763997	COLUMBIA RIVER	UNTAGGED
1977	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/21/78	03/21/78	104	149725	SPRING CR (29.0159)	055601
1977	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/21/78	03/21/78	104	9792832	SPRING CR (29.0159)	UNTAGGED
1977	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	03/21/78	03/21/78	115	9792832	SPRING CR (29.0159)	UNTAGGED
1977	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	03/21/78	03/21/78	104	149725	SPRING CR (29.0159)	UNTAGGED
1977	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/18/78	04/18/78	64		SPRING CR (29.0159)	056001
1977	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/18/78	04/18/78	64	981223643	SPRING CR (29.0159)	UNTAGGED
1977	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/18/78	04/18/78	68	92314	SPRING CR (29.0159)	056201
1977	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/18/78	04/18/78	68	2039374	SPRING CR (29.0159)	UNTAGGED
1977	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/18/78	05/18/78	56	155177	SPRING CR (29.0159)	055701
1977	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/18/78	05/18/78	56	3763997	SPRING CR (29.0159)	UNTAGGED
1977	UNKNOWN STOCK	SPRING CR NF HATCHRY	PreSm	08/18/78	08/18/78	16		COLUMBIA RIVER	UNTAGGED
1977	UNKNOWN STOCK	SPRING CR NF HATCHRY	PreSm	08/18/78	08/18/78	16	4992050565	COLUMBIA RIVER	UNTAGGED
1977	UNKNOWN STOCK	SPRING CR NF HATCHRY	PreSm	08/18/78	08/18/78	16	106826552092	COLUMBIA RIVER	UNTAGGED
1977	UNKNOWN STOCK	SPRING CR NF HATCHRY	PreSm	08/18/78	08/18/78			COLUMBIA RIVER	UNTAGGED
1977	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	08/13/78	08/18/78	16	49920	SPRING CR (29.0159)	050339
1977	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	08/13/78	08/18/78	16	362682	SPRING CR (29.0159)	UNTAGGED
1977	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	08/13/78	08/18/78	16	52092	SPRING CR (29.0159)	050340
1977	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	08/13/78	08/18/78	16	362682	SPRING CR (29.0159)	UNTAGGED
1977	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	08/13/78	08/18/78	16	50565	SPRING CR (29.0159)	050341
1977	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	08/13/78	08/18/78	16	362682	SPRING CR (29.0159)	UNTAGGED
1978	UNKNOWN STOCK	CARSON NF HATCHERY	Fingr	05/02/79	05/02/79	122	238266	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	CARSON NF HATCHERY	Fingr	05/02/79	05/02/79	122	279990	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	CARSON NF HATCHERY	Fingr	05/03/79	05/03/79	122	82472	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	CARSON NF HATCHERY	Fingr	05/03/79	05/03/79	122	447984	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	CARSON NF HATCHERY	Fingr	05/04/79	05/04/79	122	91500	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	CARSON NF HATCHERY	Fingr	05/04/79	05/04/79	122	91500	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	CARSON NF HATCHERY	Fingr	05/05/79	05/05/79	122	71160	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	CARSON NF HATCHERY	Fingr	05/05/79	05/05/79	122	79300	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	CARSON NF HATCHERY	Fingr	05/05/79	05/05/79	122	85400	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	CARSON NF HATCHERY	Fingr	05/05/79	05/05/79	122	459036	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	CARSON NF HATCHERY	Fingr	05/06/79	05/06/79	121	383080	COLUMBIA RIVER	UNTAGGED
1978	CASCADE(ODFW)	KLICKITAT HATCHERY	Fingr	06/13/79	06/13/79	75	25617	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	LTL WHITE SALMON NFH	Fingr	06/26/79	06/26/79	112	25699	COLUMBIA RIVER	UNTAGGED

Table 19 (cont.). Hatchery releases of fall chinook salmon into the Mid Columbia Mainstem sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1978	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	06/26/79	06/26/79	55	25699	COLUMBIA RIVER - GEN	UNTAGGED
1978	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	04/11/79	07/03/79		294	COL.RIV.@ MCNARY DAM	Pr*2
1978	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	05/14/79	06/21/79		573	COL.RIV.@ MCNARY DAM	RDLGYW*2
1978	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	06/12/79	07/17/79		51558	COL.RIV.@ MCNARY DAM	RDYWPK
1978	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/05/79	08/13/79		19810	COL.RIV.@ MCNARY DAM	YWBLLB*1
1978	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/24/79	08/06/79		40398	COL.RIV.@ MCNARY DAM	LBYWLB
1978	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	08/08/79	08/24/79		19895	COL.RIV.@ MCNARY DAM	RDLBPK
1978	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	03/20/79	03/20/79	153	245981	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	03/20/79	03/20/79	125	9874003	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/02/79	04/02/79	112	26200	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/02/79	04/02/79	110	150000	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/20/79	04/20/79	87	95581	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/20/79	04/20/79	84	4376793	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	04/20/79	04/20/79	78	135537	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	05/18/79	05/18/79	54	3582160	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	05/18/79	05/18/79	52	140948	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	06/01/79	06/01/79	50	489175	COLUMBIA RIVER	UNTAGGED
1978	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/20/79	03/21/79	125	245981	SPRING CR (29.0159)	050446
1978	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/20/79	03/21/79	125	9874003	SPRING CR (29.0159)	UNTAGGED
1978	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/20/79	04/20/79	87	95581	SPRING CR (29.0159)	050434
1978	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/20/79	04/20/79	87	11035	SPRING CR (29.0159)	UNTAGGED
1978	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/20/79	04/20/79	78	135537	SPRING CR (29.0159)	050444
1978	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/20/79	04/20/79	78	4376793	SPRING CR (29.0159)	UNTAGGED
1978	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/18/79	05/18/79	52	140948	SPRING CR (29.0159)	050433
1978	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/18/79	05/18/79	52	3582160	SPRING CR (29.0159)	UNTAGGED
1978	UNKNOWN STOCK	SPRING CR NF HATCHRY	PreSm	08/13/79	08/13/79	19	1127204	COLUMBIA RIVER	UNTAGGED
1978	UNKNOWN STOCK	SPRING CR NF HATCHRY	PreSm	08/13/79	08/13/79	14	55635	COLUMBIA RIVER	UNTAGGED
1978	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	08/13/79	08/14/79	14	55635	SPRING CR (29.0159)	050445
1978	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	08/13/79	08/14/79	14	1147887	SPRING CR (29.0159)	UNTAGGED
1979	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	04/23/80	04/23/80	186	96819	COLUMBIA RIVER	UNTAGGED
1979	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	04/23/80	04/23/80	157	200048	COLUMBIA RIVER	UNTAGGED
1979	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/16/80	06/16/80	101	51949	COLUMBIA RIVER	UNTAGGED
1979	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	04/23/80	04/23/80	186	296867	JOHN DAY POOL	UNTAGGED
1979	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	06/09/80	07/14/80		39005	COL.RIV.@ MCNARY DAM	Ce
1979	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/16/80	07/31/80		45582	COL.RIV.@ MCNARY DAM	CeDy
1979	UNKNOWN STOCK	SPRING CR NF HATCHRY	EmFry	12/20/79	12/20/79	1134	799100	COLUMBIA RIVER	UNTAGGED
1979	ABERNATHY CREEK	SPRING CR NF HATCHRY	FeFry	12/20/79	12/20/79	1134	799100	SPRING CR (29.0159)	UNTAGGED
1979	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/10/80	03/10/80	123	130208	COLUMBIA RIVER	UNTAGGED
1979	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/10/80	03/10/80	123	7209227	COLUMBIA RIVER	UNTAGGED
1979	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/10/80	04/10/80	83	77720	COLUMBIA RIVER	UNTAGGED
1979	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/10/80	04/10/80	83	3756884	COLUMBIA RIVER	UNTAGGED
1979	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/09/80	05/09/80	51	61771	COLUMBIA RIVER	UNTAGGED
1979	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/09/80	05/09/80	51	3128906	COLUMBIA RIVER	UNTAGGED
1979	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/19/80	05/19/80	45	102928	COLUMBIA RIVER	UNTAGGED
1979	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/19/80	05/19/80	45	103319	COLUMBIA RIVER	UNTAGGED
1979	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/10/80	03/10/80	123	130208	SPRING CR (29.0159)	050639
1979	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/10/80	03/10/80	123	7209927	SPRING CR (29.0159)	UNTAGGED
1979	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/08/80	04/21/80	83	77720	SPRING CR (29.0159)	050640
1979	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/08/80	04/21/80	83	3836257	SPRING CR (29.0159)	UNTAGGED
1979	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/09/80	05/09/80	51	61771	SPRING CR (29.0159)	050641
1979	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/09/80	05/09/80	51	3128906	SPRING CR (29.0159)	UNTAGGED
1979	SPRING CREEK	SPRING CR NF HATCHRY	PreSm	08/07/80	08/07/80	19	23095	COLUMBIA RIVER	UNTAGGED
1979	SPRING CREEK	SPRING CR NF HATCHRY	PreSm	08/07/80	08/07/80	19	1088636	COLUMBIA RIVER	UNTAGGED
1979	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	08/07/80	08/07/80	19	23563	SPRING CR (29.0159)	050642
1979	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	08/07/80	08/07/80	19	1088918	SPRING CR (29.0159)	UNTAGGED

Table 19 (cont.). Hatchery releases of fall chinook salmon into the Mid Columbia Mainstem sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1980	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	07/31/81	07/31/81	47	37440	COLUMBIA @HORSETHIEF	UNTAGGED
1980	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/12/81	06/12/81	93	25933	COLUMBIA RIVER	UNTAGGED
1980	ABERNATHY CREEK	LTL WHITE SALMON NFH	Fingr	08/04/81	08/12/81	42	72292	COLUMBIA RIVER - GEN	UNTAGGED
1980	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	06/15/81	08/30/81		17723	COL.RIV.@ MCNARY DAM	031731
1980	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/01/81	10/30/81		2869	COL.RIV.@ MCNARY DAM	031734
1980	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/01/81	10/30/81		2367	COL.RIV.@ MCNARY DAM	031735
1980	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/01/81	10/30/81		2523	COL.RIV.@ MCNARY DAM	031736
1980	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/01/81	10/30/81		1899	COL.RIV.@ MCNARY DAM	031737
1980	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/01/81	10/30/81		522	COL.RIV.@ MCNARY DAM	031738
1980	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/01/81	10/30/81		362	COL.RIV.@ MCNARY DAM	031739
1980	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/09/81	07/31/81		42580	COL.RIV.@ MCNARY DAM	031732
1980	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	08/03/81	08/26/81		16779	COL.RIV.@ MCNARY DAM	031730
1980	SPRING CREEK	SPRING CR NF HATCHRY	EmFry	12/18/80	12/18/80	1106	2417563	COLUMBIA RIVER	UNTAGGED
1980	SPRING CREEK	SPRING CR NF HATCHRY	EmFry	12/30/80	12/30/80	1008	931635	COLUMBIA RIVER	UNTAGGED
1980	ABERNATHY CREEK	SPRING CR NF HATCHRY	FeFry	12/18/80	12/30/80	1080	3349198	SPRING CR (29.0159)	UNTAGGED
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/26/81	03/26/81	91	7635077	COLUMBIA RIVER	UNTAGGED
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/15/81	04/15/81	71	4481528	COLUMBIA RIVER	UNTAGGED
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/22/81	04/22/81	75	1038395	COLUMBIA RIVER	UNTAGGED
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/24/81	04/24/81	75	12594	COLUMBIA RIVER	UNTAGGED
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/05/81	05/05/81	65	3218181	COLUMBIA RIVER	UNTAGGED
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/08/81	05/08/81	64	12984	COLUMBIA RIVER	UNTAGGED
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/26/80	03/26/81	90	104666	SPRING CR (29.0159)	050740
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/26/80	03/26/81	90	4743607	SPRING CR (29.0159)	UNTAGGED
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/26/81	03/26/81	118	28825	SPRING CR (29.0159)	050748
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/26/81	03/26/81	118	1345489	SPRING CR (29.0159)	UNTAGGED
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/26/81	03/26/81	121	13746	SPRING CR (29.0159)	050750
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/26/81	03/26/81	121	635235	SPRING CR (29.0159)	UNTAGGED
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/26/81	03/26/81	102	15378	SPRING CR (29.0159)	050751
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/26/81	03/26/81	102	748129	SPRING CR (29.0159)	UNTAGGED
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/15/81	04/15/81	71	76731	SPRING CR (29.0159)	050741
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/15/81	04/15/81	71	3118598	SPRING CR (29.0159)	UNTAGGED
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/15/81	04/15/81	71	30911	SPRING CR (29.0159)	050749
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/15/81	04/15/81	71	1255287	SPRING CR (29.0159)	UNTAGGED
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/05/81	05/05/81	65	63119	SPRING CR (29.0159)	050742
1980	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/05/81	05/05/81	65	3141859	SPRING CR (29.0159)	UNTAGGED
1980	ABERNATHY CREEK	SPRING CR NF HATCHRY	Fingr	05/08/81	05/08/81	65	12984	SPRING CR (29.0159)	UNTAGGED
1980	SPRING CREEK	SPRING CR NF HATCHRY	PreSm	08/14/81	08/14/81	15	290766	COLUMBIA RIVER	UNTAGGED
1980	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	08/14/81	08/14/81	15	7182	SPRING CR (29.0159)	050752
1980	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	08/14/81	08/14/81	15	283584	SPRING CR (29.0159)	UNTAGGED
1981	LTL WHITE SALMON-NFH	LTL WHITE SALMON NFH	Fingr	06/07/82	06/07/82	93	53331	COLUMBIA RIVER	UNTAGGED
1981	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	06/24/82	07/01/82		8667	COL.RIV.@ MCNARY DAM	231609
1981	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/06/82	07/22/82		18844	COL.RIV.@ MCNARY DAM	231611
1981	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/27/82	08/05/82		11152	COL.RIV.@ MCNARY DAM	231613
1981	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	08/09/82	09/03/82		23004	COL.RIV.@ MCNARY DAM	231615
1981	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/26/82	03/26/82	110	151366	SPRING CR (29.0159)	051050
1981	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/26/82	03/26/82	110	7048963	SPRING CR (29.0159)	UNTAGGED
1981	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/15/82	04/15/82	78	38854	SPRING CR (29.0159)	051051
1981	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/15/82	04/15/82	74	43171	SPRING CR (29.0159)	051053
1981	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/15/82	04/15/82	74	1107	SPRING CR (29.0159)	UNTAGGED
1981	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/15/82	04/15/82	70	48541	SPRING CR (29.0159)	051054
1981	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/15/82	04/15/82	70	1245	SPRING CR (29.0159)	UNTAGGED
1981	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/15/82	04/15/82	75	41295	SPRING CR (29.0159)	051055
1981	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/15/82	04/15/82	75	1059	SPRING CR (29.0159)	UNTAGGED
1981	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/15/82	04/15/82	76	48281	SPRING CR (29.0159)	051056
1981	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/15/82	04/15/82	76	1238	SPRING CR (29.0159)	UNTAGGED

Table 19 (cont.). Hatchery releases of fall chinook salmon into the Mid Columbia Mainstem sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1981	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/15/82	04/15/82	78	2135802	SPRING CR (29.0159)	UNTAGGED
1981	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/20/82	05/20/82	49	58312	SPRING CR (29.0159)	051052
1981	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/20/82	05/20/82	49	2878803	SPRING CR (29.0159)	UNTAGGED
1981	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	07/15/82	07/15/82	17	466	SPRING CR (29.0159)	050753
1981	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	07/15/82	07/15/82	17	46322	SPRING CR (29.0159)	UNTAGGED
1981	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	07/15/82	07/15/82	17	440	SPRING CR (29.0159)	050754
1981	SPRING CREEK	SPRING CR NF HATCHRY	Smolt	07/15/82	07/15/82	17	46350	SPRING CR (29.0159)	UNTAGGED
1982	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	06/16/83	06/30/83		15057	COL.RIV.@ MCNARY DAM	231623
1982	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/13/83	08/08/83		15010	COL.RIV.@ MCNARY DAM	231627
1982	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/20/83	07/27/83		14690	COL.RIV.@ MCNARY DAM	231630
1982	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/29/83	08/05/83		10601	COL.RIV.@ MCNARY DAM	231633
1982	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	08/12/83	09/02/83		17292	COL.RIV.@ MCNARY DAM	231624
1982	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/28/83	04/28/83	89	7744218	COLUMBIA RIVER	UNTAGGED
1982	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/28/83	04/28/83	65	3195551	COLUMBIA RIVER	UNTAGGED
1982	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/03/83	05/03/83	64	211876	COLUMBIA RIVER	UNTAGGED
1982	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/19/83	05/19/83	79	3169128	COLUMBIA RIVER	UNTAGGED
1982	COLUMBIA RIV BRIGHTS	SPRING CR NF HATCHRY	Fingr	06/22/83	06/22/83	148	323796	COLUMBIA RIVER	UNTAGGED
1982	COLUMBIA RIV BRIGHTS	SPRING CR NF HATCHRY	Fingr	06/24/83	06/24/83	145	317061	COLUMBIA RIVER	UNTAGGED
1982	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/28/83	04/28/83	54	49749	COLUMBIA RIVER - GEN	051142
1982	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/28/83	04/28/83	54	1276	COLUMBIA RIVER - GEN	UNTAGGED
1982	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/28/83	04/28/83	55	51266	COLUMBIA RIVER - GEN	051143
1982	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/28/83	04/28/83	55	993	COLUMBIA RIVER - GEN	UNTAGGED
1982	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/28/83	04/28/83	55	51716	COLUMBIA RIVER - GEN	051144
1982	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/28/83	04/28/83	55	841	COLUMBIA RIVER - GEN	UNTAGGED
1982	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/28/83	04/28/83	55	52282	COLUMBIA RIVER - GEN	051145
1982	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/28/83	04/28/83	55	850	COLUMBIA RIVER - GEN	UNTAGGED
1982	ABERNATHY CREEK	SPRING CR NF HATCHRY	Fingr	04/08/83	04/28/83	80	10939769	SPRING CR (29.0159)	UNTAGGED
1982	ABERNATHY CREEK	SPRING CR NF HATCHRY	Fingr	05/19/83	05/19/83	79	3169128	SPRING CR (29.0159)	UNTAGGED
1983	COLUMBIA (N BONNEVL)	RINGOLD HATCHERY	Smolt	04/01/85	04/01/85	7	1200000	SPRING CR (29.0159)	UNTAGGED
1983	TULE STOCK -COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/16/84	04/16/84	75	5028387	COLUMBIA RIVER	UNTAGGED
1983	TULE STOCK -COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/16/84	05/16/84	58	5798526	COLUMBIA RIVER	UNTAGGED
1983	TULE STOCK -COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/30/84	05/30/84	71	218372030	COLUMBIA RIVER	UNTAGGED
1983	COLUMBIA RIV BRIGHTS	SPRING CR NF HATCHRY	Fingr	06/01/84	06/01/84			COLUMBIA RIVER	UNTAGGED
1983	TULE STOCK -COLUMBIA	SPRING CR NF HATCHRY	Fingr	06/19/84	06/19/84	51	12087	COLUMBIA RIVER	UNTAGGED
1983	TULE STOCK -COLUMBIA	SPRING CR NF HATCHRY	Fingr	07/31/84	07/31/84	35	16604	COLUMBIA RIVER	UNTAGGED
1983	TULE STOCK -COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/16/84	04/16/84	68	48730	COLUMBIA RIVER - GEN	051146
1983	TULE STOCK -COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/16/84	04/16/84	68	2030	COLUMBIA RIVER - GEN	UNTAGGED
1983	TULE STOCK -COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/16/84	04/16/84	68	48695	COLUMBIA RIVER - GEN	051150
1983	TULE STOCK -COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/16/84	04/16/84	68	767	COLUMBIA RIVER - GEN	UNTAGGED
1983	TULE STOCK -COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/16/84	04/16/84	68	46449	COLUMBIA RIVER - GEN	051151
1983	TULE STOCK -COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/16/84	04/16/84	68	1935	COLUMBIA RIVER - GEN	UNTAGGED
1983	TULE STOCK -COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/16/84	04/16/84	69	46899	COLUMBIA RIVER - GEN	051152
1983	TULE STOCK -COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/16/84	04/16/84	69	1955	COLUMBIA RIVER - GEN	UNTAGGED
1983	COLUMBIA RIV BRIGHTS	SPRING CR NF HATCHRY	Fingr	05/15/84	05/15/84	159	79442	ROCK CR (31.0114)	UNTAGGED
1983	COLUMBIA RIV BRIGHTS	SPRING CR NF HATCHRY	Fingr	06/01/84	06/01/84	62	17433	ROCK CR (31.0114)	UNTAGGED
1983	ABERNATHY CREEK	SPRING CR NF HATCHRY	Fingr	04/16/84	04/16/84	75	5028387	SPRING CR (29.0159)	UNTAGGED
1983	ABERNATHY CREEK	SPRING CR NF HATCHRY	Fingr	05/16/84	05/16/84	63	5798526	SPRING CR (29.0159)	UNTAGGED
1983	ABERNATHY CREEK	SPRING CR NF HATCHRY	Fingr	07/31/84	07/31/84	35	16607	SPRING CR (29.0159)	UNTAGGED
1984	COLUMBIA RIV BRIGHTS	SPRING CR NF HATCHRY	Fingr	04/18/85	04/18/85	87		COLUMBIA RIVER	UNTAGGED
1984	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	02/25/85	02/25/85	167	18539947467	SPRING CR (29.0159)	051534
1984	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	02/25/85	02/25/85	167	431	SPRING CR (29.0159)	UNTAGGED
1984	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	02/25/85	02/25/85	167	53653	SPRING CR (29.0159)	051535
1984	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	02/25/85	02/25/85	167	542	SPRING CR (29.0159)	UNTAGGED
1984	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	02/25/85	02/25/85	167	5967544	SPRING CR (29.0159)	UNTAGGED
1984	ABERNATHY CREEK	SPRING CR NF HATCHRY	Fingr	02/25/85	02/28/85	187	13638811	SPRING CR (29.0159)	UNTAGGED

Table 19 (cont.). Hatchery releases of fall chinook salmon into the Mid Columbia Mainstem sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1984	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	02/28/85	02/28/85	147	41826	SPRINGCR (29.0159)	051536
1984	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	02/28/85	02/28/85	147	767	SPRING CR (29.0159)	UNTAGGED
1984	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	02/28/85	02/28/85	147	42707	SPRING CR (29.0159)	051537
1984	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	02128185	02/28/85	147	694	SPRING CR (29.0159)	UNTAGGED
1984	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	02/28/85	02/28/85	145	37373	SPRING CR (29.0159)	051538
1984	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	02/28/85	02/28/85	145	2008	SPRING CR (29.0159)	UNTAGGED
1984	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	02/28/85	02/28/85	145	36912	SPRING CR (29.0159)	051539
1984	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	02/28/85	02/28/85	145	2231	SPRING CR (29.0159)	UNTAGGED
1984	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	02/28/85	02/28/85	207	2483583	SPRINGCR (29.0159)	UNTAGGED
1984	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	02/28/85	02/28/85	148	5187684	SPRING CR (29.0159)	UNTAGGED
1985	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	06/11/86	06/18/86		9969	COL.RIV.@ MCNARY DAM	231921
1985	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	06/18/86	06/21/86		9982	COL.RIV.@ MCNARY DAM	231923
1985	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	06/21/86	06/27/86		9972	COL.RIV.@ MCNARY DAM	231925
1985	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	06/27/86	07/08/86		10745	COL.RIV.@ MCNARY DAM	231927
1985	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/09/86	07/15/86		9937	COL.RIV.@ MCNARY DAM	231929
1985	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/19/86	07/21/86		9968	COL.RIV.@ MCNARY DAM	231933
1985	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/21/86	07/22/86		9850	COL.RIV.@ MCNARY DAM	231935
1985	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/22/86	07/23/86		9867	COL.RIV.@ MCNARY DAM	231937
1985	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/23/86	07/28/86		9978	COL.RIV.@ MCNARY DAM	231939
1985	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/29/86	08/01/86		9976	COL.RIV.@ MCNARY DAM	231941
1985	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	08/01/86	08/06/86		5798	COL.RIV.@ MCNARY DAM	231844
1985	PRIEST RAPIDS	RINGOLD HATCHERY	Smolt	04/01/87	04/01/87	6	1100000	SPRING CR (29.0159)	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	ROCK CREEK NET PENS	Fingr	06/04/86	06/04/86	233	38140	COLUMBIA RIVER	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	SPRING CR NF HATCHRY	Fingr	05/22/86	05/22/86	111	193733	COLUMBIA RIVER	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	SPRING CR NF HATCHRY	Fingr	05/22/86	05/22/86	103	50965	COLUMBIA RIVER	UNTAGGED
1985	COLUMBIA RIV BRIGHTS	SPRING CR NF HATCHRY	Fingr	05/22/86	05/22/86	99	189373	COLUMBIA RIVER	UNTAGGED
1985	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/06/86	03/06/86	123	91229	SPRING CR (29.0159)	B50109
1985	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/06/86	03/06/86	123	1158626	SPRING CR (29.0159)	UNTAGGED
1985	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/06/86	03/06/86	126	44147	SPRING CR (29.0159)	B50112
1985	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/06/86	03/06/86	126	1205909	SPRING CR (29.0159)	UNTAGGED
1985	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/06/86	03/06/86	123	51218	SPRING CR (29.0159)	B50113
1985	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/06/86	03/06/86	123	1198838	SPRING CR (29.0159)	UNTAGGED
1985	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/08/86	04/08/86	68	93292	SPRING CR (29.0159)	B50110
1985	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/08/ 86	04/08/86	68	1137098	SPRING CR (29.0159)	UNTAGGED
1985	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/08/86	04/08/86	68	43406	SPRING CR (29.0159)	B50114
1985	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/08/86	04/08/86	68	1186984	SPRING CR (29.0159)	UNTAGGED
1985	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/08/86	04/08/86	69	51921	SPRING CR (29.0159)	B50115
1985	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/08/86	04/08/86	69	1178469	SPRING CR (29.0159)	UNTAGGED
1985	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/15/86	05/15/86	38	96854	SPRING CR (29.0159)	B50111
1985	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/15/86	05/15/86	38	962127	SPRING CR (29.0159)	UNTAGGED
1985	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/15/86	05/15/86	38	41980	SPRING CR (29.0159)	B50208
1985	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/15/86	05/15/86	38	1017000	SPRING CR (29.0159)	UNTAGGED
1985	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/15/86	05/15/86	38	52508	SPRING CR (29.0159)	850209
1985	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/15/86	05/15/86	38	1006472	SPRING CR (29.0159)	UNTAGGED
1986	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	06/18/87	06/23/87	4	10000	COL.RIV.@ MCNARY DAM	232002
1986	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	06/23/87	06/25/87		9146	COL.RIV.@ MCNARY DAM	232003
1986	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	06/25/87	07/01/87		9753	COL.RIV.@ MCNARY DAM	232004
1986	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/01/87	07/08/87		10000	COL.RIV.@ MCNARY DAM	232005
1986	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/08/87	07/14/87		10000	COL.RIV.@ MCNARY DAM	232006
1986	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/15/87	07/30/87		9392	COL.RIV.@ MCNARY DAM	232007
1986	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/30/87	08/13/87	4	10000	COL.RIV.@ MCNARY DAM	231957
1986	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/19/87	03/19/87	86	48712	SPRING CR (29.0159)	051855
1986	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/19/87	03/19/87	86	1129171	SPRING CR (29.0159)	UNTAGGED
1986	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/19/87	03/19/87	81	48882	SPRING CR (29.0159)	051856
1986	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	03/19/87	03/19/87	81	1122873	SPRING CR (29.0159)	UNTAGGED

Table 19 (cont.). Hatchery releases of fall chinook salmon into the Mid Columbia Mainstem sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1986	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	03/19/87	03/19/87	82	49259	SPRING CR (29.0159)	051857
1986	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	03/19/87	03/19/87	82	524590	SPRING CR (29.0159)	UNTAGGED
1986	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	03/19/87	03/19/87	82	49437	SPRING CR (29.0159)	051858
1986	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	03/19/87	03/19/87	82	521343	SPRING CR (29.0159)	UNTAGGED
1986	LTL WHITE SALMON-NFH	SPRING CR NF HATCHRY	Fingr	04/16/87	04/16/87	64	48971	SPRING CR (29.0159)	051859
1986	LTL WHITE SALMON-NFH	SPRING CR NF HATCHRY	Fingr	04/16/87	04/16/87	64	239791	SPRING CR (29.0159)	UNTAGGED
1986	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	04/16/87	04/16/87	60	48387	SPRING CR (29.0159)	051860
1986	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	04/16/87	04/16/87	60	1429387	SPRING CR (29.0159)	UNTAGGED
1986	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/16/87	04/16/87	60	47756	SPRING CR (29.0159)	051861
1986	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/16/87	04/16/87	60	533795	SPRING CR (29.0159)	UNTAGGED
1986	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/16/87	04/16/87	62	48073	SPRING CR (29.0159)	051862
1986	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/16/87	04/16/87	62	1125215	SPRING CR (29.0159)	UNTAGGED
1986	LTL WHITE SALMON-NFH	SPRING CR NF HATCHRY	Fingr	05/21/87	05/21/87	42	46113	SPRING CR (29.0159)	051863
1986	LTL WHITE SALMON-NFH	SPRING CR NF HATCHRY	Fingr	05/21/87	05/21/87	42	638735	SPRING CR (29.0159)	UNTAGGED
1986	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/21/87	05/21/87	37	45408	SPRING CR (29.0159)	051905
1986	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/21/87	05/21/87	37	1127942	SPRING CR (29.0159)	UNTAGGED
1986	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/21/87	05/21/87	35	47213	SPRING CR (29.0159)	051906
1986	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/21/87	05/21/87	35	830096	SPRING CR (29.0159)	UNTAGGED
1986	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/21/87	05/21/87	36	46697	SPRING CR (29.0159)	051909
1986	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/21/87	05/21/87	36	842560	SPRING CR (29.0159)	UNTAGGED
1987	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	06/13/88	06/21/88	5	10002	COL.RIV.@ MCNARY DAM	232246
1987	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	06/21/88	06/23/88	5	9812	COL.RIV.@ MCNARY DAM	232247
1987	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	06/21/88	06/23/88	5	190	COL.RIV.@ MCNARY DAM	UNTAGGED
1987	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	06/23/88	06/26/88	5	9622	COL.RIV.@ MCNARY DAM	232248
1987	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	06/23/88	06/26/88	5	380	COL.RIV.@ MCNARY DAM	UNTAGGED
1987	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	06/27/88	07/01/88	5	10001	COL.RIV.@ MCNARY DAM	232249
1987	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	06/27/88	07/01/88	5	1	COL.RIV.@ MCNARY DAM	UNTAGGED
1987	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/05/88	07/13/88	5	10001	COL.RIV.@ MCNARY DAM	232250
1987	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/05/88	07/13/88	5	1	COL.RIV.@ MCNARY DAM	UNTAGGED
1987	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/13/88	07/14/88	5	5008	COL.RIV.@ MCNARY DAM	232048
1987	MIXED COLUMBIA	QDNR (WILDSTOCK- N	Smolt	07/18/88	07/21/88	5	4992	COL.RIV.@ MCNARY DAM	232049
1987	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/07/88	04/07/88	65	23960	SPRING CR (29.0159)	051445
1987	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/07/88	04/07/88	65	203324	SPRING CR (29.0159)	UNTAGGED
1987	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/07/88	04/07/88	61	24695	SPRING CR (29.0159)	051449
1987	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/07/88	04/07/88	61	199894	SPRING CR (29.0159)	UNTAGGED
1987	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/07/88	04/07/88	68	23946	SPRING CR (29.0159)	051661
1987	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/07/88	04/07/88	68	217757	SPRING CR (29.0159)	UNTAGGED
1987	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/07/88	04/07/88	68	50332	SPRING CR (29.0159)	051923
1987	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/07/88	04/07/88	68	1397382	SPRING CR (29.0159)	UNTAGGED
1987	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/07/88	04 /07/88	68	51757	SPRING CR (29.0159)	051924
1987	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/07/88	04/07/88	68	1401442	SPRING CR (29.0159)	UNTAGGED
1987	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/07/88	04/07/88	68	51473	SPRING CR (29.0159)	051925
1987	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	04/07/88	04/07/88	68	1400050	SPRING CR (29.0159)	UNTAGGED
1987	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	05/18/88	05/18/88	33	198137	SPRING CR (29.0159)	000000*3
1987	UNKNOWN STOCK	SPRING CR NF HATCHRY	Fingr	05/18/88	05/18/88	33	19213	SPRING CR (29.0159)	UNTAGGED
1987	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/18/88	05/18/88	37	24930	SPRING CR (29.0159)	051450
1987	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/18/88	05/18/88	37	85969	SPRING CR (29.0159)	UNTAGGED
1987	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/ 18/88	05/18/88	37	25226	SPRING CR (29.0159)	051451
1987	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/18/88	05/18/88	37	86990	SPRING CR (29.0159)	UNTAGGED
1987	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/18/88	05/18/88	33	25655	SPRING CR (29.0159)	051659
1987	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/18/88	05/18/88	33	34432	SPRING CR (29.0159)	UNTAGGED
1987	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/18/88	05/18/88	33	24716	SPRING CR (29.0159)	051660
1987	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/18/88	05/18/88	33	33175	SPRING CR (29.0159)	UNTAGGED
1987	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/18/88	05/18/88	42	24120	SPRING CR (29.0159)	051662
1987	MIXED COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/18/88	05/18/88	42	219928	SPRING CR (29.0159)	UNTAGGED

Table 19 (cont.). Hatchery releases of fall chinook salmon into the Mid Columbia Mainstem sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1987	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/18/88	05/18/88	37	50786	SPRING CR (29.0159)	051910
1987	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/18/88	05/18/88	37	905678	SPRING CR (29.0159)	UNTAGGED
1987	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/18/88	05/18/88	37	50564	SPRING CR (29.0159)	051912
1987	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/18/88	05/18/88	37	910410	SPRING CR (29.0159)	UNTAGGED
1987	TULE STOCK -COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/18/88	05/18/88	34	50445	SPRING CR (29.0159)	051913
1987	TULE STOCK -COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/18/88	05/18/88	34	492323	SPRING CR (29.0159)	UNTAGGED
1987	TULE STOCK -COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/18/88	05/18/88	34	50956	SPRING CR (29.0159)	051914
1987	TULE STOCK -COLUMBIA	SPRING CR NF HATCHRY	Fingr	05/18/88	05/18/88	34	491092	SPRING CR (29.0159)	UNTAGGED
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/09/89	03/09/89	116	48276	SPRING CR (29.0159)	052013
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/09/89	03/09/89	116	2016005	SPRING CR (29.0159)	UNTAGGED
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/09/89	03/09/89	116	48798	SPRING CR (29.0159)	052015
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/09/89	03/09/89	116	2706707	SPRING CR (29.0159)	UNTAGGED
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/09/89	03/09/89	116	49731	SPRING CR (29.0159)	052016
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/09/89	03/09/89	116	2682600	SPRING CR (29.0159)	UNTAGGED
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	04/13/89	04/13/89	68	49473	SPRING CR (29.0159)	052017
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	04/13/89	04/13/89	68	632949	SPRING CR (29.0159)	UNTAGGED
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	04/13/89	04/13/89	67	49241	SPRING CR (29.0159)	052018
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	04/13/89	04/13/89	67	639295	SPRING CR (29.0159)	UNTAGGED
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	04/13/89	04/13/89	67	47883	SPRING CR (29.0159)	052019
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	04/13/89	04/13/89	67	633679	SPRING CR (29.0159)	UNTAGGED
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	04/13/89	04/13/89	67	50245	SPRING CR (29.0159)	052020
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	04/13/89	04/13/89	67	988851	SPRING CR (29.0159)	UNTAGGED
1988	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/13/89	04/13/89	67	24540	SPRING CR (29.0159)	052032
1988	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/13/89	04/13/89	67	320317	SPRING CR (29.0159)	UNTAGGED
1988	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/13/89	04/13/89	67	24036	SPRING CR (29.0159)	052033
1988	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	04/13/89	04/13/89	67	329039	SPRING CR (29.0159)	UNTAGGED
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/17/89	05/17/89	54	24781	SPRING CR (29.0159)	052034
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/17/89	05/17/89	54	58709	SPRING CR (29.0159)	UNTAGGED
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/17/89	05/17/89	53	24002	SPRING CR (29.0159)	052035
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/17/89	05/17/89	53	61163	SPRING CR (29.0159)	UNTAGGED
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/18/89	05/18/89	36	44704	SPRING CR (29.0159)	052021
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/18/89	05/18/89	36	645028	SPRING CR (29.0159)	UNTAGGED
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/18/89	05/18/89	36	48400	SPRING CR (29.0159)	052023
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/18/89	05/18/89	36	1320820	SPRING CR (29.0159)	UNTAGGED
1988	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/18/89	05/18/89	38	49365	SPRING CR (29.0159)	052024
1988	SPRING CREEK	SPRING CR NF HATCHRY	Fingr	05/18/89	05/18/89	38	638884	SPRING CR (29.0159)	UNTAGGED
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/18/89	05/18/89	36	49395	SPRING CR (29.0159)	052025
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/18/89	05/18/89	36	975562	SPRING CR (29.0159)	UNTAGGED
1988	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/18/89	05/18/89	53	25095	SPRING CR (29.0159)	052145
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	05/17/90	72	23963	SPRING CR (29.0159)	051626
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	05/17/90	72	64104	SPRING CR (29.0159)	UNTAGGED
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	05/17/90	75	24971	SPRING CR (29.0159)	051627
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	05/17/90	75	63457	SPRING CR (29.0159)	UNTAGGED
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	05/17/90	75	23318	SPRING CR (29.0159)	051628
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	05/17/90	75	329809	SPRING CR (29.0159)	UNTAGGED
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	05/17/90	77	23540	SPRING CR (29.0159)	051629
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	05/17/90	77	329821	SPRING CR (29.0159)	UNTAGGED
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	05/17/90	76	23956	SPRING CR (29.0159)	051630
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	05/17/90	76	241535	SPRING CR (29.0159)	UNTAGGED
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	05/17/90	76	23639	SPRING CR (29.0159)	051631
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	05/17/90	76	242273	SPRING CR (29.0159)	UNTAGGED
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	05/17/90	78	24708	SPRING CR (29.0159)	051632
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	05/17/90	78	152233	SPRING CR (29.0159)	UNTAGGED
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	05/17/90	75	25050	SPRING CR (29.0159)	051633
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	05/17/90	75	152603	SPRING CR (29.0159)	UNTAGGED

Table 19 (cont.). Hatchery releases of fall chinook salmon into the Mid Columbia Mainstem sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site		CWT Code
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	03/15/90	104	47265	SPRING CR	(29.0159)	052207
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	03/15/90	104	424969	SPRING CR	(29.0159)	UNTAGGED
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	03/15/90	110	46676	SPRING CR	(29.0159)	052208
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	03/15/90	110	421295	SPRING CR	(29.0159)	UNTAGGED
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	03/15/90	112	49587	SPRING CR	(29.0159)	052209
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	03/15/90	112	424544	SPRING CR	(29.0159)	UNTAGGED
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	03/15/90	103	49870	SPRING CR	(29.0159)	052210
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	03/15/90	03/15/90	103	663143	SPRING CR	(29.0159)	UNTAGGED
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	04/12/90	04/12/90	63	49409	SPRING CR	(29.0159)	052211
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	04/12/90	04/12/90	63	885163	SPRING CR	(29.0159)	UNTAGGED
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	04/12/90	04/12/90	62	49267	SPRING CR	(29.0159)	052212
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	04/12/90	04/12/90	62	653255	SPRING CR	(29.0159)	UNTAGGED
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	04/12/90	04/12/90	64	48491	SPRING CR	(29.0159)	052213
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	04/12/90	04/12/90	64	891710	SPRING CR	(29.0159)	UNTAGGED
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	04/12/90	04/12/90	63	48449	SPRING CR	(29.0159)	052214
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	04/12/90	04/12/90	63	892327	SPRING CR	(29.0159)	UNTAGGED
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/17/90	05/17/90	36	47525	SPRING CR	(29.0159)	052215
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/17/90	05/17/90	36	658825	SPRING CR	(29.0159)	UNTAGGED
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/17/90	05/17/90	36	48417	SPRING CR	(29.0159)	052216
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/17/90	05/17/90	36	416095	SPRING CR	(29.0159)	UNTAGGED
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/17/90	05/17/90	35	49648	SPRING CR	(29.0159)	052217
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/17/90	05/17/90	35	659328	SPRING CR	(29.0159)	UNTAGGED
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/17/90	05/17/90	34	47665	SPRING CR	(29.0159)	052218
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/17/90	05/17/90	34	422167	SPRING CR	(29.0159)	UNTAGGED
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/17/90	05/17/90	39	24379	SPRING CR	(29.0159)	052335
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/17/90	05/17/90	39	210828	SPRING CR	(29.0159)	UNTAGGED
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/17/90	05/17/90	37	24420	SPRING CR	(29.0159)	052336
1989	COLUMBIA (N BONNEVL)	SPRING CR NF HATCHRY	Fingr	05/17/90	05/17/90	37	209790	SPRING CR	(29.0159)	UNTAGGED
1990	TULE STOCK -COLUMBIA	WHITSON SCHOOL	PreSm	12/15/90	12/15/90	498	500	COLUMBIA RIVER		UNTAGGED

Table 20 (TD). Parasites and diseases of fall chinook -at the Spring Creek National Fish Hatchery.

Disease type	Hatchery	Specific Pathogen
Bacteria	Spring Creek	*Aeromonas salmonicida* (Furunculosis)
Bacteria	Spring Creek	*Yersinia ruckeri* (Enteric Redmouth Disease)
Bacteria	Spring Creek	*Renibacteruim salmoninarum* (Bacterial Kidney Disease)
Bacteria	Spring Creek	Myxobacteria
Bacteria	Spring Creek	*Cytophaga psychrophila* (Cold Water Disease)
Bacteria	Spring Creek	*Aeromonas liquifaciens*
Bacteria	Spring Creek	Bacterial Gill Disease
Parasite	Spring Creek	Gill Amoeba
Parasite	Spring Creek	*Hexamita*
Parasite	Spring Creek	*Ichtyobodo* 1/
Parasite	Spring Creek	*Phyllobothrium salmonis* 2/
Parasite	Spring Creek	*Chilodon* 3/
Parasite	Spring Creek	*Ichthyopthirius multifilis* (Ichthyophthirius) 4/
Virus	Spring Creek	IHN Infectious Hematopoietic Necrosis /5
Virus	Spring Creek	EIBS Erythrocytic Inclusion Body Syndrome 6/

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

1/ Occurrence in 1983 only.
2/ Occurrence in adults pre 1981.
3/ Occurrence one time only, prior to 1981.
4/ Occurrence in 1986 and 1987 only.
5/ Bonneville, URB Adults Dec. 1984, egg takes to Spring Creek negative.
6/ Occurrence in December 1984, adults only.

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WHITE SALMON SUBBASIN

Naturally Produced Summer Steelhead

GEOGRAPHIC LOCATION

The White Salmon River begins on the southwest slope of Mount Adams in south-central Washington. The river drops from its mountain source through 45 miles of forested hills and river valleys before entering into the Bonneville Pool on the Columbia River at river mile (RM) 168.3. All of the White Salmon River except the Condit project from RM 2.0 to RM 6.0 has been designated "scenic river" a classification designed to protect and preserve the undeveloped, natural condition of this section of river. The river drains a watershed of approximately 386 square miles.

ORIGIN

The wild summer steelhead in the White Salmon River is native, although interbreeding with Skamania and Wells hatchery stocks. Marked steelhead stray into the White Salmon and are caught, but it is unknown if they represent a component of the spawning population.

DISTRIBUTION

Table 1 lists rearing and spawning habitat, by quality, for White Salmon River summer steelhead based on estimates from the Northwest Power Planning Council. Historically, the upper limit for chinook was a series of falls at RM 16.2 (past reports indicate it may have been possible for steelhead to navigate over the falls under ideal conditions). Distribution of all anadromous fish was drastically reduced by the construction of Condit Dam in 1913. Although two attempts were made to ladder the dam, both failed, and without a fishway Condit Dam blocks all fish migration. Steelhead production is limited to the 2.0 miles of river downstream from the Condit Dam powerhouse.

PRODUCTION

Production Facilities

The White Salmon River has no full production hatchery operating in the basin. There are two rearing facilities in the subbasin. Spring chinook are reared at the White Salmon Rearing ponds (RM 1.5), and Northwest Lake net-pens rear steelhead. Both of these facilities release their fish into the White Salmon River.

Production Summary

No data are available on summer steelhead smolt production, Natural smolt production is limited to the lower river. The construction of Condit Dam eliminated over 50 miles of mainstem and tributary spawning and rearing habitat. This includes those miles above a falls at RM 16.2 which were assessable under the right conditions.

ADULT LIFE HISTORY

Run size and Escapement

No estimates of wild run size or escapement is available. Spawner surveys and wild fish harvest

data are incomplete, however, using smolt capacity models and 3 percent smolt to adult return rate, wild fish run size was estimated to be 50 fish (Subbasin Plan 1990).

Time of migration

Adult summer steelhead enter the river in April through December, peaking in July through September.

Harvest

Ocean harvest for summer steelhead is unknown.

Columbia River harvest is comprised of many stocks which migrate through the Columbia River. Both sport and tribal fisheries harvest steelhead in the Columbia River with White Salmon River steelhead likely being part of the harvest.

Sport harvest (mostly "dip-in" fishery) within the White Salmon River occurs below Condit Dam. Sport harvest of summer steelhead (hatchery and wild) from 1977 through 1989 averaged 1,841 fish based on permit-card harvest estimates (Table 2). As of 1986, in order to help protect wild steelhead returns, fishing regulations restrict harvest to hatchery fish only, all wild steelhead must be released.

The White Salmon River attracts a large number of anglers at the mouth of the river. This popular fishery concentrates on "dip-ins" which are generally migrating steelhead from other subbasins temporarily entering the White Salmon River where these fish are caught.

Spawning period

Wild summer steelhead spawning occurs from January through April, peaking in February and March.

Spawning area

Summer steelhead are believed to spawn in the lower 2-3 miles of river. Over 50 miles of White Salmon River steelhead habitat is blocked by Condit Dam.

Fecundity

No data are available on wild steelhead fecundity.

Age composition

One year of limited data showed 80 percent of returning fish belonged to the 2.2 age class. Table 3 outlines age data from return year 1980-81.

Size

No data are available on lengths of wild adult steelhead.

Sex ratio

No data on percent of females within returning steelhead adults.

Survival rate

No data are available for the White Salmon River.

JUVENILE LIFE HISTORY

Egg

No data are available on egg production or survival.

Emergence

Wild summer steelhead emergence occurs in spring and early summer.

Juvenile rearing

Juvenile rearing for the majority of wild smolts lasts approximately two years prior to ocean emigration.

Wild steelhead smolts emigrate in April and May, peaking in early May, at the size of 160 mm.

Hatchery releases

The majority of smolts are reared at Skamania Hatchery and released into the White Salmon River at an age of 14 months. Table 4 outlines hatchery releases into the White Salmon River from 1981 through 1990. In addition to hatchery releases, a net pen operation in Northwestern Lake above Condit Dam rears and releases steelhead into the White Salmon River with releases of 7,200 smolts in 1988 and 20,000 smolts in 1989. These fish were released below Condit Dam at river mile 1.5. The net pen operation is a cooperative project between Washington Department of Wildlife, Pacific Power and Light and a local sport-fishing club, the White Salmon Steelheaders.

BIOCHEMICAL-GENETIC CHARACTERISTICS

No data are available on wild summer steelhead. A number of factors make it questionable as to whether genetically independent wild steelhead still exist in the White Salmon River. Factors such as; blockage of the majority of spawning and rearing habitat, small size of the run, mixing with returning hatchery releases and possible interbreeding with strays from other subbasins (Subbasin Plan 1990).

DISEASES

Table 5 outlines disease history for hatchery summer steelhead released into the White Salmon River.

REFERENCES

The references for this section appear at the end of the following steelhead section.

Table 1 (HB-1). Estimated* amount of rearing and spawning habitat, by quality, of White Salmon River subbasin summer steelhead.

Area	Excellent	Good	Fair=	Poor[B]	Unknown	Total	Confidence
Miles	0.0%	0.0%	100%	0.0%		3.3	Unknown
Acres	0.0%	0.0%	100%	0.0%		17.5	Unknown

*Northwest Power Planning Council estimates based on limited observations.

[B]Ratings of fair and poor may reflect natural physical features such as waterfall barriers, as well as degradation caused by man.

Source: Presence/absence database, NPPC 199 1.

Table 2 (RS-a). Returns (sport catch and escapement) of summer steelhead to the White Salmon River subbasin.

Return Year	Escapement	Sport Catch[A]	Adult Total
1977		1,564	Unknown
1978		624	Unknown
1979		738	Unknown
1980		713	Unknown
1981		1,311	Unknown
1982		1,188	Unknown
1983		1.173	Unknown
1984		1,855	Unknown
1985		3.456	Unknown
1986		2,934	Unknown
1987		3,762	Unknown
1988		2,773	Unknown
1989		833	Unknown

[A]Sport catch within subbasin only.

Source: Sport catch based on permit-card harvest estimates. White Salmon Production Plan, 1990.

Table 3 (AC-a). Age composition percentage (freshwater.ocean) by return year, for adult wild summer steelhead originating in the White Salmon River subbasin.

		Age composition (%)						
Return Year	N[AB]	2.1	2.2	2.2s1	2.3	3.1	3.2	
1980-81	79	8.9%	81.0%	1.3%	2.5%	1.3%	5.1%	

[A]79 fish sampled from sport catch.

[B]Age data based on scale analysis.

Source: White Salmon Production Plan, 1990.

Table 4 (TR). Hatchery releases of summer steelhead into the White Salmon River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish \ lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1981	Columbia Wells	Skamania Hatchery	Smolt	04/20/83	6.6	7,524	White Salmon R - Big	
1981	Columbia Wells	Skamania Hatchery	Smolt	04/20/83	6.6	7,524	White Salmon R - Big	
1981	Columbia Wells	Skamania Hatchery	Smolt	04/20/83	6.6	5,953	White Salmon R - Big	
1981	Washougal R	Skamania Hatchery	Smolt	04/19/82	5.5	6,710	White Salmon R - Big	
1981	Washougal R	Skaniania Hatchery	Smolt	04/19/82	5.5	6,765	White Salmon R - Big	
1981	Washougal R	Skamania Hatchery	Smolt	04/20/82	5.7	6,669	White Salmon R - Big	
1984	Washougal R WF/NF	Skamania Hatchery	Non Smolt	05/23/84	800.0	20,000	Unknown	
1984	Washougal R WF/NF	S kamania Hatchery	Non Smolt	05/23/ 84	800.0	44,800	Unknown	
1984	Washougal R WF/NF	Skamania Hatchery	Non Smolt	05/23/84	800.0	24,000	Unknown	
1984	Washougal R WF/NF	S kamania Hatchery	Non Smolt	05/23/84	800.0	44,000	Unknown	
1984	Washougal R WF/NF	Skamania Hatchery	Non Smolt	05/30/84	700.0	49,000	White Salmon R - Big	
1984	Washougal R WF/NF	Skamania Hatchery	Non Smolt	05/30/84	700.0	49,000	White Salmon R - Big	

Table 4 (cont.). Hatchery releases of summer steelhead into the White Salmon River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish \ lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1984	Willamette R	S kamania Hatchery	Smolt	05/10/85	9.8	10,006	White Salmon R - Big	AD
1985	Washougal R WF/NF	S kamania Hatchery	Smolt	04/23/86	7.2	778	White Salmon R - Big	AD
1985	Washougal R WF/NF	Skamania Hatchery	Smolt	04/25/86	6.4	3,718	White Salmon R - Big	AD
1985	Washougal R WF/NF	Skamania Hatchery	Smolt	05/01/86	6.3	7,371	White Salmon R - Big	AD
1985	Washougal R WF/NF	Skamania Hatchery	Smolt	05/01/86	6.5	7,969	White Salmon R - Big	AD
1986	Washougal R	Vancouver Hatchery	Smolt	04/18/87	5.0	5,000	White Salmon R - Big	AD
1986	Washougal R	Vancouver Hatchery	Smolt	04/27/87	5.0	5,000	White Salmon R - Big	AD
1986	Washougal R WF/NF	Skamania Hatchery	Non Smolt	11/04/86	26.1	20,619	White Salmon R - Big	AD
1988	Washougal R WF/NF	Northwest Net Pen	Smolt	04/21/90	5.2	9,828	White Salmon R - Big	AD
1988	Washougal R WF/NF	Skamania Hatchery	Smolt	05/03/89	6.6	5,115	White Salmon R - Big	
1990	Washougal R WF/NF	Skamania Hatchery	Smolt	05/06/91	5.3	12,805	White Salmon R - Big	AD
1990	Washougal R WF/NF	Skamania Hatchery	Smolt	05/06/91	5.5	6,688	White Salmon R - Big	AD

ource: Terry Luvgren, WDW Hatchery Stocking Database, 1991.

Table 5 (TD). Parasites and diseases isolated at hatchery which reared White Salmon River summer steelhead smolts[a].

Disease Type	Hatchery	Specific Pathogen
Bacterial	Skamania[b]	*Renibacterium salmonarium* (BKD)
Bacterial	Skamania	*Flexibacter columnaris* (Columnaris)
Bacterial	Skamania	*Flexibacter cytophaga* (Coldwater)
Bacterial	Skamania	*Renibacterium salmonarium* (BKD)
Parasite	Skamania	*Hexamita sp.*
Parasite	Skamania	*Ichthyophthirius multiflis* (Ich)
Parasite	Skamania	*khthyoboda sp.* (Costia)
Parasite	S kamania	*Trichodina sp.*
Viral	Skamania	*Infectious hematopoietic necrosis* (IHN)

*Summer steelhead smolts released into the White Salmon River were also reared at the Vancouver Hatchery located in the city of Vancouver.
[b]Skamania Hatchery is located on the Washougal River.

Disease history represents pathogens isolated at these hatcheries and not necessarily a disease outbreak.

Source: WDW pathologist, Steve Roberts, 1991.

WHITE SALMON SUBBASIN

Naturally Produced Winter Steelhead

GEOGRAPHIC LOCATION

The White Salmon River begins on the southwest slope of Mount Adams in south central Washington. The river drops from its mountain source through 45 miles of forested hills and river valleys before finally entering into the Bonneville Pool on the Columbia River at river mile (RM) 168.3. All of the White Salmon River except the Condit project from RM 2.0 to RM 6.0 has been designated "scenic river" a classification designed to protect and preserve the undeveloped, natural condition of this section of river. The river drains a watershed of approximately 386 square miles.

ORIGIN

The wild winter steelhead stock in the White Salmon River is native, although interbreeding with Elochoman and Chambers Creek hatchery stocks has likely occurred.

DISTRIBUTION

Table 1 lists rearing and spawning habitat, by quality, for White Salmon River winter steelhead based on estimates from the Northwest Power Planning Council.

Historically, the upper limit for steelhead was a falls at RM 16.3 (past reports indicate it may have been possible for steelhead to navigate over the falls under ideal conditions). Distribution of all anadromous fish was drastically reduced by the construction of Condit Dam in 1913. Although two attempts were made to ladder the dam, both failed, and without a fishway Condit Dam blocks all fish migration. Marked steelhead from many other Columbia River stocks have been recovered in White Salmon fisheries, but if, or the extent of these populations spawning in the river is unknown.

PRODUCTION

Production Facilities

The White Salmon River has no full production hatchery operating in the basin. Two rearing facilities, White Salmon rearing ponds (RM1.5) which grow spring chinook salmon and Northwest Lake net-pens which rear steelhead, both release fish into the White Salmon River.

Production Summary

No data are available on winter steelhead smolt production. Smolt production is limited by loss of upstream habitat which is blocked by Condit dam as well as the construction of Bonneville Dam and the associated flooding of the lower river, hence current steelhead production is undoubtedly reduced relative to past levels. The Northwest Power Planning Council estimate for smolt carrying capacity below Condit Dam was 3,541 smolts (both winter and summer) which divided in half results in 1,771 winter steelhead smolts. Natural smolt production in 1985 for the 1.6 mile reach below Condit Dam was estimated at 5,116 fish (Subbasin Plan 1990).

ADULT LIFE HISTORY

Run size and Escapement

No estimates of wild run size or escapement exist. Little is known about White Salmon River

winter steelhead, biologists have no current or historical data to conclusively prove that a natural winter steelhead run actually exists in the White Salmon River. Evidence to suggest that a natural winter steelhead run exists now or in the past is unclear although hatchery introductions have led to successful returns of winter steelhead to the White Salmon River. Wild winter steelhead run size is considered small, based on smolt production potential 50 wild steelhead were recently estimated to return to the subbasin.

Time of migration

Unknown, although based on fish returning to the Kalama River, steelhead enter the river in April through December, peaking in July through September.

Harvest

Ocean harvest of winter steelhead is unknown.

No data are available for Columbia River harvest.

Sport harvest of this stock occurs below Condit Dam. Sport harvest of winter steelhead from 1970 through 1982 averaged 18 fish annually. Hatchery releases which began in 1982 increased harvest to an average of 177 fish annually from 1983 through 1989 based on permit-card harvest estimates. Table 2 list yearly catch of winter steelhead from 1977 through 1989.

Spawning Deriod

Wild winter steelhead spawning occurs from March through June.

Spawning area

Winter steelhead are believed to spawn in the lower 2-3 miles of river. Approximately 16 miles of White Salmon River steelhead spawning habitat is blocked by Condit Dam.

Fecundity

No data on wild steelhead fecundity.

Age composition

No data are available on wild winter steelhead.

Size

No data are available for wild adult steelhead.

Sex ratio

No data are available on percent of females within returning adults.

Survival rate

No data are available on winter steelhead.

JUVENILE LIFE HISTORY

Egg

No data on egg production or survival.

Emergence

No data for wild winter steelhead.

Juvenile rearing

Juvenile rearing for the majority of wild smolts lasts approximately two years prior to ocean emigration.

Wild winter steelhead smolts probably emigrate in April and May, peaking in early May, at the size of 160 mm.

Hatchery releases

The majority of winter steelhead smolts are reared at Skamania Hatchery and released into the White Salmon River at an age of 14 months. Table 9 outlines hatchery releases into the White Salmon River from 1981 through 1990. In addition to hatchery releases, a net pen operation in Northwestern Lake above Condit Dam, rears and releases winter steelhead smolts into the White Salmon River. Fish are released below Condit Dam at river mile 1 .5. The net pen operation is a cooperative project between Washington Department of Wildlife, Pacific Power and Light and the White Salmon Steelheaders.

Straying.

No data on winter steelhead strays.

BIOCHEMICAL-GENETIC CHARACTERISTICS

No data are available on wild winter steelhead. A number of factors such as; blockage of the majority of spawning and rearing habitat, small size of the run, mixing with returning hatchery releases, make it questionable as to whether genetically independent wild winter steelhead still exist in the White Salmon River.

DISEASES

Disease history for hatchery smolts released into the White Salmon River is outlined in the adjoining White Salmon summer steelhead report.

Table 1 (HB-1). Estimated* amount of rearing and spawning habitat, by quality, of White Salmon River subbasin winter steelhead.

Area	Excellent	Good	Fair[B]	Poor[B]	Unknown	Total	Confidence
Miles	0.0%	0.0%	100%	0.0%		3.3	Unknown
Acres	0.0%	0.0%	100%	0.0%		17.5	Unknown

*Northwest Power Planning Council estimates based on limited observations.

[B]Rating of fair and poor may reflect natural physical features such as waterfall barriers, as well as degradation caused by man.

Source: Presence/absence database, NPPC , 199 1.

Table 2 (RB-a). Returns (sport catch and escapement) for White Salmon River winter steelhead.

Return Year	Escapement	Sport Catch[A B]	Adult Total
1977-78		0	Unknown
1978-79		12	Unknown
1979-80		9	Unknown
1980-81		13	Unknown
1981-82		7	Unknown
1982-83		3	Unknown
1983-84		133	Unknown
1984-85		336	Unknown
1985-86		81	Unknown
1986-87		173	Unknown
1987-88		195	Unknown
1988-89		146	Unknown

*Based on fish caught between November and April.

[B]Catch within subbasin only.

Source: White Salmon Production Plan, 1990. Sport catch based on permit-card harvest estimates.

Table 3 (TR). Hatchery releases of winter steelhead into the White Salmon River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	*CWT* Codes/ Fin Clip
1981	Chambers Cr	Skamania Hatchery	Smolt	04/23/82	6.4	8,096	White Salmon R - Big	
1981	Chambers Cr	Skamania Hatchery	Smolt	04/23/82	6.6	8,283	White Salmon R - Big	
1981	Chambers Cr	Skamania Hatchery	Smolt	04/29/82	7.9	9,283	White Salmon R - Big	
1981	Chambers Cr	S kamania Hatchery	Smolt	04/29/82	5.7	7,239	White Salmon R - Big	
1983	Unknown	S kamania Hatchery	Smolt	05/01/84	4.5	5,436	White Salmon R - Big	
1983	Unknown	S kamania Hatchery	Smolt	05/01/84	5.0	4,705	White Salmon R - Big	
1984	Cowlitz R	Skamania Hatchery	Smolt	05/10/85	9.0	10,008	White Salmon R - Big	
1985	Cowlitz R	Skamania Hatchery	Non Smolt	07/23/85	160.0	*22,400*	White Salmon R - Big	
1985	Cowlitz R	Skamania Hatchery	Non Smolt	07/23/85	160.0	20,000	White Salmon R - Big	
1985	Cowlitz R	Skamania Hatchery	Non Smolt	07/23/85	160.0	20,000	White Salmon R - Big	
1985	Cowlitz R	Skamania Hatchery	Non Smolt	07/23/85	160.0	16,000	White Salmon R - Big	
1985	Cowlitz R	S kamania Hatchery	Smolt	04/23/86	*5.8*	*6,073*	White Salmon R - Big	AD

Table 3 (cont.). Hatchery releases of winter steelhead into the White Salmon River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish J lb.	Number Released	Release Site	CWT Codes/ Fin Clip
1985	Cowlitz R	Skamania Hatchery	Smolt	04/23/86	5.9	6,608	White Salmon R - Big	AD
1985	Cowlitz R	Skamania Hatchery	Smolt	04/24/86	6.0	6,886	White Salmon R - Big	AD
1985	Cowlitz R	Skamania Hatchery	Smolt	04/24/86	5.7	6,471	White Salmon R - Big	AD
1985	Cowlitz R	Skamania Hatchery	Smolt	04/24/86	5.4	6,188	White Salmon R - Big	AD
1985	Cowlitz R	Skamania Hatchery	Smolt	04/25/86	5.8	3,207	White Salmon R - Big	AD
1988	Washougal R - WF/NF	Northwest Net Pen	Smolt	04/21/90	5.2	9,854	White Salmon R - Big	AD
1990	Elochoman R	Northwest Net Pen	Smolt	04/12/91	5.8	20,000	White Salmon R - Big	621719 AD
1990	Elochoman R	Northwest Net Pen	Smolt	04/12/91	5.0	18,000	White Salmon R - Big	AD
1991	Cowlitz R	Northwest Net Pen	Smolt	04/24/92	5.8	20,800	White Salmon R - Big	AD
1991	Cowlitz R	Northwest Net Pen	Smolt	04/24/92	6.3	20,460	White Salmon R - Big	635938 ADLV

Source: Terry Lovgren, WDW Hatchery Stocking Database, 1991.

Table 4 (TD). Parasites and diseases isolated at the hatchery which reared White Salmon River winter steelhead smolts.

Disease Type	Hatchery	Specific Pathogen
Bacterial	Skamania[b]	*Renibacterium salmonarium* (BKD)
Bacterial	Skamania	*Flexibacter columnar-is* (Columnaris)
Bacterial	Skamania	*Flexibacter cytophaga* (Coldwater)
Bacterial	Skamania	*Renibacterium salmonarium* (BKD)
Parasite	Skamania	*Hexamita sp.*
Parasite	Skamania	*Ichthyophthirius multiflis* (Ich)
Parasite	Skamania	*Ichthyoboda sp.* (Costia)
Parasite	Skamania	*Trichodina sp.*
Viral	Skamania	Infectious hematopoietic necrosis (IHN)

[b]Skamania Hatchery is located on the Washougal River.

Disease history represents pathogens isolated at these hatcheries and not necessarily a disease outbreak.

Source: WDW pathologist, Steve Roberts, 1991.

REFERENCES

Howell, P. J., K. Jones, D. Scamecchia, L. LaVoy, W. Kendra, and D. Ortmann. 1985. Stock assessment of Columbia River anadromous salmonids, volumes I & II. Final report of Oregon Department of Fish and Wildlife, Washington Department of Fisheries, Washington Department of Game, and Idaho Department of Fish and Game (Project 83-335, Contract DE-AI79-84BP12737) to Bonneville Power Administration, Portland, Oregon.

WDW, Columbia Basin System Planning. White Salmon River Subbasin Production Plan, 1990.

KLICKITAT SUBBASIN

Spring Chinook

GEOGRAPHIC LOCATION

The Klickitat River subbasin, located on the east slope of the Cascade Range in south-central Washington, comprises 1,350 square miles in Klickitat and Yakima counties and enters the Columbia River at River Mile (RM) 180. The Klickitat River is bounded by Mount Adams on the West, the Goat Rocks to the north, and the Sirncoe Mountains on the east. The Yakima Indian Reservation comprises a large portion of the upper Klickitat river subbasin. Klickitat Hatchery is located at RM 42.

ORIGIN

Bryant (1949) cited reports of large runs of spring chinook and a significant Indian fishery at Lyle Falls (RM 2) prior to about 1920. The history of hatchery production begins with the first release of 11,900 yearlings of unknown stock origin in 1950 (WDF, 1951). Spring chinook were trapped from 1952 through 1959 or later at the upper fishway (Falls #5). Klickitat Hatchery has occasionally released non-local stock spring chinook of Carson, Willamette, and Cowlitz origin (Howell et al. 1985).

DISTRIBUTION

Bryant cited reports that spring chinook once spawned in the West Fork of the Klickitat River which enters the mainstem at RM 63, just below Castille Falls. In 1960 through 1962, obstructions were blasted and fishways constructed at Castille Falls (RM 64) to allow the introduction of anadromous runs to the upper Klickitat River (YIN). Spring chinook redds have been observed in the mainstem from the hatchery as far upstream as RM 84 (Stockley, 1979). However, the largest number of redds ever counted above Castille Falls was just 13 in 1971 (Schwartzberg and Roger, 1986). The naturally produced run spawns in the area from Parrott's Bridge (RM 49.0) upstream to about McCormick Meadows (RM 80.0). The primary spawning area is from Soda Ford (RM 60.7) upstream to Castile Falls, a distance of approximately 4 miles (Howell et al. 1985). Spring chinook probably also spawn in the mainstem downstream from the hatchery.

PRODUCTION

By 1951, the annual spring chinook run varied from 1,000 adults to 5,000 adults (WDF 1951). Spring chinook brood stock were trapped each year from 1952 through 1959 or later at the upper fishway (Falls #5). Counts at the trap through 1959 tanged from 110 fish to 3,588 fish, but may greatly underestimate the total runs in those years because of the lack of harvest data from the treaty fishery below Falls 5, passage over the falls itself, and off-peak periods when the trap did not operate (WDF, 1960). Primary emphasis is on hatchery production although a remnant naturally produced native run originates from the area upstream of Klickitat Hatchery (Howell et al. 1985).

Tables 1 and 2 describe the amount of spawning and rearing habitat by quality, available in the Klickitat River. This data was derived from the Presence/Absence database of Northwest Power Planning Council, 1991.

The Northwest Power Planning Council's estimate of smolt capacity for spring chinook in the Klickitat River subbasin is 620,000 smolts.

Klickitat River Hatchery spring chinook returns from 1977 - 1989 return years averaged 1,016 with

a low return of 53 for the 1985 return year and a peak of 3,176 for the 1989 return year. Klickitat Hatchery returns by age and brood year are presented in Table 3.

Klickitat River tributary sport catch estimates between 1977 - 1989 return years averaged 233 spring chinook, ranging from a low of 6 in 1980 to a high of 839 in 1989. Klickitat River tributary sport catch estimates for complete brood years are presented in Table 4.

ADULT LIFE HISTORY

Run size. catch and escapement

Ocean commercial and recreational fisheries from Alaska to Washington, in addition to Columbia River gill net and sport fisheries, all harvest a portion of the Klickitat River origin spring chinook. Most of the Klickitat Hatchery 1976 brood coded wire tagged spring chinook ocean catch occurred in Alaska (26 percent) and British Columbia (45 percent), Washington and Oregon harvest was relatively minor (Howell et al. 1985). Freshwater harvest occurs primarily by recreational anglers and Yakima Indian dipnet fishermen operating in the lower portion of the river. Each season's tributary regulations are developed through consultation between the Washington Department of Fisheries and the Yakima Indian Nation. Columbia River sport and commercial fisheries are managed to ensure attainment of hatchery egg-take requirements.

Time of Migration

Klickitat River spring chinook enter the Columbia River primarily in March and April, generally after the lower Columbia River winter gill net season. Spring chinook destined for areas upstream of Bonneville Dam usually peak at the dam between April 20 and April 28 but can be earlier during abnormally low flow years or later during high run-off. Migration into the Klickitat River reaches a peak in May and June (Howell et al. 1985).

Spawning Period

Spawning activity peaks in late August and early September. At Klickitat Hatchery spawning commences in mid-August, peaks about September 10, and is completed by the end of September (Howell et al. 1985).

Spawning Areas

The naturally produced run spawns in the area from Parrott's Bridge upstream (RM 49) to McCormick Meadows (RM 80). The primary spawning area is from Soda Ford (RM 61) upstream to Castille Falls (Rm 64). Spring chinook probably also spawn in the mainstem downstream from the hatchery.

Age Composition

Ages range from two-year-old mini-jacks to six-year-old adults with four-year-odds usually the dominant age class. Age composition data is summarized in Tables 3 through 7.

Sex Ratio

Female comprised 53.3 percent of the adult returns and 43.8 percent of the total returns to Klickitat Hatchery from 1977 through 1987 (YIN).

Fecundity

The fecundity of spring chinook returns to the Klickitat Hatchery from 1977 through 1987 ranged from 3,753 to 5,347 eggs per female with a mean of 4,188 eggs per-female (YIN, 1990). Klickitat River natural spawn and Klickitat Hatchery fecundity data by age and brood year is unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

At Klickitat Hatchery, juvenile development that corresponds to gravel emergence occurs in late November through early December (Howell et al. 1985). No information is available on time of emergence for naturally produced fry.

Time. age and size at migration

Naturally produced juveniles rear in the upper watershed and remain in the river the entire year migrating downstream in the spring as yearlings (Conroy, 1977). On the basis of redd counts from 1975 through 1985, natural smolt production has averaged around 15,000 for that period of brood years (YIN, 1990). Length data of natural spring chinook smolts from the Klickitat River is unavailable.

Smoltification in the hatchery pond begins about April 1. Hatchery 'release information for the Klickitat subbasin by brood year is presented in Table 8.

Downstream smolt migration of yearlings occurs immediately after release. Coded wire tagged hatchery spring chinook released on March 30, 1979 were recovered in the Columbia River estuary from April 6, 1979 to June 10, 1979 with a median capture date of April 19, 1979 (Dawley et al. 1979).

Survival Rate

No information is available on the naturally produced population. The 1975, 1977, and 1985 broods released as smolts had an overall egg-to-smolt survival rates of 71 percent to 74 percent. Smolt-to-adult return rates to the subbasin (including correction for subbasin treaty harvest) for the coded wire tagged 1975, 1976, and 1977 broods were 0.73 percent, 0.34 percent and 0.63 percent, respectively (YIN, 1990).

BIOCHEMICAL-GENETIC CHARACTERISTICS

Isozyme gene frequencies of Klickitat Hatchery spring chinook were determined by Milner et al. (1983).

DISEASE

Based on the disease profile during 1979 - 1983, enteric redmouth and hemorrhagic septicemia infects the Klickitat Hatchery spring chinook (Howell et al. 1985). Returning adults have received two erythromycin injections. Juveniles have received gallimycin in feed to control bacterial kidney disease (YIN, 1990). Bacteria and parasitic diseases found in the Klickitat Hatchery are listed in Table 9. (WDF Salmon Culture, Olympia).

Table 1 (HB-1). Estimated amount of rearing -and spawning habitat, by quality, of the Klickitat River spring chinook production area.

Distance/Area	Excellent	Good	Fair"	Poor[a]	Unknown	Total-	Confidence
Miles (%)	0	53	47	0		48.2	
Acres (%)	0	41	59	0		277.0	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC , 199 1.

Table 2 (HB-2). Estimated amount of rearing habitat, by quality, of the Klickitat River spring chinook production area.

Distance/Area	Excellent	Good	Fair'	Poor"	Unknown	Total	Confidence
Miles (%)	0	0	78	22		39.7	
Acres (%)	0	0	78	22		288.7	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 1991.

Table 3 (RN), Klickitat River spring chinook natural spawn escapement by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1978							
1979							
1980							
1981							
1982					1		
1983				594	2		
1984			513	209	7		
1985		50	84	178			
1986	0	98	39				
1987	0	7					
1988	0						

1988 return year - includes 5 (age 3) Carson stock. Estimate includes 1,00 fish that spawned below the hatchery.

1989 return year - includes 30 (age 4) Carson stock.

1990 return year - does not include any Carson stock.

Age based on scale reading analysis.

Table 4 (RH). Total hatchery returns of spring chinook to the Klickitat River by brood year.

Brood Year	Total Age 2	3	4	5	6	Total	Adult Total
1978							
1979							
1980							
1981							
1982							
1983				776	4		
1984			691	486	2		
1985		109	2,686	388			
1986	143	228	184				
1987	291	243					
1988	795						

1988 return year - includes 65 (age 3) Carson stock. Hatchery escapement also includes 73 adults and 2 jacks (Klickitat stock) and 3 jacks (Carson stock) donated to the Yakima Indian Nation.

1989 return year - includes 2,559 (age 4) Carson stock. Hatchery escapement includes 39 adult males and 44 jacks (Klickitat stock) and 1,001 (age 4) Carson stock donated to the Yakima Indian Nation.

1990 return year- includes 321 (age 5) Carson stock.

Age based on scale reading analysis.

Table 5 (RS). Total sport catches of spring chinook in the Klickitat River by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1978				141	0		
1979			142	109	0		
1980		156	218	82	0		300
1981	0	14	99	9	0	122	108
1982	0	50	15	9	0	74	24
1983	0	4	153	147	0	304	300
1984	0	36	106	43	2	187	151
1985	0	24	796	251			
1986	0	89	109				
1987	0	30					
1988	0						

1988 return year - includes 12 (age 3) Carson stock.

1989 return year - includes 769 (age 4) Carson stock.

1990 return year - includes 204 (age 5) Carson stock.

Age composition based on scale samples from the sport fishery.

Table 6 (RT). Klickitat River spring chinook tribal harvest by brood year.

Brood Year	Total Age 2	3	4	5	6	Total	Adult Total
1978							
1979							
1980							
1981							
1982					0		
1983				594	0		
1984			511	24	9		
1985		85	928	984			
1986	0	85	436				
1987	0	113					
1988	0						

Age based on scale reading analysis from the Klickitat River sport fishery.

Table 7 (RB). Total returns of spring chinook to the Klickitat River by brood year.

Brood Year	Total Age 2	3	4	5	6	Total	Adult Total
1978							
1979							
1980							
1981							
1982					2		
1983				2,111	6		
1984			1,821	762	20		
1985		268	4,494	1,801			
1986	143	500	768				
1987	291	393					
1988	795						

1985 brood - includes 120 (age 3), 4,121 (age 4), and 1,088 (age 5) Carson stock.

Age based on scale reading analysis.

Table 8 (TR). Hatchery releases of spring chinook salmon into the Klickitat River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CUT Code
1965	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	03/29/67	03/29/67	16	104736	KLICKITAT R 30.0002	UNTAGGED
1966	KLICKITAT RIVER	KLICKITAT HATCHERY	EmFry	01/05/67	01/05/67	1680	23786	KLICKITAT R 30.0002	UNTAGGED
1966	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/27/67	06/27/67	46	40894	KLICKITAT R 30.0002	UNTAGGED
1966	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/27/67	06/27/67	42	62370	KLICKITAT R 30.0002	UNTAGGED
1966	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	04/22/68	04/22/68	15	475365	KLICKITAT R 30.0002	UNTAGGED
1966	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	04/25/68	04/25/68	15	69090	KLICKITAT R 30.0002	UNTAGGED
1967	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	04/11/69	04/11/69	17	50067	KLICKITAT R 30.0002	UNTAGGED
1967	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	04/11/69	04/11/69	15	305865	KLICKITAT R 30.0002	UNTAGGED
1968	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	03/18/70	03/18/70	14	400750	KLICKITAT R 30.0002	UNTAGGED
1969	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	02/18/71	02/18/71	9	452403	KLICKITAT R 30.0002	UNTAGGED
1970	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	04/26/71	04/26/71	74	883560	KLICKITAT R 30.0002	UNTAGGED
1970	KLICKITAT RIVER	KLICKITAT HATCHERY	PreSm	11/05/71	11/05/71	14	57616	KLICKITAT R 30.0002	UNTAGGED
1970	KLICKITAT RIVER	KLICKITAT HATCHERY	PreSm	11/05/71	11/05/71	14	480852	KLICKITAT R 30.0002	UNTAGGED
1970	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	03/06/72	03/06/72	9	53773	KLICKITAT R 30.0002	UNTAGGED
1970	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	03/06/72	03/06/72	9	588764	KLICKITAT R 30.0002	UNTAGGED
1971	KLICKITAT RIVER	KLICKITAT HATCHERY	PreSm	11/06/72	11/06/72	10	47271	KLICKITAT R 30.0002	UNTAGGED
1971	KLICKITAT RIVER	KLICKITAT HATCHERY	PreSm	11/06/72	11/06/72	10	288393	KLICKITAT R 30.0002	UNTAGGED
1971	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	03/02/73	03/02/73	7	43560	KLICKITAT R 30.0002	UNTAGGED
1971	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	03/02/73	03/02/73	7	176418	KLICKITAT R 30.0002	UNTAGGED
1972	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/19/73	06/19/73	30	108000	KLICKITAT R 30.0002	UNTAGGED
1972	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/19/73	06/19/73	30	135000	KLICKITAT R 30.0002	UNTAGGED
1972	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/20/73	06/20/73	30	72000	KLICKITAT R 30.0002	UNTAGGED
1972	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/20/73	06/20/73	30	135000	KLICKITAT R 30.0002	UNTAGGED
1972	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/22/73	06/22/73	30	135000	KLICKITAT R 30.0002	UNTAGGED
1972	KLICKITAT RIVER	KLICKITAT HATCHERY	PreSm	09/18/73	09/18/73	15	511830	KLICKITAT R 30.0002	UNTAGGED
1972	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	03/01/74	03/01/74	6	228128	KLICKITAT R 30.0002	UNTAGGED
1973	KLICKITAT RIVER	KLICKITAT HATCHERY	PreSm	09/30/74	09/30/74	11	60400	KLICKITAT R 30.0002	151308
1973	KLICKITAT RIVER	KLICKITAT HATCHERY	PreSm	09/30/74	09/30/74	11	288342	KLICKITAT R 30.0002	UNTAGGED
1973	KLICKITAT RIVER	KLICKITAT HATCHERY	PreSm	09/30/74	09/30/74	11	288342	KLICKITAT R 30.0002	UNTAGGED
1973	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	02/28/75	02/28/75	8	37500	KLICKITAT R 30.0002	010315
1973	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	02/28/75	02/28/75	8	337500	KLICKITAT R 30.0002	UNTAGGED
1973	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	02/28/75	02/28/75	8	338732	KLICKITAT R 30.0002	UNTAGGED
1974	KLICKITAT RIVER	KLICKITAT HATCHERY	PreSm	09/04/75	09/04/75	14	453129	KLICKITAT R 30.0002	UNTAGGED
1974	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	05/03/76	05/03/76	6	410512	KLICKITAT R 30.0002	UNTAGGED
1975	COULITZ RIVER	KLICKITAT HATCHERY	Fingr	07/12/76	07/12/76	36	206698	KLICKITAT R 30.0002	UNTAGGED
1975	COULITZ RIVER	KLICKITAT HATCHERY	Fingr	07/14/76	07/14/76	44	44000	KLICKITAT R 30.0002	UNTAGGED
1975	COWLITZ RIVER	KLICKITAT HATCHERY	Fingr	07/14/76	07/14/76	41	41000	KLICKITAT R 30.0002	UNTAGGED
1975	COULITZ RIVER	KLICKITAT HATCHERY	Fingr	07/14/76	07/14/76	41	41000	KLICKITAT R 30.0002	UNTAGGED
1975	COWLITZ RIVER	KLICKITAT HATCHERY	Fingr	07/15/76	07/15/76	41	3132	KLICKITAT R 30.0002	UNTAGGED
1975	KLICKITAT RIVER	KLICKITAT HATCHERY	PreSm	10/27/76	10/27/76	27	25225	KLICKITAT R 30.0002	UNTAGGED
1975	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	04/30/77	04/30/77	7	100250	KLICKITAT R 30.0002	131103
1975	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	04/30/77	04/30/77	7	450572	KLICKITAT R 30.0002	UNTAGGED
1975	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	04/30/77	04/30/77	7	450572	KLICKITAT R 30.0002	UNTAGGED
1976	COULITZ RIVER	KLICKITAT HATCHERY	Fingr	03/29/77	03/29/77	144	48384	KLICKITAT R 30.0002	UNTAGGED
1976	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	04/12/77	04/12/77	121	98131	KLICKITAT R 30.0002	UNTAGGED
1976	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	04/12/77	04/12/77	115	48645	KLICKITAT R 30.0002	UNTAGGED
1976	COULITZ RIVER	KLICKITAT HATCHERY	Fingr	05/20/77	05/20/77	106	5194	KLICKITAT R 30.0002	UNTAGGED
1976	COULITZ RIVER	KLICKITAT HATCHERY	Fingr	05/20/77	05/20/77	106	115116	KLICKITAT R 30.0002	UNTAGGED
1976	COWLITZ RIVER	KLICKITAT HATCHERY	Fingr	03/30/77	03/30/77	144	58032	KLICKITAT R -WF (30)	UNTAGGED
1976	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	03/31/78	03/31/78	10	144851	KLICKITAT R 30.0002	631601
1976	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	03/31/78	03/31/78	10	241307	KLICKITAT R 30.0002	UNTAGGED
1976	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	03/31/78	03/31/78	10	146349	KLICKITAT R 30.0002	631602
1976	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	03/31/78	03/31/78	10	1628	KLICKITAT R 30.0002	UNTAGGED
1976	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	03/31/78	03/31/78	10	238802	KLICKITAT R 30.0002	UNTAGGED
1977	KLICKITAT RIVER	KLICKITAT HATCHERY	PreSm	09/05/78	09/05/78	19	21737	KLICKITAT R 30.0002	UNTAGGED

Table 8. Hatchery releases of spring chinook salmon into the Klickitat River subbasin sorted by brood year, hatchery and life stage - CONTINUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site		CWT Code
1977	WIND R (CARSON NFH)	KLICKITAT HATCHERY	PreSm	09/05/78	09/05/78	14	173598	KLICKITAT R	30.0002	UNTAGGED
1977	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	03/30/79	03/30/79	10	90754	KLICKITAT R	30.0002	631732
1977	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	03/30/79	03/30/79	10	485548	KLICKITAT R	30.0002	UNTAGGED
1977	WIND R (CARSON NFH)	KLICKITAT HATCHERY	Smolt	03/30/79	03/30/79	10	102100	KLICKITAT R	30.0002	631734
1977	WIND R (CARSON NFH)	KLICKITAT HATCHERY	Smolt	03/30/79	03/30/79	10	1240	KLICKITAT R	30.0002	UNTAGGED
1977	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	03/30/79	03/30/79	10	481688	KLICKITAT R	30.0002	UNTAGGED
1978	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	04/25/79	04/25/79	157	160768	KLICKITAT R	30.0002	UNTAGGED
1978	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	03/15/80	03/15/80	10	581025	KLICKITAT R	30.0002	UNTAGGED
1979	COWLITZ RIVER	KLICKITAT HATCHERY	Fingr	01/22/80	01/22/80	477	860608	KLICKITAT R	30.0002	UNTAGGED
1979	COWLITZ RIVER	KLICKITAT HATCHERY	Fingr	03/25/80	03/25/80	231	17787	KLICKITAT R	30.0002	UNTAGGED
1979	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	03/27/80	03/27/80	200	156400	KLICKITAT R	30.0002	UNTAGGED
1979	COWLITZ RIVER	KLICKITAT HATCHERY	Fingr	05/09/80	05/09/80	151	152336	KLICKITAT R	30.0002	UNTAGGED
1979	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	05/16/80	05/16/80	151	299436	KLICKITAT R	30.0002	UNTAGGED
1979	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	03/16/81	03/16/81	10	651052	KLICKITAT R	30.0002	UNTAGGED
1980	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	04/16/81	04/16/81	168	1002793	KLICKITAT R	30.0002	UNTAGGED
1980	KLICKITAT RIVER	KLICKITAT HATCHERY	PreSm	09/15/81	09/15/81	21	296857	KLICKITAT R	30.0002	UNTAGGED
1980	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	03/15/82	03/15/82	9	692166	KLICKITAT R	30.0002	UNTAGGED
1981	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	01/18/82	01/18/82	527	239400	KLICKITAT R	30.0002	UNTAGGED
1981	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	01/26/82	01/26/82	639	828236	KLICKITAT R	30.0002	UNTAGGED
1981	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	03/31/83	03/31/83		797700	KLICKITAT R	30.0002	UNTAGGED
1982	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	04/27/83	04/27/83	14:	557100	KLICKITAT R	30.0002	UNTAGGED
1982	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	03/13/84	03/13/84	10	500000	KLICKITAT R	30.0002	UNTAGGED
1983	COWLITZ RIVER	KLICKITAT HATCHERY	Fingr	02/21/84	02/21/84	204	1116100	KLICKITAT R	30.0002	UNTAGGED
1983	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	04/17/84	04/17/84	145	230400	KLICKITAT R	30.0002	UNTAGGED
1983	KLICKITAT RIVER	KLICKITAT HATCHERY	PreSm	10/08/84	10/08/84	33	181500	KLICKITAT R	30.0002	UNTAGGED
1983	KLICKITAT RIVER	KLICKITAT HATCHERY	PreSm	IO/IO/84	10/10/84	33	51200	KLICKITAT R	30.0002	UNTAGGED
1983	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	04/01/85	04/01/85	10	614500	KLICKITAT R	30.0002	UNTAGGED
1984	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	04/24/85	04/24/85	114	258100	KLICKITAT R	30.0002	UNTAGGED
1984	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	05/03/86	05/03/86	8	629900	KLICKITAT R	30.0002	UNTAGGED
1985	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	04/09/87	04/09/87	10	59300	KLICKITAT R	30.0002	UNTAGGED
1985	WIND R (CARSON NFH)	KLICKITAT HATCHERY	Smolt	04/09/87	04/09/87	10	610300	KLICKITAT R	30.0002	UNTAGGED
1986	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	05/01/88	05/01/88	8	603400	KLICKITAT R	30.0002	UNTAGGED
1987	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/01/88	06/01/88	69	52800	KLICKITAT R	30.0002	UNTAGGED
1987	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/01/88	06/01/88	69	72700	KLICKITAT R	30.0002	UNTAGGED
1987	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/17/88	06/17/88	60	72000	KLICKITAT R	30.0002	UNTAGGED
1987	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/17/88	06/17/88	56	67600	KLICKITAT R	30.0002	UNTAGGED
1987	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/20/88	06/20/88	67	93100	KLICKITAT R	30.0002	UNTAGGED
1987	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/20/88	06/20/88	58	70300	KLICKITAT R	30.0002	UNTAGGED
1987	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	04/10/89	04/10/89	9	2314	KLICKITAT R	30.0002	UNTAGGED
1987	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	04/24/89	04/24/89	9	707	KLICKITAT R	30.0002	UNTAGGED
1987	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	04/28/89	04/28/89	9	15542	KLICKITAT R	30.0002	UNTAGGED
1987	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	05/01/89	05/01/89	8	682100	KLICKITAT R	30.0002	UNTAGGED
1988	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	03/01/89	03/01/89	295	184000	KLICKITAT R	30.0002	UNTAGGED
1988	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	03/01/89	03/01 /89	252	25000	KLICKITAT R	30.0002	UNTAGGED
1988	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	04/12/89	04/12/89	89	331300	KLICKITAT R	30.0002	UNTAGGED
1988	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/27/89	06/27/89	53	53400	KLICKITAT R	30.0002	UNTAGGED
1988	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/28/89	06/28/89	52	62000	KLICKITAT R	30.0002	UNTAGGED
1988	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/28/89	06/28/89	50	60500	KLICKITAT R	30.0002	UNTAGGED
1988	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/29/89	06/29/89	49	76100	KLICKITAT R	30.0002	UNTAGGED
1988	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/29/89	06/29/89	47	73800	KLICKITAT R	30.0002	UNTAGGED
1988	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/30/89	06/30/89	52	80600	KLICKITAT R	30.0002	UNTAGGED
1988	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/30/89	06/30/89	48	74700	KLICKITAT R	30.0002	UNTAGGED
1988	KLICKITAT RIVER	KLICKITAT HATCHERY	PreSm	10/03/89	10/03/89	27	29500	KLICKITAT R	30.0002	UNTAGGED
1988	KLICKITAT RIVER	KLICKITAT HATCHERY	Smolt	05/01/90	05/01/90	7	783200	KLICKITAT R	30.0002	UNTAGGED
1989	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/28/90	06/28/90	55	58600	KLICKITAT R	30.0002	UNTAGGED

Table 8. Hatchery releases of spring chinook salmon into the Klickitat River subbasin sorted by brood year, hatchery and life stage - CONTINUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site		CWT Code
1989	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/28/90	06/28/90	55	58700	KLICKITAT R	30.0002	UNTAGGED
1989	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/29/90	06/29/90	54	22300	KLICKITAT R	30.0002	UNTAGGED

Table 9 ('I'D). Parasites and diseases of spring chinook at the Klickitat Hatchery.

Disease type	Hatchery	Specific Pathogen.
Bacteria	Klickitat	Renibacterium salmoninarium (Bacterial Kidney Disease)
Bacteria	Klickitat	Enteric Redmouth Disease (Yersinia ruckeri)
virus	Klickitat	EIBS - Erythrocytic Inclusion Body Syndrome
	Klickitat	Coagulated Yolk

Disease History only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

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KLICKITAT SUBBASIN

Fall Chinook

GEOGRAPHIC LOCATION

The Klickitat River subbasin, located on the east slope of the Cascade Range in south-central Washington, comprises 1,350 square miles in Klickitat and Yakima counties and drains into the Columbia River at River Mile (RM) 180. The river flows north-south toward the Columbia River with Mount Adams on the West, the Goat Rocks to the north, and the Simcoe Mountains on the east. The Yakima Indian Reservation comprises a large portion of the upper Klickitat River subbasin. Klickitat Hatchery is located at RM 42.

ORIGIN

Prior to the first hatchery plants of fall chinook in 1946, fall chinook were not found in the Klickitat River subbasin. The usual explanation for this is that Lyle Falls (RM 2) was impassable to chinook during the low water conditions that generally prevail in late summer and early fall (Bryant 1949).

Escapements to Klickitat Hatchery have usually been insufficient to meet egg-take goals. Both Bonneville Pool Hatchery (BPH) and Lower River Hatchery (LRH) fall chinook eggs were used at Klickitat Hatchery for eventual release as smolts into the Klickitat River. LRH stock released into the Klickitat River from 1971 through 1980 included Cowlitz, Toutle, Kalama, Washougal, Bonneville, Cascade, and Ringold stock (Howell et al. 1985). Since 1987, fall chinook egg transfers to Klickitat Hatchery have been of upriver bright stock from Priest Rapids and Bonneville Hatcheries due to poor returns of the LRH and BPH stock.

DISTRIBUTION

Currently, both tule and upriver bright fall chinook spawning ground peak index counts occur between the Klickitat Hatchery and the Twin Bridges at Rm 18, a distance of approximately 24 miles.

PRODUCTION

With annual releases from Klickitat Hatchery, passage improvements at Lyle Falls in 1952, fall chinook counts to the fish trap at Lyle Falls 5 rose to over 2,000 fish in 1956, and this was probably an underestimate (WDF, 1960). Evidence suggest natural production of tule fall chinook may be still occurring. Though hatchery releases of tule fall chinook ceased in 1986, several age classes have been observed during recent tule fall chinook spawning ground surveys.

Table 1 describes the amount of spawning and rearing habitat by quality, available in the Klickitat River. This data was derived from the Presence/Absence database of Northwest Power Planning Council, 1991.

A Northwest Power Planning Council estimate of carrying capacity for fall chinook in the Klickitat River is 843,000 smolts. The Klickitat River from its mouth to Klickitat Hatchery, a distance of 42 miles, was considered to be fall chinook spawning and rearing habitat in calculating smolt carrying capacity.

The current hatchery program sets an on-station release goal of 4 million upriver bright chinook

smolts, the number prescribed by the 1987 United States vs. Oregon Columbia River Fish Management plan.

Between 1970 through 1984 return years, Klickitat River tule fall chinook natural-escapement averaged 673 fish with a low of 128 in 1977 and a high of 1,827 in 1972 (Howell et al. 1985). The Klickitat River tule fall chinook natural spawn escapement for 1980 and 1981 brood years were 187 and 318 fish, respectively. The Klickitat River tule fall chinook natural spawn escapements by age and brood year are presented in Table 2. There were no stream surveys attempted in 1988 due to water turbidity; therefore an accounting of the 1983 through 1986 brood years is incomplete.

The Klickitat River upriver bright fall chinook escapement for 1989 and 1990 return years were 253 and 2,975 fish, respectively. The Klickitat River upriver bright fall chinook natural spawn escapement by age and brood year are presented in Table 3. There were no upriver bright fall chinook stream surveys on the Klickitat River before 1989; therefore brood year information is incomplete.

The Klickitat Hatchery tule fall chinook returns from 1980 through 1984 brood years averaged 107 and ranged from a low of 39 for the 1982 brood to a peak of 198 for the 1983 brood. Klickitat Hatchery tule fall chinook returns by age and brood year are presented in Table 4. No tule or upriver bright fall chinook returned to Klickitat Hatchery from 1988 through 1990.

Klickitat River tributary sport catch estimates from 1977 through 1986 return years average 48 fall chinook ranging from a low of 6 in 1982 to a high of 125 in 1986 (YIN, 1990). A stock specific age and brood year analysis for Klickitat River sport catch is unavailable.

Klickitat River tribal catches from 1977 through 1987 return years averaged 830 fall chinook ranging from a low of 219 in 1989 to a high of 1,392 in 1986 (YIN, 1990). A stock specific age and brood year analysis for Klickitat River tribal catch is unavailable.

ADULT LIFE HISTORY

Run size. catch and escapement

Ocean commercial and recreational fisheries from Alaska to Washington, in addition to Columbia River gill net and sport fisheries all harvest a portion of the Klickitat River origin fall chinook. Six coded wire tagged groups of tule fall chinook from Klickitat Hatchery representing 1976 through 1981 brood years revealed 64 percent of the adults were caught in salt water, 17 percent caught in the Columbia River, and 19 percent in the Klickitat River (YIN, 1990). The Yakima Indian Nation regulates a dipnet fishery in the Lyle Falls reach of the Klickitat River. Columbia River sport and commercial fisheries are not managed to ensure attainment of Klickitat Hatchery egg-take requirements.

Strays from other hatcheries are uncommon. Klickitat Hatchery origin tule and upriver bright fall chinook stray coded wire tag recoveries beginning with the 1978 brood through the 1988 brood are listed in Table 5.

Time of Migration

Tule fall chinook upstream migration begins in early August with greatest abundance in the Columbia River estuary in late August and early September. Counts of tule fall chinook at Bonneville Dam generally peak between September 4 and September 9. Approximately 90 percent

of the run has migrated past Bonneville Dam by September 20 (Howell et al. 1985).

Upriver bright fall chinook migration curve is more prolonged and gradual compared to tule fall chinook passing Bonneville Dam. Adult upriver bright migration occurs through November.

Spawning Period

Tule and upriver bright fall chinook spawning ground peak index counts are usually made during early October and November, respectively.

Spawning Areas

Fall chinook spawning occurs intermittently throughout the Klickitat River downstream of the Klickitat Hatchery at RM 42.

Age Comnosition

Klickitat River tule fall chinook ages ranges from two-year-old jacks to five-year-old adults with three-year-olds or four-year-olds usually the dominant age classes. Klickitat River tule fall chinook age composition is summarized in Tables 2 and 4. The age composition percentages by brood year for tule fall chinook returning to the Klickitat River spawning grounds and hatchery are unavailable due to limited sampling data.

Upriver bright fall chinook ages generally ranges from two-year-old jacks to six-year-old adults. Klickitat River upriver bright fall chinook natural spawn age composition is summarized in Table 3. The age composition percentages by brood year for upriver bright fall chinook returning to the Klickitat River spawning grounds and hatchery are unavailable due to limited sampling data.

Sex Ratio

No data available.

Fecundity

Klickitat River natural spawn and Klickitat Hatchery fecundity data by age and brood year is unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

Data is unavailable.

Time, age and size at migration

Hatchery release information for the Klickitat River subbasin by brood year is presented in Table 6. Length data of natural fall chinook smolts from the Klickitat River is unavailable. The number of natural juvenile fall chinook salmon that migrate from the Klickitat River is also unavailable.

Survival Bate

Six coded wire tagged groups of tule fall chinook were released from Klickitat Hatchery representing the 1976 through 1981 broods. Survival of the tag groups to all fisheries and escapement ranged from 0.058 percent to 1.063 percent while return rates to the subbasin ranged from 0.012 percent to 0.153 percent (YIN, 1990).

BIOCHEMICAL-GENETIC CHARACTERISTICS

Fall chinook that return to the Klickitat River subbasin presumably have had varied genetic makeup reflecting the contributions of Lower River Hatchery and Bonneville Pool stocks and the recently introduced upriver bright stock (YIN, 1990).

DISEASE

Bacteria and parasitic diseases found in the Klickitat Hatchery are listed in Table 7. (WDF Salmon Culture, Olympia)

Table 1 (HB-1). Estimated amount of rearing and spawning habitat, by quality, of the Klickitat River fall chinook production area.

Distance/Area	Excellent	Good	Fair"	Poor"	Unknown	Total	Confidence
Miles (%)	100	0	0	0		43.4	
Acres (%)	100	0	0	0		315.6	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 1991.

Table 2 (RN-l). Total age of natural spawner escapement of tule fall chinook returning to the Klickitat River subbasin by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974							
1975							
1976					0		
1977				1	0		
1978			153	2	0		
1979		396	178	1	0		575
1980	6	131	50	0	0	187	181
1981	37	165	12	104	0	318	281
1982	14	41	207	0	N/A		
1983	1	104	451	N/A	0		
1984	0	213	N/A	408	0		
1985	0	N/A	1,811	379			
1986	N/A	114	447				
1987	6	77					
1988	16						

No Klickitat River stream survey attempted in 1988 because of water turbidity.

Age composition is based on scale reading analysis except:

1980 and 1981 return years - No data was available.

1982, 1983, and 1985 return years - Spring Creek National Fish Hatchery age composition was used.

1984 return year - Spring Creek and Little White Salmon National Fish Hatcheries age composition was used.

Table 3 (RN-2). Total age of natural spawn escapement of upriver bright fall chinook returning to the Klickitat River subbasin by brood year.

Brood Year	Total Age 2	3	4	5	6	Total	Adult Total
1974							
1975							
1976							
1977							
1978							
1979							
1980							
1981							
1982							
1983					0		
1984				0	0		
1985			0	0			
1986		253	2,663				
1987	0	294					
1988	18						

No upriver bright fall chinook surveys were made on the Klickitat River before 1989.

Age composition based on scale analysis.

Table 4 **(RH).** Total returns of tule fall chinook to the Klickitat Hatchery by brood year.

Total Age

Brood Year	2	3	4	5	6	Total	Adult Total
1974							
1975							
1976							
1977				0			
1978			52	1			
1979		134	82	7			223
1980	23	60	79	0	0	162	139
1981	17	52	2	0	0	71	54
1982	2	6	31	0	0	39	37
1983	**7**	**163**	**28**	**0**	**0**	**198**	**191**
1984	**53**	**13**	**0**	**0**	**0**	**66**	**13**
1985	**2**	**0**	**0**	**0**			
1986	**0**	**0**	**0**				
1987	**0**	**0**					
1988	0						

1982 return - does not include 128 adults that might have been spring/summer chinook.

1984 return - does not include 6 mini-jacks considered spring chinook.

1988, 1989, and 1990 return years - No fall chinook returned to Klickitat Hatchery.

Age composition based on scale reading analysis except:

1980 and 1981 return years - No data available.

1982, 1983, and 1985 return years - age composition from Spring Creek Hatchery applied to Klickitat Hatchery return.

1987 return year - natural spawn age composition applied to hatchery return.

Table 5 (AE). Emigration of coded wire tagged fall chinook from the Klickitat River subbasin.

Hatchery/Release Site	Recovery site, Run Year(s)	Recovery Method	Number Sampled	Number Recovered	Total Number Estimated, (PSMFC)
Klickitat Hatchery (tule)	Little White Salmon, 1981	Hatchery	1,497	1	1
Klickitat Hatchery (tule)	Sea Resources Hatchery, 1982	Hatchery	---	1	1
Klickitat Hatchery (upriver bright)	Lyons Ferry Hatchery, 1986	Hatchery	457	1	1

Based on the following tag codes: 63- 19-47 (tule) and 63-21-57 (upriver bright).

Beginning with the 1978 brood.

Table 6 (TR). Hatchery releases of fall chinook salmon into the Klickitat River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1966	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	05/24/67	05/24/67	105	763008	KLICKITAT R 30.0002	UNTAGGED
1966	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	05/24/67	05/24/67	105	763009	KLICKITAT R 30.0002	UNTAGGED
1966	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	05/24/67	05/24/67	105	763009	KLICKITAT R 30.0002	UNTAGGED
1966	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	05/24/67	05/24/67	105	763009	KLICKITAT R 30.0002	UNTAGGED
1966	SPRING CREEK	KLICKITAT HATCHERY	Fingr	05/25/67	05/25/67	75	151200	KLICKITAT R 30.0002	UNTAGGED
1967	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	05/15/68	05/15/68	121	366630	KLICKITAT R 30.0002	UNTAGGED
1967	UNKNOWN	KLICKITAT HATCHERY	Fingr	05/15/68	05/15/68	111	1672659	KLICKITAT R 30.0002	UNTAGGED
1968	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	05/12/69	05/12/69	97	459392	KLICKITAT R 30.0002	UNTAGGED
1968	SPRING CREEK	KLICKITAT HATCHERY	Fingr	05/12/69	05/12/69	93	1065594	KLICKITAT R 30.0002	UNTAGGED
1968	SPRING CREEK	KLICKITAT HATCHERY	Fingr	05/12/69	05/12/69	77	1040655	KLICKITAT R 30.0002	UNTAGGED
1968	SPRING CREEK	KLICKITAT HATCHERY	Fingr	05/12/69	05/12/69	75	38700	KLICKITAT R 30.0002	UNTAGGED
1969	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	05/12/70	05/12/70	81	3272967	KLICKITAT R 30.0002	UNTAGGED
1969	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	05/12/70	05/12/70	69	366942	KLICKITAT R 30.0002	UNTAGGED
1969	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	05/12/70	05/12/70	66	1188000	KLICKITAT R 30.0002	UNTAGGED
1970	COWLITZ RIVER	KLICKITAT HATCHERY	Fingr	04/26/71	04/26/71	261	338778	KLICKITAT R 30.0002	UNTAGGED
1970	COWLITZ RIVER	KLICKITAT HATCHERY	Fingr	04/26/71	04/26/71	229	151827	KLICKITAT R 30.0002	UNTAGGED
1970	COWLITZ RIVER	KLICKITAT HATCHERY	Fingr	04/26/71	04/26/71	186	305784	KLICKITAT R 30.0002	UNTAGGED
1970	COWLITZ RIVER	KLICKITAT HATCHERY	Fingr	04/26/71	04/26/71	161	283521	KLICKITAT R 30.0002	UNTAGGED
1970	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	04/26/71	04/26/71	116	124584	KLICKITAT R 30.0002	UNTAGGED
1971	KALAMA RIVER	KLICKITAT HATCHERY	Fingr	05/15/72	05/15/72	125	604000	KLICKITAT R 30.0002	UNTAGGED
1971	COWLITZ RIVER	KLICKITAT HATCHERY	Fingr	05/15/72	05/15/72	97	982416	KLICKITAT R 30.0002	UNTAGGED
1971	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	05/15/72	05/15/72	58	81490	KLICKITAT R 30.0002	UNTAGGED
1972	TOUTLE (GREEN RIVER)	KLICKITAT HATCHERY	Fingr	05/23/73	05/23/73	80	1636000	KLICKITAT R 30.0002	UNTAGGED
1972	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	05/23/73	05/23/73	45	182880	KLICKITAT R 30.0002	UNTAGGED
1972	COWLITZ RIVER	KLICKITAT HATCHERY	Fingr	06/25/73	06/25/73	88	496496	KLICKITAT R 30.0002	UNTAGGED
1973	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	04/10/74	04/10/74	92	158978	KLICKITAT R 30.0002	UNTAGGED
1973	TOUTLE (GREEN RIVER)	KLICKITAT HATCHERY	Fingr	04/15/74	04/15/74	189	72954	KLICKITAT R 30.0002	UNTAGGED
1973	COWLITZ RIVER	KLICKITAT HATCHERY	Fingr	04/15/74	04/15/74	127	161110	KLICKITAT R 30.0002	UNTAGGED
1973	TOUTLE (GREEN RIVER)	KLICKITAT HATCHERY	Fingr	04/17/74	04/17/74	160	79987	KLICKITAT R 30.0002	UNTAGGED
1973	COWLITZ RIVER	KLICKITAT HATCHERY	Fingr	04/17/74	04/17/74	119	84779	KLICKITAT R 30.0002	UNTAGGED
1973	TOUTLE(GREEN RIVER)	KLICKITAT HATCHERY	Fingr	05/01/74	05/01/74	97	80448	KLJCKJTAT R 30.0002	UNTAGGED
1973	COWLJTZ RIVER	KLICKITAT HATCHERY	Fingr	05/07/74	05/07/74	81	965688	KLICKITAT R 30.0002	UNTAGGED
1973	TOUTLE (GREEN RIVER)	KLICKITAT HATCHERY	Smolt	02/28/75	02/28/75	8	134124	KLICKITAT R 30.0002	UNTAGGED
1974	RJNGOLD HATCHERY	KLICKITAT HATCHERY	EmFry	01/06/75	01/06/75	1106	106700	KLJCKJTAT R 30.0002	UNTAGGED
1974	LOWER KALAMA(FALLERT	KLJCKITAT HATCHERY	Fingr	05/26/75	05/26/75	100	626065	KLICKITAT R 30.0002	UNTAGGED
1974	COWLITZ RIVER	KLICKITAT HATCHERY	Fingr	06/17/75	06/17/75	83	383703	KLICKITAT R 30.0002	UNTAGGED
1974	COWLITZ RIVER	KLICKITAT HATCHERY	PreSm	09/24/75	09/24/75	49	44399	KLICKITAT R 30.0002	UNTAGGED
1974	COWLITZ RIVER	KLICKITAT HATCHERY	Smolt	05/03/76	05/03/76	6	45000	KLICKITAT R 30.0002	UNTAGGED
1975	SPRING CREEK	KLICKITAT HATCHERY	Fingr	01/22/76	01/22/76	463	1687721	KLJCKJTAT R 30.0002	UNTAGGED
1975	LOWER KALAMA(FALLERT	KLICKITAT HATCHERY	Fingr	03/31/76	03/31/76	168	51072	KLICKITAT R 30.0002	UNTAGGED
1975	COWLITZ RIVER	KLJCKJTAT HATCHERY	Fingr	06/01/76	06/01/76	73	91140	KLICKITAT R 30.0002	130601
1975	COULJTZ RIVER	KLICKITAT HATCHERY	Fingr	06/01/76	06/01/76	73	1001176	KLICKITAT R 30.0002	UNTAGGED
1975	COWLITZ RIVER	KLICKITAT HATCHERY	Fingr	06/01/76	06/01/76	73	987456	KLICKITAT R 30.0002	UNTAGGED
1976	SPRING CREEK	KLICKITAT HATCHERY	Fingr	02/16/77	02/16/77	428	437928	KLICKITAT R 30.0002	UNTAGGED
1976	SPRING CREEK	KLICKITAT HATCHERY	Fingr	05/23/77	05/23/77	83	472710	KLICKITAT R 30.0002	UNTAGGED
1976	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/03/77	06/03/77	92	139694	KLJCKJTAT R 30.0002	631605
1976	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/03/77	06/03/77	92	221210	KLJCKJTAT R 30.0002	UNTAGGED
1976	KLICKITAT RIVER	KLICKJTAT HATCHERY	Fingr	06/03/77	06/03/77	63	204008	KLICKITAT R 30.0002	UNTAGGED
1976	SPRING CREEK	KLICKITAT HATCHERY	Fingr	06/03/77	06/03/77	62	255051	KLICKITAT R 30.0002	UNTAGGED
1977	COLUMBIA (N BONNEVL)	KLICKJTAT HATCHERY	Fingr	03/28/78	03/28/78	251	225000	KLICKITAT R 30.0002	UNTAGGED
1977	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/06/78	06/06/78	87	136334	KLICKJTAT R 30.0002	631663
1977	KLICKITAT RIVER	KLJCKITAT HATCHERY	Fingr	06/06/78	06/06/78	87	10913	KLJCKJTAT R 30.0002	UNTAGGED
1977	WASHOUGAL RIVER	KLICKITAT HATCHERY	Fingr	06/06/78	06/06/78	97	819219	KLICKITAT R 30.0002	UNTAGGED
1977	COLUMBIA (N BONNEVL)	KLJCKJTAT HATCHERY	Fingr	06/06/ 78	06/06/78	97	2330768	KLICKITAT R 30.0002	UNTAGGED
1977	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/06/78	06/06/78	87	9952	KLICKITAT R 30.0002	UNTAGGED

Table 6 (cont.). Hatchery releases of fall chinook salmon into the Klickitat River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1978	CASCADE(ODFW)	KLICKITAT HATCHERY	Fingr	05/14/79	05/14/79	114	1560146	KLICKITAT R 30.0002	UNTAGGED
1978	CASCADE + KLICKITAT	KLICKITAT HATCHERY	Fingr	05121179	06/01/79	88	225351	KLICKITAT R 30.0002	631949
1978	CASCADE + KLICKITAT	KLICKITAT HATCHERY	Fingr	05/21/79	06/01/79	88	3370062	KLICKITAT R 30.0002	UNTAGGED
1978	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/01/79	06/01/79	83	97662	KLICKITAT R 30.0002	UNTAGGED
1978	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/01/79	06/01/79	83	12252	KLICKITAT R 30.0002	UNTAGGED
1978	CASCADE(ODFW)	KLICKITAT HATCHERY	Fingr	06/01/79	06/01/79	80	1670726	KLICKITAT R 30.0002	UNTAGGED
1979	COLUMBIA (N BONNEVL)	KLICKITAT HATCHERY	Fingr	05/27/80	05/27/80	85	156148	KLICKITAT R 30.0002	631947
1979	COLUMBIA (N BONNEVL)	KLICKITAT HATCHERY	Fingr	05/27/80	05/27/80	85	2984879	KLICKITAT R 30.0002	UNTAGGED
1979	COLUMBIA (N BONNEVL)	KLICKITAT HATCHERY	Fingr	05/27/80	05/27/80	85	2981693	KLICKITAT R 30.0002	UNTAGGED
1980	SPRING CREEK	KLICKITAT HATCHERY	Fingr	06/05/81	06/05/81	78	130010	KLICKITAT R 30.0002	632008
1980	SPRING CREEK	KLICKITAT HATCHERY	Fingr	06/05/81	06/05/81	78	2349069	KLICKITAT R 30.0002	UNTAGGED
1980	SPRING CREEK	KLICKITAT HATCHERY	Fingr	06/05/81	06/05/81	78	2346469	KLICKITAT R 30.0002	UNTAGGED
1981	SPRING CREEK	KLICKITAT HATCHERY	Fingr	06/04/82	06/04/82	83	204064	KLICKITAT R 30.0002	632157
1981	SPRING CREEK	KLICKITAT HATCHERY	Fingr	06/04/82	06/04/82	83	3475556	KLICKITAT R 30.0002	UNTAGGED
1982	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/01/83	06/01/83	89	426700	KLICKITAT R 30.0002	UNTAGGED
1982	SPRING CREEK	KLICKITAT HATCHERY	Fingr	06/01/83	06/01/83	89	4437900	KLICKITAT R 30.0002	UNTAGGED
1983	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/07/84	06107184	71	174500	KLICKITAT R 30.0002	UNTAGGED
1983	KALAMA RIVER	KLICKITAT HATCHERY	Fingr	06/07/84	06/07/84	71	1021300	KLICKITAT R 30.0002	UNTAGGED
1984	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	04/19/85	04/19/85	76	59900	KLICKITAT R 30.0002	UNTAGGED
1984	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	05/09/85	05/09/85	52	63200	KLICKITAT R 30.0002	UNTAGGED
1985	OREGON - BIG CREEK	KLICKITAT HATCHERY	Fingr	04/02/86	04/02/86	98	1000000	KLICKITAT R 30.0002	UNTAGGED
1985	OREGON - BIG CREEK	KLICKITAT HATCHERY	Fingr	04/18/86	04/18/86	72	1426600	KLICKITAT R 30.0002	UNTAGGED
1985	OREGON - BIG CREEK	KLICKITAT HATCHERY	Fingr	05/01/86	05/01/86	54	1417000	KLICKITAT R 30.0002	UNTAGGED
1985	LTL WHITE SALMON-NFH	KLICKITAT HATCHERY	Fingr	06/02/86	06/02/86		358900	KLICKITAT R 30.0002	UNTAGGED
1986	WELLS DAM	KLICKITAT HATCHERY	Fingr	04/08/87	04/08/87	1::	405000	KLICKITAT R 30.0002	UNTAGGED
1986	PRIEST RAPIDS	KLICKITAT HATCHERY	Fingr	04/08/87	04/08/87	113	495000	KLICKITAT R 30.0002	UNTAGGED
1986	WELLS DAM	KLICKITAT HATCHERY	Fingr	05/05/87	05/05/87	57	798600	KLICKITAT R 30.0002	UNTAGGED
1986	PRIEST RAPIDS	KLICKITAT HATCHERY	Fingr	05/05/87	05/05/87	57	995500	KLICKITAT R 30.0002	UNTAGGED
1986	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	05/06/87	05/06/87	66	99200	KLICKITAT R 30.0002	UNTAGGED
1986	PRIEST RAPIDS	KLICKITAT HATCHERY	Fingr	06/05/87	06/05/87	70	102426	KLICKITAT R 30.0002	633315
1986	PRIEST RAPIDS	KLICKITAT HATCHERY	Fingr	06/05/87	06/05/87	70	1909374	KLICKITAT R 30.0002	UNTAGGED
1987	PRIEST RAPIDS	KLICKITAT HATCHERY	Fingr	03/10/88	03/10/88	657	903500	KLICKITAT R 30.0002	UNTAGGED
1987	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	05/27/88	05/27/88	98	16000	KLICKITAT R 30.0002	UNTAGGED
1987	PRIEST RAPIDS	KLICKITAT HATCHERY	Fingr	05/27/88	05/27/88	98	984000	KLICKITAT R 30.0002	UNTAGGED
1987	PRIEST RAPIDS	KLICKITAT HATCHERY	Fingr	06/21/88	06/21/88	77	384500	KLICKITAT R 30.0002	UNTAGGED
1987	PRIEST RAPIDS	KLICKITAT HATCHERY	Fingr	06/23/88	06/23/88	77	2140200	KLICKITAT R 30.0002	UNTAGGED
1987	KLICKITAT RIVER	KLICKITAT HATCHERY	Fingr	06/23/88	06/23/88	76	39500	KLICKITAT R 30.0002	UNTAGGED
1988	PRIEST RAPIDS	KLICKITAT HATCHERY	Fingr	03/09/89	03/09/89	428	83000	KLICKITAT R 30.0002	UNTAGGED
1988	PRIEST RAPIDS	KLICKITAT HATCHERY	Fingr	03/09/89	03/09/89	401	294000	KLICKITAT R 30.0002	UNTAGGED
1988	PRIEST RAPIDS	KLICKITAT HATCHERY	Fingr	03/13/89	03/13/89	401	56800	KLICKITAT R 30.0002	UNTAGGED
1988	PRIEST RAPIDS	KLICKITAT HATCHERY	Fingr	05/15/89	05/15/89	74	2699900	KLICKITAT R 30.0002	UNTAGGED
1988	PRIEST RAPIDS	KLICKITAT HATCHERY	Fingr	06/26/89	06/26/89	66	1470800	KLICKITAT R 30.0002	UNTAGGED
1989	PRIEST RAPIDS	KLICKITAT HATCHERY	Fingr	05/17/90	05/17/90	80	155470	KLICKITAT R 30.0002	630416
1989	PRIEST RAPIDS	KLICKITAT HATCHERY	Fingr	05/17/90	05/17/90	80	2794230	KLICKITAT R 30.0002	UNTAGGED
1989	PRIEST RAPIDS	KLICKITAT HATCHERY	Fingr	06/07/90	06/07/90	74	79371	KLICKITAT R 30.0002	631459
1989	PRIEST RAPIDS	KLICKITAT HATCHERY	Fingr	06/07/90	06/07/90	74	1183829	KLICKITAT R 30.0002	UNTAGGED

Table 7 (TD). Parasites and diseases of fall chinook at the Klickitat Hatchery.

Disease type	Hatchery	Specific -Pathogen
Bacteria	Klickitat	*Renibacterium salmoninarium* (Bacterial Kidney Disease)
Bacteria	Klickitat	*Yersinia ruckeri* (Enteric Redmouth Disease)
virus	. Klickitat	EJBS - Erythrocytic Inclusion Body Syndrome
	Klickitat	Coagulated Yolk

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

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KLICKITAT SUBBASIN

Coho

GEOGRAPHIC LOCATION

The Klickitat River subbasin, located on the east slope of the Cascade Range is south-central Washington comprises 1,350 square miles in Klickitat and Yakima counties and drains into the Columbia River at River Mile (RM) 180. The basin trends north-south toward the Columbia River and is bounded by Mount Adams on the west, Goat Rocks to the north, and the Simcoe Mountains on the east. The Yakima Indian Reservation comprises a large portion of the upper Klickitat River subbasin. Klickitat Hatchery is located at RM 42.

ORIGIN

Coho are not believed to be native to the Klickitat subbasin. The Klickitat Hatchery was completed in 1952, with reports of 29 adults returning that same year, apparently from earlier releases (YIN). The Columbia River Management Plan calls for 2 million late coho smolts and 500,000 early coho smolts from Lower Columbia River hatcheries to be released in the Klickitat River (YIN). Since the original agreement, there have been modifications, but the total amount of coho transferred remains the same. These plants began in 1988 in addition to the existing Klickitat Hatchery program.

Both early (Type-S) coho and late (Type-N) coho have been released in the Klickitat River. Type-S hatchery programs are considered to be linked to native Toutle River stock coho. Washington stations either received Toutle stock eggs or utilized local native early run coho. Late stock coho Type-N are informally considered synonymous with Cowlitz River stock coho. Late stock hatchery programs were developed utilizing Cowlitz River stock, their derivatives, or native late runs. Late coho used in most of the current programs are presumably a blend of all of these, although egg transfers from Cowlitz Hatchery occur most frequently (Howell et al. 1985).

DISTRIBUTION

Coho are not believed to be native to the Klickitat. In 1960 through 1962, obstructions were blasted and fishways constructed at Castile Falls (RM 64) to allow the introduction of anadromous runs to the upper Klickitat River (YIN).

Although only limited surveys have been conducted, Washington Department of Wildlife reported juvenile coho in Summit Creek (YIN) and Washington Department of Fisheries has observed large numbers of coho spawning in Dofner creek near the mouth of the Klickitat River (WDF 1981).

PRODUCTION

Since 1952, hatchery returns have fluctuated between zero and 4,283 adults. At Lyle Falls 2, coho counts peaked at 4,384 fish in 1956 (YIN). Primary interest is solely hatchery production of coho. Both early and late coho have been reared at the Klickitat Hatchery, and releases of early and late coho from other Lower Columbia River hatcheries has occurred. During 1986 - 90, 81 percent of the juvenile coho releases above Bonneville have been into the Little White Salmon and Klickitat Rivers (TAC, 1991).

All coho production from the Washougal Hatchery shifted to late coho in 1985 brood year. The production goal of the Washougal Hatchery is three million fish, with 2.5 million being transferred

to the Klickitat (WDF, 1990). If the Washougal Hatchery is unable to reach production goals other Lower Columbia River hatcheries such as the Cowlitz, Toutle, or Lewis River Hatcheries supplements the difference.

Tables 1 describes the amount of spawning and rearing habitat, by quality, available in the Klickitat River. This data was derived from the Presence/Absence database of the Northwest Power Planning Council, 1991.

The Northwest Power Planning Council's estimate of smolt capacity for coho in the Klickitat River subbasin is 28,000 smolts.

The Klickitat River tributary sport catch estimates between 1980 - 1988 return years averaged 506 adult coho, ranging from a low of 50 in 1980 and a high of 1,624 in 1983 based on catch records and limited actual sampling data. However, specific age and brood year analysis for Klickitat River sport catch is unavailable.

The commercial tribal harvest estimates of coho in the Klickitat from 1986 through 1990 return years averaged 7,860 adults with a low of 200 in 1987 and a peak of 23,000 in 1986. These numbers exclude Klickitat catches accounted for in concurrent Zone 6 fisheries. (TAC, 1991).

Klickitat Hatchery return for the 1980 through 1990 return years averaged 118 adults with zero for 1981 through 1985, 1987, 1989, and 1990 and a peak of 779 adults for 1983. Specific age and brood year analyses for the Klickitat River are unavailable.

ADULT LIFE HISTORY

Run size, catch and escapement

For 1977 through 1985, the average return of coho to the Klickitat subbasin was estimated at 919 fish. The run size for 1986 was 25,954 fish (YIN). Seven coded-wire tagged study groups were looked at for harvest rates. Four of the seven were early coho releases with ocean harvest rates of 54 percent, a Columbia River harvest rate of 28 percent, and a 19 percent escapement (YIN). For the remaining three late coho study groups, an ocean harvest rate of 76 percent, a Columbia River harvest of 22 percent, and a 2 percent escapement occurred (YIN).

Ocean commercial and recreational fisheries off the Oregon coast are the primary harvesters of early coho. The Oregon troll fishery accounts for the highest percentage of the overall catch. Most of the freshwater recreational harvest occurs in the Washington tributaries (Howell et al. 1985).

Based on coded-wire tagged releases of 1976 - 1978 brood late coho, most of the harvest occurs in the Washington and Oregon ocean fisheries. Late coho have a more northerly migration pattern than early coho (WDF, 1990). This is reflected in the catch distribution where the Washington coastal catch comprised 40 percent of the total harvest compared to 20 percent for early coho during 1979 - 1981. Late coho also contribute significantly to the lower Columbia River commercial gill net fishery (Howell et al. 1985).

Strays from other lower river hatcheries are not unusual. Table 4 lists Klickitat Hatchery origin coho stray coded-wire tag recoveries beginning with the 1978 brood through to the 1988 brood. Table 5 lists the coded-wire tags recovered within the Klickitat subbasin which originated outside the Klickitat subbasin.

Harvest rates have averaged 79 percent and 85 percent for Type-S and N stocks, respectively, between 1983 and 1987. Harvest of Type-S coho is occasionally constrained by one or more of the fall chinook stocks. Harvest of Type-N coho is generally not constrained by weak stocks, with hatchery escapement being the only management constraint (WDF, 1990).

Time of Migration

Early coho enter the Columbia River by mid-August and begin returning to the lower Columbia hatcheries in early September. In the mainstem Columbia River early coho predominate from August to mid-September. Stock composition shifts to late coho in late September and October. Typically, the late coho run begins entering freshwater in mid to late September with mid-October considered the main migratory period in the mainstem Columbia River (Howell et al. 1985).

Spawning Period

For Type-S coho, both hatchery and natural spawning occurs around late October, while for Type-N coho spawning will extend from late November through March, with the bulk being in December and early January (Howell et al. 1985)

Spawning Areas

Klickitat Hatchery and very limited tributaries.

Age composition

Coho return as two-year-old jacks and three-year-old adults. Specific age composition percentage (freshwater.ocean) by brood year for coho spawning naturally and hatchery returns are unavailable.

Sex Ratio

For the return years 1978, 1979, 1984, and 1986, the percent of adult males averaged 68.7 percent with a low of zero percent in 1984 and a high of 78.6 percent in 1986. The percent of adult females averaged 18.2 percent with a low of zero percent in 1984 and a high 20.5 percent in 1986. The percent of jacks averaged 13.1 percent with a low of 7 percent in 1986 and a high of 100 percent in 1984 (Klickitat Hatchery). The percentage of females by brood year and age class for coho spawning naturally and hatchery returns is unavailable.

Fecundity

Klickitat River natural spawn and Klickitat Hatchery fecundity by freshwaterocean rearing and brood year is unavailable.

JUVENILE LIFE HISTORY

Time of Emergence

The juvenile life history for Klickitat subbasin coho is similar to that of other stocks in the region with a spring emergence (WDF, 1990).

Time. age and size at migration

Freshwater rearing generally lasts for. about 14 months. Hatchery release information for the Klickitat subbasin by brood year is presented in Table 2. Based on coded-wire tag recovery studies by Dawley et al. (1982), arrival in the Columbia River estuary occurs soon after hatchery release (Howell et al. 1985). Length data of natural coho smolts from the Klickitat River is unavailable. The number of natural juvenile coho salmon that migrate from the Klickitat River is also unavailable.

Survival Rate

Before the acclimation pond existed at the Klickitat Hatchery, survival rates of two early coho groups and three late coho groups ranged from 1.478 percent to 2.529 percent (YIN). The two early coho groups that were acclimated to the river water had survival rates at 5.837 percent and 5.876 percent (YIN).

BIOCHEMICAL-GENETIC CHARACTERISTICS

Data has not been compiled.

DISEASE

Bacteria and parasitic diseases found in the Klickitat Hatchery are listed in Table 3. (WDF Salmon Culture, Olympia).

Table 1 (HB-1). Estimated amount of rearing- and spawning habitat, by quality, of Klickitat River coho production area.

Distance/Area	Excellent	Good	Fair[a]	Poor[a]	Unknown	Total	Confidence
Miles (%)	20	38	31	11		34.3	
Acres (%)	7	33	19	41		346.2	

[a] Ratings of fair and poor habitat quality may reflect natural physical features such as waterfall barriers, as well as degradation caused by humans.

Source: Presence/Absence database, NPPC, 1991.

Table 2 (TR). Hatchery releases of coho salmon into the Klickitat River subbasin sorted by brood year, hatchery and life stage.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1965	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	Fingr	01/01/67	01/01/67	38	543229	KLICKITAT R 30.0002	UNTAGGED
1965	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	Fingr	01/01/67	01/01/67	38	543229	KLICKITAT R 30.0002	UNTAGGED
1965	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	Fingr	01/01/67	01/01/67	31	114181	KLICKITAT R 30.0002	UNTAGGED
1965	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	Fingr	01/01/67	01/01/67	29	29820	KLICKITAT R 30.0002	UNTAGGED
1965	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	Fingr	01/01/67	01/01/67	29	260544	KLICKITAT R 30.0002	UNTAGGED
1966	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	Smolt	04/22/68	04/22/68	16	82908	KLICKITAT R 30.0002	UNTAGGED
1966	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	smott	04/22/68	04/22/68	16	799092	KLICKITAT R 30.0002	UNTAGGED
1967	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	Smolt	03/19/69	03/19/69	15	1204995	KLICKITAT R 30.0002	UNTAGGED
1967	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	smott	04/02/69	04/02/69	16	104000	KLICKITAT R 30.0002	UNTAGGED
1968	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	smott	04/07/70	04/07/70	16	654176	KLICKITAT R 30.0002	UNTAGGED
1969	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	Smolt	03/29/71	03/29/71	14	1445878	KLICKITAT R 30.0002	UNTAGGED
1970	COLUMBIA R - TYPE-S	KLICKITAT HATCHERY	Fingr	06/23/71	06/23/71	43	116100	KLICKITAT R 30.0002	UNTAGGED
1970	COLUMBIA R - TYPE-S	KLICKITAT HATCHERY	Fingr	06/24/71	06/24/71	43	116100	KLICKITAT R 30.0002	UNTAGGED
1970	COLUMBIA R - TYPE-S	KLICKITAT HATCHERY	Fingr	06/25/71	06/25/71	43	75250	KLICKITAT R 30.0002	UNTAGGED
1970	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/04/72	04/04/72	17	252025	KLICKITAT R 30.0002	UNTAGGED
1970	COLUMBIA R - TYPE-S	KLICKITAT HATCHERY	Smolt	04/04/72	04/04/72	14	502656	KLICKITAT R 30.0002	UNTAGGED
1970	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	Smolt	04/04/72	04/04/72	14	653954	KLICKITAT R 30.0002	UNTAGGED
1971	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	Fingr	07/11/72	07/11/72	36	54000	KLICKITAT R 30.0002	UNTAGGED
1971	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	Fingr	07/11/72	07/11/72	36	108000	KLICKITAT R 30.0002	UNTAGGED
1971	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	Fingr	07/11/72	07/11/72	36	162000	KLICKITAT R 30.0002	UNTAGGED
1971	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	Fingr	07/12/72	07/12/72	36	172800	KLICKITAT R 30.0002	UNTAGGED
1971	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/03/73	04/03/73	25	870660	KLICKITAT R 30.0002	UNTAGGED
1972	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	Fingr	06/21/73	06/21/73	35	42480	KLICKITAT R 30.0002	UNTAGGED
1972	ELOCHOMAN R TYPE-S	KLICKITAT HATCHERY	Fingr	06/21/73	06/21/73	59	176100	KLICKITAT R -WF (30)	UNTAGGED
1972	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04109174	04/09/74	18	60045	KLICKITAT R 30.0002	UNTAGGED
1972	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/09/74	04/09/74	18	119138	KLICKITAT R 30.0002	UNTAGGED
1972	ELOCHOMAN R TYPE-S	KLICKITAT HATCHERY	Smolt	04/09/74	04/09/74	13	46805	KLICKITAT R 30.0002	UNTAGGED
1972	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/30/74	04/30/74	17	30856	KLICKITAT R 30.0002	151505
1972	TOUTLE (GREEN) TYP-S	KLICKITAT HATCHERY	Smolt	04/30/74	04/30/74	13	30904	KLICKITAT R 30.0002	151506
1972	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/30/74	04/30/74	16	31642	KLICKITAT R 30.0002	151507
1972	TOUTLE (GREEN) TYP-S	KLICKITAT HATCHERY	Smolt	04/30/74	04/30/74	13	29541	KLICKITAT R 30.0002	151508
1972	TOUTLE (GREEN) TYP-S	KLICKITAT HATCHERY	Smolt	04/30/74	04/30/74	9	20633	KLICKITAT R 30.0002	151510
1972	TOUTLE (GREEN) TYP-S	KLICKITAT HATCHERY	smott	04/30/74	04/30/74	14	21012	KLICKITAT R 30.0002	151511
1972	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	05/03/74	05/03/74	16	60700	KLICKITAT R 30.0002	UNTAGGED
1972	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	05/03/74	05/03/74	16	123786	KLICKITAT R 30.0002	UNTAGGED
1972	ELOCHOMAN R TYPE-S	KLICKITAT HATCHERY	Smolt	05/03/74	05/03/74	12	46850	KLICKITAT R 30.0002	UNTAGGED
1973	TOUTLE RIVER TYPE-S	KLICKITAT HATCHERY	Fingr	06/25/74	06/25/74	70	56000	KLICKITAT R 30.0002	UNTAGGED
1973	TOUTLE RIVER TYPE-S	KLICKITAT HATCHERY	Fingr	06/26/74	06/26/74	70	63000	KLICKITAT R 30.0002	UNTAGGED
1973	TOUTLE RIVER TYPE-S	KLICKITAT HATCHERY	Fingr	06/26/74	06/26/74	70	73500	KLICKITAT R 30.0002	UNTAGGED
1973	TOUTLE RIVER TYPE-S	KLICKITAT HATCHERY	Fingr	12/27/74	12/27/74	18	97008	KLICKITAT R 30.0002	UNTAGGED
1973	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	Smolt	04/08/75	04/08/75	10	229782	KLICKITAT R 30.0002	UNTAGGED
1973	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/14/75	04/14/75	15	614243	KLICKITAT R 30.0002	UNTAGGED
1974	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	EmFry	02/28/75	02/28/75	1463	101048	LITTLE KLICKITAT RIV	UNTAGGED
1974	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	EmFry	02/28/75	02/28/75	1463	109964	OUTLET CR (30.0308)	UNTAGGED
1974	COWLITZ RIVER TYPE-S	KLICKITAT HATCHERY	Smolt	04/15/76	04/15/76	16	365443	KLICKITAT R 30.0002	UNTAGGED
1974	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/20/76	04/20/76	20	92424	KLICKITAT R 30.0002	130515
1974	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/20/76	04/20/76	20	38193	KLICKITAT R 30.0002	UNTAGGED
1974	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/20/76	04/20/76	20	26395	KLICKITAT R 30.0002	UNTAGGED
1974	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	smott	05/03/76	05/03/76	19	92850	KLICKITAT R 30.0002	130514
1974	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	smott	05/03/76	05/03/76	19	542300	KLICKITAT R 30.0002	UNTAGGED
1974	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	05/03/76	05/03/76	19	528000	KLICKITAT R 30.0002	UNTAGGED
1975	TOUTLE (GREEN) TYP-S	KLICKITAT HATCHERY	Smolt	04/06/77	04/30/77	13	60513	KLICKITAT R 30.0002	131404
1973	TOUTLE (GREEN) TYP-S	KLICKITAT HATCHERY	Smolt	04/06/77	04/30/77	13	284478	KLICKITAT R 30.0002	UNTAGGED
1975	WASHOUGAL R TYPE-S	KLICKITAT HATCHERY	Smolt	04/06/77	04/06/77	14	258141	KLICKITAT R 30.0002	UNTAGGED
1975	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/30/77	04/30/77	16	61013	KLICKITAT R 30.0002	131405

Table 2. Hatchery releases of coho salmon into the Klickitat River subbasin sorted by brood year, hatchery and life stage - CONTINUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site	CWT Code
1975	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/30/77	04/30/77	16	608626	KLICKITAT R 30.0002	UNTAGGED
1975	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/30/77	04/30/77	16	607394	KLICKITAT R 30.0002	UNTAGGED
1975	WASHOUGAL R TYPE-S	KLICKITAT HATCHERY	smott	04/30/77	04/30/77	12	26337	KLICKITAT R 30.0002	UNTAGGED
1976	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Fingr	03/23/77	03/23/77	945	73381	CUNNINGHAM CR 300480	UNTAGGED
1976	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Fingr	03/23/77	03/23/77	945	76240	KLICKITAT R 30.0002	UNTAGGED
1976	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	Fingr	04/12/77	04/12/77	121	24442	KLICKITAT R 30.0002	UNTAGGED
1976	KLICKITAT RIV TYPE-N	KLICKITAT HATCHERY	Fingr	04/12/77	04/12/77	116	5784	KLICKITAT R 30.0002	UNTAGGED
1976	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	Fingr	04/12/77	04/12/77	114	6291	KLICKITAT R 30.0002	UNTAGGED
1976	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Fingr	12/02/77	12/02/77	39	415455	KLICKITAT R 30.0002	UNTAGGED
1976	TOUTLE (GREEN) TYP-S	KLICKITAT HATCHERY	smott	04/28/78	04/28/78	13	57782	KLICKITAT R 30.0002	631652
1976	TOUTLE (GREEN) TYP-S	KLICKITAT HATCHERY	Smolt	04/28/78	04/28/78	13	821036	KLICKITAT R 30.0002	UNTAGGED
1976	KALAMA RIVER TYPE-S	KLICKITAT HATCHERY	Smolt	04/28/78	04/28/78	13	820862	KLICKITAT R 30.0002	UNTAGGED
1976	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	smott	05/04/78	05/04/78	13	59752	KLICKITAT R 30.0002	631653
1976	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	05/04/78	05/04/78	13	300073	KLICKITAT R 30.0002	UNTAGGED
1976	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	05/04/78	05/04/78	13	299593	KLICKITAT R 30.0002	UNTAGGED
1977	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	EmFry	01/12/78	01/12/78	986	7896	KLICKITAT R 30.0002	UNTAGGED
1977	COWLITZ TYPE-NSTOCK	KLICKITAT HATCHERY	Smolt	04/16/79	04/16/79	18	382614	KLICKITAT R 30.0002	UNTAGGED
1977	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	smott	04/20/79	04/20/79	18	382002	KLICKITAT R 30.0002	UNTAGGED
1977	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	05/14/79	05/14/79	14	59993	KLICKITAT R 30.0002	631751
1977	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	05/14/79	05/14/79	14	556675	KLICKITAT R 30.0002	UNTAGGED
1977	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	05/14/79	05/14/79	14	556254	KLICKITAT R 30.0002	UNTAGGED
1978	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/30/80	04/30/80	16	1366561	KLICKITAT R 30.0002	UNTAGGED
1979	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	EmFry	01/11/80	01/11/80	1008	24286	KLICKITAT R 30.0002	UNTAGGED
1979	KLICKITAT R TYPE-S	KLICKITAT HATCHERY	EmFry	01/22/80	01/22/80	1008	40246	KLICKITAT R 30.0002	UNTAGGED
1979	COULITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/30/81	04/30/81	16	1018727	KLICKITAT R 30.0002	UNTAGGED
1980	COLUMBIA R - TYPE-S	KLICKITAT HATCHERY	EmFry	01/30/81	01/30/81	1463	315249	KLICKITAT R 30.0002	UNTAGGED
1980	COULITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	03/15/82	03/15/82	14	277939	KLICKITAT R 30.0002	UNTAGGED
1980	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/15/82	04/15/82	16	1375748	KLICKITAT R 30.0002	UNTAGGED
1981	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	05/16/83	05/16/83	15	1447153	KLICKITAT R 30.0002	UNTAGGED
1982	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/24/84	04/24/84	19	540000	KLICKITAT R 30.0002	UNTAGGED
1982	COLUMBIA R - TYPE-S	KLICKITAT HATCHERY	Smolt	04/24/84	04/24/84	19	799300	KLICKITAT R 30.0002	UNTAGGED
1983	TOUTLE R TYPE-S	KLICKITAT HATCHERY	Smolt	04/21/85	06/13/85	12	22461	KLICKITAT R 30.0002	633030
1983	TOUTLE R TYPE-S	KLICKITAT HATCHERY	Smolt	04/21/85	06/13/85	12	559284	KLICKITAT R 30.0002	UNTAGGED
1983	TOUTLE R TYPE-S	KLICKITAT HATCHERY	Smolt	04/21/85	06/13/85	12	22462	KLICKITAT R 30.0002	633031
1983	TOUTLE R TYPE-S	KLICKITAT HATCHERY	Smolt	04/21/85	06/13/85	12	559281	KLICKITAT R 30.0002	UNTAGGED
1984	COLUMBIA R - TYPE-S	KLICKITAT HATCHERY	Fingr	03/15/85	03/15/85	432	1002200	KLICKITAT R 30.0002	UNTAGGED
1984	COLUMBIA R - TYPE-S	KLICKITAT HATCHERY	Fingr	05/08/85	05/08/85	124	349700	KLICKITAT R 30.0002	UNTAGGED
1984	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/14/86	06/09/86	17	19752	KLICKITAT R 30.0002	633513
1984	COULITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/14/86	06/09/86	17	538957	KLICKITAT R 30.0002	UNTAGGED
1984	COULITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/14/86	06/09/86	17	19751	KLICKITAT R 30.0002	633514
1984	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/14/86	06/09/86	17	538964	KLICKITAT R 30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/14/87	06/10/87	16	25910	KLICKITAT R 30.0002	633649
1985	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/14/87	06/10/87	16	588904	KLICKITAT R 30.0002	UNTAGGED
1985	COULITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/14/87	06/10/87	16	25399	KLICKITAT R 30.0002	633650
1985	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/14/87	06/10/87	16	577238	KLICKITAT R 30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/14/87	04/14/87	16	9200	KLICKITAT R 30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/28/87	04/28/87	16	19700	KLICKITAT R 30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	05/12/87	05/12/87	16	63800	KLICKITAT R 30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	05/26/87	05/26/87	17	38600	KLICKITAT R 30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	06/10/87	06/10/87	16	34800	KLICKITAT R 30.0002	UNTAGGED
1985	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	53758	KLICKITAT R 30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	42187	KLICKITAT R 30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	48006	KLICKITAT R 30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	48333	KLICKITAT R 30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	55000	KLICKITAT R 30.0002	UNTAGGED

Table 2. Hatchery releases of coho salmon into the Klickitat River subbasin sorted by brood year, hatchery and life stage - CONTINUED.

Brood Year	Stock	Hatchery	Life Stage	Release Date 1	Release Date 2	Fish /lb.	Number Released	Release Site		CWT Code
1985	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	61173	KLICKITAT R	30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	66190	KLICKITAT R	30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	74049	KLICKITAT R	30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	75834	KLICKITAT R	30.0002	UNTAGGED
1985	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	84345	KLICKITAT R	30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	84836	KLICKITAT R	30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	88302	KLICKITAT R	30.0002	UNTAGGED
1985	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	94358	KLICKITAT R	30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	101167	KLICKITAT R	30.0002	UNTAGGED
1985	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	112522	KLICKITAT R	30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	132672	KLICKITAT R	30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	137109	KLICKITAT R	30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	138854	KLICKITAT R	30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	152001	KLICKITAT R	30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	157084	KLICKITAT R	30.0002	UNTAGGED
1985	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	159084	KLICKITAT R	30.0002	UNTAGGED
1985	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	169061	KLICKITAT R	30.0002	UNTAGGED
1985	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	174715	KLICKITAT R	30.0002	UNTAGGED
1985	COLUMBIA R - TYPE-S	WASHOUGAL HATCHERY	Smolt	04/17/87	04/17/87	20	176940	KLICKITAT R	30.0002	UNTAGGED
1986	COLUMBIA R - TYPE-S	KLICKITAT HATCHERY	Fingr	02/24/87	02/24/87	574	194500	KLICKITAT R	30.0002	UNTAGGED
1986	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/14/88	04/14/88	19	51606	KLICKITAT R	30.0002	UNTAGGED
1986	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/28/88	04/28/88	19	188513	KLICKITAT R	30.0002	UNTAGGED
1986	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	05/12/88	05/12/88	17	442955	KLICKITAT R	30.0002	UNTAGGED
1986	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	05/26/88	05/26/88	15	276859	KLICKITAT R	30.0002	UNTAGGED
1986	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	06/09/88	06/09/88	14	97246	KLICKITAT R	30.0002	UNTAGGED
1986	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	06/24/88	06/24/88	14	107959	KLICKITAT R	30.0002	UNTAGGED
1986	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	06/30/88	06/30/88	14	1163	KLICKITAT R	30.0002	UNTAGGED
1986	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	07/01/88	07/01/88	13	154600	KLICKITAT R	30.0002	UNTAGGED
1986	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/14/88	04/14/88	21	2478200	KLICKITAT R	30.0002	UNTAGGED
1987	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/30/89	04/30/89	19	282849	KLICKITAT R	30.0002	UNTAGGED
1987	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	05/14/89	05/14/89	19	231104	KLICKITAT R	30.0002	UNTAGGED
1987	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	05/15/89	05/15/89	19	400425	KLICKITAT R	30.0002	UNTAGGED
1987	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	06/15/89	06/15/89	19	138441	KLICKITAT R	30.0002	UNTAGGED
1987	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	06/30/89	06/30/89	19	156881	KLICKITAT R	30.0002	UNTAGGED
1987	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/03/89	04/03/89	20	957200	KLICKITAT R	30.0002	UNTAGGED
1987	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/03/89	04/03/89	20	1447800	KLICKITAT R	30.0002	UNTAGGED
1988	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Fingr	03/20/89	03/20/89	375	293900	KLICKITAT R	30.0002	UNTAGGED
1988	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Fingr	05/24/89	05124189	280	258300	KLICKITAT R	30.0002	UNTAGGED
1988	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/21/90	06/02/90	20	45114	KLICKITAT R	30.0002	631137
1988	COWLITZ TYPE-N STOCK	KLICKITAT HATCHERY	Smolt	04/21/90	06/02/90	20	1490923	KLICKITAT R	30.0002	UNTAGGED
1988	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/03/90	04/03/90	20	30711	KLICKITAT R	30.0002	631161
1988	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/03/90	04/03/90	20	1279585	KLICKITAT R	30.0002	UNTAGGED
1988	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/03/90	04/03/90	20	31120	KLICKITAT R	30.0002	631162
1988	COWLITZ TYPE-N STOCK	WASHOUGAL HATCHERY	Smolt	04/03/90	04/03/90	20	1296584	KLICKITAT R	30.0002	UNTAGGED

Table 3 (TD). Parasites and diseases of coho at the Klickitat Hatchery.

Disease type	Hatchery	Specific Pathogen.
Bacteria	Klickitat	Renibacterium salmoninarium (Bacterial Kidney Disease)
Bacteria	Klickitat	Cytophaga psychrophila (Cold Water Disease)
virus	Klickitat	EIBS - Hrythrocytic Inclusion Body Syndrome
	Klickitat	Coagulated Yolk

Disease history only represents pathogens isolated at the hatchery and not necessarily a disease outbreak.

REFERENCES

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KLICKITAT RIVER SUBBASIN

Naturally Produced Summer Steelhead

GEOGRAPHIC LOCATION

The Klickitat River originates on the east slope of the Cascade Mountains in south central Washington. Starting at an elevation of 4,400 feet the river runs south for 95.7 miles, joining the Columbia River at the Bonneville Pool river mile (RM) 180.4. The Klickitat basin is bound by Mount Adams on the west, the Simcoe Mountains on the east and Goat Rocks to the north. Topography within the basin ranges from rugged mountains in the northern section, to rolling hills and plateaus in the southern section. The entire watershed encompasses 1,350 miles.

ORIGIN

The wild summer steelhead stock in the Klickitat River is native, although interbreeding with introduced Skamania hatchery stock has likely occurred.

DISTRIBUTION

Table 1 lists rearing and spawning habitat, by quality, for Klickitat River summer steelhead based on estimates from the Northwest Power Planning Council. The Northwest Power Planning Council habitat estimates depend on subjective habitat quality ratings, which are based on limited observations. Washington Department of Wildlife developed a Smolt Density Model which predicts a smolt carrying capacity of 121,871 total smolts.

Distribution of summer steelhead occurs throughout the mainstem Klickitat River and in major tributaries including; Little Klickitat River, Mill Creek, White Creek, Trout Creek, Summit Creek and Diamond Fork. The Klickitat River contains two obstacles to fish migration, Lyle Falls (RM 2.2) and Castile Falls (RM 64.2). In 1952, rocks were cleared and a fishway constructed on Lyle Falls resulting in improved access to the river upstream. Increasing fish passage above Castile Falls, which actually consisted of a series of eleven consecutive falls, proved much more diicult. The original plan was to increase fish passage by by-passing all eleven falls with a single tunnel 3,200 feet long. In 1960 construction began but due to unforeseen difficulties, construction of the single tunnel was abandoned and a new system consisting of two tunnels with a fishway between tunnels was built and operational in 1962. At this time, even with the tunnel fishway, aerial surveys conducted in the spring of 1988 showed no steelhead spawning redds above Castile falls leading biologists to suggest that Castile Falls is still a serious barrier to summer steelhead. Barriers to steelhead also exist in several of the tributaries which contain falls and cascades near their mouths which impede or prevent fish passage. The Little Klickitat River and the West Fork may be the most significant of tributaries with barriers to steelhead passage.

PRODUCTION

Production Facilities

The Klickitat Hatchery, which produces chinook and coho salmon, is located on the Klickitat River at river mile 42.4. No steelhead rearing facility exists on the Klickitat River.

Production Summary

No data are available on natural smolt production. Natural production continues in both the mainstem Klickitat and parts of most tributaries. Smolt production in the upper portion of both the river and most tributaries is believed to be reduced due to clogged streams and misplaced culverts from logging activities and/or livestock grazing.

ADULT LIFE HISTORY

Run size and Escapement

Data are limited on wild run size and escapement. Estimates of escapement from 1980 through 1985, based on redd surveys and harvest sampling, showed an average escapement of 2,712 steelhead (wild and hatchery; Table 2). Based on age data from 1979 and 1981, approximately one-third of the run is considered wild origin while the remaining two-thirds are hatchery returns.

Time of migration

Adult time of entry for wild summer steelhead is generally from April through December, peaking July through October.

Harvest

Ocean harvest of Klickitat River steelhead is unknown.

The Columbia River supports treaty and sport fisheries which harvest large numbers of steelhead and although the exact number of Klickitat steelhead caught is unknown, some Klickitat River fish are likely part of the Columbia River harvest.

Tribal and sport fishing account for the majority of fish harvested from the Klickitat River. Based on treaty fishing rights, harvest of Klickitat River summer steelhead is divided so that neither the tribal catch or recreational catch shall exceed 50 percent of the aggregate harvestable steelhead. Tribal fishing is concentrated in the lower river, with a dip net fishery at Lyle Falls. Tribal harvest for the period 1977 through 1987 averaged 1,974 fish per year.

Sport fishing is closed in the lower river between river mile 1.5 and river mile 2.2 but remains open throughout the mainstem Klickitat and its tributaries. Sport harvest for the period 1980 through 1990 averaged 1,629 fish based on permit-card harvest estimates (Table 2). Wild fish release regulations currently allow only hatchery steelhead to be legally retained by sport anglers while wild steelhead must be released to help increase escapements of native fish.

Spawning period

Wild summer steelhead spawning occurs from January through March.

Spawning area

Wild steelhead spawn throughout the Klickitat River and in the lower reaches of many tributaries. Helicopter surveys of spawning areas, which began in the spring of 1988, showed the majority of redds (97) downstream of the Klickitat Salmon Hatchery although counting was difficult upstream of the hatchery as the river flows through a deep canyon between the hatchery and Castile Falls.

Fecundity

No data are available for Klickitat steelhead.

Age composition

Age composition for 440 sport caught fish (wild and hatchery) between 1979 through 1981 showed 32 percent or 151 fish of the sampled catch was of wild origin. Further breakdown of this subsample of wild fish showed 14 percent were l-ocean fish, 78 percent were 2-ocean fish, 5 percent were 3-ocean fish and 3 percent were repeat spawners ranging from age 3 through 6-ocean fish (Table 4).

Size

Based on the subsample listed above wild steelhead mean fork lengths were l-ocean fish at 60 cm, 2-ocean fish at 73 cm, 3-ocean fish at 80 cm and repeat spawners at 77 cm (Table 6).

Sex ratio

Data obtained on summer steelhead sampled from 440 sport caught steelhead showed natural fish with 55 percent females, while females comprised 64 percent of the hatchery fish. Table 5 also presents sex ratio from a limited sample of native fish for the years 1980 and 1981.

Survival rate

No data on steelhead smolt to adult survival.

JUVENILE LIFE HISTORY

Egg

No data on egg to smolt survival.

Emergence

No data are available on Klickitat steelhead.

Juvenile rearing

Juvenile rearing for the majority of wild smolts lasts approximately two years prior to ocean emigration. Based on the 15 1 natural steelhead sampled 1979-1981, 94 percent showed freshwater residence of two years and 6 percent for three years before outmigration.

Wild steelhead smolts emigrate in April and May, peaking in early May, at the size of 160 mm. Table 4 presents data collected from 1990 smolt sampling on tributaries of the Klickitat River.

Hatchery releases

Washington Department of Wildlife has planted summer steelhead smolts in the Klickitat River annually since 1960. Skamania Hatchery, located on the Washougal River, is the main source for smolts planted in the Klickitat River. The Skamania stock was developed in the late 1950's from a

combination of wild Washougal River and wild Klickitat River summer steelhead. Table 8 outlines hatchery releases into the Klickitat River from 1981 through 1990.

Data collected on hatchery fish from a 440 fish sample showed 68 percent or 299 fish of hatchery origin. Age composition for hatchery fish was 4 percent were one-ocean fish, 93 percent were two-ocean fish, 2 percent were three-ocean fish and 1 percent were 4+ age or repeat spawners. The four age groups had mean fork lengths of 62 cm, 72 cm, 90 cm and 79 cm, respectively.

Straying

No data are available on Klickitat steelhead.

BIOCHEMICAL-GENETIC CHARACTERISTICS

No data are available on Klickitat River steelhead.

DISEASES

Disease history for hatchery smolts planted in the Klickitat River is presented in Table 9.

REFERENCES

The references for this section appear at the end of the following steelhead section.

Table 1 (HB-1). Estimated* amount of rearing-and spawning habitat, by quality, of Klickitat River subbasin summer steelhead.

Area	Excellent	Good	Fair[B]	Poor[B]	Unknown	Total	Confidence
Miles	11.0%	47.4%	39.1%	2.5%		147.2	Unknown
Acres	8.6%	30.9%	56.3%	4.2%		1241.0	Unknown

*Northwest Power Planning Council estimates based on limited observations.

[B]Ratings of fair and poor habitat may reflect natural physical features such as waterfall barriers, as well as degradation caused by man.

Source: Presence/absence database, NPPC, 1991.

Table 2 (RR-a). Returns (sport catch and escapement) of summer steelhead to the Klickitat River subbasin.

Return Year	Escapement[A]	Sport Catch[B]	Adult Total'
1980	2,236	1,485	3,721
1981	5,972	3,972	9,944
1982	2,319	1,537	3,856
1983	1,335	883	2,218
1984	3.049	1.980	5.029
1985	1,364	886	2,250
1986		1,480	Unknown
1987		1,514	Unknown
1988		1,718	Unknown
1989		833	Unknown

*Escapement based on redd surveys.

[B]Catch within subbasin only.

[C]Total represents sport catch and escapement.

Source: 1991 All Species Review, Columbia River Fish Management Plan.
Sport catch estimated by angler returned permit-cards.

Table 3 (SL-a). Lengths of wild/natural summer steelhead smolts from the Klickitat River subbasin.

Location[A] and Year	Number Fish[B]	Length range (mm)
Little Klickitat 1990	15	57-183
Bear Creek 1990	8	75-131
Piscoe Creek 1990	9	91-207
Huckleberry Creek 1990	3	107-147
Trout Creek 1990	38	86-169
Surveyors Creek 1990	28	79-189
White Creek 1990	12	77-125
Swale Creek 1990	13	66-140

*Trap locations are all tributaries to the Klickitat River.

[B]Smolts collected from electrofishing Sampling, June-August 1990.

Source: Bill Sharp, Yakima Indian Nation, December 1991.

Table 4 (AC-a). Age composition percentage (freshwater.ocean), by return year, for adult wild summer steelhead originating in the Klickitat River subbasin.

Age composition (%)[A]

Return Year	N[B]	2.1	2.1s1	2. lslsl	2.2	2.2sl	2.2s1s1	2.3	3.1	3.2
1979	46	21.7	2.2	2.2	65.2	2.2	2.2		4.3	
1980	79	8.9			81.0	1.3		2.5	1.3	5.1
1981	26	3.8			65.4			23.1		7.7

[A]Age data based on scale analysis.
[B]Fish sampled from Klickitat River sport catch.

Source: Charles Morrill, Washington Department of Wildlife 1980-81 and 1981-82 Columbia River Tag Recovery.

Table 5 (AS-a). Percent females by return year and age class[A] for wild summer steelhead originating in the Klickitat River subbasin.

% Females

Return Year	N[B]	2.1	2.1s1	2. lslsl	2.2	2.2s1	2.2s1s1	2.3	3.1	3.2	Total % Female
1979	22	16.2			27.9	2.3	2.3		2.3		51.1
1980	45	6.3			45.5	1.2		1.2		2.4	56.9
1981	16	3.8			42.3			11.5		3.8	61.5

[A]Age determined by scale analysis.
[B]Fish collected from Klickitat River.

Source: Stock Assessment of Columbia River Salmonids, Vol. II. 1985.

Table 6 (AL-a). Mean fork length and age class (freshwater.ocean) for summer steelhead originating in the Klickitat River subbasin.

Mean Fork Length (cm)

Return 'Year	N	1.2	2.1	2.1s1	2.1s1s1	2.2	2.2s1	2.2s1s1	2.3	3.1	3.2
1979	46[A]		63.0	76.0	84.0	75.0	71.0	82.0		51.0	
1980	79[A]		60.0			72.0	73.0		81.0	53.0	66.0
1981	26[A]		65.0			72.0			79.0		74.0
1991	20[B]	70.3	58.0			74.1			82.6	64.0	68.0

[A]Sample comprised of wild fish only. Fish sampled from sport catch.
[B]Sample combination of wild and hatchery fish. Fish captured by boat angling.

Age determined by scale analysis.

Source: Charles Morrill Washington Department of Wildlife 1980-81 and 1981-82 Columbia River Tag Recovery.
Bill Sharp, Yakima Indian Nation, Boat Angler Sampling, 1990-91.

Table 7 (TR). Hatchery releases of summer steelhead into the Klickitat River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	WT Codes/ Fin Clip
1981	Columbia McNary-Upper	Naches	Smolt	04/19/83	6.0	4,860	Klickitat R	
1981	Columbia McNary-Upper	Naches	Smolt	04/20/83	6.0	4,980	Klickitat R	
1981	Columbia McNary-Upper	Naches	Smolt	04/20/83	6.0	5,070	Klickitat R	
1981	Columbia McNary-Upper	Naches	Smolt	04/20/83	6.0	4,860	Klickitat R	
1981	Columbia McNary-Upper	Naches	Smolt	04/25/83	6.0	5,070	Klickitat R	
1981	Columbia McNary-Upper	Naches	Smolt	04125183	6.0	5,130	Klickitat R	
1981	Columbia McNary-Upper	Naches	Smolt	04/27/83	6.0	5,010	Klickitat R	
1981	Columbia McNary-Upper	Naches	Smolt	04/27/83	6.0	5,040	Klickitat R	
1981	Columbia McNary-Upper	Naches	Smolt	04/27/83	6.0	2,910	Klickitat R	
1981	Columbia McNary-Upper	Naches	Smolt	05/02/83	6.0	5,280	Klickitat R	
1981	Columbia McNary-Upper	Naches	Smolt	05/03/83	6.0	5,280	Klickitat R	
1981	Washougal R	Naches	Smolt	04/22/82	7.0	5,740	Klickitat R	

Table 7 (cont.). Hatchery releases of summer steelhead into the Klickitat River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	WT Codes/ Fin Clip
1981	Washougal R	Naches	Smolt	04/23/82	7.0	7,035	Klickitat R	
1981	Washougal R	Naches	Smolt	04/26/82	7.0	5,705	Klickitat R	
1981	Washougal R	Naches	Smolt	04/27/82	7.0	5,950	Klickitat R	
1981	Washougal R	Naches	Smolt	04/27/82	7.0	6,580	Klickitat R	
1981	Washougal R	Naches	Smolt	04/28/82	7.0	5,635	Klickitat R	
1981	Washougal R	Vancouver	Smolt	04/18/83	4.8	7,680	Klickitat R	A D
1981	Washougal R	Vancouver	Smolt	04/18/83	4.8	7,632	Klickitat R	AD
1981	Washougal R	Vancouver	Smolt	04/19/82	5.5	7,040	Klickitat R	AD
1981	Washougal R	Vancouver	Smolt	04/19/82	5.5	6,875	Klickitat R	AD
1981	Washougal R	Vancouver	Smolt	04/20/82	5.5	6,875	Klickitat R	AD
1981	Washougal R	Vancouver	Smolt	04/20/82	5.5	6,930	Klickitat R	AD
1981	Washougal R	Vancouver	Smolt	04/21/82	5.5	7,095	Klickitat R	AD

Table 7 (cont.). Hatchery releases of summer steelhead into the Klickitat River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	WT Codes/ Fin Clip
1981	Washougal R	Vancouver	Smolt	04/25/83	5.2	5,460	Klickitat R	AD
1981	Washougal R	Vancouver	Smolt	04/25/83	4.8	5,040	Klickitat R	AD
1981	Washougal R	Vancouver	Smolt	04/26/82	5.3	8,003	Klickitat R	AD
1981	Washougal R	Vancouver	Smolt	04/27/82	5.3	8,056	Klickitat R	AD
1981	Washougal R	Vancouver	Smolt	04/28/82	5.3	3,233	Klickitat R	AD
1981	Washougal R - WFINF	Naches	Smolt	05/03/82	7.0	6,405	Klickitat R	AD
1981	Washougal R - WF/NF	Naches	Smolt	05/04/82	7.0	6,685	Unknown	
1983	Columbia McNary-Upper	Naches	Smolt	04/09/84	6.0	5,280	Klickitat R	AD
1983	Columbia McNary-Upper	Naches	Smolt	04/17/84	6.0	6,120	Klickitat R	AD
1983	Columbia McNary-Upper	Naches	Smolt	04/18/84	6.0	5,460	Klickitat R	AD
1983	Columbia McNary-Upper	Naches	Smolt	04/18/84	6.0	6,060	Klickitat R	AD
1983	Columbia McNary-Upper	Naches	Smolt	04/18/84	6.0	5,490	Klickitat R	AD

Table 7 (cont.). Hatchery releases of summer steelhead into the Klickitat River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	WT Codes/ Fin Clip
1983	Columbia McNary-Upper	Naches	Smolt	04/19/84	6.0	6,060	Klickitat R	AD
1983	Columbia McNary-Upper	Naches	Smolt	04/19/84	6.0	5,280	Klickitat R	AD
1983	Columbia McNary-Upper	Naches	Smolt	04/19/84	6.0	6,300	Klickitat R	AD
1983	Columbia McNary-Upper	Naches	Smolt	04/23/84	6.0	5,520	Klickitat R	AD
1983	Washougal R - WFINF	Skamania	Smolt	04/18/84	6.7	7,893	Kliclcitat R	AD
1983	Washougal R - WF/NF	Skamania	Smolt	04/18/84	6.7	7,672	Klickitat R	AD
1983	Washougal R - WFINF	Skamania	Smolt	04/19/84	6.2	7,068	Klickitat R	AD
1983	Washougal R - WFINF	Skamania	Smolt	04/19/84	5.8	6,641	Klickitat R	AD
1983	Washougal R - WFINF	Skamania	Smolt	04/20/84	5.6	6,406	Klickitat R	AD
1983	Washougal R - WF/NF	Skamania	Smolt	04/20/84	5.6	6,440	Klickitat R	AD
1983	Washougal R - WFINF	Skamania	Smolt	04/23/84	5.7	6,646	Klickitat R	AD
1983	Washougal R - WFINF	Skamania	Smolt	04/24/84	6.2	7,186	Klickitat R	AD

Table 7 (cont.). Hatchery releases of summer steelhead into the Klickitat River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	WT Codes/ Fin Clip
1983	Washougal R - WFINF	Skamania	Smolt	04/24/84	6.2	7,136	Klickitat R	AD
1983	Washougal R - WFINF	Skamania	Smolt	04/25/84	5.5	6,390	Klickitat R	AD
1983	Washougal R - WF/NF	Skamania	Smolt	04/27/84	5.9	6,832	Klickitat R	AD
1983	Washougal R - WFINF	Skamania	Smolt	04/30/84	6.4	7,405	Klickitat R	AD
1983	Washougal R - WFINF	Skamania	Smolt	04/30/84	6.4	7,373	Klickitat R	AD
1983	Washougal R - WFINF	Skamania	Smolt	05/03/84	6.1	7,631	Klickitat R	AD
1984	Washougal R	Vancouver	Smolt	05/01/85	4.5	6,930	Klickitat R	AD
1984	Washougal R	Vancouver	Smolt	05/01/85	4.5	5,423	Klickitat R	AD
1984	Washougal R	Vancouver	Smolt	05/01/85	4.5	5,342	Klickitat R	AD
1984	Washougal R	Vancouver	Smolt	05/07/85	4.5	1,809	Klickitat R	AD
1984	Washougal R - WFINF	S kamania	Smolt	04/22/85	6.8	8,051	Klickitat R	AD
1984	Washougal R - WF/NF	Skamania	Smolt	04/23/85	6.6	7,735	Klickitat R	AD

Table 7 (cont.). Hatchery releases of summer steelhead into the Klickitat River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	WT Codes/ Fin Clip
1984	Washougal R - WFINF	Skamania	Smolt	04/24/85	7.2	8,352	Klickitat R	AD
1984	Washougal R - WFINF	Skamania	Smolt	04/25/85	6.7	7,852	Klickitat R	AD
1984	Washougal R - WFINF	Skamania	Smolt	04/26/85	6.9	8,073	Klickitat R	AD
1984	Washougal R - WFINF	Vancouver	Smolt	04/30/85	4.8	7,248	Klickitat R	AD
1984	Washougal R - WFINF	Vancouver	Smolt	04/30/85	4.8	7,464	Klickitat R	AD
1984	Washougal R - WFINF	Vancouver	Smolt	04/30/85	4.8	5,784	Klickitat R	A D
1985	Washougal R - WF/NF	S kamania	Smolt	04/15/86	5.7	6,504	Klickitat R	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/16/86	5.7	6,424	Klickitat R	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/17/86	5.9	6,756	Klickitat R	AD
1985	Washougal R - WF/NF	Skamania	Smolt	04/18/86	6.4	7,226	Klickitat R	AD
1985	Washougal R - WF/NF	Skamania	Smolt	04/21/86	6.3	6,710	Klickitat R	AD
1985	Washougal R - WF/NF	Skamania	Smolt	04/21/86	6.4	7,509	Klickitat R	AD

Table 7 (cont.). Hatchery releases of summer steelhead into the Klickitat River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	WT Codes/ Fin Clip
1985	Washougal R - WFINF	Skamania	Smolt	04/23/86	7.2	8,114	Klickitat R	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/30/86	6.9	7,970	Klickitat R	AD
1985	Washougal R - WFINF	Skamania	Smolt	04/30/86	6.6	7,496	Klickitat R	AD
1985	Washougal R - WFINF	Skamania	Smolt	05/01/86	6.6	7,544	Klickitat R	AD
1985	Washougal R - WF/NF	S kamania	Smolt	05/07/86	6.5	7,768	Klickitat R	AD
1985	Washougal R - WF/NF	Vancouver	Smolt	04/18/86	5.2	8,190	Klickitat R	AD
1985	Washougal R - WFINF	Vancouver	Smolt	04/18/86	5.2	8,190	Klickitat R	AD
1985	Washougal R - WFINF	Vancouver	Smolt	04/21/86	5.2	8,060	Klickitat R	AD
1985	Washougal R - WFINF	Vancouver	Smolt	04/21/86	5.2	8,060	Klickitat R	AD
1985	Washougal R - WFINF	Vancouver	Smolt	04/21/86	5.2	8,840	Klickitat R	AD
1985	Washougal R - WFINF	Vancouver	Smolt	04/25/86	5.2	6,760	Klickitat R	AD
1985	Washougal R - WFINF	Vancouver	Smolt	04/25/86	5.2	6,968	Klickitat R	AD

Table 7 (cont.). Hatchery releases of summer steelhead into the Klickitat River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	WT Codes/ Fin Clip
1986	Washougal R	Vancouver	Smolt	04/18/87	5.0	7,500	Klickitat R	AD
1986	Washougal R	Vancouver	Smolt	04/18/87	5.0	7,500	Klickitat R	AD
1986	Washougal R	Vancouver	Smolt	04/22/87	5.0	7,500	Klickitat R	AD
1986	Washougal R	Vancouver	Smolt	04/22/87	5.0	7,500	Klickitat R	AD
1986	Washougal R	Vancouver	Smolt	04/23/87	5.0	8,000	Klickitat R	AD
1986	Washougal R	Vancouver	Smolt	04/24/87	5.0	7,500	Klickitat R	A D
1986	Washougal R	Vancouver	Smolt	04/24/87	5.0	5,500	Klickitat R	AD
1986	Washougal R	Vancouver	Smolt	04/25/87	5.0	5,500	Klickitat R	AD
1987	Washougal R	Vancouver	Smolt	04/15/88	5.6	8,316	Klickitat R	AD
1987	Washougal R	Vancouver	Smolt	04/15/88	5.6	8,960	Klickitat R	AD
1987	Washougal R	Vancouver	Smolt	04/18/88	5.9	9,626	Klickitat R	AD
1987	Washougal R	Vancouver	Smolt	04/18/88	5.5	8,910	Klickitat R	AD

Table 7 (cont.). Hatchery releases of summer steelhead into the Klickitat River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	WT Codes/ Fin Clip
1987	Washougal R	Vancouver	Smolt	04/19/88	5.5	8,855	Klickitat R	AD
1987	Washougal R	Vancouver	Smolt	04/19/88	5.7	9,234	Klickitat R	AD
1987	Washougal R	Vancouver	Smolt	04/20/88	5.6	6,440	Klickitat R	"
1988	Washougal R	Vancouver	Smolt	04/17/89	5.3	15,661	Klickitat R	AD
1988	Washougal R	Vancouver	Smolt	04/18/89	5.3	7,367	Klickitat R	AD
1988	Washougal R	Vancouver	Smolt	04/18/89	5.3	7,950	Klickitat R	AD
1988	Washougal R	Vancouver	Smolt	04/20/89	5.3	7,950	Klickitat R	AD
1988	Washougal R	Vancouver	Smolt	04/20/89	5.3	8,427	Klickitat R	AD
1988	Washougal R - WFINF	S kamania	Smolt	04/15/89	6.3	8,820	Klickitat R	"
1988	Washougal R - WFINF	Skamania	Smolt	04/15/89	6.3	8,914	Klickitat R	AD
1988	Washougal R - WFINF	Skamania	Smolt	04/16/89	6.3	8,914	Klickitat R	AD
1988	Washougal R - WF/NF	Skamania	Smolt	04/16/89	6.3	8,757	Klickitat R	AD

Table 7 (cont.). Hatchery releases of summer steelhead into the Klickitat River by brood year and, if marked, the coded wire tag codes,

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	WT Codes/ Fin Clip
1988	Washougal R - WF/NF	Skamania	Smolt	04/21/89	5.7	7,980	Klickitat R	AD
1988	Washougal R - WF/NF	S kamania	Smolt	04/22/89	5.7	8,037	Klickitat R	AD
1988	Washougal R - WF/NF	Skamania	Smolt	04/24/89	5.8	8,178	Klickitat R	AD
1989	Washougal R	Vancouver	Smolt	04/16/90	4.6	6,026	Klickitat R	AD
1989	Washougal R	Vancouver	Smolt	04/17/90	4.6	6,371	Klickitat R	AD
1989	Washougal R	Vancouver	Smolt	04/18/90	4.6	6,946	Klickitat R	AD
1989	Washougal R	Vancouver	Smolt	04/19/90	4.6	7,038	Klickitat R	AD
1989	Washougal R	Vancouver	Smolt	04/23/90	4.6	13,800	Klickitat R	AD
1989	Washougal R	Vancouver	Smolt	04/25/90	4.6	2,760	Klickitat R	AD
1989	Washougal R	Vancouver	Smolt	04/25/90	4.7	7,097	Klickitat R	AD
1990	Washougal R	Vancouver	Smolt	04/22/91	5.6	7,924	Klickitat R	AD
1990	Washougal R	Vancouver	Smolt	04/23/91	5.3	8,029	Klickitat R	AD

Table 7 (cont.). Hatchery releases of summer steelhead into the Klickitat River by brood year and, if marked, the coded wire tag codes.

Brood Year	Stock	Hatchery	Life Stage	Release Date	Fish / lb.	Number Released	Release Site	WT Codes/ Fin Clip
1990	Washougal R	Vancouver	Smolt	04/23/91	5.3	7,976	Klickitat R	AD
1990	Washougal R	Vancouver	Smolt	04/24/91	5.3	7,950	Klickitat R	AD
1990	Washougal R	Vancouver	Smolt	04/24/91	5.5	5,665	Klickitat R	AD
1990	Washougal R	Vancouver	Smolt	04/25/91	5.6	5,824	Klickitat R	AD
1990	Washougal R	Vancouver	Smolt	04/26/91	5.6	6,804	Klickitat R	AD
1990	Washougal R	Vancouver	Smolt	04/26/91	5.4	6,993	Klickitat R	AD
1990	Washougal R - WFINF	Skamania	Smolt	04/25/91	5.0	11,000	Klickitat R	AD
1990	Washougal R - WFINF	Skamania	Smolt	05/02/91	5.1	26,555	Klickitat R	AD
1990	Washougal R - WFINF	Skamania	Smolt	05/03/91	5.5	21,000	Klickitat R	AD

Source: Terry Lovgren, WDW Stocking Database, 1991.

Table 8 (TD). Parasites and diseases isolated at hatcheries rearing Klickitat River summer steelhead smolts[A].

Disease Type	Hatchery	Specific Pathogen
Bacterial	Skamania[B]	*Renibacterium salmonarium* (BKD)
Bacterial	Skamania	*Flexibacter columnaris* (Columnaris)
Bacterial	Skamania	*Flexibacter cytophaga* (Coldwater)
Bacterial	Skamania	*Renibacterium salmonarium* (BKD)
Parasite	Skamania	*Hexamita sp.*
Parasite	Skamania	*Ichthyophthirius multiflis* (Ich)
Parasite	Skamania	*Ichthyobodu sp.* (Costia)
Parasite	Skamania	*Trichodina sp.*
Viral	Skamania	Infectious hematopoietic necrosis (IHN)
Bacterial	Vancouver[C]	*Aeromonas salmonicida* (Furunculosis)
Bacterial	Vancouver	*Flexibacter cytophaga* (Coldwater)
Bacterial	Vancouver	*Flavobacterium sp.*
Bacterial	Vancouver	*Renibacterium salmonarium* (BKD)
Parasite	Vancouver	*Gyrodactylus sp.*
Parasite	Vancouver	*Hexamita sp.*
Parasite	Vancouver	*Ichthyobodu sp.* (Costia)
Parasite	Vancouver	*Ichthyophthirius multiflis* (Ich)
Parasite	Vancouver	*Trichodina sp.*

[A]Summer steelhead smolts released into the Klickitat River were also reared at the Naches Hatchery located on the Yakima River.
[B]Vancouver Hatchery is located adjacent to the Lower Columbia River at the city of Vancouver.
[C]Skamania Hatchery is located on the Washougal River.

Disease history represents pathogens isolated at these hatcheries and not necessarily a disease outbreak.

Source: WDW pathologist, Steve Roberts, 1991.

KLICKITAT SUBBASIN

Naturally Produced Winter Steelhead

GEOGRAPHIC LOCATION

The Klickitat River originates on the east slope of the Cascade Mountains in south-central Washington. Starting at an elevation of 4,400 feet the river runs south for 95.7 miles, joining the Columbia River at the Bonneville Pool river mile (RM) 180.4. The Klickitat basin is bound by Mount Adams on the west, the Simcoe Mountains on the east and the Goat Rocks to the north. Topography within the basin range from rugged mountains in the northern section to rolling hills and plateaus in the southern section. The entire watershed encompasses 1,350 miles.

ORIGIN

The wild winter steelhead stock in the Klickitat River is native.

DISTRIBUTION

Distribution of winter steelhead is unknown.

PRODUCTION

Production Facilities

The Klickitat Hatchery, which rears chinook and coho salmon, is located on the Klickitat River at RM 42.4 No steelhead rearing facility exists on the Klickitat River.

Production Summary

No data are available on winter steelhead smolt production.

ADULT LIFE HISTORY

Run size and Escapement

Howell et al. (1985) and Klickitat Subbasin Production Plan both recognize a winter steelhead run in the Klickitat Subbasin. Data to support the evidence of a winter race is based on bright steelhead being observed in the late winter and early spring steelhead catches. Although annual catches of bright steelhead occur each winter season the wild winter steelhead run is considered small. No accurate data exists on run size or escapement.

Time of migration

Adult winter steelhead migration period is from January through May, peaking in March.

Harvest

Ocean harvest of Klickitat steelhead is unknown.

Columbia River harvest is comprised of many stocks which migrate through the Columbia River.

No data exists on harvest of Klickitat Winter steelhead although some fish are likely part of the Columbia River catch.

Sport harvest of this stock occurs primarily in the lower and middle sections of the Klickitat River. Steelhead caught by sport anglers and reported on permit-cards as March and April caught fish are assumed to be wild winter steelhead. Based on the March through April catch period, total harvest ranged from 2 steelhead in 1986 to 105 steelhead in 1981 based on permit-card harvest estimates. In an effort to protect the winter steelhead current regulations prohibit sport fishing from December through May.

Treaty fishing is closed from January through March.

Spawning period

Wild winter steelhead spawning occurs from March through June.

Spawning area

Winter steelhead are believed to spawn in the lower portion of the Klickitat River.

Fecundity

No data are available on Klickitat steelhead.

Age composition

No data are available on Klickitat steelhead.

Size

No data are available on Klickitat steelhead.

Sex ratio

No data are available on Klickitat steelhead.

Survival rate

No data are available on Klickitat steelhead.

JUVENILE LIFE HISTORY

Egg

No data on egg production or survival.

Emergence

No data are available on Klickitat steelhead.

Juvenile rearing

Juvenile rearing for the majority of wild smolts lasts approximately two years prior to ocean emigration.

Wild steelhead smolts emigrate in April and May, peaking in early May, at the size of 160 mm.

Straying

No data on Klickitat River steelhead.

BIOCHEMICAL-GENETIC CHARACTERISTICS

Although no data exists on the winter stock, managers would like to protect the genetic integrity of the winter race. In this effort, 1) there has never been supplemental releases of winter hatchery steelhead smolts into the Klickitat River, and 2) continuation of closures for winter steelhead harvest, and 3) closely monitor the summer steelhead smolt release program to minimize potential impacts that summer steelhead may have on genetic make-up of the winter race.

DISEASES

No data are available on Klickitat steelhead.

REFERENCES

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Appendix Table 1. Snake River chinook electrophoretic data from Waples et al. (1991).

Allele frequency data for 1988 brood-year samples of juvenile Snake River chinook salmon. Locus abbreviations are explained in Table 1. N is the number of fish scored for each locus. Allele mobility designations are explained in text. Alleles screened but not found in any samples are shown in parentheses after locus names.

Locus/ Allele	Marsh Creek	Johnson Creek	Upper Salmon River	Valley Creek	Secesh River	Lostine River	Imnaha River	McCall Hatchery	Sawtooth Hatchery	Looking. Hatchery	Imnaha Hatchery
*sAAT-1,2** (105)											
(N)	100	96	99	97		100	99	100	99	100	100
100	1.000	0.956	0.977	0.992	0.9%	1.000	1.000	0.998	0.975	1.000	1.000
85	0.000	0.044	0.023	0.008	0.005	0.000	0.000	0.003	0.025	0.000	0.000
*sAAT-3** (90)											
(N)	100	97	99	99	92	99	100	100	89	99	98
100	1.000	1.000	0.965	0.990	1.000	1.000	0.995	1.000	1.000	0.980	1.000
113	0.000	0.000	0.036	0.010	0.000	0.000	0.005	0.000	0.000	0.020	0.000
*sAAT-4** (130)											
(N)	98	86	89	97	76	95	98	68	89	92	95
100	0.985	0.919	1.000	1.000	0.967	0.716	0.959	0.919	0.966	0.978	0.974
63	0.015	0.081	0.000	0.000	0.033	0.284	0.041	0.081	0.034	0.022	0.026
*mAAT-1** (-77)											
(N)	100	96	99	98	90	96	100	96	100	94	100
-100	1.000	0.990	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.995
-104	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
ADA-S											
(N)	100	97	99	99	92	100	100	100	100	100	100
100	0.910	0.985	0.949	0.694	0.842	0.970	0.995	0.940	0.935	1.000	1.000
83	0.090	0.015	0.051	0.106	0.158	0.030	0.005	0.060	0.065	0.000	0.000
*ADH** (-170)											
(N)	99	97	99	99	92	100	100	100	100	100	100
-100	1.000	1.000	1.000	1.000	1.000	0.985	0.995	1.000	1.000	1.000	1.000
-52	0.000	0.000	0.000	0.000	0.000	0.015	0.005	0.000	0.000	0.000	0.000
*sAH** (69, 108, 1161											
	100	97	99	99	92	100	100	100	100	100	100
100	1.000	1.000	1.000	1.000	1.000	0.995	1.000	0.990	0.995	1.000	0.985
86	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.010	0.005	0.000	0.015
*mAH-2**											
(N)	99	60	98	96	84	100	98	89	93	100	100
100	0.884	0.883	0.918	0.807	0.958	0.900	0.929	0.933	0.918	0.885	0.915
88	0.116	0.117	0.082	0.193	0.042	0.100	0.071	0.067	0.082	0.115	0.085
*mAH-4** (112)											
(N)	100	94	99	99	91	100	100	100	100	100	100
100	1.000	1.000	1.000	1.000	1.000	0.990	0.990	0.985	1.000	1.000	0.990
119	0.000	0.000	0.000	0.000	0.000	0.010	0.010	0.015	0.000	0.000	0.010
*GAPDH-2**											
(N)	100	96	99	98	85	1.00	100	100	100	100	100
100	1.000	1.000	1.000	1.000	1.000	0.995	1.000	1.000	1.000	1.000	1.000
22	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000

Appendix Table 1. Cont.

Locus/ Allele	Marsh Creek	Johnson Creek	Upper Salmon River	Valley Creek	Secesh River	Lostine River	Imnaha River	McCall Hatchery	Sawtooth Hatchery	Looking. Hatchery	Imnaha Hatchery
*sMDH-B1,2** (83)											
(N)	100	97	99	99	92	100	'100	100	100	100	100
100	0.990	0.979	0.985	0.944	0.997	0.988	0.985	0.993	0.980	0.993	0.943
121	0.010	0.015	0.013	0.056	0.003	0.013	0.015	0.008	0.020	0.008	0.057
70	0.000	0.005	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
*mMDH-1 **											
(N)	92	49	99	99	13	95	100	92	100	100	100
-100	1.000	1.000	1.000	1.000	1.000	1.000	0.995	1.000	1.000	1.000	1.000
-900	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000
*mMDH-2**											
(N)	99	97	97	97	91	100	98	100	97	100	99
100	0.646	0.598	0.485	0.557	0.753	0.735	0.658	0.735	0.526	0.800	0.697
200	0.354	0.402	0.515	0.443	0.247	0.265	0.342	0.265	0.473	0.200	0.303
*sMEP-1** (105)											
(N)	95	97	99	97	89	96	98	99	99	100	93
100	0.079	0.077	0.030	0.031	0,017	0.052	0.061	0.035	0.010	0.070	0.043
92	0.921	0.923	0.970	0.969	0.983	0.948	0.939	0.965	0.990	0.930	0.957
*sMEP-2**'											
(N)	100	97	99	99	91	100	99	100	100	100	95
100	0.900	0.898	1.000	1.000	0.790	1.000	1.000	1.000	1.000	1.000	1.000
78	0.100	0.102	0.000	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000
*MPI** (113)											
(N)	100	95	99	99	91	100	100	100	99	100	100
100	0.880	0.989	0.939	0.889	0.967	0.770	0.885	0.920	0.884	0.935	0.780
109	0.120	0.011	0.061	0.111	0.033	0.225	0.115	0.080	0.316	0.065	0.220
95	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000
*PEPA** (86)											
(N)	loo	97	99	99	92	100	100	100	100	100	loo
loo	0.995	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.995	1.000	1.000
90	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000
*PEPB-1 **											
(N)	100	94	99	99	92	100	100	100	100	100	99
100	0.945	0.856	0.879	0.904	0.902	0.960	0.915	0.935	0.870	0.805	0.909
130	0.050	0.027	0.091	0.096	0.065	0.015	0.050	0.015	0.090	0.095	0.030
-350	0.005	0.117	0.030	0.000	0.033	0.025	0.035	0.050	0.040	0.100	0.061
*PEPD-2**											
(N)	loo	97	99	99	92	100	100	100	100	100	100
100	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.995	1.000	1 .000	1.000
107	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000
*PEP-LT**											
(N)	100	97	99	99	92	100	100	100	100	100	100
100	0.870	0.948	0.985	0.919	0.870	0.925	0.965	0.920	0.885	0.945	0.955
110	0.130	0.052	0.015	0.081	0.130	0.075	0.035	0.080	0.115	0.055	0.045
*PGK-2**											
(N)	100	97	99	99	92	100	100	100	95	100	100
100	0.065	0.067	0.101	0.187	0.152	0.085	0.100	0.110	0.142	0.085	0.120
90	0.935	0.933	0.899	0.813	0.848	0.915	0.900	0.890	0.858	0.915	0.880

Appendix Table 2. Additional Snake River chinook electrophoretic data cited by Waples et. al. (1991)

Temporal comparisons of allele frequency in Snake River chinook salmon populations for which old data are available (Milner et al. 1983; Milner et al. 1986). Brood years for samples are indicated below population names; other details are as in Appendix Table 1.

Locus/ allele	McCall Hatchery 1981	McCall Hatchery 1988	Johnson Creek 1981	Johnson Creek 1988	Valley Creek 1982	Valley Creek 1988	Looking. Hatchery 1988	Rapid River H. 1981+84	Upper Salmon River 1981	Upper Salmon River 1988	Sawtooth Hatchery 1988
*sAAT-1,2**											
(N)	50	100	66	98	22	97	100	150	50	100	99
100	1.000	0.998	0.964	0.957	0.977	0.992	1.000	1.000	1.000	0.978	0.975
85	0.000	0.003	0.036	0.043	0.023	0.008	0.000	0.000	0.000	0.023	0.025
*sAAT-3**											
(N)	50	100	56	100	22	99	99	150	50	100	89
100	1.000	1.000	1.000	1.000	1.000	0.990	0.980	0.990	1.000	0.965	1.000
113	0.000	0.000	0.000	0.000	0.000	0.010	0.020	0.010	0.000	0.035	0.000
*ADA-1**											
(N)	50	100	56	100	22	99	100	150	48	99	100
100	0.900	0.940	1.000	0.986	0.932	0.894	1.000	0.990	0.969	0.949	0.935
83	0.100	0.060	0.000	0.016	0.068	0.106	0.000	0.010	0.031	0.051	0.065
*sAH**											
(N)	50	100	53	99		99	100	148	50	100	100
100	1.000	0.990	1.000	1.000	1.0%	1.000	1.000	0.993	1.000	1.000	0.995
86	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.005
*GR**											
(N)	50	100	56	100	22	99	100	150	50	100	100
100	1.000	0.985	1.000	0.995	1.000	1.000	1.000	0.997	1.000	1.000	1.000
85	0.000	0.015	0.000	0.005	0.000	0.000	0.000	0.003	0.000	0.000	0 . 0 0 0
*HAGH**											
(N)	50	100	56	68	22	99	99	144	48	100	99
100	0.970	0.960	0.991	1.000	0.955	0.949	0.944	0.913	0.917	0.970	0 939
143	0.030	0.040	0.009	0.000	0.045	0.061	0.056	0.087	0.083	0.030	0.061

Appendix Table 2. Continued

Locus/ allele	McCall Hatchery 1981	McCall Hatchery 1988	Johnson Creek 1981	Johnson Creek 1988	Valley Creek 1982	Valley Creek 1988	Looking. Hatchery 1988	Rapid River H. 1981+84	Upper Salmon River 1981	Upper Salmon River 1988	Sawtooth Hatchery 1988
*PEPB-1**				94		99					
(N)	50	100	56	0.973	22	0.904	100	148	50	100	100
100	0.930	0.985	0.991		0.818		0.905	0.892	0.860	0.910	0.910
130	0.070	0.015	0.009	0.027	0.182	0.096	0.095	0.108	0.140	0.090	0.090
PEP-LT[a]			56						50		
(N)	60	100	0.929	0 . 2	22	0.9%	100	150	0.970	100	100
100	0.890	0,920			0.841		0.946	0.963		0.985	0.885
110	0.110	0.080	0.071	0.050	0.159	0.081	0.055	0.037	0.030	0.015	0.115
*PGK-2**											
(N)	50	100	56	100	22	99	100	150	50	99	95
100	0.080	0.110	0.045	0.065	0.205	0.187	0.085	0.103	0.090	0.101	0.142
90	0.920	0.890	0.955	0.935	0.795	0.813	0.915	0.897	0.910	0.899	0.858
*sSOD-1**											
(N)	50	100	56	97	22	99	100	150	48	98	100
-100	0.980	0.980	0.973	0.974	0.886	0.939	0,970	0.913	0.948	0.964	0.965
-260	0.020	0.020	0.027	0.026	0.114	0.061	0.030	0.087	0,052	0.036	0.035

[a] Includes "94" allele
[b] Includes "90" allele
[c] Includes "-350" allele

Appendix Table 3. Columbia River chinock electrophoretic data from Schreck et al. (1986).

Isoayme gene frequencies and sample sizes (N) as determined by electrophoresis for-chinook salmon stocks in Oregon, Washington and Idaho. Numbers at the top of each column are the relative mobilities for each allele present in the enzyme system. Minus signs indicate cathodal migration. An asterisk indicates that an allele was present at a frequency of less than .005. "Form" is the time of freshwater entry (S for spring, F for fall and SUM for summer). A pound sign (#) indicates that data for that stock was obtained from the Genetic Stock Identification Study (Milner et al. 1983).

Chinook salmon gene frequency data (continued).

CHINOOK STOCK	FORM	ACONITATE HYDRATASE				ADENOSINE DEAMINASE			ALCOHOL DEHYDROGENASE		
		N	-- 100	86	116	69	N	100	83	N	-100	-52
WALLOWA-LOSTINE RIVER	S	47	1.00				47	1.00		47	1.00	
WALLOWA-LOSTINE RIVER 84	S	40	.99	.01						40	.98	.03
KOOSKIA HATCHERY STOCK	S	100	1.00							90	.99	.01
RED R. SF CLEARWATER #	S	40	1.00				40	.98	.03	40	1.00	
IMNAHA RIVER	S	87	.99	.01			87	1.00		87	.99	.01
IMNAHA RIVER 84	S	108	.99	.01						108	1.00	
RAPID RIVER HATCHERY #	S	50	.98	.02			50	.98	.02	50	1.00	
JOHNSON CREEK #	SUM	53	1.00				56	1.00		56	1.00	
McCALL HATCHERY #	SUM	50	1.00				50	.90	.10	50	1.00	
MIDDLE FORK SALMON	S	50	.98	.02						86	1.00	
EAST FK. SALMON R. STOCK	S	50	1.00				50	.98	.02	50	1.00	
VALLEY CREEK	SUM	20	1.00							50	1.00	
VALLEY CREEK #	S	22	1.00				22	.93	.07	22	1.00	
SAWTOOTH STOCK #	S	50	1.00				48	.97	.03	50	1.00	
YAKIMA RIVER	F	36	.97	.03			36	.97	.03	36	.99	.01
YAKIMA RIVER	S	50	.98	.02			42	.96	.04	50	1.00	
NACHES RIVER	S	37	1.00				50	1.00		50	.98	.02
HANFORD REACH	F	53	.89	• ll						100	1.00	
HANFORD REACH 85	F	100	.81	.18	.01		100	1.00		100	.97	.04
PRIEST RAPIDS HATCHERY	F	100	.84	.16			50	1.00		100	.99	.01
WENATCHEE RIVER	S	194	.99	.01			50	.95	.05	199	1.00	
WENATCHEE RIVER	SUM	40	.81	.19						50	1.00	
WENATCHEE RIVER 85	SUM	49	.83	.17			50	.99	.01	50	1.00	
LEAVENWORTH HATCHERY	S	89	.99	.01						100	1.00	
LEAVENWORTH HATCHERY 85	S	l o o	1.00				100	.97	.04	100	1.00	
ENTIAT RIVER	S	128	.98	.02			50	.97	.03	133	1.00	
WELLS DAM HATCHERY	SUM	98	.88	.12			98	1.00		100	1.00	
METHOW RIVER 83	S	53	.97	.03								
METHOW RIVER 84	S	50	.99	.01			so	.96	.04	50	1.00	
METHOW RIVER	SUM	85	.82	.18								
WINTHROP HATCHERY #	S	50	.92	.07	.01		129	• 1[illegible]	.03	129	.98	.02
OKANAGAN RIVER	SUM	100	.78	.22						90	.97	.03
OKANAGAN RIVER 85	SUM	50	.75	.24	.01		50	1.00		49	.99	.01

Chinook salmon gene frequency data (continued).

CHINOOK STOCK	FORM	GLUCOSE PHOSPHATE ISOMERASE-2			GLUCOSE PHOSPHATE ISOMERASE 1-3H			GLUCOSE PHOSPHATE ISOMERASE-3		
		N	100	60	N	STANDARD	VARIANT	N	100	90
WALLOWA-LOSTINE RIVER	S	47	.90	.10	47	1.00		47	1.00	
WALLOWA-LOSTINE RIVER 84	s	40	1.00		40	1.00		40	1.00	
KOOSKIA HATCHERY STOCK	S	78	1.00		78	1.00		78	1.00	
RED R. SF CLEARWATER #	s	40	1.00					40	1.00	
IMNAHA RIVER	S	87	1.00		87	l.w		87	1.00	
IMNAHA RIVER 84	S	108	1.00		100	1.00		100	1.00	
RAPID RIVER HATCHERY #	s	50	1.00					50	1.00	
JOHNSON CREEK #	SUM	56	1.00					56	1.00	
McCALL HATCHERY #	SUM	50	1.00					50	1.00	
MIDDLE FORK SALMON	s	50	l,oo		50	1.00		50	1.00	
EAST FK. SALMON R. STOCK	S	50	1.00		50	1.00		50	1.00	
VALLEY CREEK	SUM	48	1.00		48	1.00		48	1.00	
VALLEY CREEK #	S	22	1.00					22	1.00	
SAWTOOTH STOCK #	S	50	1.00					50	1.00	
YAKIMA RIVER	F	36	1.00		36	1.00		36	1.00	
YAKIMA RIVER	S	42	1.00		30	1.00		48	1.00	
NACHES RIVER	s	50	.94	.06	50	1.00		50	1.00	
HANFORD REACH	F	96	1.00		96	.80	.20	96	1.00	
HANFORD REACH 85	F	loo	1.00		100	.90	.10	100	1.00	
PRIEST RAPIDS HATCHERY	F	91	1.00		91	.90	.10	91	1.00	
WENATCHEE RIVER	S	194	1.00		194	1.00		194	1.00	
WENATCHEE RIVER	SUM	50	1.00		50	1.00		50	1.00	
WENATCHEE RIVER 85	SUM	50	1.00		50	.96	.04	50	1.00	
LEAVENWORTH HATCHERY	S	95	1.00		95	1.00		95	1.00	
LEAVENWORTH HATCHERY 85	S	93	1.00		93	1.00		93	1.00	
ENTIAT RIVER	S	133	1.00		133	1.00		133	1.00	
WELLS DAM HATCHERY	SUM	97	1.00		97	.83	.17	97	1.00	
METHOW RIVER 83	S	53	1.00		53	1.00		53	1.00	
METHOW RIVER 84	S	50	1.00		40	1.00		50	1.00	
METHOW RIVER	SUM	88	1.00		88	.89	.11	88	1.00	
WINTHROP HATCHERY #	S	129	1.00					129	.98	.02
OKANAGAN RIVER	SUM	100	.90	.10	loo	.83	.17	100	1.00	
OKANAGAN RIVER 85	SUM	50	1.00		50	1.00		50	1.00	

Chinook salmon gene frequency data (continued).

CHINOOK STOCK	FORM	ASPARTATE AMINOTRANSFERASE			ISOCITRATE DEHYDROGENASE				L-LACTATE m - 4		
		N	loo	90	N	100	74	127	N	100	120
WALLOWA-LOSTINE RIVER	S	25	1.00		46	.86	.11	.03	47	1.00	
WALLOWA-LOSTINE RIVER 84	S	34	1.00		35	.84	.15	.01	40	1.00	
KOOSKIA HATCHERY STOCK	S	80	1.00		73	.92	.08		loo	.99	.01
RED R. SF CLEARWATER #	S	40	1.00		80	.94	.06		40	.95	.05
IMNAHA RIVER	S	87	1.00		84	.91	.09		87	1.00	
IMNAHA RIVER 84	S	100	1.00		89	.87	.13		108	1.00	
RAPID RIVER HATCHERY #	S	50	1.00		50	.97	.04		50	.98	.02
JOHNSON CREEK #	SUM	56	1.00		56	.95	.05		56	1.00	
McCALL HATCHERY #	SUM	50	1.00		50	.87	.13		50	1.00	
MIDDLE FORK SALMON	S	40	1.00		14	.89	.11		50	.96	.04
EAST FK. SALMON R. STOCK	S	37	1.00		50	.97	.03		50	.99	.01
VALLEY CREEK	SUM	45	1.00		40	.98	.02		48	.98	.02
VALLEY CREEK #	S	22	1.00		22	.91	.05	.05	22	.98	.02
SAWTOOTH STOCK #	S	50	1.00		50	.92	.08		50	.98	.02
YAKIMA RIVER	F	36	1.00		30	.91	.03	.06	36	.97	.03
YAKIMA RIVER	S	44	1.00		44	.86	.14		50	1.00	
NACHES RIVER	S	50	1.00		50	.95	.04	.01	50	1.00	
HANFORD REACH	F	100	1.00		60	.92	.01	.07	100	1.00	
HANFORD REACH 85	F	100	1.00		91	.93	.06	.01	100	1.00	
PRIEST RAPIDS HATCHERY	F				65	.98	.02		92	1.00	
WENATCHEE RIVER	S	180	1.00		160	.86	.14		199	.99	.01
WENATCHEE RIVER	SUM				44	.98	.01	.01	50	1.00	
WENATCHEE RIVER 85	SUM	50	1.00		50	.89	.01	.10	50	1.00	
LEAVENWORTH HATCHERY	S				96	.90	*	.10	100	.97	.03
LEAVENWORTH HATCHERY 85	S	75	1.00		94	.93	.07		100	1.00	
ENTIAT RIVER	S	123	1.00		105	.81	.19		132	.98	.02
WELLS DAM HATCHERY	SUM								98	1.00	
METHOW RIVER 83	S	50	1.00		39	.89	.02	.09	43	1.00	
METHOW RIVER 84	S	43	1.00		37	.81	.19		50	.99	.01
METHOW RIVER	su4	20	1.00		71	.95	.04	•			
WINTHROP HATCHERY #	S	50	1.00		129	.97	.03	.01	129	1.00	
OKANAGAN RIVER	SUM				84	.93	.06	.01	96	1.00	
OKANAGAN RIVER 85	SUM	50	1.00		50	.92		.08	50	1.00	

Chinook salmon gene frequency data (continued).

CHINOOK STOCK	FORM	L-LACTATE m - 5			MALATE DEHYDROGENASE-1&2				MALATE DEHYDROGENASE-3&4			
		N	100	90	N	100	140	27	N	100	121	70
WALLOWA-LOSTINE RIVER	S	47	1.00		47	1.00			45	.95	.05	
WALLOWA-LOSTINE RIVER 84	S	40	1.00		40	1.00			40	1.00		
KOOSKIA HATCHERY STOCK	S	100	1.00		90	1.00			100	.98	.02	
RED R. SF CLEARWATER #	S	40	1.00		80	1.00			78	.99	.01	
IMNAHA RIVER	S	87	1.00		87	1.00			87	.99	.01	
IMNAHA RIVER 84	S	107	1.00		108	1.00			108	.98	.02	
RAPID RIVER HATCHERY #	S	50	1.00		50	1.00			49	1.00		
JOHNSON CREEK #	SUM	56	.98	.02	56	1.00			56	1.00		
McCALL HATCHERY #	SUM	50	.97	.03	50	1.00			50	.99	.01	
MIDDLE FORK SALMON	S	50	1.00						50	.98	.02	
EAST FK. SALMON R. STOCK	S	37	1.00		50	1.00			50	.98	.02	
VALLEY CREEK	SUM	48	1.00		45	1.00			48	.97	.03	
VALLEY CREEK #	S	22	1.00		22	1.00			22	.99	.01	
SAWTOOTH STOCK #	S	48	1.00		50	1.00			49	1.00		
YAKIMA RIVER	F	36	1.00		36	1.00			36	1.00		
YAKIMA RIVER	S	50	1.00		50	1.00			50	1.00		
NACHES RIVER	S	50	1.00		50	1.00			50	.98	.01	.01
HANFORD REACH	F	100	.97	.03	100	1.00			98	.97	.01	.01
HANFORD REACH 85	F	100	.99	.01	100	1.00			100	.96	.03	.01
PRIEST RAPIDS HATCHERY	F	100	.98	.02	100	1.00			100	.98	.01	.02
WENATCHEE RIVER	'S	181	1.00		195	1.00	*		95	.97	.03	
WENATCHEE RIVER	SUM	45	.99	.01	50	1.00			48	.97	.01	.02
WENATCHEE RIVER 85	SUM	50	.96	.04	50	1.00			50	.95	.01	.04
LEAVENWORTH HATCHERY	S	100	1.00		100	1.00			100	.99	.01	
LEAVENWORTH HATCHERY 85	S	97	1.00		95	1.00			99	.97	.03	
ENTIAT RIVER	S	121	1.00		132	1.00	*		31	.99	.01	
WELLS DAM HATCHERY	SUM	90	.99	.01	98	1.00			98	.98	.01	.01
METHOW RIVER 83	S	50	.99	.01	43	1.00			45	.97	.03	
METHOW RIVER 84	S	49	1.00		50	.99	*	*	50	.97	.03	
METHOW RIVER	SUM	80	.99	.01	88	1.00			87	.97	.02	.01
WINTHROP HATCHERY #	S	129	1.00		3.29	1.00			129	.99	.01	
OKANAGAN RIVER	SUM	100	.93	.07	100	1.00			95	.97	.02	.01
OKANAGAN RIVER 85	SUM	50	.95	.05	50	1.00			50	.96	.02	.02

Chinook salmon gene frequency data (continued).

CHINOOK STOCK	FORM	MANNOSE PHOSPHATE ISOMERASE					DIPEPTIDASE			TRIPEPTIDE AMINOPEPTIDASE			
		N	100	109	95	113	N	100	90	N	100	130	45
WALLOWA-LOSTINE RIVER	S	45	.76	.24			47	l.w		43	.96	.04	
WALLOWA-LOSTINE RIVER 84	S	39	.74	.26			35	1.00		40	.99	.01	
KOOSKIA HATCHERY STOCK	S	74	.95	.05			91	.98	.02	71	.99	.01	
RED R. SF CLEARWATER #	S	40	.95	.05			40	1.00		36	.94	.06	
IMNAHA RIVER	S	86	.80	.20			87	.99	.01	87	.99	.01	.01
IMNAHA RIVER 84	S	99	.82	.18			108	1.00		108	1.00		
RAPID RIVER HATCHERY #	s	50	.95	.05			50	1.00		50	.90	.10	
JOHNSON CREEK #	SUM	56	.95	.05			56	1.00		56	.99	.01	
McCALL HATCHERY #	SUM	50	.96	.04			50	1.00		50	.93	.07	
MIDDLE FORK SALMON	s	50	.96	.04			50	1.00		37	.97	.03	
EAST FK. SALMON R. STOCK	S	50	1.00				50	1.00		50	1.00		
VALLEY CREEK	SUM	35	.87	.13			4s	1.00		32	1.00		
VALLEY CREEK #	S	22	.80	.21			22	.98	.02	22	.82	.18	
SAWTOOTH STOCK #	s	50	.89	.11			50	.99	.01	50	.86	.14	
YAKIMA RIVER	F	36	.92	.08			36	1.00		35	.84	.16	
YAKIMA RIVER	s	50	.86	.14			50	.98	.02	47	.95	.05	
NACHES RIVER	s	46	.77	.23			50	1.00		49	.98	.02	
HANFORD REACH	F	99	.72	.27	.01		100	1.00		100	.77	.23	
HANFORD REACH 85	F	99	.54	.46			100	.99	.01	99	.82	.18	
PRIEST RAPIDS HATCHERY	F	88	.74	.26			100	1.00		94	.68	.32	
WENATCHEE RIVER	s	165	.90	.10			191	.99	.01	181	.91	.09	
WENATCHEE RIVER	SUM	34	.66	.34			50	1.00					
WENATCHEE RIVER 85	SUM	50	.63	.37			50	.94	.06	50	.74	.26	
LEAVENWORTH HATCHERY	s	loo	.90	.10			100	.99	.01	100	.87	.13	
LEAVENWORTH HATCHERY 85	S	93	.83	.17			100	.99	.01	90	1.00		
ENTIAT RIVER	S	132	.90	.10			132	.99	.01	118	.94	.06	
WELLS DAM HATCHERY	SCM	76	.71	.29			98	1.00		98	.66	.34	
METHOW RIVER 83	S	36	.85	.15			53	1.00		53	.90	.10	
METHOW RIVER 84	s	50	.97	.03			50	1.00		50	.97	.03	
METHOW RIVER	SUM	-					88	1.00		86	.73	.27	
WINTHROP HATCHERY #	S	22	.70	.30			22	1.00		22	.99	.01	
OKANAGAN RIVER	SUM	92	.74	.26			loo	1.00		96	.68	.32	
OKANAGAN RIVER 85	SUM	50	.63	.37			50	.99		48	.69	.31	

Chinook salmon gene frequency data (continued).

CHINOOK STOCK	FORM	PHOSPHO-GLUCOMUTASE N	-100	-60	PHOSPHOGLYCERATE KINASE-2 N	100	90	64	SUPEROXIDE DISMUTASE N	-100	-260	1250
WALLOWA-LOSTINE RIVER	*S	47	1.00		45	.07	.92	.01	47	.79	.21	
WALLOWA-LOSTINE RIVER 84	S	40	1.00		90		1.00		40	.86	.14	
KOOSKIA HATCHERY STOCK	S	100	1.00		46	.04	.96		99	.84	.16	
RED R. SF CLEARWATER #	S	40	1.00		40	.15	.85		40	.95	.05	
IMNAHA RIVER	S	87	1.00		78	.15	.85		87	.89	.11	
IMNAHA RIVER 84	S	108	1.00		90		1.00		87	.87	.13	
RAPID RIVER HATCHERY #	S	50	1.00		50	.15	.85		so	.96	.04	
JOHNSON CREEK #	SUM	56	1.00		56	.05	.96		56	.97	.03	
MCCALL HATCHERY #	SUM	50	1.00		so	.08	.92		so	.98	.02	
MIDDLE FORK SALMON	S	so	1.00		so	.05	.95		3s	.80	.20	
EAST FK. SALMON R. STOCK	S	50	1.00						50	.98	.02	
VALLEY CREEK	SUM	48	1.00		43	.20	.80		48	.94	.06	
VALLEY CREEK #	S	22	1.00		22	.21	.80		22	.89	.11	
SAWTOOTH STOCK #	S	50	1.00		50	.09	.91		48	.95	.05	
YAKIMA RIVER	F	36	1.00		36	.38	.62		36	.85	.15	
YAKIMA RIVER	S	so	1.00		30	.17	.83		so	.76	.24	
NACHES RIVER	S	49	1.00		so	.38	.62		49	.70	.30	
HANFORD REACH	F	100	1.00		39	.74	.26					
HANFORD REACH 85	F	100	1.00		100	.65	.36		100	.53	.47	
PRIEST RAPIDS HATCHERY	F	100	1.00						92	.50	.50	
WENATCHEE RIVER	S	184	1.00		76	.09	.91		170	.82	.18	•
WENATCHEE RIVER	SUM	50	1.00									
WENATCHEE RIVER 85	SUM	50	1.00		50	.58	.42		50	.46	.53	.01
LEAVENWORTH HATCHERY	S	100	1.00		76	.03	.97		100	.84	.16	
LEAVENWORTH HATCHERY 85	S	100	1.00		79	.12	.88		94	. n	.29	
ENTIAT RIVER	S	128	1.00		35	.03	.97		130	.76	.24	
WELLS DAM HATCHERY	SUM	98	1.00		74	.64	.36		97	.58	.42	
METHOW RIVER 83	S	53	1.00						36	.67	.33	
METHOW RIVER 84	s	50	1.00		3s	.03	.97		50	.77	.23	
METHOW RIVER	SUM	88	.99	.01	-				76	.49	.51	
WINTHROP HATCHERY #	S	123	1.00		98	.50	.50		129	.74	.26	
OKANAGAN RIVER	SUM	100	1.00		49	.70	.30					
OKANAGAN RIVER 85	SUM	50	1.00		50	.68	.32		50	.52	.48	

Appendix Table 4. Columbia River steelhead electrophoretic data. from Schreck et al. (1986).

Isozyme gene frequencies and sample sizes (N) as determined by electrophoresis for steelhead trout stocks in Oregon, Washington and Idaho. Numbers at the top of each column are the relative mobilities for each allele present in the enzyme system. Minus signs indicate cathodal migration. An asterisk indicates that an allele was present at a frequency of less than .005. "Form" is the time of freshwater entry (S for summer and W for winter). A pound sign (#) indicates that data for that stock was obtained from the Genetic Analysis of Columbia River Steelhead Trout (Wishard and Seeb 1983) prepared for the Idaho Department of Fish and Game.

Steelhead trout gene frequency data (continued).

STEELHEAD STOCK	FORM	CREATINE KINASE			GLUCOSE PHOSPHATE ISOMERASE-1				GLUCOSE PHOSPHATE ISOMERASE-2		
		N	100	70	N	100	130	25	N	100	120
UMATILLA RIVER	S	100	1.00		100	1.00			100	1.00	
UMATILLA HATCHERY	s	100	1.00		100	1.00			100	1.00	
WALLA WALLA RIVER	s	40	1.00		40	1.00			40	1.00	
TOUCHET RIVER	S	50	1.00		50	1.00			50	1.00	
TUCANNON RIVER	s	113	.99	.01	113	1.00			113	1.00	
TUCANNON RIVER 85	s	50	.99	.01	50	1.00			50	1.00	
GRANDE RONDE RIVER	s	50	1.00		50	1.00			50	1.00	
GRANDE RONDE RIVER 84	s	110	1.00		110	1.00			110	1.00	
WALLOWA-LOSTINE	S	73	1.00		73	1.00			73	1.00	
WALLOWA-LOSTINE 84	S	62	1.00		62	1.00			62	1.00	
WALLOWA HATCHERY	s	100	.99	.01	100	1.00			100	1.00	
MISSION CREEK	S	30	1.00		30	1.00			30	1.00	
BIG CANYON/COTTONWOOD CRKS.	S	88	1.00		88	1.00			88	1.00	
DWORSHAK HATCHERY	S	73	1.00		73	1.00			73	1.00	
SELWAY RIVER	s	98	1.00		97	1.00			98	1.00	
LOCHSA RIVER	s	50	1.00		47	1.00			50	1.00	
IMNAHA RIVER	S	81	1.00		96	1.00			96	1.00	
IMNAHA RIVER 84	s	58	1.00		58	1.00			58	1.00	
IMNAHA HATCHERY	s	100	1.00		100	.90	.10		100	1.00	
SHEEP & BARGAMIN CRKS.	s	120	1.00		120	1.00			120	1.00	
S.F.SALMON (SECESH RIVER)	S	61	1.00		61	1.00			61	1.00	
S.F.SALMON (JOHNSON CREEK)	S	50	.99	.01	50	1.00			50	1.00	
CHAMBERLAIN CREEK	s	-			97	.99	.01				
HORSE CREEK	S	51	1.00		50	1.00			51	1.00	
MIDDLE FORK SALMON RIVER #	s	-			158	.97	.03		158	1.00	
PAHSIMEROI 'B' STOCK	s	50	1.00		50	1.00			50	1.00	
SAWTOOTH 'A' STOCK	s	50	1.00		50	1.00			50	1.00	
HELLS CANYON STOCK	s	100	1.00		100	1.00			100	1.00	
YAKIMA RIVER	s	48	.99	.01	48	1.00			46	1.00	
YAKIMA RIVER 84	S	49	.99	.01	49	1.00			49	1.00	
WENATCHEE RIVER	s	96	1.00		96	1.00			96	1.00	
ENTIAT RIVER	S	50	1.00		50	1.00			50	1.00	
WELLS HATCHERY	S	81	1.00		81	1.00			81	1.00	
METHOW RIVER	S	55	1.00		58	1.00			58	1.00	

Steelhead trout gene frequency data (continued).

STOCK	FORM	GLUCOSE PHOSPHATE ISOMERASE-3 N	100	120	92	ASPARTATE AMINO-TRANSFERASE-1,2 N	100	112	ASPARTATE AMINO-TRANSFERASE-3 N	100	77
UMATILLA RIVER	S	100	1.00			loo	1.00				
UMATILLA HATCHERY	S	100	1.00						100	.98	.02
WALLA WALLA RIVER	s	40	1.00			34	1.00		30	1.00	
TOUCHET RIVER	s	50	1.00			44	1.00		50	1.00	
TUCANNON RIVER	s	113	1.00			103	1.00		103	1.00	
TUCANNON RIVER 85	s	50	1.00			50	1.00		50	1.00	
GRANDE RONDE RIVER	s	50	1.00			50	1.00		50	1.00	
GRANDE RONDE RIVER 84	s	110	.99	.01		110	1.00		60	1.00	
WALLOWA-LOSTINE	s	73	1.00			36	1.00				
WALLOWA-LOSTINE 84	S	62	1.00						62	1.00	
WALLOWA HATCHERY	S	100	1.00			loo	1.00		loo	1.00	
MISSION CREEK	S	30	1.00						30	1.00	
BIG CANYON/COTTONWOOD CRKS.	s	88	1.00						88	1.00	
DWORSHAK HATCHERY	s	73	1.00						72	.91	.09
SELWAY RIVER	s	97	.99		.01	-			97	1.00	
LOCHSA RIVER	s	50	1.00						50	.99	.01
IMNAHA RIVER	s	96	1.00			86	1.00		96	1.00	
IMNAHA RIVER 84	s	58	1.00			58	1.00		58	1.00	
IMNAHA HATCHERY	S	100	1.00			loo	1.00		83	1.00	
SHEEP & BARGAMIN CRKS.	S	120	.99		.01	-			116	1.00	
S.F.SALMON (SECESH RIVER)	S	61	.99	.01							
S.F.SALMON (JOHNSON CREEK)	s	50	1.00			50	1.00		50	.99	.01
CHAMBERLAIN CREEK	s	97	.99	.01							
HORSE CREEK	s	50	1.00						50	1.00	
MIDDLE FORK SALMON RIVER #	s	277	.99	.01							
PAHSIMEROI 'B' STOCK	s	50	1.00			50	1.00		47	1.00	
SAWTOOTH 'A' STOCK	s	50	1.00			50	.99	.01	50	1.00	
HELLS CANYON STOCK	s	95	.97	.03		75	.99	.01	94	1.00	
YAKIMA RIVER	s	48	1.00			48	1.00		48	1.00	
YAKIMA RIVER 84	s	49	1.00			49	1.00		49	.98	.02
WENATCHEE RIVER	S	96	.97	.03		96	1.00		96	1.00	
ENTIAT RIVER	s	so	1.00			50	1.00				
WELLS HATCHERY	S	81	.98	.01	.01	50	1.00		loo	.99	.01
METHOW RIVER	s	58	.96	.04					58	1.00	

Steelhead troutgene frequency data (continued).

STEELHEAD STOCK	FORM	ISOCITRATE DEHYDROGENASE-3,4					LACTATE DEHYDROGENASE-4				MALATE DEHYDROGENASE-1,2				
		N	100	40	120	71	N	100	76	111	N	100	140	70	40
UMATILLA RIVER	s	98	.66	.19		.15	99	.42	.58		100	.99	.01		
UMATILLA HATCHERY	s	90	.66	.12		.22	100	.57	.43		100	1.00			
WALLA WALLA RIVER	S	40	.62	.16		.23	40	.36	.64		40	.99			.01
TOUCHET RIVER	S	49	.61	.17		.21	50	.45	.55		50	.99	.01		
TUCANNON RIVER	s	106	.64	.17		.19	112	.33	.67		113	1.00			
TUCANNON RIVER 85	S	49	.62	.19		.19	50	.29	.70	.01	50	.99	.02		
GRANDE RONDE RIVER	s	50	.70	.15		.14	49	.25	.75		50	.98	.02		
GRANDE RONDE RIVER 84	S	74	.72	.12		.17	109	.39	.61		110	1.00			
WALLOWA-LOSTINE	S	72	.75	.14		.12	73	.34	.66		73	.99		.01	
WALLOWA-LOSTINE 84	s	57	.71	.12	*	.17	62	.36	.64		-				
WALLOWA HATCHERY	S	92	.67	.16		.17	100	.24	.77		100	1.00			
MISSION CREEK +	s	30	.64	.13		.23	30	.42	.58		30	.99	.01		
BIG CANYON/COTTONWOOD CRKS.+	s	86	.58	.15		.28	88	.16	.84		88	.99	.01		
DWORSHAK HATCHERY +	S	71	.65	.22		.13	73	.23	.77		73	.99	.01		
SELWAY RIVER +	S	96	.62	.15		.24	98	.34	.66		98	1.00			
LOCHSA RIVER +	s	43	.68	.12		.20	50	.27	.73		50	.99	.01		
IMNAHA RIVER	s	96	.70	.14		.16	96	.29	.71		96	1.00			
IMNAHA RIVER 84	s	57	.72	.13		.15	58	.28	.72		58	1.00			
IMNAHA HATCHERY	S	87	.74	.08	•	.18	99	.39	.61		50	1.00			
SHEEP & BARGAMIN CRKS. +	S	94	.57	.18		.25	120	.29	.70	.02	120	1.00			
S.F.SALMON (SECESH RIVER)	S	56	.64	.24		.12	61	.25	.75		61	1.00	•		
S.F.SALMON (JOHNSON CREEK)	s	47	.57	.33	.01	.10	50	.28	.72		50	1.00			
CHAMBERLAIN CREEK +	S	97	.67	.15	.01	.18	97	.24	.73	.03	97	1.00			
HORSE CREEK +	s	40	.68	.07	.01	.24	50	.28	.72		50	1.00			
MIDDLE FORK SALMON RIVER #	S	158	.67	.15		.18	277	.33	.66	.01	277	1.00			
PAHSIMEROI 'B' STOCK	s	38	.68	.09	.01	.22	50	.29	.71		50	1.00	.01		
SAWTOOTH 'A' STOCK	S	28	.73	.08	.02	.17	50	.43	.56	.01	50	1.00			
HELLS CANYON STOCK	S	67	.63	.19		.18	100	.21	.74	.06	100	1.00			
YAKIMA RIVER	S	46	.65	.15	.02	.18	48	.68	.32		48	1.00			
YAKIMA RIVER 84	S	46	.62	.16		.22	49	.61	.39		49	.99	.02		
WENATCHEE RIVER	S	73	.62	.21	.01	.17	95	.38	.61	.01	96	1.00			
ENTIAT RIVER	s	50	.60	.19	*	.21	50	.29	.69	.02	50	.99	.01		
WELLS HATCHERY	S	81	.66	.18		.16	81	.26	.74		81	.98	.02		
METHOW RIVER	s	53	.66	.14		.20	58	.29	.71		58	.99	.01		

Steelhead trout gene frequency data (continued).

STOCK	FORM	MALATE DEHYDROGENASE-3,4					NADP+ MALATE DEHYDROGENASE			MANNOSE PHOSPHATE ISOMERASE			
		N	100	83	110	90	N	100	85	N	100	94	110
UMATILLA RIVER	S	100	.98	*	.02		100	1.00		100	1.00		
UMATILLA HATCHERY	S	100	.98	.01	.01		100	1.00		50	1.00		
WALLA WALLA RIVER	S	40	.98	.02			40	1.00		30	.99	.01	
TOUCHET RIVER	S	50	.97	.01	.01	.02	50	1.00		50	.99	.01	
TUCANNON RIVER	S	112	.98	.01	.01		113	1.00					
TUCANNON RIVER 85	S	50	.99	.01			50	1.00		50	.96	.03	.01
GRANDE RONDE RIVER	S	50	.99	.01			50	1.00					
GRANDE RONDE RIVER 84	S	110	.99	*		.01	110	1.00		50	1.00		
WALLOWA-LOSTINE	S	73	.95	.01	.04		73	1.00		73	.99	.01	
WALLOWA-LOSTINE 84	S	62	.95	.01	.04	.01	62	1.00		62	1.00		
WALLOWA HATCHERY	S	100	.96	.01	.03		1 m l . w			100	1.00		
MISSION CREEK	S	30	1.00							30	.95	.05	
BIG CANYON/COTTONWOOD CRKS.	S	88	1.00							88	.90	.10	
DWORSHAK HATCHERY	S	73	.99		.01					73	1.00		
SELWAY RIVER	S	98	1.00		•					98	.95	.04	.01
LOCHSA RIVER	S	50	.99		.01					40	1.00		
IMNAHA RIVER	S	96	1.00				94	1.00		96	.98	.01	.01
IMNAHA RIVER 84	S	58	1.00				58	1.00		58	1.00		
IMNAHA HATCHERY	S	100	1.00				100	1.00		100	1.00		
SHEEP & BARGAMIN CRKS.	S	120	.99		.02					120	.99	.02	
S.F.SALMON (SECESH RIVER)	S	61	.98		.02		61	1.00		61	1.00		
S.F.SALMON (JOHNSON CREEK)	S	50	.99	.01			50	1.00		50	.99	.01	
CHAMBERLAIN CREEK	S	97	.98		.01	.01				97	.98	.02	
HORSE CREEK	S	50	.99		.01	.01				50	1.00		
MIDDLE FORK SALMON RIVER #	S	277	.98	.02						277	1.00		
PAHSIMEROI 'B' STOCK	S	50	1.00				50	1.00		50	1.00		
SAWTOOTH 'A' STOCK	S	50	.99	.01			50	1.00		50	.95	.05	
HELLS CANYON STOCK	S	100	.98	.02			96	1.00		100	.99	.01	
YAKIMA RIVER	S	48	.98	.02	.01		48	1.00		48	1.00		
YAKIMA RIVER 84	S	49	1.00				49	1.00		49	1.00		
WENATCHEE RIVER	S	96	.94	.02		.04	96	1.00		96	.99	.01	
ENTIAT RIVER	S	50	.99	*	*		40	1.00		50	1.00		
WELLS HATCHERY	S	76	.99		.01		76	1.00		81	1.00		
METHOW RIVER	S	58	.98	.01	.01		58	1.00		58	.99	.01	

Steelhead trout gene frequency data (continued).

STEELHEAD STOCK	FORM	DIPEPTIDASE				TRIPEPTIDE AMINOPEPTIDASE					PHOSPHO-GLUCOMUTASE-1			
		N	100	110	85	95	N	100	129	74	50	N	-100	-115	-85
UMATILLA RIVER	S	98	.90	.10			100	1.00				100	1.00		
UMATILLA HATCHERY	S	100	.95	.05			100	.99	.01			100	1.00		
WALLA WALLA RIVER	S	40	.83	.18			40	.90	.04		.06	40	1.00		
TOUCHET RIVER	S	47	.93	.07			48	.98	.02			50	.97	.03	
TUCANNON RIVER	S	112	.88	.11	•		112	1.00	*			100	.99	.01	
TUCANNON RIVER 85	S	50	.90	.10			50	.99	.01		.	50	1.00		
GRANDE RONDE RIVER	S	50	.93	.04	.03		50	1.00				50	.99		.01
GRANDE RONDE RIVER 84	S	110	.90	.09	.01		110	.99	.01			110	1.00		
WALLOWA-LOSTINE	S	73	1.00				73	1.00				73	1.00		
WALLOWA-LOSTINE 84	S	62	.93	.07			52	1.00				62	1.00		
WALLOWA HATCHERY	S	100	.93	.06	.01		loo	1.00				100	1.00		
MISSION CREEK	S	30	.80	.20			30	1.00				30	.98		.02
BIG CANYON/COTTONWOOD CRKS.	S	88	.89	.09	.02		88	1.00				88	.99		.01
DWORSHAK HATCHERY	S	73	.54	.45			73	1.00				73	1.00		
SELWAY RIVER	S	98	.82	.18			98	1.00				95	1.00		
LOCHSA RIVER	S	46	.71	.29			50	1.00				49	1.00		
IMNAHA RIVER	S	100	.97	.03			100	1.00				96	1.00		
IMNAHA RIVER 84	S	58	.94	.06			58	1.00				58	1.00		
IMNAHA HATCHERY	S	100	.99	.01			100	1.00				100	1.00		
SHEEP & BARGAMIN CRKS.	S	120	.97	.04			120	1.00				120	1.00		
S.F.SALMON (SECESH RIVER)	S	61	.98	.02			57	1.00				61	1.00		
S.F.SALMON (JOHNSON CREEK)	S	50	.83	.16		.01	50	1.00				50	1.00		
CHAMBERLAIN CREEK	S	92	.95	.04		.01	97	1.00							
HORSE CREEK	S	50	.96	.04			51	1.00				50	1.00		
MIDDLE FORK SALMON RIVER #	S	277	.96	.04			277	.99	.01			277	1.00		
PAHSIMEROI 'B' STOCK	S	50	.54	.46			50	1.00				50	1.00		
SAWTOOTH 'A' STOCK	S	so	.95	.05			50	1.00				50	1.00		
HELLS CANYON STOCK	S	96	.96	.04	.01		100	.99	.01			100	1.00		
YAKIMA RIVER	S	48	.91	.09			48	1.00				48	1.00		
YAKIMA RIVER 84	S	49	.82	.18			49	1.00				49	1.00		
WENATCHEE RIVER	S	96	.94	.06			96	1.00				96	1.00		
ENTIAT RIVER	S	49	.96	.04			40	1.00				50	1.00		
WELLS HATCHERY	S	81	.91	.09			81	1.00				61	1.00		
METHOW RIVER	S	58	.95	.05			58	1.00				58	1.00		

Steelhead trout gene frequency data (continued).

STEELHEAD STOCK	FORM	PHOSPHO- V - 2			L-IDITOL DEHYDROGENASE			SUPEROXIDE DISMUTASE			
		N	-100	-140	N	100	195	N	100	152	48
UMATILLA RIVER	s	loo	1.00		100	1.00		96	.95		.05
UMATILLA HATCHERY	s	100	1.00		100	1.00		100	.98	.02	
WALLA WALLA RIVER	s	40	1.00		40	1.00		40	.86	.01	.13
TOUCHET RIVER	s	50	1.00		50	1.00		50	.99		.01
TUCANNON RIVER	s	113	.99	.01	113	1.00		113	.93	.06	.02
TUCANNON RIVER 85	S	50	1.00		50	1.00		50	.94		.06
GRANDE RONDE RIVER	S	50	1.00		50	.93	.07	50	.90	.10	
GRANDE RONDE RIVER 84	S	110	1.00		110	1.00		110	.93	.01	.06
WALLOWA-LOSTINE	S	73	1.00		73	1.00		73	.95	.03	.02
WALLOWA-LOSTINE 84	S	62	.99	.01	62	1.00		62	.90	.03	.07
WALLOWA HATCHERY	s	100	1.00		100	1.00		100	.99		.01
MISSION CREEK	S	30	1.00					30	.92	.07	.02
BIG CANYON/COTTONWOOD CRKS.	S	88	.98	.02				88	.93	.01	.06
DWORSHAK HATCHERY	S	73	1.00					73	1.00		
SELWAY RIVER	S	98	.97	.03				98	.91	.04	.05
LOCHSA RIVER	S	50	1.00					50	.90		.10
IMNAHA RIVER	S	87	1.00		96	1.00		86	.95	.04	.01
IMNAHA RIVER 84	s	58	1.00		58	1.00		58	.90	.02	.09
IMNAHA HATCHERY	S	loo	1.00		100	1.00		89	.91	.03	.06
SHEEP & BARGAMIN CRKS.	S	120	.99	.01				120	.87	.01	.13
S.F.SALMON (SECESH RIVER)	S	61	1.00		61	.99	.01	61	.89		.11
S.F.SALMON (JOHNSON CREEK)	S	50	1.00					49	.89	.04	.07
CHAMBERLAIN CREEK	S	97	1.00					97	.96	.01	.03
HORSE CREEK	s	50	1.00					50	1.00		
MIDDLE FORK SALMON RIVER #	S	277	1.00					277	.91	.01	.08
PAHSIMEROI 'B' STOCK	S	50	.99	.01				50	1.00		
SAWTOOTH 'A' STOCK	s	50	1.00					50	.91	.01	.08
HELLS CANYON STOCK	S	100	.99	.01				100	.95	.01	.04
YAKIMA RIVER	S	48	.98	.02	48	1.00		47	.92	.04	.04
YAKIMA RIVER 84	S	49	1.00		49	1.00		49	.86		.14
WENATCHEE RIVER	s	96	1.00					96	.91	.03	.06
ENTIAT RIVER	S	5 0	1.00		50	1.00		49	.96		.04
WELLS HATCHERY	S	61	1.00					81	.90	.01	.09
METHOW RIVER	s	58	1.00		58	1.00		58	.97	.01	.02