

AUGMENTED FISH HEALTH MONITORING

Annual Report 1987

Prepared by

Paty Michak
Bob Rogers

Washington State Department of Fisheries
115 General Administration Building
Olympia, Washington 98504

Funded by

U.S. Department of Energy
Bonneville Power Administration
Division of Fish and Wildlife
P.O. Box 3621
Portland, Oregon 97208
Contract Number DE-A179-86BP63461
Columbia River Basin Fish and Wildlife Program measure 704(f)(1)

Prepared for

Ron Morinaka, Project Officer

TABLE OF CONTENTS

Introduction	1
Description of Study Area	2
Methods and Materials	5
Database Development	8
Results and Discussion	12
Summary and Conclusions	18
Summary of Expenditures	20
Acknowledgments	21
Literature Cited	22
Appendix A Ovarian Fluid Protocol for Bacterial Kidney Disease . . . ,	A1
Appendix B <u>Myxobolus cerebralis</u> Sampling and Processing Protocol . . .	B1
Appendix C Length, Weight and Hematocrit Data	C1
Appendix D Disease Prevalence Summary Report	D1
Appendix E Hatchery Rearing Parameters and Mortality Summary Report . .	E1
Appendix F Yearly Medication Report	F1
Appendix G Viral Certification Form	G1
Appendix H Historical Fish Health Data and Loss by Life Stage	H1
Appendix I Adult Contribution of Index Station Stocks	I1
Appendix J Organosomatic Index summary report and data	J1

LIST OF TABLES

Table 1. Washington Department of Fisheries Columbia Basin Hatcheries	4
Table 2. Pathogen Detection Methods	6
Table 3. Inspection Results on 1987 Returning Adults	13
Table 4. 1985 Brood Pre-Release Sampling Results	15
Table 5. 1986 Brood Pre-Release Sampling Results	17
Table 6. 1986 Brood Midterm Sampling Results	19

LIST OF FIGURES

Figure 1. Washington Department of Fisheries Columbia Basin Hatcheries	3
Figure 2. Pathologists Field Report	9
Figure 3. Hatchery Monthly Report Form	10
Figure 4. Hatchery Monthly Worksheet	11

INTRODUCTION

In 1986 Washington Department of Fisheries (WDF) began its Augmented Fish Health Monitoring project. Funded by Bonneville Power Administration (BPA) this project was developed to fill a void of information in the area of artificial production in the Columbia Basin. Data will be collected to improve the health, quality and thus survival of artificially produced smolts.

An interagency technical committee was formed to determine the minimum level of fish health monitoring needed in the Columbia Basin. Members include both administrative and technical personnel from WDF, Washington Department of Wildlife, Oregon Fish and Game, Idaho Fish and Game and the U.S. Fish and Wildlife Service. The committee developed a monitoring program which includes agreed upon levels of testing in these areas: specific fish health parameters, water quality and prevalence of certain fish pathogens. BPA's funding enabled WDF to expand its fish health monitoring in the 14 Columbia Basin hatcheries to the level set forth by this group.

Benefits of project

This project will augment previous studies of Columbia Basin anadromous hatcheries funded by BPA. Data provided will allow proposals to be made to improve artificial production in the Columbia Basin. The overall goal of the project is to increase smolt to adult survival by 20 percent. This will be evaluated by coded wire tagging projects currently in place for U.S./Canada management and other studies.

Summary of analysis

Washington Department of Fisheries has divided the sampling and data collection into three major groups: adult analysis, juvenile analysis and database development. The adult analysis done at spawning includes screening for viral pathogens and Bacterial Kidney Disease (BKD). Pre-spawning mortalities are sampled for the presence of bacterial pathogens and parasites to determine causes of pre-spawning loss. Juvenile analysis involves monthly monitoring: pre-release examinations for viral pathogens, BKD and, where appropriate, whirling disease (*M. cerebralis*):completion of the Organosomatic analysis (Goede 1987)on four index stocks, and midterm exams on yearling groups for BKD and *M. cerebralis*. Database development required constructing fish health monitoring forms and a computer based data entry and retrieval system.

Current status of WDF

We have completed a full year of sampling and data collection, January, 1987 to January, 1988. This report will present and analyze this information.

DESCRIPTION OF STUDY AREA

WDF operates 9 hatcheries in the Lower Columbia Basin (Columbia River mouth to Snake River confluence) and 5 hatcheries in the Upper Columbia Basin (including the Snake River drainage). Figure 1. Species reared include spring, summer and fall chinook and early and late coho. Watershed and species reared by hatchery are listed in Table 1.

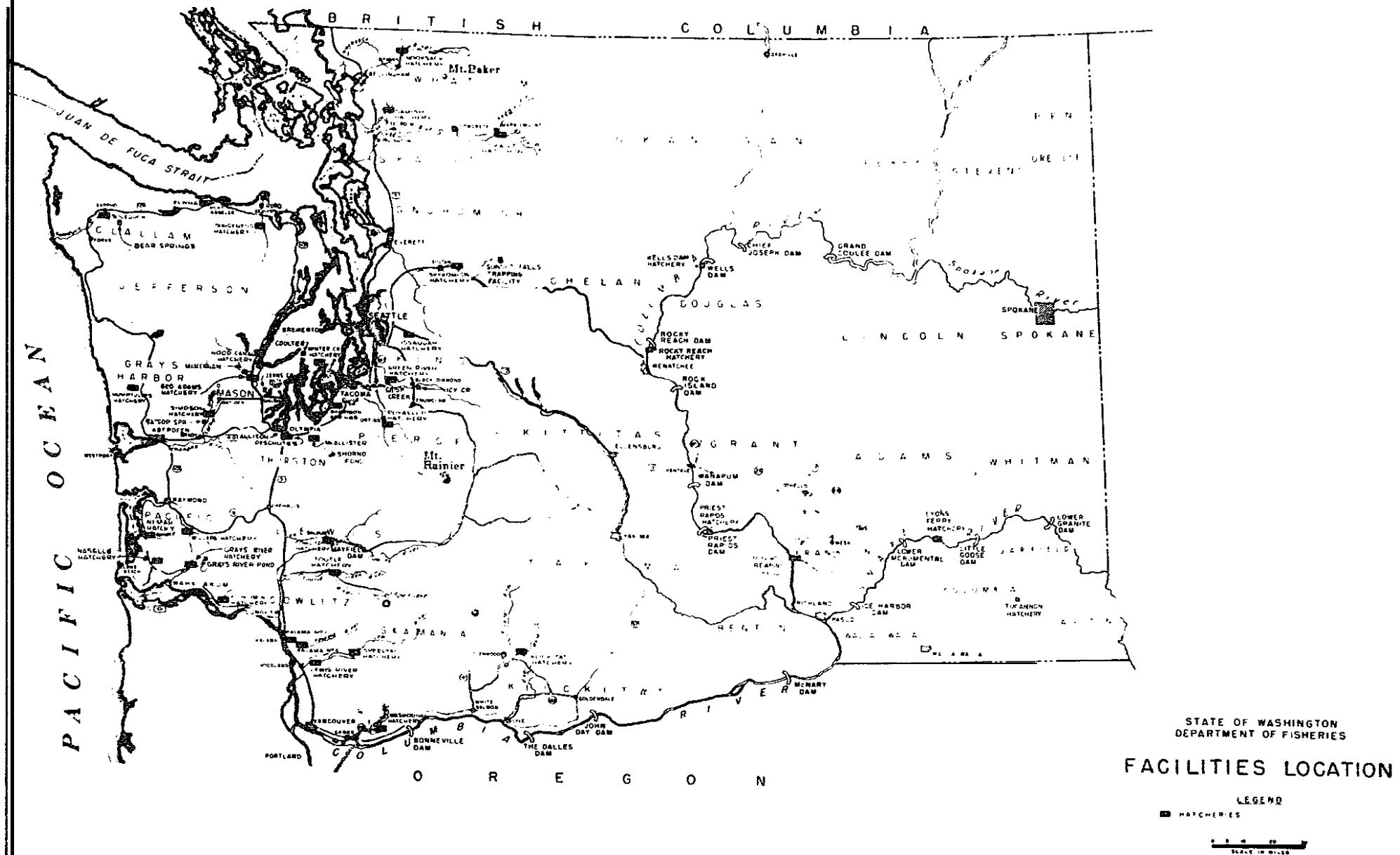


Figure 1. Washington Department of Fisheries Columbia Basin hatcheries.

Table 1. Washington Department of Fisheries Columbia Basin Hatcheries

Hatchery	Watershed	Rearing Program	*
LOWER COLUMBIA			
Cowlitz	Cowlitz River	Spring and fall chinook & Late coho	
Toutle	Cowlitz River	Early coho and fall chinook (release only)	
Elokomin	Elokomin River	Fall chinook and Late coho	
Grays River	Grays River	Fall chinook and Early coho	
Kalama Falls	Kalama River	Spring and fall chinook & Late coho	
Klickitat	Klickitat River	Spring and fall chinook & Late coho	
Lewis River	Lewis River	Spring chinook & Early and late coho	
Lower Kalama	Kalama River	Fall chinook & Early coho	
Speelyai	Lewis River	Spring chinook & Early coho	
Washougal	Washougal River	Fall chinook & Early and late coho	
UPPER COLUMBIA			
Lyon's Ferry	Snake River	Fall chinook	
Tucannon	Tucannon	Spring chinok	
Priest Rapids	Columbia River	Fall chinook	
Ringold	Columbia River	Fall and spring chinook & Early coho	
Rocky Reach	Columbia River	Fall chinook & Early and late coho	
Wells	Columbia River	Summer chinook	

METHODS AND MATERIALS

Methods used to detect specific pathogens have been agreed upon by technical representatives of all participating agencies. Generally all procedures follow the standards for pathogen detection in American Fisheries Society "Procedures For The Detection and Identification of Certain Fish Pathogens", 1985(AFS Blue Book), any deviations will be noted and detailed.

Sampling of adults and juveniles was conducted on site by staff fisheries biologists or fish pathologists or supervised by them. All samples, with the exception of bacteriology culture plates, are received at our main lab located on The Evergreen State College campus, Olympia, Washington. Bacteriology is completed at our lab located in the Salmon Culture Division office, downtown Olympia.

Adult analysis

Fish health monitoring of 1987 returning adults involved virus screening for Infectious Hematopoietic Necrosis Virus (IHNV), Infectious Pancreatic Necrosis Virus (IPNV) and Erythrocytic Inclusion Body Syndrome (EIBS). Additionally adults were screened for the presence of BKD. The above sampling was done at spawning on all returning species to the facilities listed in Table 1.

Adults were also routinely examined during the pre-spawning holding period. In trying to determine cause of pre-spawning loss fresh mortalities were examined by the visiting fish pathologist. Special attention was given in looking for Furunculosis, Enteric Redmouth (ERM) and Ceratomyxosis to determine their role in pre-spawning mortality.

Pathogen detection methods were as per AFS Blue Book as outlined in Table 2, with the exception of ovarian fluid sampling for BKD. In screening adults for BKD we developed a method, with the help of Diane Elliott of the USFWS, National Fisheries Research Center, Seattle, Washington, to sample ovarian fluid. We chose ovarian fluid because of the ease of sampling and the close association of the fluid to the eggs. Approximately a one ml sample from each female (60 females per species/stock) was taken from a cup of eggs using a disposable transfer pipet. The BKD sample was taken before the viral sample to prevent cross contamination from the viral sampling syringe (five fish pooled sample for virology). The one ml sample was then placed in a micro-centrifuge tube. The tubes were frozen on return to the lab to await later processing. Processing involves spinning the samples in a high speed centrifuge (13000 x g) to pellet the cellular material. After centrifugation the supernatant was discarded and a thin film of the pelleted material was placed on a fluorescent antibody spot slide. After air drying the slide was heat and methanol fixed and either stored refrigerated for later reading or read immediately using direct fluorescent antibody technique (FAT). The complete ovarian fluid testing protocol is presented in Appendix A.

Table 2. Pathogen Detection Methods

Pathogen	Life Stage	Tissue Sampled	Detection Method 1
Viral			
IHNV	Juvenile Adult	Kidney/spleen ovarian fluid	Tissue culture EPC\CHSE 214 Tissue culture EPC
IPNV	Juvenile & Adult	Kidney/spleen	Tissue culture CHSE 214
EIBS	Juvenile & Adult	Blood film	Leishman/Giemsa stain, read two (2) minutes at 1000X
Bacterial			
BKD	*Juvenile Adult	Kidney smear Ovarian fluid	FAT, 30 fields at 600X FAT, 30 fields at 600X
CWD	Juvenile	Kidney or spleen	Gram stain
Furunculosis	Juvenile & Adult	Kidney or spleen	Culture TSA media
ERM	Juvenile & Adult	Kidney or spleen	Culture TSA media
Parasite			
<u>M. cerebralis</u>	Juvenile	Head cartilage	Plankton centrifuge confirm by histopathology
Ceratomyxosis	Juvenile & Adult	Hindgut	Light microscopy
PKD	Juvenile	Posterior kidney	Light microscopy, confirm by histopathology

IHNV - Infectious Hematopoietic Necrosis Virus

IPNV - Infectious Pancreatic Necrosis Virus

EIBS - Erythrocytic Inclusion Body Syndrome

BKD - Bacterial Kidney Disease (R. salmoninarum)

CWD - Coldwater Disease

ERM - Enteric red mouth (Y. ruckeri)

PKD - Proliferative Kidney Disease

Furunculosis - A. salmonicida

* For detailed protocol see Appendix A.

¹ Amos, K., 1985. Procedures for the Detection and Identification of Certain Fish Pathogens. American Fisheries Society, Fish Health Section, Bethesda, MD. 119 pages.

METHODS AND MATERIALS

Juvenile analysis

Monthly monitoring visits continued throughout 1987. All stocks and brood years at WDF Columbia Basin hatcheries were evaluated by the visiting fish pathologist to determine their general overall health condition. Routine exams include: external appearance, eye condition, fin integrity, gill condition, external and gill parasite prevalence, internal organ color and quality. In addition the disease status of moribund fish and a cause for any increase in loss was determined by the appropriate method (gram stain, wet mount, bacterial culture, tissue culture, etc.) as determined by the pathologist. Emphasis was placed on screening juveniles for the presence of ERM, Furunculosis, Coldwater disease (CWD) and Ceratomyxosis. Detection methods are listed in Table 2.

Pre-release examinations were conducted on 1985 brood yearling and 1986 brood sub-yearling release groups at all stations listed in Table 1. Sixty asymptomatic fish were screened for IHNV, IPNV, EIBS, BKD and where appropriate Mvxobolus cerebralis. In addition to the sixty fish sample, up to 10 moribund fish were sampled for IHNV and IPNV. Tissues sampled and detection techniques are listed in Table 2. A detailed protocol for M.cerebralis screening is presented in Appendix B.

Additional data collection at pre-release included length, weight and hematocrits. Hematocrits were not required by contract, but we felt that valuable baseline information could be obtained with a minimum of effort (Appendix C).

Organosomatic analyses, based on Goede's method (personal communication, 1987) were performed at release on index station stocks. WDF index stations and stocks are: Cowlitz Hatchery spring and fall chinook (Tule), Lower Kalama Hatchery early (Type-S) coho and Lyon's Ferry Hatchery fall chinook (Upriver Brights). These stocks plus additional stocks sampled by the other participating agencies comprise representation for all species/stock types in the Columbia Basin. All stocks are coded wire tagged as part of U.S./Canada management and other projects. The organosomatic Index is an autopsy system designed to assess and evaluate health and condition of a given fish population. The only deviation from Goede's methodology was that serum proteins were not measured on 1987 releases.

Midterm exams were conducted on all yearling groups at approximately 6 months (or greater) into their rearing cycle. Exams included sampling 60 asymptomatic fish for BKD and sampling the most susceptible species, at stations with surface water supplies, for M.cerebralis. Sampling for M.cereralis at midterm reduced the volume of tissue to be processed by one half or more (Appendix B).

DATABASE DEVELOPMENT

An inherent part of this project is collection and evaluation of fish health data. We developed three forms to fulfill our data collection needs. Form FH01 Fish Health Monitoring Report (Part 1) allows the pathologist to describe the current status of the stock and list sampling done in the field or samples sent to the lab during a monthly monitoring visit. The form is uniquely numbered with a case history number to track sampling data and results (Figure 2). Part 2, form FH02 is used on station to record hatchery rearing parameters and to account for cause of loss and medication used (Figure 3). Form FH03 the Medication and Mortality Report is a daily worksheet for recording loss by cause, medication usage and magnitude and duration of epizootics (Figure 4). Both form FH02 and FH03 are completed by hatchery personnel for each species on station and sent to our main office monthly.

To compile hatchery rearing data, monthly sampling data, pre-release, midterm and adult sampling data and lab results we developed a database management system. Using R:Base System 5 and consulting with a computer programming specialist we have developed a data compilation and report generation system. At present we are routinely producing the following reports: Disease Prevalence Summary (Appendix D), Hatchery Rearing Parameters and Mortality Summary (by hatchery or species) (Appendix E), Yearly Medication Report (Appendix F) and Viral Certifications (Appendix G).

Historical database

Development of a historical database to estimate project benefits has been completed. All available information on disease treatment, amount of medication used, loss at each life stage over normal production periods, food conversion efficiency and adult survival (at index hatcheries) was summarized from numerous hatchery forms. To date this information has not been entered into our database system because of format inconsistencies with current data.

Information on percentage incidence and mortality by each pathogen is not available. Historically mortality records by cause were not kept. Some indication of pathogen incidence is discernible from historical medication usage, Appendix H.

Loss by lifestage over a normal production period was summarized, Appendix H. Because of rearing program changes species reared historically may not reflect current rearing listed in Table 1.

Adult contribution, expressed as % survival, by location, species and brood year is presented in Appendix I. Percent survival is based on coded wire tag recoveries from all fisheries and hatchery rack return.

Figure 2. Pathologists Field Report.

Form FH01

FISH HEALTH MONITORING REPORT (Part 1)

Location: _____ Date: _____ / _____ / _____
 month day year

Lot Description: _____ species stock brood sub-group

Exam Type: _____ Size: _____ Mortality: _____
 [Monit-M,Diag-D,Pre-P,Cert-C] [Egg-E,Juv-#/lb,Adult-A] [Nor-N,Inc-I,Epi-E]

Ave % daily loss: _____ %

*** SAMPLE SIZE ***

*** SAMPLE SIZE ***

Type Pathogen Hlthy Morib Total #Pos Type Pathogen Hlthy Morib Total # Pos

*	*	*	*	*	*	11	*	*	*	*	*	*	*
*	*	*	*	*	*	11	*	*	*	*	*	*	*
*	*	*	*	*	*	11	*	*	*	*	*	*	*
*	*	*	*	*	*	11	*	*	*	*	*	*	*

[Viral: IHN,IPN,EIB Bact: BKD,CWD,FUR,ERM Paras: M.c,C.s,PKX]

POND	TEMP	LOSS	POPUL	%LOSS	F/LB	FLOW	LBS/GPM	LBSFED/DAY
1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1

Diagnosis, Recommendations, Remarks:

Examiner: _____

Case Number: _____ **2605**

Figure 3. Hatchery monthly report form.
Form: F302 FISH

FISH HEALTH MONITORING REPORT (Part 2)

Location: _____

Information for:

— year

Lot Description:

Specie Description Species Stock Brood Sub-group

TOTAL: _____ **LAST DAY OF MONTH:** _____

FISH INFO: Ave Lth _____ in.

DIET INFO:

Type _____

Pellet Size

Lot Number

WATER INFO:

Max Temp _____
Range lowest highest

Figure 4 . Hatchery monthly worksheet.

FOR THE FHO

MEDICATION AND MORTALITY REPORT

Location: _____

Information for: _____
month _____ **year** _____

Lot Description: _____

ANSWER The answer is 1000.

—

Sub-group

RESULTS AND DISCUSSION

A full season of fish health monitoring has been completed. From January, 1987 to January, 1988 monitoring sampling was conducted on 23 adult stocks at spawning, 18 yearling releases (1985 brood), 17 sub-yearling "zero" releases (1986 brood) and 20 midterm exams (1986 brood). In addition to sampling, processing, reading and recording all the above, monthly monitoring visits were completed by staff fish pathologists and monthly hatchery rearing data was collected and entered in the database.

Results of fish health inspections on adults and juveniles were recorded in two ways. For IHNV, IPNV and M. cerebralis results are listed as positive (P) or negative (N). The results are for the species and stock in question, a number positive is not given because we are determining the presence or absence of virus or parasite in the population. If IHNV has been found previously or the population is suspect additional sampling to the 60 fish was conducted (additional sampling is conducted at WDF's expense). For all other pathogens results were listed as the number positive.

Adult analysis

Results of inspections on 1987 returning adults are shown in Table 3. IHNV was found in four stocks: Cowlitz spring and fall chinook, Tucannon spring chinook and Wells summer chinook. IPNV and other replicable agents were negative in all stocks. Presence of erythrocytic inclusion bodies was determined to be 19.6 % positive over all species and stocks sampled. Results differentiated by species are as follows:

Spring chinook	34.8 % positive	n = 307
Fall chinook	22.7 % positive	n = 419
Summer chinook	5.0 % positive	n= 60
Early coho	20.2 % positive	n = 218
Late coho	2.0 % positive	n = 300

It was quite apparent the adult late coho stocks have a significantly lower prevalence of inclusion bodies present in their blood. Reasons for this occurrence are unknown at this time, but we do feel it is not reflective of any sampling or processing artifact.

Prevalence of BKD overall was 16.4 %. The breakdown by species were as follows:

Spring chinook	22.2 % positive	n = 284
Fall chinook	11.9 % positive	n = 420
Summer chinook	18.3 % positive	n= 60
Early coho	8.9 % positive	n = 192
Late coho	21.7 % positive	n = 300

Analysis of BKD results by species is somewhat reflective of

Table 3. Inspection Results on 1987 returning Adults.

Species	Stock	IHNV		IPNV		EIBS		BKD	
		Fish	Result	Fish	Result	Fish	Result	Fish	Result
Hatchery:	Cowlitz								
Spring -	Cowlitz	778	P	60	N	60	22	60	12
Fall	cowlitz	2560	P	60	N	60	0	60	12
L. Coho	Cowlitz	2519	N	120	N	60	0	60	33
Hatchery:	Elokomin								
Fall	Elokomin	60	N	60	N	60	1	60	1
L. Coho	Elokomin	60	N	60	N	60	3	60	8
Hatchery:	Grays River								
Fall	Grays River	60	N	60	N	60	24	60	12
E. Coho	Grays River	60	N	60	N	62	4	60	2
Hatchery:	Kalama Falls								
Spring	Kalama Falls	120	N	60	N	60	31	60	2
L. Coho	Kalama Falls	60	N	60	N	60	1	60	0
Hatchery:	Klickitat								
Spring	Klickitat	60	N	60	N	60	30	60	9
Hatchery:	Lewis River								
Spring	Lewis River	9	N						
L. Coho	Lewis River	60	N	60	N	60	2	60	15
Hatchery:	Lower Kalama								
Fall	Kalama Falls	60	N	60	N	60	41	60	10
E. Coho	Lower Kalama	60	N	60	N	60	5	60	0
Hatchery:	Lyons Ferry								
Spring	Tucannon	48	P	63	N	67	21	43	12
Fall	Lyons Ferry	1579	N	60	N	59	3	60	3
Hatchery:	Priest Rapids								
Fall	Priest Rapids	116	N	60	N	60	0	60	0
Hatchery:	Speelyai								
Spring	Lewis River	82	N	60	N	60	3	61	28
E. Coho	Lewis River	60	N	60	N	59	30	60	10
Sockeye	Wild	37	N						
Hatchery:	Washougal								
Fall	Washougal	148	N	60	N	60	26	60	12
E. Coho	Washougal	12	N	37	N	37	5	12	5
L. Coho	Washougal	60	N	60	N	60	0	60	9
Hatchery:	Wells Spawning Channel								
Summer	Wells	456	P	60	N	60	3	60	11

Result: N = negative P = positive for the species and stock # = # positive

RESULTS AND DISCUSSION

Adult analysis

prevalence trends within WDF Columbia Basin hatcheries. However origin of the species/stock may greatly influence overall incidence by species. For example Cowlitz hatchery has a historically high prevalence of BKD, and the late coho sampled at Cowlitz in 1987 were 55% positive, substantially higher than all other late coho stocks (13.4 % positive without Cowlitz late coho). As additional information is collected over the following three years, analysis by location, species, stock and brood will be possible and more reflective of the prevalence of BKD.

Pre-spawning loss was monitored extensively throughout the adult holding period in 1987. Loss is detailed in the Disease Prevalence Summary report (Appendix D). Adult pre-spawning loss was attributed to the following diseases and conditions: Bacterial Gill Disease, BKD, Columnaris, Furunculosis, Saprolegnia, handling, jumpouts, normal, pre-spawning and Ceratomyxosis. Loss designated as "pre-spawning" was loss not attributable to any specific cause or pathogen and was generally thought to normal holding loss.

Juvenile analysis

Monthly monitoring visits were completed throughout the past season. All data from form FH01 (Figure 2) was entered onto the database system, along with the corresponding lab results. Significant results from monthly monitoring visits include; Proliferative Kidney Disease (PKD) in Rocky Reach 1986 brood late coho, and an intranuclear parasite (Elston 1987) in 1986 brood Wells summer chinook. Additional, monthly monitoring has played a large role in accurately determining cause of loss and attributing monthly loss appropriately.

Pre-release exam results for 1985 brood yearling releases are presented in Table 4. Viral exams for IHNV, IPNV and other replicable agents were negative for all species/stocks. Prevalence of EIBS was high at 72.3 % positive. Spring chinook stocks had a considerably higher than average prevalence of EIBS of 92.3 %. Overall prevalence of BKD for these yearling stocks was 28.8 % positive. Results from the first ten groups processed and read are suspect due to protocol changes. Refinement of our fluorescent antibody technique included filtering of the conjugate to remove fluorescein isothiocyanate (FITC) dye debris. We feel that some false positives may have occurred because of dye debris. Comparison with 1986 brood yearling releases may give some indication as to whether these groups had abnormally high incidence of BKD. The 1986 brood yearlings will be sampled in the spring of 1988. No *M. cerebralis* spores were found in the plankton centrifuge samples of the 1985 brood. However spores of the genus *Myxobolus* were found in the tissue homogenates from several stations. Resampling of these locations to obtain samples for histopathological examination was completed and all samples

Table 4. 1985 Brood Pre-Release Sampling Results

<u>Species</u>	<u>Stock</u>	<u>IHNV</u>		<u>IPNH</u>		<u>EIBS</u>		<u>BKD</u>		<u>M.c.</u>	
		<u>Fish</u>	<u>Result</u>								
Hatchery: Cowlitz											
Spring Cowlitz	60	N	60	N	59	56	60	44	60	—	N
L. Coho Cowlitz	60	N	60	N	60	52	60	1	—		
Hatchery: Elokomin											
L. Coho Elokomin	60	N	60	N	60	7	60	16	—		
Hatchery: Grays River											
E. Coho Grays River	60	N	60	N	60	51	62	0	—		
Hatchery: Kalama Falls											
L. Coho Kalama	60	N	60	N	60	42	60	20	—		
Hatchery: Klickitat											
Spring Klickitat	60	N	60	N	60	49	60	0	60	—	N
L. Coho Klickitat	60	N	60	N	60	60	60	1	—		
Hatchery: Lewis River											
Spring Lewis River	60	N	60	N	60	60	60	34	60	—	N
L. Coho Lewis River	60	N	60	N	60	51	60	48	—		
Hatchery: Lower Kalama											
E. Coho Low. Kalama	60	N	60	N	60	45	60	23	—		
Hatchery: Lyons Ferry											
Spring Tucannon	30	N	30	N	30	28	30	21	30	—	N
Fall Lyons Ferry	60	N	60	N	60	52	60	45	—		
Hatchery: Ringold											
Fall Ringold	60	N	60	N	60	54	60	48	60	—	N
Hatchery: Rocky Reach											
Fall Priest Rapids	60	N	60	N	59	37	60	0	60	—	N
L. Coho Rocky Reach	60	N	60	N	60	10	60	1	—		
Hatchery: Washougal											
E. Coho Washougal	60	N	60	N	60	33	60	0	—		
L. Coho Washougal	60	N	60	N	59	54	60	0	—		
Hatchery: Wells Spawning Channel											
Summer Wells	60	N	60	N	60	16	60	1	60	—	N

M.c. - *Myxobolus cerebralis*

Result: N = negative P = positive for the species and stock # = # positive

RESULTS AND DISCUSSION

Juvenile analysis

were negative. Histology was performed by John Morrison, USFWS, Olympia, Washington.

Pre-release exams for the 1986 brood consisted of sampling sub-yearling, "zero", groups. The majority of these releases are fall chinook with one group of spring chinook and two releases of summer chinook. Groups designated as delayed in Table 5 are released from one month up to three months after the normal timing release. Viral assays for IHNV, IPNV and other replicable agents were negative. Prevalence of EIBS was 48.3 % overall. The two groups of summer chinook were considerably higher than average with 82.7 % of the 120 fish sampled positive for EIBS. Whether this is a reflection of species or origin is unknown at this time. BKD was found to be very low in all but two groups, Cowlitz spring chinook (31.7 % positive) and Washougal fall chinook (33.3 % positive). With the exclusion of these two groups the prevalence of BKD was only 1.3 %.

Organosomatic Index analysis

The organosomatic index was conducted on the selected species/stocks for yearling, zero and delayed releases. A total of seven exams were completed: Cowlitz '85 brood yearling spring chinook, '86 brood zero spring chinook, '86 brood zero fall chinook normal release and delayed release; Lower Kalama '85 brood yearling early coho and Lyon's Ferry '85 brood yearling and '86 brood zero fall chinook. The computer generated summary and raw data for all indices are in Appendix J.

Interpretation of results are based on training received from Goede at a seminar sponsored by WDF and Washington Department of Wildlife in 1987.

Cowlitz '85 brood yearling spring chinook. These fish appeared to be generally healthy. Fat level was possibly less than desirable with 75 % of the fish with a fat level of +1 (less than 50 % of each caecum covered). The only large deviation from normal was found in the spleen. Enlarged spleens were observed in 40 % of the fish. This may indicate a bacterial infection or chronic stress.

Cowlitz '86 brood zero spring chinook. Once again fat level in these fish seemed to be less than desirable with a mean fat level of 0.8. The short rearing period of these fish may greatly impact the level of fat obtainable before release. Enlarged spleens were also seen in these fish but at a much lower level, 13 %.

Cowlitz '86 brood zero fall chinook normal release. Only minor deviations from normal were found in this group. Seven percent of the fish had fatty livers. This condition can reflect dietary abnormalities, cause at this time is unknown.

Cowlitz '86 brood zero fall chinook delayed release. This group of fish appeared to be affected by some stressor. The

Table 5. 1986 Brood Pre-release Sampling Results

Species	Stock	IHNV		IPNV		EIBS		BKD		Comments
		Fish	Result	Fish	Result	Fish	Result	Fish	Result	
Hatchery:	Cowlitz									
Spring	Cowlitz	60	N	60	N	60	28	60	19	
Fall	Cowlitz	60	N	60	N	60	18	60	5	
Fall	Cowlitz	60	N	60	N	60	32	60	1	Delayed
Hatchery:	Elokomin									
Fall	Elokomin	60	N	60	N	60	29	60	0	
Hatchery:	Grays River									
Fall	Grays River	60	N	60	N	60	24	60	0	
Fall	Grays River	57	N	57	N	56	37	57	0	Delayed
Hatchery:	Kalama Falls									
Fall	Kalama Falls	60	N	60	N	60	25	60	0	
Hatchery:	Klickitat									
Fall	Priest Rapids	60	N	60	N	60	19	60	3	
Fall	Klickitat	60	N	60	N	60	19	60	0	
Fall	Priest Rapids	60	N	60	N	60	32	60	0	Delayed
Hatchery:	Lower Kalama									
Fall	Lower Kalama	60	N	60	N	60	28	60	2	
Hatchery:	Lyons Ferry									
Fall	Lyons Ferry	60	N	60	N	60	38	60	0	
Hatchery:	Priest Rapids									
Fall	Priest Rapids	60	N	60	N	60	25	60	0	
Hatchery:	Rocky Reach									
Fall	Rocky Reach	60	N	60	N	60	24	60	0	
Hatchery:	Washougal									
Fall	Washougal	60	N	60	N	60	24	60	20	
Hatchery:	Wells Spawning Channel									
Summer	Wells	60	N	60	N	60	51	60	0	
Summer	Wells	60	N	60	N	60	38	60	1	Delayed

Delayed - Delayed release groups separate from normal timing release.

Result: N = negative P = positive for species and stock # = # positive

RESULTS AND DISCUSSION

Juvenile analysis

coefficient of variation of the hematocrits was slightly high at 16 %, indicating that the "stressor" was affecting the fish at different degrees. Pale gills were found in 13 % of the fish, 23 % had mildly hemorrhaged thymus, and 5 % had severe hemorrhaging in the thymus.

Lower Kalama '85 brood yearling early coho. An overall healthy group with all parameters normal with the exception of the sex ratio. We hope that the high level of males (78 %) was a sampling artifact and not reflective of the population.

Lyon's Ferry '85 brood yearling fall chinook. These fish seemed to be affected by a mild stressor with 18 % of the fish having mild hemorrhaging in the thymus and 7 % having inflamed pseudobranches. A minor deviation from normal was also seen in the hindgut with 5 % of the fish showing mild inflammation.

Lyon's Ferry '86 brood zero fall chinook. The only deviation from normal seen was mild hemorrhaging in the thymus in 10 % of the fish. All other conditions were normal

Midterm exams

Results of midterm BKD exams on 1986 brood yearling groups (Table 6) showed very low levels of BKD, .2% positive. Additionally, midterm sampling for M. cerebralis was negative.

SUMMARY AND CONCLUSIONS

With only one full year completed of this five year project, we have already begun to see benefits and improvements to fish health within our agency. Communication between fish health professionals, hatchery personnel and administrators has greatly increased due in a large part to this project. Computerization of fish health and hatchery data has provided WDF with a way to better track fish health problems at its Columbia Basin hatcheries.

Evaluation of specific project goals can only occur in future years when replicate data to that presented here is available. We look forward to completing another year of the project in 1989 in hopes of a better understanding of fish health concerns in WDF's Columbia Basin hatcheries.

Table 6. 1986 Brood Midterm Sampling Results

<u>Species</u>	<u>Stock</u>	<u>BKD</u>		<u>M.c.</u>	
		<u>Fish</u>	<u>Result</u>	<u>Fish</u>	<u>Result</u>
Hatchery:	Cowlitz				
Spring	Cowlitz	60	0	72	N
L. Coho	Cowlitz	60	1	--	
Hatchery:	Elokomin				
L. Coho	Elokomin	60	0	--	
Hatchery:	Grays River				
Fall	Grays River	--		57	N
E. Coho	Grays River	60	0	--	
Hatchery:	Kalama Falls				
Spring	Kalama Falls	60	0	60	N
L. Coho	Kalama Falls	60	0	--	
Hatchery:	Klickitat				
Spring	Klickitat	60	0	60	N
L. Coho	Klickitat	60	0	--	
Hatchery:	Lewis River				
Spring	Lewis River	60	0	60	N
L. Coho	Lewis River	60	0	--	
Hatchery:	Lower Kalama				
E. Coho	Lower Kalama	60	0	--	
Hatchery:	Lyons Ferry				
Spring	Tucannon	60	1	--	
Fall	Lyons Ferry	60	0	--	
Hatchery:	Ringold				
Spring	Wind River	60	0	60	N
Hatchery:	Rocky Reach				
Fall	Wells	60	0	60	N
E. Coho	Rocky Reach	66	0	--	
Hatchery:	Speelyai				
Spring	Speelyai	60	0	60	N
E. Coho	Lewis River	60	0	--	
Hatchery:	Washougal				
L. Coho	Washougal	60	0	--	
Hatchery:	Wells Spawning Channel				
Summer	Wells	60	0	--	

M.c. - *Mvxobolus cerebralis*

Result: N = negative P = positive # = # positive

SUMMARY OF EXPENDITURES
Major property purchased up to January, 1988.

ITEM	COST
Refrigerated centrifuge (Beckman)	\$ 7609.60
Stomacher (Tekmar)	1700.00
Hematocrit centrifuge	871.07
Freezer (Sears)	563.00
Refrigerator (Sears)	537.00
Nanopure water system	1539.52
Biological Hood (BBL)	5983.12
Low temperature incubator	1950.00
Telephones (2)	96.66
Kaypro computer	1719.14
Fujitsu printer	1130.79
Printer cover and stand	557.53
Nikon upright microscope with camera and epifluorescence	15805.00
D.O. meters (Otterbine) (15)	3615.00
Ohaus digital scale (15)	1425.00
Microcentrifuge (Beckman) with fixed horizontal rotor	1099.89
Kodak slide projector	290.20
Konica camera	193.44
Nikon inverted microscope	8237.00

ACKNOWLEDGMENTS

Project Leader: Kevin Amos.

Fish Pathologists: Kevin Amos, Tami Black, Pat Chapman, Mark DeCew, Kathy Hopper, Dick Westgard.

Laboratory staff: Jennifer Hulett.

Computer Specialists: Bob Foster, Tony Rasch.

Ron Goede

Operations Manager: Lew Atkins

Hatchery Managers: Paul Peterson, Ed Jouper, Dick Aksamit, Bob Ready, John Norton, Doug Loucks, Robin Nicolay, Carl Ross, Ernie Davis, Frank Anderson, Don Rapelje, Dick Johnson and Jerry Morre, Don Peterson.

All hatchery crews.

LITERATURE CITED

- Amos, Kevin H., editor. 1985
Procedures for the detection and identification of certain fish pathogens. 3d edition. Fish Health Section, American Fisheries Society. Corvalis, Oregon.
- Elston R. A., M.L. Kent, and L. Harrell. 1987. An Intranuclear Microsporidium Associated with Acute Anemia in the Chinook Salmon, *Oncorhynchus tshawytscha*. J. Protozool., 34(3):274-277.
- Goede, Ron, Fish Pathologist. Utah Division of Wildlife Resources. Personal Communication, 1987.

APPENDIX A

Appendix A contains the detailed protocol for ovarian fluid testing for Bacterial Kidney Disease (BKD). This method was developed to screen spawning salmon populations for the presence of Renibacterium salmoninarum.

Ovarian Fluid Testing Protocol for Bacterial Kidney Disease

Sampling Protocol

1. Collect a cupful of eggs-fluid from a spawning female.
2. Remove approximately 1 (one) ml of ovarian fluid.
(We use a disposable plastic transfer pipet)
- NOTE: If viral samples will be collected in pooled lots take BKD samples first to prevent cross contamination.
3. Dispense the 1 ml of ovarian fluid into micro-centrifuge tubes.
4. Transport to lab for processing.

Lab Processing Protocol

1. Samples may be frozen for storage when immediate processing is not possible.
2. Thaw samples if frozen.
3. Load centrifuge, spin for 5 (five) minutes at a minimum of 10,000 x g to pellet cellular material.
4. Decant supernatant from centrifuge tube.
5. Using a disposable inoculating loop or CalgiSwab (dampened in Phosphate Buffered Saline [PBS]) smear a thin film of the pelleted material on a FA spot slide. A light amount of material adheres best to the slide.
6. Air dry.
7. Heat fix.
8. Methanol fix 5 (five) minutes.
9. Slides can now be stored or continue on.
10. Place a drop of FITC conjugated anti - R. salmoninarum immunoglobulin* on each well of the spot slide. (*Obtained from U.S. Fish and Wildlife Service National Fish Health Research Laboratory, Kearneysville, West Virginia, USA) Diluted 1:160 v/v in PBS pH 7.4, and filtered weekly through a 0.2 μ m Acrodisc nucleopore polycarbonate filter.
11. Incubate 10 (ten) minutes in dark humid container to prevent drying of the conjugate.
12. Rinse slides in FTA hemagglutination buffer - dip slides repeatedly. Soaking can cause tissue to slough off.
NOTE: Change solutions weekly or more frequently when processing a large number of slides.
13. Counterstain with Evans Blue 1:100 concentration for 3-5 minutes.
14. Rinse in second container of FTA - dip slides repeatedly.
15. Air dry in dark and/or quick dry with hair dryer.
16. Store in dark until ready to read. If it will be days before slides are read storing in the refrigerator seems to prolong life of FITC dye.
17. Cover slip - mounted with DIFCO FA mounting fluid pH 9.
18. Slides are examined under oil at 600x for 30 fields with epifluorescence illumination. Suspect bacteria are confirmed at 1000x. Characteristics required are apple-green fluorescence, small size, and halo fluorescence.
19. Bacteria per 30 fields are counted for each sample and recorded as follows: <10 bacteria per 30 fields, >10 but <100, >10c but < 1000, >1000 and TNTC (too numerous to count).

Materials Required for Ovarian fluid sampling and processing

<u>Item</u>	<u>Vendor</u>	<u>Catalogue Number**</u>
paper cups		
disposable transfer pipet	VWR	14607-001
microcentrifuge tubes	VWR	20170-_____ (o. 228)
highspeed centrifuge		
Beckman Microfuge E	VWR	BK348720
Horizontal rotor	VWR	BK349358
Tube slides	VWR	BK342828
FA snot slides	Cel-Line Assoc. (Attachments)	
inoculating loops 1 ul	VWR	DF1905-96 (p. 900)
CalgiSwabs Type 1	VWR	15648-100 (p. 129)
CalgiSwabs Type 2	VWR	15648-201 (p. 129)
PBS pH 7.4	VWR	AL48410-3
Methanol	VWR	
BKD antisera		
Acrodiscs Nuclepore filter	VWR	28144-040
FTA hemagglutination buffer	VWR	BB11248
Evans Blue	VWR	EM-EX0975-1 (p. 307)
staining dishes & racks	VWR	
cover slips	VWR	PP. 886-887
DIFCO mounting fluid pH 9	VWR	DF3340-57
immersion oil	VWR	48218-048 (p. 884)

Epifluorescent microscope with appropriate filters (for FITC).

* BKD antisera is now available from: Kirkegaard and Perry Laboratories, Inc. Gaithersburg, Maryland. (800) 638-3167.

** WR Catalogue 87 - 88 phone: (800) 562-5344

APPENDIX B

Appendix B details WDF's protocol for screening fish populations for Myxobolus cerebralis. Our protocol follows AFS "Blue Book" for plankton centrifuge technique. Sampling techniques are also outlined.

Myxobolus cerebralis Sampling and Processing Protocol

Routine sampling for the causative agent of whirling disease was implemented at facilities that (1) are on surface water supplies, and (2) rear susceptible species for a length of time sufficient enough to detect mature spores upon examination.

Chinook lots destined for yearling release were targeted for sampling.

The 1985 brood yearling lots were sampled at release. Myxosporean spores were found in two of the seven lots, but due to delayed sample processing, histology was not possible.

The 1986 brood chinook were sampled in August-September of 1987. Spores were subsequently found in the plankton centrifuge residue from Spring chinook reared at the Cowlitz and Kalama hatcheries. Additional samples were taken and histology confirmed the presence of spores only in the brain and spinal cord. No spores were observed in the cartilage. Spores have also been found in the plankton centrifuge residue from Spring chinook at the Lewis River hatchery, but histology has not yet been completed.

SAMPLING PROTOCOL

(1)--Sixty (60) fish are sub-sampled from an original sample of approximately 100 fish. All sub-sampled fish are subjected to a lethal concentration of MS-222,

(2)--Each head is severed immediately posterior to the operculum,

(3)--The lower jaw is removed,

(4)--The remainder of the head is sectioned into two equal halves (sagittal section),

(5)--One half of each head is placed in a plastic bag and frozen for later plankton centrifuge processing. The remaining half is placed in Bouins solution and stored.

LAB PROCESSING PROTOCOL

With the exception of the modifications indicated below, samples are processed by the Plankton Centrifuge Method in accordance with the AFS Fish Health Blue Book (Amos, 1985).

Step 1(c)--The tissue homogenate is first strained through polyester filter fiber (instead of glass wool) and then through a #100 U.S.A. Standard Sieve (150 micron).

Step 1(g)--Samples are scanned at 400X for 3 minutes or until spores are found. If spores are found, the heads retained in Bouins solution then undergo histological sectioning.

APPENDIX C

Appendix C contains the length, weight and hematocrit data collected during pre-release exams. The data are sorted first by species then brood year and listed by location. The average, maximum and minimum are calculated for all three parameters. In addition the results from EIBS and BKD screening are appended.

Length is measured as Total length in mm.
Weight is measured as weight in grams.

Appendix C. Length Weight Hematocrit Data

Spring	Chinook	Length	Weight	Hematocrit	Analysis				
					Hatchery				
Fish #	Cowlitz	Brood '85	Lewis R.	Brood '85	Tucannon	Brood '85	Klickitat	Brood '85	
	Length	Weight	Hemat.	Length	Weight	Hemat.	Length	Weight	Hemat.
1	187	79.6	-	200	70.9	32	220	93.7	46
2	183	77.6	-	135	22.5	39	164	38.8	46
3	182	82.8	-	178	49.8	37	152	33.3	51
4	185	68.8	-	134	25.3	37	184	62.5	48
5	199	103.5	-	180	53.5	38	188	58.0	38
6	170	60.9	-	188	60.5	32	122	16.8	48
7	170	56.5	-	153	31.9	-	210	84.8	43
8	175	64.0	-	154	34.1	31	152	33.3	45
9	200	90.2	27	139	24.5	37	223	100.9	43
10	193	101.7	37	154	32.7	36	223	99.9	40
11	170	59.6	37	174	45.5	39	208	82.4	42
12	171	63.6	42	148	30.7	30	205	77.9	40
13	173	62.5	35	144	28.3	27	150	30.7	39
14	199	91.4	38	151	30.3	31	216	82.1	40
15	185	80.8	34	149	27.4	28	230	118.9	44
16	185	75.3	-	151	30.0	31	162	41.1	38
17	168	59.9	31	133	27.3	34	164	39.1	40
18	194	92.6	39	154	35.2	35	150	28.2	39
19	137	30.6	30	143	26.9	34	144	24.3	39
20	122	21.0	43	135	22.1	26	128	17.7	37
21	173	62.3	41	158	30.1	34	154	32.2	38
22	170	56.5	33	183	60.9	43	162	39.1	35
23	172	67.9	35	150	30.7	32	214	93.9	36
24	160	49.4	44	180	49.4	38	223	99.5	35
25	160	51.8	38	155	35.7	47	215	89.6	33
26	171	64.4	38	151	31.4	43	216	96.2	36
27	168	58.6	36	140	25.4	34	205	85.5	37
28	156	46.8	37	146	30.4	44	162	41.3	40
29	170	59.4	31	139	25.7	38	148	29.4	35
30	123	21.3	39	143	24.8	38	150	31.5	34
31	181	72.3	40	213	91.3	38	-	-	216
32	136	31.2	36	150	31.0	33	-	-	165
33	187	89.6	30	168	46.2	34	-	-	170
34	166	55.3	34	154	34.2	28	-	-	157
35	179	72.2	23	161	38.5	34	-	-	168
36	186	72.8	42	154	35.8	32	-	-	170
37	166	53.6	43	155	32.9	29	-	-	154
38	160	51.2	40	160	34.6	35	-	-	170
39	160	48.5	36	164	40.9	33	-	-	170
40	133	28.1	28	149	28.6	32	-	-	167
41	185	78.2	36	201	71.0	36	-	-	169
42	197	97.6	31	129	20.3	38	-	-	162
43	185	82.4	23	157	37.4	42	-	-	181
44	180	74.0	35	150	28.9	38	-	-	167
45	185	79.8	39	168	42.7	37	-	-	150
46	173	66.8	37	149	30.8	41	-	-	170
47	126	76.1	31	175	42.7	45	-	-	167
48	181	71.2	31	144	28.4	43	-	-	145
49	137	31.6	37	140	25.4	43	-	-	158
50	121	20.1	42	141	26.4	38	-	-	152
51	161	49.4	36	153	30.8	37	-	-	178
52	159	47.3	39	154	32.3	39	-	-	174
53	166	54.4	41	153	30.2	38	-	-	161
54	131	25.7	38	148	25.6	34	-	-	188
55	165	57.6	39	151	32.0	40	-	-	168
56	157	47.9	40	149	27.3	30	-	-	167
57	198	99.6	38	148	28.3	41	-	-	181
58	158	51.2	40	147	27.4	39	-	-	162
59	119	18.3	39	157	33.3	37	-	-	167
60	186	79.7	35	144	25.6	31	-	-	155
Avg	169.3	62.4	36.2	155.5	35.2	35.9	181.5	60.1	40.2
MAX	200.0	103.5	44.0	213.0	91.3	47.0	230.0	118.9	51.0
MIN	119.0	18.3	23.0	129.0	20.3	26.0	122.0	16.8	33.0
EBS				56pos/59		60pos/60		28pos/30	
BKD				44pos/55*		34pos/58*		21pos/25*	
									49pos/60
									0pos/60

* Results suspect due to technique changes.

Appendix C. Length Weight Hematocrit Data

Spring	Chinook	Length	Weight	Hematocrit	Analysis
		-----Hatchery -----			
	Cowlitz	Brood '86			
Fish #		Length	Weight	Hemat.	
		122	16.6	32	
		111	11.5	33	
3		97	8.7	36	
4		84	5.3	36	
5		100	8.7	34	
6		106	9.8	34	
7		111	11	36	
8		106	10.5	33	
9		115	12.2	33	
10		109	11.1	41	
11		84	5	30	
12		78	3.9	32	
13		86	5.5	33	
14		96	7.9	33	
15		108	11.2	34	
16		100	9	30	
17		98	8.4	26	
18		111	11.9	30	
19		98	7.7	35	
20		119	14.5	33	
21		76	3.6	33	
22		92	6.9	33	
23		97	8.4	37	
24		108	11	38	
25		94	7.3	28	
26		115	12.7	29	
27		92	7.1	32	
28		114	13.1	37	
29		98	8.8	25	
30		108	10.9	33	
31		102	8.9	28	
32		107	10.6	37	
33		97	8.7	30	
34		94	6.9	33	
35		92	6.9	32	
36		102	8.6	41	
37		102	8.8	37	
38		108	10.2	22	
39		106	10.3	33	
40		129	18.2	38	
41		118	13.2	36	
42		82	4.7	33	
43		94	6.8	35	
44		110	10	33	
45		82	5.3	29	
46		90	5.9		
47		102	9.1	36	
48		107	10.1	29	
49		97	8.7	34	
50		107	10.5	35	
51		70	2.7		
52		118	14.6	37	
53		120	16.4	28	
54		108	11	35	
55		108	10.3	28	
56		103	10.3	33	
57		117	13.9	38	
58		108	11.2	39	
59		99	8.9	38	
60		106	11.4	28	
AVG		102.0	9.6	33.2	
MAX		129.0	18.2	41.0	
MIN		70.0	2.7	22.0	
EIBS				28pos/60	
BKD				19pos/55*	

* Results suspect due to technique changes.

Appendix C. Length Weight Hematocrit Data

Summer Fish #	Chinook	Length			Weight			Hematocrit Analysis		
		Wells Brood '85			Wells Brood '86			Wells Brood '86		
		Length	Weight	Hemat.	Length	Weight	Hemat.	Length	Weight	Hemat.
1		165	38.2	36	123	16.9	34	92	6.2	41
2		182	52.2	36	119	14.5	37	102	8.9	36
3		172	44.9	36	101	9.7	38	95	7.0	37
4		173	46.6	38	124	18.1	39	104	9.2	42
5		177	45.9	36	110	11.8	41	100	8.7	36
6		184	51.5	38	108	11.1		95	7.6	32
7		163	36.8	35	122	16.3	37	105	9.2	30
8		169	40.8	37	104	11.1	38	93	6.5	35
9		184	52.6	36	117	14.7	37	92	6.3	30
10		186	54.1	34	116	14.6	38	90	5.9	30
11		176	44.9	33	77	3.9		90	6.5	35
12		185	53.6	32	81	4.1		109	10.9	37
13		189	57.1	32	101	8.7	31	106	9.3	39
14		192	60.7	35	120	16.4	36	96	7.5	37
15		156	33.9	37	119	16.7	33	102	9.0	43
16		151	27.9	31	113	12.7	36	112	11.8	42
17		160	35.9	36	114	13.1	34	99	7.8	35
18		163	38.3	42	121	15.9	31	93	6.8	
19		160	34.8	30	126	17.5	38	90	6.1	38
20		171	51.1	33	99	8.9	35	90	5.8	36
21		157	31.7	35	121	16.8	38	85	5.1	35
22		202	68.6	34	109	11.4	34	98	7.8	34
23		169	43.3	31	121	14.1	34	99	8.5	37
24		181	51.1	37	111	12.8	36	97	8.0	32
25		161	37.8	32	129	19.9	37	81	3.6	
26		163	38.8	33	118	16.4	30	95	6.9	32
27		182	50.6	34	110	11.4	37	104	10.5	38
28		165	39	32	119	14.5	38	92	6.5	29
29		170	40.7	34	122	14.7	38	87	5.2	32
30		158	34.3	34	107	10.4	40	75	3.2	
31		150	30.5	44	100	8	34	105	9.8	33
32		180	48.4	39	117	15.3	36	81	4.0	
33		180	52.8	35	126	18.1	38	97	7.6	38
34		175	46.8	31	130	18.9	36	98	7.7	41
35		194	63.2	33	95	7	37	99	7.8	36
36		160	38.3	38	97	7.3	35	92	6.9	34
37		171	43.4	34	104	9	33	85	5.0	31
38		120	15.2	31	98	8.3	34	93	7.0	34
39		163	38.9	32	117	13.9	35	86	5.3	
40		187	55.6	41	118	14.8	39	86	5.0	32
41		176	53.1	35	80	4.1		95	7.0	37
42		211	80.9	35	79	4.3	31	97	7.5	37
43		177	47.8	36	101	9.5	28	89	6.4	37
44		182	49.5	36	119	15.1	40	92	6.9	37
45		180	47.8	31	130	19.4	41	99	8.1	30
46		176	47.1	33	113	13	35	93	6.7	36
47		168	42	33	113	12.1	35	90	6.1	
48		138	20.7	35	123	18.8	38	86	5.3	
49		178	45.3	34	122	15.7	37	89	5.9	33
50		158	34.5	39	120	14.6	42	77	3.5	
51		177	48.2	34	81	5.1		93	8.0	28
52		159	34.7	35	100	8.9	36	95	7.2	
53		178	50.3	37	118	13.6	32	85	7.3	41
54		181	49.6	33	117	9.7	37	98	7.4	34
55		160	33.3	33	117	14.1	40	95	6.9	33
56		173	48.7	37	121	14.9	36	94	6.8	37
57		170	42.4	38	130	20.2	37	93	6.8	34
58		166	37.7	32	116	12.3	38	93	6.6	
59		195	64	33	122	18.7	37	88	5.4	38
60		164	37.7	31	117	14	36	91	5.7	
AVG		171.9	44.8	34.8	112.1	13.0	36.1	93.7	7.0	35.3
MAX		211.0	80.9	44.0	130.0	20.2	42.0	112.0	11.8	43.0
MIN		120.0	15.2	30.0	77.0	3.9	28.0	75.0	3.2	28.0
EIBS			16pos/60			38pos/61			51pos/60	
BKD			1pos/60			1pos/60			0pos/60	

* Results suspect due to technique changes.

Appendix C. Length Weight Hematocrit Data.

Fall	Chinook	Length	Weight	Hematocrit	Analysis				
	Hatchery								
	Lyon's Ferry	Brood '85	Ringold	Brood '85	Rocky Reach	Brood '85	Klickitat	Brood '86	
Fish #	Length	Weight	Hemat.	Length	Weight	Hemat.	Length	Weight	Hemat.
1	188	61.0	43	178	48.8	34	167	41.9	43
2	176	47.4	51	171	41.0	43	172	46.5	37
3	173	46.6	41	209	73.9	38	175	47.7	39
4	200	66.7	40	212	82.3	47	189	61.1	40
5	193	63.1	46	195	63.8	40	168	34.2	43
6	186	56.1	48	190	56.4	42	197	67.8	41
7	195	64.8	52	203	68.4	47	175	44.9	43
8	186	61.5	48	210	76.0	51	170	43.3	36
9	186	58.0	50	185	49.9	47	160	35.0	36
10	180	50.5	51	182	52.4	50	155	32.3	40
11	183	48.6	39	220	89.0	42	188	59.0	43
12	180	49.0	41	161	35.5	31	166	39.9	40
13	184	58.2	42	206	81.6	31	167	40.6	39
14	190	60.5	36	200	70.7	43	178	54.6	37
15	178	53.4	38	206	76.9	41	163	40.2	27
16	163	47.6	45	180	48.2	41	178	52.4	43
17	172	45.2	41	198	68.8	40	176	49.2	40
18	188	59.2	38	178	48.9	37	170	40.8	38
19	163	44.2	40	189	57.2	40	144	21.2	46
20	193	65.6	42	167	43.0	36	165	38.5	37
21	184	62.0	48	218	90.3	46	171	44.3	40
22	183	54.7	42	175	47.2	48	180	53.4	43
23	196	68.0	46	205	75.7	45	178	50.4	38
24	186	62.0	49	200	67.5	43	180	50.4	40
25	191	62.1	47	181	47.3	47	169	44.2	40
26	190	59.4	44	154	33.0	38	178	49.5	45
27	197	71.4	44	170	44.4	40	188	60.3	41
28	180	52.1	49	206	73.5	38	175	45.8	40
29	176	48.0	47	185	56.3	41	155	31.5	39
30	177	51.7	50	187	51.6	48	170	45.0	44
31	183	59.2	36	186	57.7	42	182	55.1	45
32	175	48.0	38	203	71.8	43	208	77.9	40
33	196	73.6	35	188	57.8	40	175	48.1	40
34	182	59.1	44	188	56.5	43	156	32.3	47
35	177	57.6	45	175	46.9	41	164	41.3	40
36	167	43.6	41	168	43.5	41	190	63.4	46
37	188	62.1	40	166	36.7	28	171	46.2	40
38	181	58.2	41	201	71.5	39	168	42.5	47
39	181	54.6	42	195	64.3	41	163	37.4	39
40	138	25.4	48	156	58.3	42	110	11.1	39
41	191	64.7	44	203	70.8	157	33.8	45	87
42	171	44.6	51	183	54.3	47	188	59.3	46
43	170	47.1	45	193	64.3	45	185	56.5	44
44	201	79.7	46	195	68.9	48	182	48.4	41
45	170	46.1	46	187	58.0	48	190	64.5	46
46	172	46.7	43	167	37.5	43	188	61.3	48
47	174	49.8	45	173	46.7	43	177	49.3	40
48	173	48.4	46	168	43.6	42	165	36.3	43
49	169	42.8	48	176	43.9	37	177	49.9	38
50	172	45.4	44	218	90.5	41	146	19.2	38
51	182	51.2	44	192	59.0	36	173	47.3	41
52	182	55.5	42	195	64.3	43	187	59.7	46
53	194	68.5	45	202	77.3	42	172	46.6	50
54	190	61.5	40	177	50.1	43	186	55.5	39
55	196	68.7	38	181	53.6	38	180	50.2	42
56	184	56.8	42	165	37.9	37	170	45.4	44
57	183	57.0	37	201	75.0	40	175	51.1	45
58	175	50.2	41	188	57.2	43	168	43.2	46
59	166	54.3	40	203	70.2	40	155	29.7	46
60	165	45.0	48	222	97.8	34	151	26.7	43
AVG	181.1	55.4	43.7	188.9	60.1	41.4	172.1	45.9	41.5
MAX	201.0	79.7	52.0	222.0	97.8	51.0	208.0	77.9	50.0
MIN	138.0	25.4	35.0	154.0	33.0	28.0	110.0	11.1	27.0
EIBS		52pos/60			54pos/60			37pos/59	
BKD		45pos/56*			48pos/59*			0pos/60	
								19pos/60	
								0pos/60	

* Results suspect due to technique changes.

Appendix C. Length Weight Hematocrit Data

Fish #	Fall	Chinook	Length	Weight	Hematocrit	Analysis							
	Klickitat '86(Prst/Wells) Hatchery						Rocky	Reach	Brood	'86	Lyon's Ferry	Brood '86	
		Length	Weight	Hemat.	Length	Weight	Hemat.	Length	Weight	Hemat.	Length	Weight	Hemat.
1	93	7.4	45	97	7.2	34	78	3.9			97	8.6	45
2	96	8.0	44	86	4.6	38	77	4.1			103	9.5	43
3	92	8.2	36	77	3.3	31	74	2.2			97	7.9	44
4	93	7.2	38	96	6.5	33	72	3.1			105	9.6	40
5	96	8.6	42	54	1.1		67	2.7			100	8.1	41
6	87	6.1	42	76	3.6	38	64	2.6			100	8.5	42
7	84	5.6		69	2.5		71	3.2			108	10.5	41
8	93	7.7	43	67	2.4		76	3.5			108	10.1	38
9	77	4.5	36	50	1.0		68	2.6			92	6.2	36
10	70	2.6		71	2.7		68	2.6			90	6	43
11	106	10.4	37	81	4.1	36	69	2.8			122	15.7	41
12	85	5.5	35	82	4.2	35	77	4.1			100	8.3	37
13	84	5.2	33	91	6.0	41	85	4.8	37	106	10.5	36	
14	94	8.1	32	79	3.9		77	3.9	36	114	12.8	41	
15	88	6.6	36	87	5.1	31	74	3.4		99	7.9	39	
16	103	9.7	38	81	4.2		77	3.8		98	7.9	42	
17	84	5.7	39	84	4.4		73	3.3		101	8.5	44	
18	88	6.5	34	78	3.9	30	80	4.3		100	8.6	42	
19	98	8.9	38	71	2.9		78	4.1	39	95	6.2	37	
20	97	8.1	39	61	2.0		68	2.7		93	5.7	46	
21	96	8.0	41	76	3.3		75	3.4		110	11.3	39	
22	80	5.1		82	4.3	39	86	5.2	36	105	9.9	41	
23	90	6.9	34	88	5.8	42	89	5.8	38	84	5.2	39	
24	93	6.9	44	82	4.2		83	5.1	39	110	11.3	44	
25	91	8.2	43	83	4.4	28	69	2.9		105	11.4	44	
26	95	8.3		86	5.1	36	80	3.9		107	10.1	44	
27	89	6.1	41	76	3.6	36	75	3.4		86	5.1	43	
28	80	4.6		85	4.7	35	73	3.1		96	6.7	31	
29	88	6.5		73	2.9		77	4.0		99	8	41	
30	79	4.7					73	3.2		90	5.6	43	
31	91	8.0	47	83	4.3	27	78	3.8		118	14.7	40	
32	96	8.4	38	96	7.6	39	84	4.7		87	5.5	39	
33	88	6.4	38	87	5.5	29	84	4.9	38	108	9.9	43	
34	97	8.4	46	85	4.6	38	75	3.6		100	8.1	35	
35	101	10.2	45	70	2.7		73	2.9		108	10.2	39	
36	74	3.3		78	3.5	32	83	4.8		98	7.9	42	
37	94	8.4	43	77	3.5		67	2.4		98	7.5	44	
38	101	10.0	43	81	3.9		72	3.3		105	9.6	45	
39	89	6.7	32	83	4.5	33	74	3.4		100	9	40	
40	85	5.3	36	76	3.3		71	2.8		98	7.6	42	
41	112	14.3	45	88	5.4	37	75	3.6	37	106	10.5	43	
42	87	5.9	34	93	5.9	38	75	3.5		112	11.9	42	
43	102	10.0	42	84	4.7	33	80	4.6		105	9.6	42	
44	88	6.7		78	3.6		72	2.9		106	10	42	
45	96	8.5	40	85	4.5		75	3.8		95	7.4	38	
46	101	10.2	39	80	3.9	35	57	1.6		95	6.9	40	
47	86	6.3	34	74	2.9		72	3.0		101	8.5	40	
48	88	5.7	38	76	3.6		74	3.5		91	5.9	44	
49	86	5.0		63	2.2		69	2.8		92	6.1	46	
50	63	2.1		85	5.1	39	65	2.3		91	6	44	
51	97	8.8	42	91	5.8	36	81	4.6		99	8.5		
52	95	8.2	42	94	6.5	40	70	2.8		114	12.8	42	
53	96	7.6	38	92	6.6	37	82	4.7		104	9.5	47	
54	107	11.9	45	85	5.0	36	73	3.3		111	12.1	44	
55	95	8.4	42	88	5.1	34	74	3.5		100	7.8	40	
56	94	8.5	42	87	4.9	35	75	3.5		98	7.5	45	
57	94	8.4	40	84	4.9	38	76	3.6		102	8.9	51	
58	88	6.4	38	83	4.6	33	79	4.1		100	8	43	
59	96	8.4	42	73	2.8		71	2.7		113	12.3	39	
60	92	7.3	31	70	2.6		70	2.8		100	7.8	48	
AVG	91.1	7.3	39.4	80.3	4.2	35.2	74.7	3.5	37.5	101.3	8.8	41.6	
MAX	112.0	14.3	47.0	97.0	7.6	42.0	89.0	5.8	39.0	122.0	15.7	51.0	
MIN	63.0	2.1	31.0	50.0	1.0	27.0	57.0	1.6	36.0	84.0	5.1	31.0	
EIBS			19pos/60			29pos/60			24pos/60		38pos/58		
SKD			3pos/60			0pos/60			0pos/60		0pos/60		

* Results suspect due to technique changes.

Appendix C. Length Weight Hematocrit Data

	Fall	Chinook	Length	Weight	Hematocrit	Analysis						
Fish #	Hatchery											
	Grays River Brood '86			Kalama Falls Brood '86			Lower Kalama Brood '86			Priest Rapids Brood '86		
	Length	Weight	Hemat.	Length	Weight	Hemat.	Length	Weight	Hemat.	Length	Weight	Hemat.
1	103	10.3	40	93	7	38	89	6.3	35	117	13.9	44
2	98	8.0	33	102	9.3	41	90	6.1	35	100	7.5	40
3	110	11.9	34	93	7.1	37	77	4.3		100	7.8	44
4	104	11.1	33	90	5.6	39	104	10.2	40	106	10.4	37
5	104	9.9	43	86	6	42	98	8.7	40	97	7.6	38
6	111	13.3	37	79	3.8		87	5.4	35	103	8.4	40
7	100	8.1	37	82	4.8	41	82	4.8		99	7.8	39
8	90	6.8	33	87	5.9		88	6.5		94	7.2	42
9	99	8.6	36	85	5		99	9.2	38	80	4.2	38
10	100	9.2	35	82	4.9		76	3.6		89	5.7	41
11	103	9.6	34	82	4.6		109	12.7	33	106	9.5	43
12	107	10.0	37	85	5.3	40	112	13	38	109	10.4	44
13	101	9.0	30	92	6	30	93	8	38	97	7.2	43
14	106	10.2	38	84	5.4	34	98	8.8	37	100	7.8	43
15	91	5.8	33	95	7.9		105	10.9	39	96	6.8	49
16	103	9.9	32	100	9.5	38	92	7	33	94	7	35
17	96	7.6	32	88	5.8	35	93	7.7	36	102	8.1	47
18	81	4.5		85	5.7	33	86	5.3	34	88	5.4	
19	90	6.3	36	89	5.6	29	83	5.1	30	99	8.4	
20	91	7.7	29	76	4		78	4.1		89	5.9	39
21	111	11.7	30	97	8.2	34	106	12.4	38	99	7.9	42
22	102	9.3	36	82	5.1	31	91	6.6	33	79	3.7	
23	102	9.4	34	100	8.9	32	107	12.4	35	110	11.1	48
24	108	11.2	32	89	7.1	30	102	10.2	37	95	7.6	43
25	99	8.4	31	85	5.3		83	5.3		102	9.1	41
26	98	8.7	31	92	6.2	31	85	5.3	30	91	5.9	
27	103	9.8	30	86	5.3		99	8.9	36	86	5.2	42
28	103	9.9	32	93	6.3	32	77	4.2	33	88	5.6	40
29	98	9.3	32	82	4.4	38	90	6.6	34	85	5	
30	99	8.0	37	88	5.7	34	86	4.7	27	76	3.5	37
31	102	9.3	38	95	7.7	32	88	6.3	33	106	10.7	46
32	99	8.7	37	102	9.2	35	103	9.9	38	91	6.1	39
33	100	7.3	32	87	5.1	35	94	7.6	33	94	6.4	42
34	109	10.5	34	90	5.8	33	89	6.4	34	99	7.8	41
35	99	8.8	31	95	7.9	33	94	7.6	33	85	5.3	40
36	93	7.4		87	5.2	34	91	6.7	33	97	7.9	45
37	96	8.0	30	92	7.1	33	97	7.7	37	92	6.8	41
38	94	7.3	40	87	6.2		92	7	41	89	6	40
39	93	6.9	38	87	5.7	32	90	5.9	37	89	5.4	44
40	95	7.4	36	79	3.9	33	68	2.5		91	6	44
41	101	9.3	35	85	5.1	35	77	3.5	30	119	14.4	46
42	107	11.4	27	94	7.3	32	81	3.9	33	82	4.2	39
43	97	8.4	29	92	7.1	37	90	6.4	33	87	5.5	
44	112	12.9	33	93	6.7	38	93	7.1	30	110	11.9	43
45	98	8.1	35	87	5.3		104	10	37	88	5.3	47
46	101	8.4	37	79	4		85	5.1	32	81	4	40
47	101	9.3		95	7.3	36	93	6.3	27	119	13.7	46
48	101	9.2	39	75	3.4		81	4.8	27	116	13.5	45
49	98	8.4	29	71	2.4		75	3.7		116	13.2	52
50	93	6.8	25	79	3.9		88	6	37	80	4	
51	103	9.0	34	95	7.6	33	97	7.6	37	89	5.5	42
52	104	10.2	35	100	8.8	33	85	5.7	34	89	5.6	43
53	115	13.2	38	83	4.7	32	109	13.1	36	97	7.4	44
54	96	7.4	35	87	5.9	42	98	8.8	36	100	7.6	48
55	91	6.5	33	91	6.3		93	7	29	93	6.3	43
56	107	9.7	31	86	5.9	38	95	7.6	31	86	4.9	
57	103	9.2	28	92	6.7	34	94	6.8	35	85	4.7	
58	105	9.2	43	86	5.5	34	97	8.3	32	93	6.4	48
59	89	5.4	35	83	4.8	31	86	5.6	28	84	5.2	42
60	92	7.8	36	78	4.2	30	79	4.1		86	5.5	
AVG	100.1	8.9	34.0	88.0	6.0	34.6	91.2	7.1	34.3	95.2	7.3	42.6
MAX	115.0	13.3	43.0	102.0	9.5	42.0	112.0	13.1	41.0	119.0	14.4	52.0
MIN	81.0	4.5	25.0	71.0	2.4	29.0	68.0	2.5	27.0	76.0	3.5	35.0
EIBS			24pos/60			25pos/58			28pos/60		25pos/60	
BKD			0pos/60			0pos/60			2pos/60		0pos/60	

* Results suspect due to technique changes,

Appendix C. Length Weight Hematocrit Data

Fish #	Fall	Chinook	Analysis											
			Klickitat '86(Priest)				Washougal Brood '86				Cowlitz Brood '86			
			Length	Weight	Hemat.		Length	Weight	Hemat.		Length	Weight	Hemat.	
1	94	7.3	37	90	6.4	41	95	7.4	29	102	9.3			
2	95	8.5	40	82	4.8		106	10.6	37	153	34.6	43		
3	80	4.5		92	6.6	28	106	10.2	30	122	16.8	31		
4	93	7.3		85	5.6	41	100	9.6	33	146	29.1	33		
5	90	7.1	42	89	6.2	26	98	8.4	35	140	24.1	21		
6	74	3.2		85	5.4	37	107	10.4	33	165	40.9	26		
7	81	4.6	40	85	5.1	36	102	10.2	27	174	53	29		
8	85	5.7	34	90	6.4	37	96	8.1	32	152	31.2	33		
9	84	5.4	36	76	3.5		100	9	38	169	44.1	38		
10	66	2.8		89	5.6	33	96	7.7	28	162	39.3	30		
11	86	5.7	37	90	5.8	36	96	7.8	32	138	23.9	34		
12	96	8.7	39	92	6.9	28	109	11.6	31	141	24.5	31		
13	94	6.9	36	96	7.2	40	97	8	24	149	31.5	34		
14	97	8.7	38	82	4.5	38	95	7.6	33	150	29.4	32		
15	76	4	33	92	7.3	35	110	12.5	33	150	32.9	39		
16	88	6.9	37	85	5.1	27	82	4.2	35	157	33.1	32		
17	92	7.5	31	84	4.9	34	95	7.9	31	156	34.5	35		
18	88	5.6	37	92	6.8	34	85	5.1	32	151	30.3	42		
19	95	8.9	35	87	5.8	32	95	7.3	39	157	32.4	38		
20	88	5.8	33	83	5		96	8	36	154	31.6	35		
21	92	8.7	34	91	6.9	34	98	8.6	35	151	32.2	25		
22	84	5.4	37	82	4.6		107	11.2	24	149	32.2	39		
23	103	11	38	89	5.7		106	11.4	32	130	19.6	34		
24	81	5	28	84	5.5	32	82	4.1	28	149	28.6	38		
25	73	3.4		86	5.8	38	85	5.4	22	139	25.1	30		
26	99	9.3	32	87	5.4	28	110	11.2	36	148	31	37		
27	88	6.5	38	93	6.2		106	10.4	38	150	30.6	29		
28	86	5.5		80	4.9		100	9.4	30	155	34.2	30		
29	92	7.6	34	87	5.9	34	104	9.6	31	142	26.8	37		
30	95	8.6	33	66	3.4		90	6.5	30	154	32.9	32		
31	85	5.6	31	87	5.7		68	2.9		145	29	27		
32	86	6.5	38	97	7.9	37	70	2.6		145	28.4	38		
33	91	7.2	32	94	7.2	35	86	5.3	30	134	21.1	29		
34	82	5.4	32	89	6.2	36	96	7.6	32	125	21.4	29		
35	91	6.8	36	91	6.2	32	92	6.7		147	29.5	36		
36	93	7.4	34	87	5.7	35	105	10.1	36	147	28.6	37		
37	86	5.6	30	75	3.7		110	12.7	34	151	31.4	41		
38	87	6.4	36	88	6		102	9.1	30	152	34.3	34		
39	80	4.8	30	88	6.1	38	99	8.8	33	151	32.5	44		
40	77	3.7		74	3.8		101	9.3	30	151	30.4	43		
41	83	5.2		86	5.8	37	98	8.2	29	162	40.4	35		
42	92	7.2		85	5.6	27	109	11.4	30	142	27.2	36		
43	77	4.4		88	5.8	33	89	6.2	32	153	34	37		
44	82	5.3	31	87	5.4	36	111	11.8	32	133	20.1	35		
45	90	6.6	34	85	5.4	30	109	12.1	31	156	34.5	38		
46	86	6	30	91	6.9	33	98	8.2	28	164	42	43		
47	87	5.4		88	5.9	35	98	8.8	32	157	35.2	33		
48	87	6	31	84	5.2	31	98	8.2	30	139	23.1	39		
49	94	7.2	32	83	5.2		105	10	31	129	19.4	37		
50	85	5.5		79	4.4	34	94	7.6	29	142	27.2	35		
51	72	3.4		96	6.3	33	85	5.5	29	152	31.9	22		
52	71	3		81	4.8	40	83	4.6	41	132	22.4	37		
53	81	5.1	32	92	6.1	41	97	8	30	137	21.8	47		
54	94	8.7	35	90	6.8	34	97	7.8	33	147	28.4	43		
55	83	5.2	35	84	5.5	38	84	5	37	136	23.3	38		
56	83	4.8	32	81	4.7	30	92	6.5	31	156	34	32		
57	84	5.3	32	75	3.6		106	10	32	145	29.4	27		
58	86	5.3		83	5.2	35	97	7.7	33	117	14.8	28		
59	95	7.5	37	81	4.4		96	6.9	34	127	19.8	33		
60	78	4.4	32	70	3.1		98	8.4	34	128	18.7	39		
AVG	86.4	6.1	34.5	85.8	5.6	34.3	97.1	8.3	31.9	146.0	29.2	34.6		
MAX	103.0	11.0	42.0	97.0	7.9	41.0	111.0	12.7	41.0	174.0	53.0	47.0		
MIN	66.0	2.8	28.0	66.0	3.1	26.0	68.0	2.6	22.0	102.0	9.3	21.0		
EIBS			32pos/60			24pos/60			18pos/60		32pos/60			
BKD			0pos/60			20pos/60			5pos/57*		1pos/60			

* Results suspect due to technique changes.

Appendix C. Length Weight Hematocrit Data.

	Fall	Chinook	Length	Weight	Hematocrit	Analysis
						Hatchery -----
		Grays River Brood '86				
Fish #		Hemat.				
1		32				
2		34				
3		32				
4		37				
5		33				
6		29				
7		33				
8		39				
9		32				
10		27				
11		28				
12		32				
13		34				
14		40				
15		40				
16		33				
17		28				
18		31				
19		31				
20		40				
21		37				
22		34				
23		38				
24		40				
25		44				
26		32				
27		33				
28		37				
29		40				
30		40				
31		35				
32		37				
33		37				
34		37				
35		28				
36		33				
37		38				
38		34				
39		32				
40		42				
41		32				
42		33				
43		34				
44		36				
45		26				
46		40				
47		33				
48		36				
49		28				
50		33				
51						
52		26				
53		20				
54		35				
55		30				
56		33				
57		31				
58						
59						
60						
AVG		33.9				
MAX		44.0				
MIN		20.0				
EIBS		37pos/57				
BKD		0pos/60				

* Results suspect due to technique changes.

Appendix C. Length Weight Hematocrit Data.

Early Coho			Length			Weight			Hematocrit			Analysis			
Fish #	Hatchery						Brood '85								
	Lower	Kalama	Brood '85	Length	Weight	Hemat.	Length	Weight	Hemat.	Length	Weight	Hemat.			
1	156	29.8	33	137	21.3	28	134	19.2	28						
2	150	25.4	38	123	16.6	34	145	27.0	32						
3	154	28.4	40	158	35.2	35	130	18.8	35						
4	149	28.0	30	145	28.3	30	143	25.7	34						
5	152	29.0	41	139	22.9	35	135	20.6	30						
6	141	24.0	41	115	12.5	19	137	21.7	31						
7	155	31.6	41	136	22.1	23	148	30.5	33						
8	148	27.9	39	130	22.1	31	133	21.2	33						
9	143	23.9	41	130	19.6	30	123	15.9	25						
10	146	25.7	40	135	19.7	24	124	15.4	29						
11	153	29.5	32	148	27.3	31	148	28.6	26						
12	149	27.5	31	139	24.8	28	144	24.9	28						
13	160	34.3	33	138	22.8	25	132	20.9	29						
14	167	36.7	37	146	28.4	30	138	21.6	31						
15	152	28.1	32	164	36.3	40	140	23.5	39						
16	147	27.0	28	140	24.3	31	135	21.7	26						
17	144	25.8	32	140	25.1	31	135	20.7	31						
18	156	32.5	37	127	18.4	29	130	19.5	22						
19	153	29.5	34	144	24.9	10	131	18.8	30						
20	142	25.2	30	138	22.4	35	123	16.9	29						
21	151	27.0	39	147	26.7	35	151	29.8	35						
22	141	22.8	37	154	32.1	34	130	19.3	32						
23	150	31.2	41	148	30.3	34	128	17.9	28						
24	152	30.4	30	150	29.8	37	139	22.0	25						
25	122	13.0	34	150	31.0	30	136	21.4	20						
26	156	31.9	42	139	22.1	26	149	29.0	34						
27	152	21.8	40	145	24.6	31	139	22.6	31						
28	156	30.8	36	147	27.7	35	130	19.4	28						
29	151	27.3	40	121	14.7	37	133	20.3	31						
30	148	28.5	40	148	27.7	27	138	20.6	33						
31	148	28.3	30	158	34.5		136	22.6	20						
32	160	32.2	39	152	28.8	28	133	19.3	23						
33	157	34.4	32	137	23.8	27	137	22.9	31						
34	147	27.5	31	145	27.4	26	132	19.9	19						
35	148	25.3	34	161	33.9	28	137	21.5	29						
36	148	27.2	35	157	33.0	26	137	21.3	33						
37	151	28.1	32	147	27.2	35	130	18.9	29						
38	153	28.0	39	145	27.4	31	135	19.6	32						
39	158	33.7	37	135	20.1	30	117	13.9	30						
40	151	28.3	32	139	21.5	31	130	18.4	23						
41	150	27.5	51	155	29.1		147	26.9	21						
42	154	30.8	42	132	19.0	28	134	19.5	30						
43	154	30.2	49	154	29.2	33	135	21.6	31						
44	154	30.4	53	144	24.8	31	138	23.8	32						
45	148	28.0	41	148	27.2	37	135	21.4	32						
46	164	38.4	43	143	26.0	33	130	16.7	28						
47	143	23.5	53	142	21.4	30	145	25.3	37						
48	156	30.6	46	122	16.1	26	138	21.7	19						
49	153	32.4	51	111	12.3	28	120	14.1	23						
50	151	28.3	48	142	26.5	29	144	24.7	27						
51	148	27.4	39	139	22.1	22	116	13.2	30						
52	150	25.0	36	136	23.3	26	135	20.2	25						
53	164	35.5	34	149	29.9	35	135	20.5	33						
54	156	29.9	38	134	21.2	8	128	18.3	30						
55	150	30.5	37	150	30.0	32	150	28.7	30						
56	155	30.4	39	142	24.7	22	136	20.8	38						
57	153	31.2	35	153	28.4	38	127	17.7	35						
58	149	28.5	36	145	27.7	29	137	20.8	30						
59	157	29.2	37	147	27.2	31	122	15.4	29						
60	145	26.5	37	152	29.9	26	133	18.8	34						
AVG	151.2	28.7	37.9	142.3	25.3	29.1	134.8	21.1	29.4						
MAX	167.0	38.4	53.0	164.0	36.3	40.0	151.0	30.5	39.0						
MIN	122.0	13.0	28.0	111.0	12.3	3.0	116.0	13.2	19.0						
E18S			45pos/60		51pos/60			33pos/60							
EKD			23pos/55*		0pos/60			0pos/60							

* Results suspect due to technique changes.

Appendix C. Length Weight Hematocrit Data.

Late Coho				Length				Weight				Hematocrit				Analysis					
Fish #	Lewis R.			Brood '85			Kalama			Brood '85			Elokomin			Brood '85			Klickitat		
	Hatchery		Length	Weight	Hemat.	Length	Weight	Hemat.	Length	Weight	Hemat.	Length	Weight	Hemat.	Length	Weight	Hemat.	Length	Weight	Hemat.	
1		154	34.2	39	152	30.0	34	130	20.2	44	132	18.6	44								
2		142	23.7	34	166	35.2	35	131	20.1	40	152	31.6	35								
3		158	35.8	38	148	28.3	32	143	26.5	46	92	7.6	47								
4		134	21.2	34	172	42.5	37	134	21.0	45	119	15.7	46								
5		134	21.1	44	157	33.4	36	142	26.0	44	144	25.0	41								
6		135	20.8	38	136	20.4	30	147	28.0	43	149	29.1	42								
7		128	19.7	37	154	29.9	38	127	18.0	45	142	22.5	48								
8		131	20.1	37	143	24.6	29	131	20.9	42	142	23.8	47								
9		124	17.5	35	160	33.4	36	135	22.5	48	139	22.8	41								
10		124	16.5	38	158	34.0	35	130	20.4	47	139	20.9	38								
11		139	25.0	34	152	29.0	35	130	19.9	33	128	18.5	39								
12		116	12.9	29	165	38.4	38	125	18.2	31	129	19.1	41								
13		126	16.9	31	161	38.2	29	155	34.6	33	139	23.0	41								
14		125	17.1	-	151	28.3	37	141	27.3	32	146	25.7	39								
15		145	23.6	30	160	32.4	32	124	18.2	38	138	23.9	41								
16		137	21.6	35	135	20.4	32	145	28.4	40	125	17.3	35								
17		141	25.5	28	160	33.6	34	134	23.4	35	135	23.1	38								
18		115	13.3		170	42.4	31	150	32.6	39	126	17.1									
19		122	15.7	32	145	22.8	31	151	33.2	37	88	8.2	27								
20		115	13.9	28	145	25.3	37	139	24.9	40	132	19.3	35								
21		152	32.3	37	130	18.6	25	147	31.2	41	127	18.6	36								
22		144	25.9		158	31.5	28	130	21.3	46	142	25.9	36								
23		166	42.2	38	160	32.2	35	148	30.0	41	151	29.9	32								
24		158	34.8	37	160	33.4	32	151	36.0	46	115	11.7	33								
25		134	21.8	33	155	30.9	34	149	31.6	48	126	16.1	41								
26		145	25.9	36	148	26.2	33	155	36.3	49	142	25.9	41								
27		146	26.9	42	146	23.4	36	131	24.0	48	134	21.5	45								
28		125	17.5	38	159	33.9	34	148	33.0	46	145	25.4	36								
29		115	14.3	33	137	21.2	32	148	30.2	49	142	24.8	37								
30		120	15.0		149	27.4	33	126	22.0	48	138	20.4	37								
31		145	25.5		160	34.2	34	125	19.3	35	139	25.1	36								
32		145	28.3	30	160	33.9	37	136	27.3	29	135	21.2	41								
33		145	25.3	29	160	31.8	34	140	28.1	33	129	19.8	38								
34		141	24.5	28	157	33.0	28	159	40.2	38	135	21.3	46								
35		140	24.9	27	140	22.3	37	162	44.2	40	129	17.6	38								
36		130	19.9	27	150	29.9	30	129	24.2	31	129	17.8	40								
37		143	25.4	35	143	24.7	32	139	28.2	40	133	20.7	37								
38		148	27.3	28	141	24.4	32	157	37.5	36	140	22.7	42								
39		113	12.7	28	147	27.1	37	142	27.6	33	130	19.6	46								
40		129	18.9	27	148	28.3	34	143	27.6	37	132	19.5	41								
41		147	27.2	40	138	22.0	34	142	28.1	43	160	37.8	39								
42		141	24.5	45	148	29.0	34	147	27.3	38	134	21.8	35								
43		135	18.4	40	150	30.6	25	135	21.8	32	128	17.6	41								
44		124	16.5	40	153	31.8	38	137	20.0	40	143	25.4	46								
45		150	31.7	40	143	23.8	32	150	31.6	38	144	25.0	42								
46		132	20.5	41	152	28.1	32	148	29.1	40	122	16.1	40								
47		128	17.4	41	154	31.1	32	130	19.7	32	119	13.7	40								
48		125	16.6	37	156	31.7	32	142	25.8	42	125	17.4	41								
49		109	11.8	35	161	34.8	35	156	35.2	39	133	18.8	43								
50		123	18.7	36	151	26.4	27	151	30.7	38	134	23.6	45								
51		145	24.4	42	172	44.0	35	147	28.5	38	144	31.8	42								
52		140	23.7	44	154	28.8	38	148	30.5	39	139	23.1	44								
53		130	18.1	38	164	34.4	41	150	32.5	38	147	27.7	39								
54		133	19.5	39	142	23.0	32	135	24.6	35	148	27.3	47								
55		196	18.6		161	33.6	39	141	25.4	37	140	23.6	44								
56		131	20.7	35	145	26.5	26	144	30.2	41	123	16.3	44								
57		138	21.7	34	155	32.4	37	142	27.9	36	132	19.6	45								
58		123	16.2	37	160	33.1	40	132	21.0	36	132	20.5	45								
59		128	18.2	34	145	24.9	29	151	33.7	40	134	20.6	44								
60		117	13.5	33	134	21.2	35	131	20.9	40	125	16.7	46								
AVG		135.4	21.7	35.3	152.3	29.7	33.5	141.1	27.1	39.6	133.9	21.4	40.6								
MAX		196.0	42.2	45.0	172.0	44.0	41.0	162.0	44.2	49.0	160.0	37.8	48.0								
MIN		109.0	11.8	27.0	130.0	18.6	25.0	124.0	18.0	29.0	88.0	7.6	27.0								
EBC					51pos/60			42pos/60			7pos/60						60pos/60				
BKD					48pos/59*			20pos/59*			16pos/58*						1pos/60				

* Results suspect due to technique changes.

Appendix C. Length Weight Hematocrit Data

Fish #	Late Coho		Length		Weight		Hematocrit		Analysis	
	Rocky Reach		Brood '85		Washougal		Brood '85		Cowlitz	
	Length	Weight	Hemat.	Length	Weight	Hemat.	Length	Weight	Hemat.	
1	175	47.4	37	138	20.2	29	145	30.1	36	
2	187	53.9	40	147	25.5	23	148	29.4	38	
3	153	29.6	39	140	21.6	36	117	15.6		
4	180	39.5	41	142	23.6	27	129	19.6	38	
5	143	22.8	37	140	21.8	31	147	28.4	36	
6	157	31.2	38	136	20.6	31	147	27.1	33	
7	154	28.8	28	135	21.5	29	142	25.2	34	
8	127	17.4	41	135	19.8	33	137	23.4	31	
9	195	61	40	142	21.5	30	122	14.3	38	
10	128	16.6	38	114	11.1	27	145	26.8	37	
11	203	65.8	40	159	32.4	35	125	17.9	32	
12	178	49.4	43	156	30.2	30	155	33.5	37	
13	174	37	39	149	27	24	140	28.3	39	
14	172	39.5	47	156	31.5	40	137	24.8		
15	111	11.3		135	19.8	38	141	23.4	39	
16	95	6.3		151	28.3	25	128	18.9	35	
17	157	30	45	139	21.6	26	130	19.7	36	
18	140	24.3	42	148	25.8	24	137	23.2	36	
19	141	22	42	155	29.4	27	144	22.2	38	
20	165	37.9	38	136	20.8	27	143	22.8	39	
21	204	44.3	45	115	13.1	25	141	24.3	33	
22	174	41.3	45	139	22	31	141	24.5	43	
23	106	8.9	40	132	18.7	24	154	30.8	35	
24	191	54.2	49	140	21.4	33	135	20.7	38	
25	191	57.5	44	133	18.5	32	132	21.9	36	
26	159	34.6	44	122	15.1	29	143	24.1	34	
27	145	23.3	43	147	25.5	24	137	22	38	
28	154	26.5	34	125	16.7	30	147	29.5	37	
29	147	26.8	46	136	20	34	129	17.5	39	
30	140	21	37	127	16.1	25	132	18.5	32	
31	128	18	37	132	18	30	150	29.7		
32	186	52.8	47	149	28	25	131	21.9	39	
33	160	32.8	44	140	21.8	23	135	21	38	
34	160	35.8	38	139	22.9	23	134	21.5	37	
35	158	31.5	44	142	25.1	35	140	25.7	32	
36	140	27.4	32	139	21.7	33	145	24.7	34	
37	149	25.6	48	147	27.2	23	145	24.6	38	
38	140	22	37	148	25	37	124	14.9	35	
39	125	16.5	39	132	17.2	33	140	23.1	39	
40	114	11	42	136	19.7	34	154	30.7	34	
41	155	32.2	42	133	20.2	24	152	33.1	36	
42	160	35.9	44	137	20.7	28	161	37.2	30	
43	169	40.2	45	137	19.3	25	146	25.4	34	
44	192	55.6	52	130	17.7	24	147	25.4	34	
45	155	25.5	40	149	26.2	28	136	22.4	35	
46	135	20.8	33	134	18.8	23	119	15.4	36	
47	133	24.6	50	139	21.3	28	139	22.5	35	
48	144	24.7	45	135	18.4	31	109	10.7	37	
49	138	22.2	41	129	16.6	33	132	21.1	37	
50	120	13	43	140	21.8	29	130	18.9	38	
51	181	52.1	48	136	20.1	31	134	19.4		
52	179	47.9	51	146	25.5	32	141	26.6	36	
53	175	41.9	46	135	19.7	21	140	25.1	38	
54	174	42.9	44	155	31.3	40	154	30.4	41	
55	162	32.6	38	138	21.4	37	156	31.8	42	
56	152	26.6	41	155	29	32	143	25.1	30	
57	156	27.1	46	141	21.9	30	136	21	32	
58	143	20.8	38	140	21	40	137	22.2	39	
59	151	23.7	39	137	20.7	42	131	18.5	42	
60	120	14.2	36	121	12.8	35	122	15.8	33	
AVG	155.0	31.8	41.6	139.0	21.9	29.8	138.6	23.6	36.2	
MAX	204.0	65.8	52.0	159.0	32.4	42.0	161.0	37.2	43.0	
MIN	95.0	6.3	28.0	114.0	11.1	21.0	109.0	10.7	30.0	
EIBS			10pos/60		54pos/59			52pos/60		
BKD			1pos/60		0pos/60			1pos/60		

* Results suspect due to technique changes.

APPENDIX D

Appendix D contains the Disease Prevalence Summary Report for calendar year 1987. Pathogens and causes of loss are categorized by; Bacterial, Other, Parasite and Viral. Loss to each pathogen or cause is totaled per month with Lower Columbia (LCol) and Upper Columbia (UCol) stations divided.

Abbreviations:

BHS - Bacterial Hemorrhagic Septicemia

ERM - Enteric Redmouth

**WDF PROGRAM QCO,
DISEASE PREVALENCE SUMMARY
March 17, 1989**

Page: 1

**Disease Category: Bacterial
Agent: Bacterial Gill Dis**

Basin	Location	Species	Stock	Brood	Size	Flow	Density	Number	%
					Fish/Lb	Index	Index	LOSS	LOSS
LCol									
Month: September	1987								
ELokoni n	Fall Chinook	ELokoni n		A	- 0-	- cl-	- 0-	859	- 0-
Month: April	1987								
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86		178.	0.72	0.12	14886	1.23
								14886	

WDF PROGRAM QCOI
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 2

Disease Category: Bacterial

Agent: BHS

Basin	Location	Spec i es	stock	Brood	Size	Flow	Density	Number	%				
					Fish/Lb	Index	Index	LOSS	LOSS				
LCOI													
Month: April													
1987													
Lower Kalama Early Coho Kalama Falls 86 350. 0.709 0.0665 583 0.1													
Lower Kalama Fall Chinook Kalama Falls 86 162. 0.858 0.0606 1580 0.04													
.....													
2163													
Month: May													
1987													
Cowlitz Spring Chinook Cowlitz 86 59. -0. -0. 43862 1.76													
Klickitat Spring Chinook Klickitat 86 62. -0. -0. 1050 0.16													
Lower Kalama Early Coho Kalama Falls 86 250. 0.736 0.0534 567 0.09													
Lower Kalama Fall Chinook Kalama Falls 86 92. 1.522 0.0911 2286 0.07													
.....													
47765													
Month: June													
1987													
Cowlitz Spring Chinook Cowlitz 86 45. 0.364 0.0438 18840 2.89													
.....													
18840													
Month: July													
1987													
Cowditz Fall Chinook Cowditz 86 39. 0.302 0.0364 13896 2.97													
Cowditz Spring Chinook Cowditz 86 27. 0.328 0.0397 7648 1.2													
Klickitat Spring Chinook Klickitat 86 31. 1.34 0.0556 175 0.03													
Washougal Fall Chinook Washougal 86 50. 1.24 0.0506 450 0.12													
.....													
22169													
Month: August													
1987													
Kalama Falls Spring Chinook Kalama Falls 86 35. 1.079 0.1124 1465 0.47													
Klickitat Spring Chinook Klickitat 86 20. 1.842 0.0764 160 0.03													
Washougal Fall Chinook Washougal 86 49. 1.22 0.0497 1b20 0.45													
.....													
3245													
Month: September													
1987													
Kalama Falls Spring Chinook Kalama Falls 86 25. 1.106 0.1397 260 0.08													
Klickitat Spring Chinook Klickitat 86 18. 1.663 0.0813 1005 0.16													
.....													
1265													

VDF PROGRAM PC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 3

Disease Category: Bacterial
Agent: Bacterial Kidney Dis

Basin	Location	Species	Stock	Size	Flow	Density	Number	%
				Brood	Fish/Lb	Index	Index	Loss
LCol								
Mnth: February	1987							
Cowlitz	Spring Chinook Cowlitz		85	9.	-0.	-0.	383	0.06
Klickitat	Late Coho Elokomin		85	22.	2.127	0.1724	3800	0.27
Lewis River	Late Coho Lewis River		85	24.	4.677	0.3015	2	E-5
.....								
Mnth: March	1987							
Cowlitz	Spring Chinook Cowlitz		85	7.6	-0.	-0.	3046	0.48
Klickitat	Spring Chinook Klickitat		86	120.	1.102	0.1095	450	0.07
Lewis River	Late Coho Lewis River		85	24.	2.588	0.1949	1060	0.02
.....								
							4556	
Mnth: April	1987							
Klickitat	Spring Chinook Klickitat		86	89.	0.692	0.0686	1450	0.23
.....								
							1450	
Mnth: May	1987							
Klickitat	Spring Chinook Klickitat		86	62.	-D-	-0.	1380	0.22
.....								
							1380	
Mnth: June	1987							
Klickitat	Spring Chinook Klickitat		86	45.	0.942	0.0448	1760	0.28
Lewis River	Spring Chinook Lewis River		86	56.	0.728	0.0369	1288	0.22
Speelyai	Spring Chinook Kalam Falls		86	50.	0.71	0.036	250	0.14
Washougal	Fall Chinook Washougal		86	78.	0.942	0.0384	120	0.03
.....								
							3418	
Mnth: July	1987							
Klickitat	Spring Chinook Klickitat		86	31.	1.34	0.0556	560	0.09
Lewis River	Spring Chinook Lewis River		86	34.	0.843	0.0534	930	0.16
Speelyai	Spring Chinook Kalam Falls		86	36.	0.67	0.0431	320	0.18
Washougal	Fall Chinook Washougal		86	50.	1.24	0.0506	150	0.04
.....								
							1960	
Mnth: August	1987							
Klickitat	Spring Chinook Klickitat		86	20.	1.842	0.0764	525	0.09
Klickitat	Spring Chinook Klickitat		A	-0.	-0.	-0.	b	0.9
Lewis River	Spring Chinook Lewis River		86	28.	0.91	0.0593	34	E.2
.....								
							565	
Mnth: September	1987							
Klickitat	Spring Chinook Klickitat		86	18.	1.663	0.0813	425	0.07
Lewis River	Spring Chinook Lewis River		86	21.	1.167	0.0739	185	0.03

VDF PROGRAM PC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 4

610

Month: October	1987							
	Klickitat	Late Coho	Cowlitz	86	33.	1.783	0.3003	445 0.03
	Klickitat	Spring Chinook	Klickitat	86	lb.	1.598	0.0921	405 0.07
	Lewis River	Spring Chinook	Lewis River	86	19.	1.229	0.0778	1787 0.31

2637

Month: November	1987							
	Klickitat	Late Coho	Cowlitz	86	25.	2.192	0.3692	3328 0.21
	Klickitat	Spring Chinook	Klickitat	86	13.	1.759	0.1013	560 0.09
	Lewis River	Early Coho	Lewis River	A	-0.	-0.	-0.	8 7.27
	Lewis River	Late Coho	Lewis River	A	-0.	-0.	-0.	10 0.39
	Lewis River	Spring Chinook	Lewis River	86	12.	1.608	0.1018	1502 0.27

5408

Month: December	1987							
	Klickitat	Late Coho	Cowlitz	86	22.	2.384	0.4024	8050 0.52
	Klickitat	Spring Chinook	Klickitat	86	11.	1.966	0.1133	310 0.05
	Lewis River	Late Coho	Lewis River	A	-0.	-0.	-0.	100 -0.
	Lewis River	Spring Chinook	Lewis River	86	12.	1.497	0.0986	360 0.07

8820

UC01

Month: February	1987							
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	85	10.	0.429	0.0408	1000 0.65
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	85	ID.	0.416	0.0624	434 0.28

1434

Month: March	1987							
	Wells Spawning	Summer Chinook	Wells	86	230.	0.796	0.1289	2821 0.19

Month: April	1987							
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	85	9.	0.698	0.1163	9 0.02
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	85	7.	0.529	0.0882	85 0.05
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	85	6.	0.603	0.0574	176 0.11
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	55	9.	0.624	0.104	48 0.13
	Lyon's Ferry	Spring Chinook	Tucannon	86	87.	0.617	0.1105	16 E-2
	Wells Spawning	Summer Chinook	Wells	86	200.	0.903	0.1464	102 E-2

436

Month: May	1987							
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	56	71.	0.742	0.0742	2 E-3
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	48.	0.483	0.0241	2 E-3
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	36	104.	0.583	0.0583	2 E-4
	Lyon's Ferry	Spring Chinook	Tucannon	56	62.	0.249	0.0249	13 E-2
	Wells Spawning	Summer Chinook	Wells	56	100.	1.194	0.1934	156 0.01

VDF PROGRAM QCOI
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 5

175

Month: June		1987							
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	77.	0.547	0.0821		6	E-3
Lyon's Ferry	Spring Chinook	Tucannon	86	44.	1.029	0.1029		69	0.01
Ringold	Spring Chinook	Wind River	86	60.	-0.	-0.		2409	0.24
Rocky Reach	Fall Chinook	Wells	86	85.	0.732	0.1977		300	0.12
Wells Spawning	Summer Chinook	Wells	86	70.	0.637	0.1031		1359	0.26
								4143	
Month: July		1987							
Lyon's Ferry	Spring Chinook	Tucannon	86	30.	0.401	0.0401		404	0.26
Wells Spawning	Summer Chinook	Wells	86	68.	0.69	0.069		282	0.07
								686	
Month: August		1987							
Lyon's Ferry	Spring Chinook	Tucannon	86	22.	0.514	0.0514		20	0.01
Lyon's Ferry	Spring Chinook	Tucannon	A	-0.	-0.	-0.		6	5.94
Wells Spawning	Summer Chinook	Wells	86	38.	-0.	-0.		716	0.18
								742	
Month: September		1987							
Wells Spawning	Summer Chinook	Wells	86	24.	1.063	0.0716		64	0.02
								64	
Month: October		1987							
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	21.	0.538	0.0806		5	E-3
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	23.	0.602	0.0903		16	E-2
Lyon's Ferry	Spring Chinook	Tucannon	a6	12.	0.572	0.0743		113	0.07
wells Spawning	Summer Chinook	Wells	86	17.	1.729	0.1144		121	0.03
								255	
Month: November		1987							
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	lb.	0.65	0.0975		169	0.07
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	19.	0.668	0.1003		128	0.07
Tucannon	Spring Chinook	Tucannon	86	10.	-0.	-0.		31	0.02
Wells Spawning	Summer Chinook	Wells	86	15.	1.898	0.1256		a59	0.22
								1187	
Month: December		1987							
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	15.	0.669	0.1003		986	0.4
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	lb.	0.706	0.1059		708	0.41
Wells Spawning	Summer Chinook	Wells	86	12.	2.094	0.1385		15	E-3
								1709	

VDF PROGRAM 0C01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 6

Disease Category: Bacterial

Agent: Columnaris

Basin	Location	Species	Stock	Size		Flow	Density	Number	%
				Brood	Fish/Lb	Index	Index	LOSS	LOSS
LCol									
Month: August	1987								
	Washougal	Late Coho	Washougal	86	96.	3. 055	0. 0686	3423	0. 1
3423									
Month: November	1987								
	Lewis River	Early Coho	Lewis River	A	-0.	-0.	-0.	7	6. 36
	Lewis River	Late Coho	Lewis River	A	-0.	-0.	-0.	7	0. 28
14									
UC01									
Month: July	1987								
	Rocky Reach	Early Coho	Kalam Falls	86	57.	0.533	0. 0643	495	0. 11
495									

VDF PROGRAM PC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

page: 7

Disease Category: Bacterial

Agent: Cold Water Disease

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density Index	Number	% Loss
LCOL									
Mnth: February 1987									
Cowlitz Late Coho Cowlitz a5 25. -0. -0. 14706 0.3									
CowLitz Spring Chinook Cowlitz a5 9. -0. -0. 287 0.04									
Grays River Early Coho Grays River a5 22. 2.156 0.0697 a72 0.2									
Grays River Early Coho Grays River 86 632. 2.027 0.1244 2509 0.17									
Grays River Early Coho Washougal 86 604. 1.39 0.0879 783 0.11									
Grays River Fall Chinook Grays River 86 283. 1.11 0.0628 a72 0.2									
Klickitat Fall Chinook Priest Rapids 86 500. -0. -0. 3900 0.11									
Lewis River Late Coho Lewis River a5 24. 4.677 0.3015 1118 0.02									
Lewis River Spring Chinook Lewis River a5 10.5 1.315 0.0999 634 0.09									
Washougal Early Coho Washougal 86 718. -0. -0. 25500 2.1									
.....									
51181									
Mnth: March 1987									
Cowlitz Late Coho Cowlitz a5 22. -- -0- 34213 0.71									
CowLitz Spring Chinook Cowlitz a5 7.6 -0. -0. 2285 0.36									
Grays River Early Coho Grays River a5 1a. 1.766 0.0596 1387 0.32									
Grays River Early Coho Grays River a6 340. 1.304 0.0743 2460 0.31									
Grays River Fall Chinook Grays River a6 231. 0.68 0.0478 387 0.07									
Grays River Fall Chinook Skamakowa 86 264. 1.074 0.0723 159 0.15									
Grays River Fall Chinook Washougal 86 668. 1.305 0.0743 315 0.03									
Klickitat Late Coho Cowlitz 86 462. 1.036 0.1026 14040 0.85									
Lewis River Late Coho Lewis River a5 24. 2.588 0.1949 2120 0.04									
Lewis River Late Coho Lewis River a6 970. -0. -0. 3235 0.07									
Lower Kalama Early Coho Kalama Falls 86 450. 1.308 0.0123 812 0.14									
Speelyai Early Coho Lewis River a6 390. -0. -0. 9600 0.62									
.....									
71013									
Mnth: April 1987									
Cowlitz Late Coho Cowlitz 85 19. -0. -0. 36100 0.76									
Elokomin Late Coho Kalama Falls 86 609. 1.071 0.0803 5084 0.92									
Grays River Early Coho Grays River 85 14.5 2.185 0.0707 1704 0.4									
Grays River Early Coho Grays River 86 173. 2.023 0.1152 552 0.07									
Klickitat Late Coho Cowlitz a6 302. 1.298 0.1285 14220 0.87									
Lewis River Late Coho Lewis River a5 17. 3.177 0.2392 120 E-3									
Lewis River Late Coho Lewis River 86 476. 1.206 0.1138 2226 0.05									
.....									
60006									
Mnth: May 1987									
Elokomin Late Coho Kalama Falls a6 311. 1,548 0.2321 11110 2.05									
Kalama Falls Late Coho Kalama Falls 86 338. 1.809 0.1885 7515 1.33									
Klickitat Late Coho Cowlitz a6 106. 0-0 -0. 1700 0.11									
Lewis River Late Coho Lewis River a5 17. 3.173 0.2257 a4 E-3									
Lewis River Late Coho Lewis River 86 223. 1.374 0.1889 16772 0.4									
Washougal Late Coho Washougal 86 299. 2.057 0.0729 104220 2.83									
.....									
141401									

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
Mrhc 17, 1989

page: a

Month:	June	1987							
Kalama Falls	Late Coho	Kalama Falls	86	207.	0.766	0.0792	2035	0.19	
Klickitat	Late Coho	Cowlitz	86	144.	0.853	0.108	750	0.05	
Lewis River	Late Coho	Lewis River	86	138.	1.189	0.0616	15567	0.42	
Lewis River	Spring Chinook	Lewis River	86	56.	0.728	0.0369	43	E-2	
Washougal	Late Coho	Washougal	86	192.	1.386	0.0473	23600	0.7	
							41995		
Month:	July	1987							
Klickitat	Late Coho	Cowlitz	86	95.	1.166	0.1458	970	0.06	
Lewis River	Late Coho	Lewis River	86	100.	1.137	0.0711	2241	0.06	
							3211		
Month:	August	1987							
Grays River	Early Coho	Grays River	86	54.	-0.	.0-	794	0.11	
Klickitat	Late Coho	Cowlitz	86	67.	1.451	0.1832	620	0.04	
Lewis River	Late Coho	Lewis River	86	72.	1.423	0.0891	208	E-Z	
Lewis River	Late Coho	Lewis River	86	72.	1.423	0.0891	208	E-2	
							1830		
Month:	September	1987							
Grays River	Early Coho	Grays River	86	42.	1.488	0.0493	1484	0.2	
Klickitat	Late Coho	Cowlitz	86	45.	1.783	0.2476	4950	0.32	
Lewis River	Late Coho	Lewis River	86	65.	1.488	0.0997	1140	0.03	
							7574		
Month:	October	1987							
Cowlitz	Late Coho	Cowlitz	86	39.	1.94	0.2337	29143	0.56	
Grays River	Early Coho	Grays River	86	36.	2.236	0.0547	768	0.1	
Klickitat	Late Coho	Cowlitz	86	33.	1.783	0.3003	1770	0.11	
Lewis River	Late Coho	Lewis River	86	50.	1.429	0.1151	2590	0.07	
Lewis River	Spring Chinook	Lewis River	86	19.	1.229	0.0778	1a	E-3	
							34289		
Month:	November	1987							
Cowlitz	Late Coho	Cowlitz	86	34.	2.223	0.2678	4789	0.09	
Grays River	Early Coho	Grays River	86	32.	1.339	0.0538	320	0.04	
Klickitat	Late Coho	Cowlitz	86	25.	2.192	0.3692	2304	0.15	
Lewis River	Late Coho	Lewis River	86	45.	1.387	0.1105	4276	0.11	
							11689		
Month:	December	1987							
Grays River	Early Coho	Grays River	86	30.	1.618	0.0615	52	E-2	
Klickitat	Late Coho	Cowlitz	86	22.	2.384	0.4024	1550	0.1	
Klickitat	Spring Chinook	Klickitat	86	11.	1.966	0.1133	155	0.03	
Lewis River	Late Coho	Lewis River	86	38.	1.375	0.1191	1984	0.05	
							3651		

**WDF PROGRAM QCOI
DISEASE PREVALENCE SUMMARY
March 17, 1989**

Page: 9

Month: January	1987								
	Rocky Reach	Late Coho	Rock" Reach	85	18.	1.078	0.1494	8917	1.88

								8917	
Month: February	1987								
	Rocky Reach	Early Coho	Kalama Falls	86	428.	0.943	0.2	5500	1.15

								5500	
Month: March	1987								
	Rocky Reach	Early Coho	Kalama Falls	86	285.	0.604	0.1282	2131	0.45

								2131	
Month: May	1987								
	Rocky Reach	Early Coho	Kalama Falls	86	123.	0.789	0.1664	864	0.19
	Wells Spawning	Summer Chinook	Wells	86	100.	1.194	0.1934	56	E-3

								920	
Month: June	1987								
	Wells Spawning	Summer Chinook	Wells	86	70.	0.637	0.1031	600	0.11

								600	
Month: July	1987								
	Wells Spawning	Summer Chinook	Wells	86	68.	0.69	0.069	274	0.07

								274	
Month: September	1987								
	Rocky Reach	Early Coho	Kalama Falls	86	33.	1.058	0.1244	1086	0.26

								1086	

WDF PROGRAM PC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 10

Disease Category: Bacterial

Agent: Enteric Redmouth Dis

Basin	Location	Species	Stock	Size		Flow	Density	Number	%
				Brood	Fish/Lb	Index	Index	LOSS	LOSS
LC01									
Mnth: February	1987								
	Elokomin	Fall Chinook	Elokomin	86	456.	1. 653	0. 1128	50	E-3
	Elokomin	FalI Chinook	Skamakowa	86	347.	1. 533	0. 1096	10	E-3
								60	
Mnth: March	1987								
	Elokomin	Fall Chinook	Elokomin	86	300.	0. 867	0. 1253	560	0. 02
								560	
Mnth: August	1987								
	Cowlitz	Fall Chinook	Cowlitz	86	27.	0. 801	0. 0965	5886	0. 61
	Cowlitz	Spring Chinook	Cowlitz	86	26.	0. 281	0. 1031	3534	0. 56
								9420	
Mnth: September	1987								
	Cowlitz	Fall Chinook	Cowlitz	86	14.	1. 299	0. 1565	1813	0. 19
	Cowlitz	Spring Chinook	Cowlitz	86	20.	0. 375	0. 0453	12146	1. 97
	Lewis River	Spring Chinook	Lewis River	86	21.	1. 167	0. 0739	81	0. 01
								14040	
Mnth: October	1987								
	Cowlitz	Spring Chinook	Cowlitz	86	15.	0. 496	0. 06	1609	0. 26
	Lewis River	Spring Chinook	Lewis River	86	19.	1. 229	0. 0778	101	0. 02
								1710	
UC01									
Mnth: April	1987								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	a5	9.	0. 624	0. 104	3	E-2
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	a5	7.	0. 529	0. 0882	9	E-2
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	a5	9.	0. 698	0. 1163	1	E-3
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	a5	6.	0. 603	0. 0574	39	0. 03
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	178.	0. 72	0. 12	40	E-3
								92	
Mnth: May	1987								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	104.	0. 583	0. 0583	3	E-3
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	48.	0. 483	0. 0241	3	E-3
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	71.	0. 742	0. 0742	3	E-3
								9	
Mnth: June	1987								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	77.	0. 547	0. 0821	2	E-4

WDF PROGRAM QCOI
DISEASE PREVALENCE SUMMARY
March 17, 1989

page: 11

Lyon's Ferry	Spring Chinook Tucannon	86	44. 1.029 0.1029	2 E-4
			4	
Month: JULY	1987			
Lyon's Ferry	Fall Chinook Lyon's FW).	86	52. 0.711 0.1066	2 E-4
Lyon's Ferry	Spring Chinook Tucannon	86	30. 0.401 0.0401	3 E-3
			
			5	
Month: August	1987			
Lyon's Ferry	Fall Chinook Lyon's Ferry	86	41. 0.575 0.0863	1 E-4
			
			1	
Month: September	1987			
Lyon's Ferry	Fall Chinook Lyon's Ferry	86	28. 0.531 0.0797	1 E-3
			
			1	
Month: November	1987			
Lyon's Ferry	Fall Chinook Lyon's Ferry	86	19. 0.668 0.1003	5 E-3
Lyon's Ferry	Fall Chinook Lyon's Ferry	86	16. 0.65 0.0975	8 E-3
			
			13	
Month: December	1987			
Lyon's Ferry	Fall Chinook Lyon's Ferry	86	16. 0.706 0.1059	28 0.02
Lyon's Ferry	Fall Chinook Lyon's Ferry	86	15. 0.669 0.1003	33 0.01
			
			61	

WDF PROGRAM QCQOL
OISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 12

Disease Category: Bacterial

Agent: Furnuculosis

Basin	Location	Species	Stock	Size		FFlow	Density	Number	%
				Brood	Fish/Lb	Index	Index	LOSS	LOSS
LCOL									
Mnth: February	1987								
	Lewis River	Late Coho	Lewis River	85	24.	4. 677	0. 3015	5	E-4
								5	
Mnth: June	1987								
	Elokomin	Late Coho	Elokomin	86	209.	1. 421	0. 1066	3462	0. 19
	Kalama Falls	Spring Chinook	Kalama Falls	86	64.	0. 679	0. 1019	645	0. 2
	Lower Kalama	Early Coho	Kalam Falls	86	173.	0. 799	0. 0695	1122	0. 19
								5229	
Mnth: July	1987								
	Elokomin	Late Coho	Elokomin	86	141.	0. 732	0. 0573	2578	0. 15
	Kalama Falls	Late Coho	Kalama Falls	86	131.	0. 933	0. 0884	710	0. 06
	Lower Kalama	Early Coho	Kalama Falls	86	151.	0. 373	0. 0326	913	0. 15
	Washougal	Late Coho	Washougal	86	138.	1. 77	0. 0604	8380	0. 25
								12581	
Mnth: August	1987								
	Elokomin	Late Coho	Elokomin	86	79.	-0.	-0.	7789	0. 45
	Kalama Falls	Late Coho	Kalama Falls	86	80.	1. 126	0. 1173	30	E-3
	Klickitat	Spring Chinook	Klickitat	A	, 0-	-0.	-0.	1	0. 15
	Lewis River	Late Coho	Lewis River	86	72.	1. 423	0. 0891	8	E-4
	Lewis River	Late Coho	Lewis River	86	72.	1. 423	0. 0891	8	E-4
	Lewis River	Spring Chinook	Lewis River	86	28.	0. 91	0. 0593	20	E-3
	Lower Kalama	Early Coho	Kalama Falls	86	113.	0. 449	0. 039	68	0. 01
	Washougal	Late Coho	Washougal	86	96.	3. 055	0. 0686	9943	0. 3
								17867	
Mnth: September	1987								
	Elokomin	Late Coho	Elokomin	86	70.	0. 945	0. 052	17271	0.
	Lewis River	Late Coho	Lewis River	86	b5.	1. 488	0. 0997	1075	0. 03
	Lewis River	Spring Chinook	Lewis River	86	21.	1. 167	0. 0739	5	E-3
	Lower Kalama	Early Coho	Kalama Falls	86	98.	0. 829	0. 0319	344	0. 06
	Washougal	Late Coho	Washougal	86	74.	2. 08	0. 0818	2520	0. 08
								21215	
Mnth: October	1987								
	Lewis River	Late Coho	Lewis River	86	50.	1. 429	0. 1151	4907	0. 13
	Lewis River	Spring Chinook	Lewis River	86	19.	1. 229	0. 0778	1300	0. 23
								6207	
Mnth: November	1987								
	Lewis River	Early Coho	Lewis River	A	-0.	-0.		44	40.
	Lewis River	Late Coho	Lewis River	86	45.	1. 387	0. 1105	4445	0. 11

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 13

Lewis River	Late Coho	Lewis River	A	-0.	-0.	-0.	20	0.79
Lewis River	Spring Chinook	Lewis River	86	12.	1.608	0.1018	919	0.16
							5428	

Month: December	1987							
Lewis River	Late Coho	Lewis River	86	38.	1.375	0.1191	223	E-2
Lewis River	Late Coho	Lewis River	A	-0.	-0-	-0.	150	-0.
Lewis River	Spring Chinook	Lewis River	86	12.	1.497	0.0986	196	0.04
Washougal	Fall. Chinook	Washougal	A	-0-	-0-	-0-	24	0.42
							593	

UC01

Month: April	1987							
Lyon's Ferry	Fall Chinook	Lyon's Ferry	85	7.	0.529	0.0882	2	E-3
							2	

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 14

Disease Category: Other

Agent: blank egg

Basin	Location	Species	Stock	Size	Flow	Density	Number	% Loss
				Brood	Fish/Lb	Index	Index	Loss
LCol								
Month: December	1987							
Grays River	Early Coho	Big Creek	E	-0.	-0.	-0.	461000	24.7
							461000	

WDF PROGRAM 'X01
DISEASE PREVALENCE SUMMARY
March 17, 1989

page: 15

Disease Category: Other

Agent: Coagulated Yolk

Basin	Location	Species	Stock	Brood	Size	Flow	Density	Number	%				
					Fish/Lb	Index	Index	LOSS	LOSS				
LCol													
Mnth: February 1987													
El okomin	Fall Chinook	Elokamin	86	456.	1. 653	0. 1128		2667	0. 12				
Kalam Falls	Fall Chinook	Kalama Falls	86	775.	0. 68	0. 0708		1376	0. 03				
Klickitat	Fall Chinook	Priest Rapids	86	500.	-0-	-0-		3900	0. 11				
									7943				
Mnth: March 1987													
Lewis River	Late Coho	Lewis River	86	970.	-0-	-0-		381	E-2				
									381				
Mnth: April 1987													
Grays River	Fall Chinook	Washougal	86	252.	1. 438	0. 0383		2176	0. 17				
Lewis River	Late Coho	Lewis River	86	476.	1. 206	0. 1138		201	E-3				
									2377				
UCol													
Mnth: February 1987													
Rocky Reach	Fall Chinook	Wells	86	556.	0. 848	0. 1272		14305	2. 57				
Wells Spawning	Summer Chinook	Wells	86	450.	-0.	-0.		11200	0. 63				
									25505				
Mnth: March 1987													
Rocky Reach	Fall Chinook	Wells	86	340.	0. 59	0. 1252		780	0. 15				
Wells Spawning	Summer Chinook	Wells	86	230.	0. 796	0. 1289		2720	0. 19				
Mnth: April 1987													
Wells Spawning	Summer Chinook	Wells	86	200.	0. 903	0. 1464		70	E-3				
									70				
Mnth: December 1987													
Wells Spawning	Spring Chinook	Leavenworth	87	240.	0. 797	0. 1884		1587	1. 34				
Wells Spawning	Summer Chinook	Wells	87	830.	0. 69	0. 1632		875	0. 29				

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 16

Disease Category: Other

Agent: Dropout

Basin	Location	Species	Stock	Brood	Size Fish/Lb	FLOW Index	Density Index	Number Loss	% LOSS
LCO1									
Month: July 1987									
Cowlitz Spring Chinook Cowlitz 86 27. 0.328 0.0397 382 0.06									
..... 382									
Month: August 1987									
Cowlitz Late Coho Cowlitz 86 67. 1.524 0.1836 60 E-3									
..... 60									
UC01									
Month: July 1987									
Lyon's Ferry Fall Chinook Lyon's Ferry 86 52. 0.711 0.1066 1052 0.25									
Wells Spawning Summer Chinook Wells 86 68. 0.69 0.069 5900 1.5									
Month: August 1987									
Lyon's Ferry Fall Chinook Lyon's Ferry a6 41. 0.575 0.0863 522 0.15									
Rocky Reach Early Coho Kalama Falls 86 45. 0.617 0.0752 638 0.14									
Wells Spawning Summer Chinook Wells 86 38. -0. -0. 755 0.19									
..... 1915									
Month: September 1987									
Lyon's Ferry Fall Chinook Lyon's Ferry 86 27. 0.455 0.0683 10 E. 3									
Lyon's Ferry Fall Chinook Lyon's Ferry 86 28. 0.531 0.0797 338 0.19									
Wells Spawning Summer Chinook Wells 86 24. 1.063 0.0716 25 E-2									
..... 373									
Month: October 1987									
Lyon's Ferry Fall Chinook Lyon's Ferry 86 21. 0.538 0.0806 45 0.02									
Lyon's Ferry Fall Chinook Lyon's Ferry a6 23. 0.602 0.0903 150 0.09									
Lyon's Ferry Spring Chinook Tucannon 86 12. 0.572 0.0743 38 0.02									
Wells Spawning Summer Chinook Wells 86 17. 1.729 0.1144 34 E-2									
..... 267									
Month: November 1987									
Lyon's Ferry Fall Chinook Lyon's Ferry 86 19. 0.668 0.1003 42 0.02									
Wells Spawning Summer Chinook Wells 86 15. 1.898 0.1256 21 E-2									
..... 63									
Month: December 1987									
wells Spawning Summer Chinook Wells 86 12. 2.094 0.1385 80 0.02									
..... 80									

**WOF PROGRAM QCOI
DISEASE PREVALENCE SUMMARY
March 17, 1989**

page: 17

VDF PROGRAM QCOL
DISEASE PREVALENCE SUMMARY
March 17, 1989

page: 18

Disease Category: Other

Agent: Predation

Basin	Location	Species	Stock	size	Flow	Density	Number	%			
				Brood	Fish/Lb	Index	LOSS	LOSS			
LCOL											
Mnth: February 1987											
	Klickitat	Late Coho	Elikomin	a5	22.	2. 127	0. 1724	15200 1. 09			
	Washougal	Early Coho	Washougal	a5	25. 5	2. 373	0. 073	510 0. 29			
	Washougal	Late Coho	Washougal	a5	26.	1. 572	0. 0483	1785 0. 35			
	Washougal	Late Coho	Washougal	a5	25.	2. 407	0. 057	4250 0. 16			
								21745			
Mnth: March 1987											
	Lower Kalama	Early Coho	Kalama Falls	a5	16.	1. 711	0. 1368	200 0. 04			
	Washougal	Late Coho	Cowlitz	85	23.	0. 331	0. 0102	a5 0. 37			
	Washougal	Late Coho	Washougal	a5	22.	2. 081	0. 0639	1280 0. 26			
	Washougal	Late Coho	Washougal	85	22.	2. 505	0. 5935	4250 0. 16			
								5815			
Mnth: June 1987											
	Washougal	Fall Chinook	Washougal	86	82.	3. 017	0. 0536	8580 0. 15			
								8580			
Mnth: July 1987											
	Grays River	Early Coho	Grays River	a6	70.	1. 073	0. 0359	232 0. 03			
								232			
Mnth: September 1987											
	Klickitat	Late Coho	Cowlitz	86	45.	1. 783	0. 2476	750 0. 05			
	Klickitat	Spring Chinook	Klickitat	86	18.	1. 663	0. 0813	395 0. 06			
								1145			
Mnth: October 1987											
	Klickitat	Late Coho	Cowlitz	86	33.	1. 783	0. 3003	745 0. 05			
	Klickitat	Spring Chinook	Klickitat	86	16.	1. 598	0. 0921	595 0. 1			
								1340			
Mnth: November 1987											
	Klickitat	Late Coho	Cowlitz	86	25.	2. 192	0. 3692	768 0. 05			
	Klickitat	Spring Chinook	Klickitat	86	13.	1. 759	0. 1013	440 0. 07			
								1208			
Mnth: December 1987											
	Kalama Falls	Spring Chinook	Kalama Falls	86	14.	1. 761	0. 0942	3000 0. 98			
	Klickitat	Late Coho	Cowlitz	86	22.	2. 384	0. 4024	1450 0. 09			
	Klickitat	Spring Chinook	Klickitat	86	11.	1. 966	0. 1133	310 0. 05			
	Lower Kalama	Early Coho	Kalama Falls	86	44.	1. 52	0. 0561	200 0. 03			

VDF PROGRAM QCOI
DISEASE PREVALENCE SUMMARY
March 17, 1989

page: 19

UCol

Month: February	1987	Ringold	Fall Chinook	Priest Rapids a5	7. 7. 797	0. 0164	4506	0. 39
							
							4506	
Month: March	1987	Ringold	Fall Chinook	Priest Rapids a5	6. 5. 913	0. 0132	70000	6. 36
							
							70000	
Month: April	1987	Wells Spawning	Summer Chinook Wells		86	200. 0. 903	0. 1464	5 E-4
							
							5	
Month: August	1987	Wells Spawning	Summer Chinook Wells		86	38. -0.	-0.	12 E-3
							
							12	
Month: September	1987	Ringold	Spring Chinook Wnd River		86	25. 1. 093	0. 003	4665 0. 47
							
Month: October	1987	Ringold	Spring Chinook Wnd River		86	20. 1. 223	0. 0034	10000 1. 03
							
							10000	
Month: November	1987	Ringold	Spring Chinook Wnd River		86	12. 1. 788	0. 0049	10000 1. 04
							
Month: December	1987	Ringold	Spring Chinook Wnd River	86	10. 2. 581	0. 005	10000 1. 05	
		Wells Spawning	Spring Chinook Leavenworth	87	240. 0. 797	0. 1884	a5	0. 07
		Wells Spawning	Summer Chinook Wells	86	12. 2. 094	0. 1385	5	E-3
							
							10090	

**WDF PROGRAM QCO,
DISEASE PREVALENCE SUMMARY
March 17, 1989**

page: 20

Disease Category: Other
Agent: Eye picking

Basin	Location	Species	Stock	Size	Flow	Density	Number	%			
				Brood	Fish/Lb	Index	Index	LOSS			
LCOL											
Month: June											
	1987										
	Grays River	Early Coho	Grays River	86	88.	0.911	0.0306	1137 0.15			
								1137			
Month: July											
	1987										
	Grays River	Early Coho	Grays River	a6	70.	1.073	0.0359	362 0.05			
								362			
Month: August											
	1987										
	Grays River	Early Coho	Grays River	86	54.	-0.	-0.	131 0.02			
								131			
UCOL											
Month: July											
	1987										
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	52.	0.711	0.1066	230 0.05			
	Wells Spawning	Summer Chinook	Wells	86	68.	0.69	0.069	7 E-3			
								237			
Month: August											
	1987										
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	41.	0.575	0.0863	122 0.03			
	Wells Spawning	Summer Chinook	Wells	86	38.	-0.	-[I]	147 0.04			
								269			
Month: September											
	1987										
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	28.	0.531	0.0797	124 0.07			
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	27.	0.455	0.0683	219 0.09			
	Wells Spawning	Summer Chinook	Wells	86	24.	1.063	0.0716	383 0.1			
								726			
Month: October											
	1987										
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	23.	0.602	0.0903	74 0.04			
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	21.	0.538	0.0806	172 0.07			
	Wells Spawning	Summer Chinook	Wells	86	17.	1.729	0.1144	230 0.06			
								476			
Month: November											
	1987										
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	a6	19.	0.668	0.1003	197 0.11			
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	lb.	0.65	0.0975	267 0.11			
	Tucannon	Spring Chinook	Tucannon	86	10.	-0.	-0.	29 0.02			
	Wells Spawning	Summer Chinook	Wells	86	15.	1.898	0.1256	46 0.01			
								539			

**WDF PROGRAM QCII
DISEASE PREVALENCE SUMMARY
March 17, 1989**

Page: 21

Month:	December	1987							
Wells	spawning	Summer	Chinook	Wells					
					86	12.	2.094	0.1385	74 0.02
									74

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 22

Disease Category: Other
Agent: Saprolegina

Basin	Location	Species	Stock	Brood	Size	FFlow	Density	Number	%
					Fish/Lb	Index	Index	Loss	Loss
LCOL									
Month: April	1987								
	Elokomin Grays River	Fall Chinook Fall Chinook	Elokomin Grays River	86	111. 1. 399	0. 2663		4355	0. 14
				86	83. 1. 403	0. 0904		21	E-3
									4376
Month: May	1987								
	Kalama Falls	Spring Chinook	Kalama Falls A	-0.	-0.	-0-		9	5. 77
									9
Month: June	1987								
	Kalama Falls	Spring Chinook	Kalama Falls A	-0.	-0.	-0-		41	11. 6
									41
Month: July	1987								
	Kalama Falls	Spring Chinook	Kalama Falls A	-0.	-0.	-0-		39	a.99
									39
Month: August	1987								
	Kalama Falls	Spring Chinook	Kalama Falls A	-0.	-0.	-0-		20	4. 58
	Klickitat	Spring Chinook	Klickitat A	-0.	-0.	-0-		3	0. 45
									23
Month: September	1987								
	Kalama Falls	Fall Chinook	Kalama Falls A	-0.	.0-	-0-		395	18. 8
	Kalama Falls	Late Coho	Kalama Falls 86	54.	1. 325	0. 1534		75	E-2
	Kalama Falls	Spring Chinook	Kalama Falls 86	25.	1. 106	0. 1397		27	E-2
	Kalama Falls	Spring Chinook	Kalama Falls A	-0-	-0-	-0-		35	-0-
	Klickitat	Spring Chinook	Klickitat A	-0.	-0.	-0-		5	0. 58
									537
Month: October	1987								
	Kalama Falls	Early Coho	Kalama Falls A	-0.	-0.	-0-		10	-0-
	Kalama Falls	Fall Chinook	Kalama Falls A	-cl-	-0-	-0-		100	156.
	Kalama Falls	Late Coho	Kalama Falls 86	42.	0. 142	0. 0178		156	0. 01
	Kalama Falls	Spring Chinook	Kalama Falls 86	23.	1. 053	0. 133		231	0. 07
	Speelyai	Early Coho	Lewis River A	-0.	-0-	-0-		35	4. 67
									532
Month: November	1987								
	Kalama Falls	Late Coho	Kalama Falls 86	36.	0. 875	0. 1044		60	E-2
	Kalama Falls	Spring Chinook	Kalama Falls 86	19.	1. 419	-0-		200	0. 06
	Lewis River	Early Coho	Lewis River A	-0-	-0-	-0-		44	40.
	Lewis River	Late Coho	Lewis River A	-0-	-0-	-0-		104	4. 1

**WDF PROGRAM QCO,
DISEASE PREVALENCE SUMMARY
March 17, 1989**

Page: 23

Lower Kalama	Fall Chinook	Kalama Falls	A	-0	-0	-0.	197	100.
							605	
Mnth: December	1987							
Elokomin	Fall Chinook	Elokomin	E	-0.	-0.	-0.	4970	0.11
Kalama Falls	Late Coho	Kalama Falls	86	30.	0.967	0.1146	15	E-3
Klickitat	Fall Chinook	Klickitat	E	-0.	-0.	-0.	900	1.15
Klickitat	Fall Chinook	Priest Rapids	a7	-0.	-0.	-0.	94385	1.31
Klickitat	Fall Chinook	Priest Rapids	87	-0.	-0.	-0.	94385	1.31
Klickitat	Fall Chinook	Priest Rapids	87	-0.	-0.	-0.	94385	1.31
Klickitat	Fall Chinook	Priest Rspids	87	-0.	-0.	-0.	94385	1.31
Klickitat	Spring Chinook	Klickitat	E	-0.	-0.	-0.	13570	0.9
Lewis River	Late Coho	Lewis River	A	-0.	-0.	-0.	422	-0.
Speelyai	Early Caho	Lewis River	E	-0.	-0.	-0.	50000	4.25
Washougal	Fall Chinook	Washougal	A	-0.	-0.	-0.	49	0.86
							447466	

UC01

Lyon's Ferry	Fall Chinook	Lyon's Ferry	A	-0.	-0.	-0.	2	0.11
							2	
Mnth: September	1987							
Lyon's Ferry	Fall Chinook	Lyon's Ferry	A	-0.	-0.	-0.	2	0.08
							2	
Mnth: October	1987							
Lyon's Ferry	Fall Chinook	Lyon's Ferry	A	-0.	-0.	-0.	2	0.08
							2	
Mnth: November	1987							
Rocky Reach	Fall Chinook	Wells	86	18.	0.647	0.0761	300	0.12
							300	
Mnth: December	1987							
Rocky Reach	Fall Chinook	Wells	86	15.	0.712	0.0838	4603	1.96
							4603	

VDF PROGRAM QC?
DISEASE PREVALENCE SUMMARY
March 17, 1989

page: 24

Disease Category: Other
Agent: Handling mortality

	Location	Species	Stock	Size		Flow	Density	Number	%
				Brood	Fish/Lb	Index	Index	LOSS	Loss
LCol									
Mnth: July	1987								
	Cowlitz	Spring Chinook	Cowlitz	86	27.	0.328	0.0397	191	0.03
								191	
Mnth: August	1987								
	Cobitz	Late Coho	Cowlitz	86	67.	1.524	0.1836	2380	0.04
	Kalama Falls	Spring Chinook	Kalama Falls	A	-0.	-0.	-0.	28	6.41
								2408	
Mnth: September	1987								
	Kalama Falls	Fall Chinook	Kalama Falls	A	-0.	-0.	-0.	222	10.6
	Kalama Falls	Spring Chinook	Kalama Falls	A	-0.	-0.	-0.	52	-0-
	Lower Kalama	Early Coho	Kalama Falls	86	98.	0.829	0.0319	800	0.14
								1074	
Mnth: November	1987								
	Grays River	Early Coho	Grays River	86	32.	1.339	0.0538	169	0.02
	Kalama Falls	Late Coho	Kalama Falls	86	36.	0.875	0.1044	200	0.02
								369	
Mnth: December	1987								
	Klickitat	Spring Chinook	Klickitat	87	856.	-0.	-0.	9400	0.72
								9400	
UCOI									
Mnth: August	1987								
	Rocky Reach	Early Coho	Kalama Falls	86	45.	0.617	0.0752	65	0.01
								65	
Mnth: September	1987								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	28.	0.531	0.0797	335	0.19
								335	
Mnth: October	1987								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	21.	0.538	0.0806	40	0.02
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	A	-0.	-0.	-0.	28	1.09
								68	
Mnth: November	1987								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	A	-0.	-0.	-0.	307	67.
	Tucannon	Spring Chinook	Tucannon	56	10.	-0.	-0.	15	E-2

**VDF PROGRAM QCOI
DISEASE PREVALENCE SUMMARY
MARCH 17, 1989**

page: 25

322

Month:	December	1987									
Wells	Spawning	Spring	Chinook	Leavenworth	87	240.	0. 797	0. 1884	400	0. 34	
											400

WDF PROGRAM 0COI
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 26

Disease Category: Other

Agent: Jumpounds

Basin	Location	Species	Stock	Size		FLOW Density	Number	% LOSS
				Brood	Fish/Lb			
LC0i								
Mnth: September	1987							
	Klickitat	Spring Chinook	Klickitat	A	-0.	-0.	-0.	1 0.12
	Lewis River	Spring Chinook	Lewis River	A	-0.	-0.	-0.	1 0.46
								2
Mnth: November	1987							
	Grays River	Early Coho	Grays River	a6	32.	1. 339	0. 0538	53 E-2
								53
Mnth: December	1987							
	Grays River	Early Coho	Grays River	86	30.	I. 618	0. 0615	12 E-3
								12
UC0i								
Mnth: July	1987							
	Rocky Reach	Fall Chinook	Wells	a6	55.	0. 524	0. 107	10514 4.3
								10514
Mnth: August	1987							
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	41.	0. 575	0. 0863	1b74 0.47
	Lyon's Ferry	Spring Chinook	Tucannon	A	-0.	-0.	-0.	7 b. 93
								1981
Mnth: October	1987							
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	21.	0. 538	0. 0806	16 E-2
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	23.	0. 602	0. 0903	9 E-2
	Lyon's Ferry	Spring Chinook	Tucannon	86	12.	0. 572	0. 0743	30 0.02
								55
Mnth: November	1987							
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	1b.	0. 65	0. 0975	8 E-3
								a

VDF PROGRAM QOL
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 27

Disease Category: Other
Agent: Marking mortality

Basin	Location	Species	Stock	Size		Flow Density		Number	%
				Brood	Fish/Lb	Index	Index		
Month: April	1987								
	Wells spawning	Summer Chinook	Wells						
				86	200.	0. 903	0. 1464	14252	0. 99
								14252	
Month: May	1987								
	Wells Spawning	Summer Chinook	Wells						
				86	100.	1. 194	0. 1934	5996	0. 42

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 28

Disease Category: Other

Agent: Normal

Basin	Location	Species	Stock	Size		Flow Index	Density Index	Number	% Loss
				Brood	Fish/Lb				
<hr/>									
LCol									
Month: January	1987								
	Elokomin	Fall Chinook	Elokomin	86	734.	1.211	0.0673	10108	0.39
	Elokomin	Late Coho	Elokomin	85	24.	1.028	0.0742	1450	0.1
								11558	
Month: February	1987								
	Cowlitz	Late Coho	Cowlitz	85	25.	-0-	-0-	3676	0.08
	Cowlitz	Spring Chinook	Cowlitz	85	9.	-0-	-0-	144	0.02
	Elokomin	Fall Chinook	Elokomin	86	456.	1.653	0.1128	7951	0.35
	Elokomin	Fall Chinook	Kalama Falls	86	964.	-0-	-0-	500	0.22
	Elokomin	Fall Chinook	Skamakowa	86	347.	1.533	0.1096	1990	0.38
	Elokomin	Late Coho	Elokomin	85	21.	1.125	0.0815	187	0.01
	Grays River	Fall Chinook	Skamakowa	86	617.	0.739	0.0418	102	0.09
	Kalama Falls	Fall Chinook	Kalama Falls	86	775.	0.68	0.0708	2293	0.06
	Kalama Falls	Late Coho	Elokomin	85	20.	1.121	0.0943	100	0.02
	Kalama Falls	Late Coho	Kalama Falls	85	20.	0.619	0.052	400	0.12
	Kalama Falls	Spring Chinook	Kalama Falls	86	405.	0.759	0.087	593	0.19
	Klickitat	Fall Chinook	Klickitat	86	402.	-0-	-0-	500	0.52
	Klickitat	Late Coho	Cowlitz	86	1096.	-0-	-0-	3500	0.44
	Klickitat	Spring Chinook	Klickitat	86	267.	-0-	-0-	1100	0.17
	Klickitat	Spring Chinook	Wind River	85	14.	1.776	0.1073	1100	0.16
	Lewis River	Late Coho	Lewis River	85	24.	4.677	0.3015	2996	0.06
	Lewis River	Spring Chinook	Lewis River	85	10.5	1.315	0.0999	446	0.07
	Lower Kalama	Early Coho	Kalama Falls	85	21.5	1.227	0.1104	1000	0.18
	Lower Kalama	Early Coho	Kalama Falls	86	1050.	0.636	0.0596	1000	0.17
	Lower Kalama	Fall Chinook	Kalama Falls	86	644.	0.837	0.0784	6000	0.17
	Washougal	Early Coho	Washougal	85	25.5	2.373	0.073	90	0.05
	Washougal	Early Coho	Washougal	86	718.	-0-	-0-	4500	0.37
	Washougal	Fall Chinook	Washougal	86	854.	-0-	-0-	27000	0.43
	Washougal	Late Coho	Washougal	85	26.	1.572	0.0483	315	0.06
	Washougal	Late Coho	Washougal	85	25.	2.407	0.057	750	0.03
								68233	
Month: March	1987								
	Cowlitz	Fall Chinook	Cowlitz	86	356.	-0-	-0-	8362	0.1
	Cowlitz	Late Coho	Cowlitz	85	22.	-0-	-0-	8553	0.18
	Cowlitz	Spring Chinook	Cowlitz	85	7.6	-0-	-0-	1143	0.18
	Cowlitz	Spring Chinook	Cowlitz	86	114.	-0-	-0-	15926	0.49
	Elokomin	Fall Chinook	Elokomin	86	300.	0.867	0.1253	10740	0.34
	Elokomin	Late Coho	Elokomin	85	16.	1.404	0.1207	2900	0.2
	Grays River	Early Coho	Grays River	85	18.	1.766	0.0596	58	0.01
	Grays River	Early Coho	Grays River	86	340.	1.304	0.0743	245	0.03
	Grays River	Early Coho	Washougal	86	568.	-0-	-0-	90	0.01
	Grays River	Fall Chinook	Grays River	86	231.	0.68	0.0478	293	0.05
	Grays River	Fall Chinook	Skamakowa	86	264.	1.074	0.0723	73	0.07
	Grays River	Fall Chinook	Washougal	86	668.	1.305	0.0743	1121	0.09
	Kalama Falls	Fall Chinook	Kalama Falls	86	281.	1.761	0.1918	2980	0.05
	Kalama Falls	Late Coho	Elokomin	85	17.	1.237	0.1039	505	0.08

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 29

Kalama Falls	Late Coho	Kalama Falls	85	17.	0.682	0.0573	622	0.18
Kalama Falls	Spring Chinook	Kalama Falls	86	208.	1.161	0.1693	144	0.05
Klickitat	Fall Chinook	Klickitat	86	124.	0.851	0.0851	300	0.31
Klickitat	Fall Chinook	Priest Rapids	86	202.	1.296	0.1494	13350	0.29
Klickitat	Spring Chinook	Klickitat	86	120.	1.102	0.1095	300	0.05
Klickitat	Spring Chinook	Wind River	85	11.	1.975	0.1229	1000	0.15
Lewis River	Late Coho	Lewis River	85	24.	2.588	0.1949	2120	0.04
Lewis River	Late Coho	Lewis River	86	970.	-0-	-0-	76	E-3
Lewis River	Spring Chinook	Lewis River	85	10.	1.759	0.1108	1200	0.24
Lower Kalama	Early Coho	Kalama Falls	85	16.	1.711	0.1368	350	0.06
Lower Kalama	Fall Chinook	Kalama Falls	86	376.	0.66	0.0429	2564	0.07
Speelyai	Early Coho	Lewis River	86	390.	-0-	-0-	2500	0.16
Washougal	Fall Chinook	Washougal	86	540.	-0-	-0-	13100	0.21
Washougal	Late Coho	Cowlitz	85	23.	0.331	0.0102	15	0.06
Washougal	Late Coho	Washougal	85	22.	2.505	0.5935	750	0.03
Washougal	Late Coho	Washougal	85	22.	2.081	0.0639	320	0.07
Washougal	Late Coho	Washougal	86	1164.	-0-	-0-	6800	0.19

							98500	

Month: April	1987							
	Cowlitz	Fall Chinook	Cowlitz	86	164.	-0-	-0-	8013
Elokomin	Fall Chinook	Elokomin	86	111.	1.399	0.2663	2345	0.07
Elokomin	Late Coho	Elokomin	85	14.4	0.618	0.0974	400	0.11
Elokomin	Late Coho	Elokomin	86	704.	1.268	0.0951	5800	0.18
Elokomin	Late Coho	Kalama Falls	86	609.	1.071	0.0803	1816	0.33
Grays River	Early Coho	Grays River	85	14.5	2.185	0.0707	200	0.05
Grays River	Early Coho	Grays River	86	173.	2.023	0.1152	4048	0.52
Grays River	Fall Chinook	Grays River	86	83.	1.403	0.0904	679	0.12
Grays River	Fall Chinook	Skamakowa	86	127.	1.036	0.0586	200	0.19
Grays River	Fall Chinook	Washougal	86	252.	1.438	0.0383	884	0.07
Kalama Falls	Fall Chinook	Kalama Falls	86	138.	1.056	0.102	6270	0.18
Kalama Falls	Late Coho	Elokomin	85	15.	0.982	0.0819	635	0.43
Kalama Falls	Late Coho	Kalama Falls	85	15.	0.982	0.0819	600	0.4
Kalama Falls	Late Coho	Kalama Falls	86	783.	2.753	0.2007	4865	0.61
Kalama Falls	Spring Chinook	Kalama Falls	86	114.	0.955	0.1193	575	0.18
Klickitat	Fall Chinook	Klickitat	86	69.	1.25	0.125	200	0.21
Klickitat	Fall Chinook	Priest Rapids	86	142.	1.262	0.0643	850	0.02
Klickitat	Late Coho	Cowlitz	86	302.	1.298	0.1285	780	0.05
Lewis River	Late Coho	Lewis River	85	17.	3.177	0.2392	3233	0.06
Lewis River	Late Coho	Lewis River	86	476.	1.206	0.1138	1383	0.03
Lower Kalama	Early Coho	Kalama Falls	85	15.8	1.714	0.12	335	0.06
Lower Kalama	Early Coho	Kalama Falls	86	350.	0.709	0.0665	482	0.08
Lower Kalama	Fall Chinook	Kalama Falls	86	162.	0.858	0.0606	2210	0.06
Speelyai	Early Coho	Lewis River	86	219.	1.086	0.0695	11000	0.81
Speelyai	Spring Chinook	Lewis River	86	90.	1.085	0.0943	660	0.1
Washougal	Early Coho	Washougal	85	20.	2.671	0.0601	6300	0.25
Washougal	Fall Chinook	Washougal	86	228.	1.642	0.0424	9640	0.15
Washougal	Late Coho	Washougal	85	19.7	2.238	0.0716	6300	1.25
Washougal	Late Coho	Washougal	86	496.	-0-	-0-	6500	0.16

							87203	

Month: May	1987							
	Cowlitz	Fall Chinook	Cowlitz	86	96.	-0-	-0-	48270
Cowlitz	Late Coho	Cowlitz	86	263.	-0-	-0-	33396	0.65
Cowlitz	Spring Chinook	Cowlitz	86	59.	-0-	-0-	43862	1.76

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY

March 17, 1989

Page: 30

Elokomin	Late Coho	Elokomin	85	12.5	0.039	0.0063	236	1.06
Elokomin	Late Coho	Elokomin	86	382.	0.967	0.0726	4700	0.26
Elokomin	Late Coho	Kalama Falls	86	311.	1.548	0.2321	1190	0.22
Grays River	Early Coho	Grays River	86	118.	1.323	0.0754	6700	0.87
Grays River	Fall Chinook	Grays River	86	52.	1.661	0.1136	525	0.1
Grays River	Fall Chinook	Skamakowa	86	61.	1.28	0.0966	137	0.13
Grays River	Fall Chinook	Washougal	86	111.	1.559	0.0372	749	0.09
Kalama Falls	Fall Chinook	Kalama Falls	86	88.	1.381	0.1439	15455	0.65
Kalama Falls	Late Coho	Elokomin	85	15.	0.983	0.1024	40	0.05
Kalama Falls	Late Coho	Kalama Falls	85	15.	0.982	0.1023	72	0.1
Kalama Falls	Late Coho	Kalama Falls	86	338.	1.809	0.1885	5010	0.89
Klickitat	Fall Chinook	Priest Rapids	86	115.	1.461	0.0688	1000	0.05
Klickitat	Late Coho	Elokomin	85	16.	-0-	-0-	2000	0.69
Klickitat	Spring Chinook	Klickitat	86	62.	-0-	-0-	240	0.04
Lewis River	Late Coho	Lewis River	85	17.	3.173	0.2257	2247	0.06
Lewis River	Late Coho	Lewis River	86	223.	1.374	0.1889	1480	0.03
Lewis River	Spring Chinook	Lewis River	86	80.	0.576	0.029	100	0.02
Lower Kalama	Early Coho	Kalama Falls	86	250.	0.736	0.0534	485	0.08
Lower Kalama	Fall Chinook	Kalama Falls	86	92.	1.522	0.0911	2950	0.09
Speelyai	Spring Chinook	Kalama Falls	86	72.	0.563	0.0285	300	0.17
Washougal	Fall Chinook	Washougal	86	117.	1.784	0.0425	34000	0.55
Washougal	Late Coho	Washougal	86	299.	2.057	0.0729	11580	0.31

							216724	

Month: June	1987							
Cowlitz	Fall Chinook	Cowlitz	86	68.	-0-	-0-	86100	8.51
Cowlitz	Late Coho	Cowlitz	86	163.	0.367	0.0442	30400	0.4
Cowlitz	Spring Chinook	Cowlitz	86	45.	0.364	0.0438	12560	1.93
Elokomin	Fall Chinook	Elokomin	86	65.	1.819	0.356	803	0.03
Elokomin	Late Coho	Elokomin	85	13.	2.279	0.3731	10	E-3
Elokomin	Late Coho	Elokomin	86	209.	1.421	0.1066	3438	0.19
Elokomin	Late Coho	Kalama Falls	86	212.	2.106	0.2843	2500	0.47
Grays River	Early Coho	Grays River	86	88.	0.911	0.0306	999	0.13
Grays River	Fall Chinook	Grays River	86	70.	0.384	0.0217	185	0.18
Grays River	Fall Chinook	Skamakowa	86	50.	1.948	0.1103	10	E-2
Grays River	Fall Chinook	Washougal	86	85.	1.876	0.0447	916	0.11
Kalama Falls	Fall Chinook	Kalama Falls	86	71.	-0-	-0-	8700	0.37
Kalama Falls	Late Coho	Elokomin	85	14.	-0-	-0-	103	0.15
Kalama Falls	Late Coho	Kalama Falls	85	14.	-0-	-0-	2	E-3
Kalama Falls	Late Coho	Kalama Falls	86	207.	0.766	0.0792	806	0.07
Kalama Falls	Spring Chinook	Kalama Falls	86	64.	0.679	0.1019	845	0.27
Klickitat	Spring Chinook	Klickitat	86	45.	0.942	0.0448	440	0.07
Lewis River	Late Coho	Lewis River	86	138.	1.189	0.0616	524	0.01
Lewis River	Spring Chinook	Lewis River	86	56.	0.728	0.0369	479	0.08
Lower Kalama	Early Coho	Kalama Falls	86	173.	0.799	0.0695	1479	0.25
Speelyai	Early Coho	Lewis River	86	142.	1.026	0.0669	1750	0.13
Speelyai	Spring Chinook	Kalama Falls	86	50.	0.71	0.036	250	0.14
Washougal	Fall Chinook	Washougal	86	78.	0.942	0.0384	120	0.03
Washougal	Fall Chinook	Washougal	86	82.	3.017	0.0536	780	0.01
Washougal	Late Coho	Washougal	86	192.	1.386	0.0473	5900	0.18

							160099	

Month: July	1987							
Cowlitz	Fall Chinook	Cowlitz	86	39.	0.302	0.0364	3474	0.74
Cowlitz	Late Coho	Cowlitz	86	106.	1.193	0.1434	14490	0.21

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY

March 17, 1989

Page: 31

Cowlitz	Spring Chinook	Cowlitz	86	27.	0.328	0.0397	1338	0.21
Elokomin	Late Coho	Elokomin	86	141.	0.732	0.0573	2686	0.15
Grays River	Early Coho	Grays River	86	70.	1.073	0.0359	810	0.11
Grays River	Fall Chinook	Grays River	86	37.	0.591	0.0337	130	0.12
Kalama Falls	Late Coho	Kalama Falls	86	131.	0.933	0.0884	8985	0.81
Kalama Falls	Spring Chinook	Kalama Falls	86	51.	0.704	0.0853	810	0.26
Lewis River	Late Coho	Lewis River	86	100.	1.137	0.0711	878	0.02
Lewis River	Spring Chinook	Lewis River	86	34.	0.843	0.0534	267	0.05
Lower Kalama	Early Coho	Kalama Falls	86	151.	0.373	0.0326	2071	0.35
Speelyai	Early Coho	Lewis River	86	115.	1.214	0.0796	1260	0.1
Speelyai	Spring Chinook	Kalama Falls	86	36.	0.67	0.0431	160	0.09
Washougal	Fall Chinook	Washougal	86	50.	1.24	0.0506	150	0.04
Washougal	Late Coho	Washougal	86	138.	1.77	0.0604	800	0.02

38309

Month: August	1987								
	Cowlitz	Fall Chinook	Cowlitz	86	27.	0.801	0.0965	1961	0.2
	Cowlitz	Late Coho	Cowlitz	86	67.	1.524	0.1836	20555	0.32
	Cowlitz	Spring Chinook	Cowlitz	86	26.	0.281	0.1031	624	0.1
	Elokomin	Late Coho	Elokomin	86	79.	-0-	-0-	1781	0.1
	Grays River	Early Coho	Grays River	86	54.	-0-	-0-	523	0.07
	Grays River	Fall Chinook	Grays River	86	27.	0.853	0.0401	78	0.07
	Kalama Falls	Late Coho	Kalama Falls	86	80.	1.126	0.1173	2710	0.24
	Kalama Falls	Spring Chinook	Kalama Falls	86	35.	1.079	0.1124	1815	0.58
	Klickitat	Late Coho	Cowlitz	86	67.	1.451	0.1832	725	0.05
	Klickitat	Spring Chinook	Klickitat	86	20.	1.842	0.0764	155	0.03
	Lewis River	Late Coho	Lewis River	86	72.	1.423	0.0891	2227	0.06
	Lewis River	Late Coho	Lewis River	86	72.	1.423	0.0891	2227	0.06
	Lewis River	Spring Chinook	Lewis River	86	28.	0.91	0.0593	523	0.09
	Lower Kalama	Early Coho	Kalama Falls	86	113.	0.449	0.039	912	0.15
	Speelyai	Early Coho	Lewis River	86	85.	1.286	0.0838	700	0.06
	Speelyai	Spring Chinook	Kalama Falls	86	31.	0.616	0.0447	600	0.34
	Washougal	Fall Chinook	Washougal	86	49.	1.22	0.0497	180	0.05
	Washougal	Late Coho	Washougal	86	96.	3.055	0.0686	2934	0.09

41230

Month: September	1987								
	Cowlitz	Fall Chinook	Cowlitz	86	14.	1.299	0.1565	605	0.06
	Cowlitz	Late Coho	Cowlitz	86	49.	1.454	0.1752	6950	0.13
	Cowlitz	Spring Chinook	Cowlitz	86	20.	0.375	0.0453	1350	0.22
	Elokomin	Late Coho	Elokomin	86	70.	0.945	0.052	971	0.06
	Grays River	Early Coho	Grays River	86	42.	1.488	0.0493	908	0.12
	Kalama Falls	Late Coho	Kalama Falls	86	54.	1.325	0.1534	2277	0.21
	Kalama Falls	Spring Chinook	Kalama Falls	86	25.	1.106	0.1397	902	0.29
	Lewis River	Late Coho	Lewis River	86	65.	1.488	0.0997	1628	0.04
	Lewis River	Spring Chinook	Lewis River	86	21.	1.167	0.0739	1056	0.18
	Lower Kalama	Early Coho	Kalama Falls	86	98.	0.829	0.0319	2277	0.38
	Speelyai	Early Coho	Lewis River	86	60.	2.076	0.1211	1500	0.12
	Speelyai	Spring Chinook	Kalama Falls	86	27.	0.726	0.0519	132	0.08

20556

Month: October	1987								
	Cowlitz	Spring Chinook	Cowlitz	86	15.	0.496	0.06	2414	0.39
	Elokomin	Late Coho	Elokomin	86	48.	0.947	0.0653	428	0.02

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 32

Grays River	Early Coho	Grays River	86	36.	2.236	0.0547	667	0.09
Kalama Falls	Late Coho	Kalama Falls	86	42.	0.142	0.0178	741	0.07
Kalama Falls	Spring Chinook	Kalama Falls	86	23.	1.053	0.133	1290	0.42
Klickitat	Late Coho	Cowlitz	86	33.	1.783	0.3003	40	E-3
Lewis River	Late Coho	Lewis River	86	50.	1.429	0.1151	431	0.01
Lewis River	Spring Chinook	Lewis River	86	19.	1.229	0.0778	419	0.07
Lower Kalama	Early Coho	Kalama Falls	86	55.	1.226	0.0472	775	0.13
Speelyai	Early Coho	Lewis River	86	48.	2.089	0.1447	1400	0.12
Speelyai	Spring Chinook	Kalama Falls	86	23.	0.817	0.0908	200	0.11
Washougal	Late Coho	Washougal	86	54.	2.32	0.0383	916	0.03

							9721	

Month: November	1987								
	Cowlitz	Late Coho	Cowlitz	86	34.	2.223	0.2678	4788	0.09
	Cowlitz	Spring Chinook	Cowlitz	86	12.	0.616	0.0744	3904	0.64
	Elokomin	Late Coho	Elokomin	86	40.	1.083	0.0767	596	0.03
	Grays River	Early Coho	Grays River	86	32.	1.339	0.0538	345	0.05
	Kalama Falls	Late Coho	Kalama Falls	86	36.	0.875	0.1044	400	0.04
	Kalama Falls	Spring Chinook	Kalama Falls	86	19.	1.419	-0-	505	0.16
	Lewis River	Late Coho	Lewis River	86	45.	1.387	0.1105	1049	0.03
	Lewis River	Spring Chinook	Lewis River	86	12.	1.608	0.1018	1522	0.27
	Lower Kalama	Early Coho	Kalama Falls	86	70.	1.04	0.04	500	0.08
	Speelyai	Early Coho	Lewis River	86	40.	2.305	0.1597	700	0.06
	Speelyai	Spring Chinook	Kalama Falls	86	19.	0.933	0.1037	200	0.11
	Washougal	Late Coho	Washougal	86	46.	2.17	0.0363	950	0.03

							15459		

Month: December	1987								
	Cowlitz	Late Coho	Cowlitz	86	32.	2.013	0.2425	7463	0.14
	Cowlitz	Spring Chinook	Cowlitz	86	12.	0.523	0.0632	1697	0.28
	Elokomin	Fall Chinook	Elokomin	E	-0-	-0-	-0-	41748	0.89
	Elokomin	Late Coho	Elokomin	86	36.	1.051	0.0786	403	0.02
	Elokomin	Late Coho	Elokomin	87	1343.	1.231	0.0855	1860	0.18
	Grays River	Early Coho	Big Creek	E	-0-	-0-	-0-	91000	4.88
	Grays River	Early Coho	Grays River	86	30.	1.618	0.0615	169	0.02
	Grays River	Early Coho	Grays River	E	-0-	-0-	-0-	62000	13.6
	Grays River	Fall Chinook	Big Creek	E	-0-	-0-	-0-	137130	17.4
	Grays River	Fall Chinook	Elokomin	E	-0-	-0-	-0-	122000	9.36
	Grays River	Fall Chinook	Grays River	E	-0-	-0-	-0-	47000	8.08
	Grays River	Fall Chinook	Kalama Falls	E	-0-	-0-	-0-	131000	12.
	Kalama Falls	Fall Chinook	Kalama Falls	E	-0-	-0-	-0-	556900	7.57
	Kalama Falls	Late Coho	Kalama Falls	86	30.	0.967	0.1146	22	E-3
	Kalama Falls	Spring Chinook	Kalama Falls	E	-0-	-0-	-0-	206100	19.9
	Klickitat	Fall Chinook	Klickitat	E	-0-	-0-	-0-	2700	3.46
	Klickitat	Fall Chinook	Priest Rapids	87	-0-	-0-	-0-	283155	3.93
	Klickitat	Fall Chinook	Priest Rapids	87	-0-	-0-	-0-	283155	3.93
	Klickitat	Fall Chinook	Priest Rapids	87	-0-	-0-	-0-	283155	3.93
	Klickitat	Fall Chinook	Priest Rapids	87	-0-	-0-	-0-	283155	3.93
	Klickitat	Spring Chinook	Klickitat	E	-0-	-0-	-0-	40710	2.7
	Lewis River	Late Coho	Lewis River	86	38.	1.375	0.1191	702	0.02
	Lewis River	Spring Chinook	Lewis River	86	12.	1.497	0.0986	1931	0.35
	Lower Kalama	Early Coho	Kalama Falls	86	44.	1.52	0.0561	100	0.02
	Speelyai	Early Coho	Lewis River	86	33.	2.348	0.1622	1000	0.08
	Speelyai	Early Coho	Lewis River	E	-0-	-0-	-0-	161000	13.7
	Speelyai	Spring Chinook	Kalama Falls	86	18.	0.977	0.1085	36	0.02

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 33

Washougal	Early Coho	Washougal	E	-0-	-0-	-0-	31500	8.84
Washougal	Fall Chinook	Washougal	E	-0-	-0-	-0-	390000	5.21
Washougal	Late Coho	Washougal	A	-0-	-0-	-0-	500	15.6
Washougal	Late Coho	Washougal	E	-0-	-0-	-0-	128000	6.26

3297291

UCol

Month: January	1987								
	Rocky Reach	Fall Chinook	Priest Rapids	85	13.	0.937	0.0967	178	0.07
	Rocky Reach	Late Coho	Rocky Reach	85	18.	1.078	0.1494	65	0.01

243

Month: February	1987								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	85	11.	0.632	0.0856	112	0.15
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	85	10.	0.429	0.0408	47	0.03
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	676.	-0-	-0-	4193	0.36
	Lyon's Ferry	Spring Chinook	Tucannon	85	7.	0.116	0.0322	16	0.12
	Lyon's Ferry	Spring Chinook	Tucannon	86	237.	0.614	0.0504	1191	0.69
	Ringold	Early Coho	Klickitat	86	612.	0.653	0.0961	100	0.08
	Ringold	Fall Chinook	Priest Rapids	85	7.	7.797	0.0164	5494	0.47
	Ringold	Spring Chinook	Wind River	86	430.	1.244	0.1873	4800	0.48
	Rocky Reach	Early Coho	Kalama Falls	86	428.	0.943	0.2	1147	0.24
	Rocky Reach	Fall Chinook	Priest Rapids	85	12.5	0.974	0.1005	124	0.05
	Rocky Reach	Late Coho	Rocky Reach	85	16.4	1.183	0.164	65	0.01
	Wells Spawning	Summer Chinook	Wells	85	12.	1.02	0.1446	99	0.03

17388

Month: March	1987								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	85	7.	0.552	0.0526	458	0.3
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	85	8.	0.483	0.0805	370	0.24
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	85	10.	0.578	0.0963	741	0.99
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	293.	-0-	-0-	4455	0.36
	Lyon's Ferry	Spring Chinook	Tucannon	85	7.	0.116	0.0322	33	0.26
	Lyon's Ferry	Spring Chinook	Tucannon	86	135.	0.625	0.0714	599	0.35
	Priest Rapids	Fall Chinook	Priest Rapids	86	300.	-0-	-0-	56450	0.8
	Priest Rapids	Fall Chinook	Priest Rapids	86	300.	-0-	-0-	56450	0.8
	Ringold	Early Coho	Klickitat	86	170.	1.02	0.1545	200	0.15
	Ringold	Spring Chinook	Wind River	86	267.	0.833	0.1257	1200	0.12
	Rocky Reach	Early Coho	Kalama Falls	86	285.	0.604	0.1282	1499	0.32
	Rocky Reach	Fall Chinook	Priest Rapids	85	11.3	1.006	0.1038	97	0.04
	Rocky Reach	Fall Chinook	Wells	86	340.	0.59	0.1252	125	0.02
	Rocky Reach	Late Coho	Rocky Reach	85	15.5	1.232	0.1709	36	E-2
	Wells Spawning	Summer Chinook	Wells	85	10.	1.223	0.1735	174	0.04
	Wells Spawning	Summer Chinook	Wells	86	230.	0.796	0.1289	511	0.04

123398

Month: April	1987								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	85	6.	0.603	0.0574	144	0.09
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	85	9.	0.698	0.1163	424	1.04
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	85	9.	0.624	0.104	129	0.35
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	85	7.	0.529	0.0882	335	0.21

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 34

Lyon's Ferry	Spring Chinook	Tucannon	85	6.	0.129	0.0362	2	0.02
Lyon's Ferry	Spring Chinook	Tucannon	86	87.	0.617	0.1105	166	0.1
Priest Rapids	Fall Chinook	Priest Rapids	86	118.	0.939	0.1262	9102	0.13
Ringold	Early Coho	Klickitat	86	75.	0.975	0.1772	200	0.15
Ringold	Spring Chinook	Wind River	86	150.	0.757	0.1369	1200	0.12
Rocky Reach	Early Coho	Kalama Falls	86	209.	0.73	0.1549	3635	0.77
Rocky Reach	Fall Chinook	Priest Rapids	85	8.5	0.828	0.127	237	0.1
Rocky Reach	Fall Chinook	Wells	86	213.	0.818	0.1735	3113	0.59
Rocky Reach	Late Coho	Rocky Reach	85	12.8	1.351	0.1873	122	0.03
Wells Spawning	Summer Chinook	Wells	85	9.	1.433	0.1877	72	0.02
Wells Spawning	Summer Chinook	Wells	86	200.	0.903	0.1464	437	0.03

20430

Month: May	1987							
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	104.	0.583	0.0583	57	E-2
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	71.	0.742	0.0742	847	0.33
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	48.	0.483	0.0241	57	0.02
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	71.	0.742	0.0742	205	0.08
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	71.	0.742	0.0742	57	0.02
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	48.	0.483	0.0241	847	0.33
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	48.	0.483	0.0241	205	0.08
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	104.	0.583	0.0583	205	0.04
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	104.	0.583	0.0583	847	0.15
Lyon's Ferry	Spring Chinook	Tucannon	86	62.	0.249	0.0249	394	0.25
Priest Rapids	Fall Chinook	Priest Rapids	86	76.	-0-	-0-	10900	0.18
Ringold	Early Coho	Klickitat	86	33.	1.102	0.2671	100	0.08
Ringold	Spring Chinook	Wind River	86	83.	0.824	0.1988	775	0.08
Rocky Reach	Early Coho	Kalama Falls	86	123.	0.789	0.1664	8664	1.88
Rocky Reach	Fall Chinook	Wells	86	140.	0.666	0.1399	507	0.2
Wells Spawning	Summer Chinook	Wells	86	100.	1.194	0.1934	2120	0.15

26787

Month: June	1987							
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	71.	0.742	0.0742	2	E-3
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	76.	0.553	0.0553	13	0.02
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	77.	0.547	0.0821	118	0.03
Lyon's Ferry	Spring Chinook	Tucannon	86	44.	1.029	0.1029	259	0.05
Ringold	Early Coho	Klickitat	86	27.	-0-	-0-	100	0.08
Rocky Reach	Early Coho	Kalama Falls	86	83.	0.444	0.0505	3637	0.79
Rocky Reach	Fall Chinook	Wells	86	85.	0.732	0.1977	242	0.1
Wells Spawning	Summer Chinook	Wells	86	70.	0.637	0.1031	4704	0.88

9075

Month: July	1987							
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	52.	0.711	0.1066	308	0.07
Lyon's Ferry	Spring Chinook	Tucannon	86	30.	0.401	0.0401	282	0.18
Ringold	Spring Chinook	Wind River	86	40.	1.112	0.2709	700	0.07
Rocky Reach	Early Coho	Kalama Falls	86	57.	0.533	0.0643	435	0.1
Rocky Reach	Fall Chinook	Wells	86	55.	0.524	0.107	542	0.22

2267

Month: August	1987							
Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	41.	0.575	0.0863	144	0.04

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 35

Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	37.	0.295	0.0443	15	0.02
Lyon's Ferry	Spring Chinook	Tucannon	86	22.	0.514	0.0514	114	0.07
Ringold	Spring Chinook	Wind River	86	30.	1.246	0.3197	380	0.04
Rocky Reach	Early Coho	Kalama Falls	86	45.	0.617	0.0752	845	0.19
Rocky Reach	Fall Chinook	Wells	86	40.	0.626	0.1323	650	0.27
Wells Spawning	Summer Chinook	Wells	86	38.	-0-	-0-	36	E-2

								2184

Month: September	1987								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	27.	0.455	0.0683	130	0.05
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	28.	0.531	0.0797	107	0.06
	Rocky Reach	Early Coho	Kalama Falls	86	33.	1.058	0.1244	1086	0.26
	Rocky Reach	Fall Chinook	Wells	86	30.	0.652	0.1574	381	0.16

								1704	

Month: October	1987								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	21.	0.538	0.0806	192	0.08
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	23.	0.602	0.0903	156	0.09
	Lyon's Ferry	Spring Chinook	Tucannon	86	12.	0.572	0.0743	190	0.12
	Rocky Reach	Early Coho	Kalama Falls	86	25.	0.956	0.1124	105	0.03
Rocky Reach	Fall Chinook	Wells	86	22.	0.82	0.1913	1023	0.42	

								1666	

Month: November	1987								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	19.	0.668	0.1003	609	0.35
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	16.	0.65	0.0975	896	0.36
	Rocky Reach	Early Coho	Kalama Falls	86	22.	1.022	0.1202	42	0.01
	Rocky Reach	Fall Chinook	Wells	86	18.	0.647	0.0761	2013	0.84
Tucannon	Spring Chinook	Tucannon	86	10.	-0-	-0-	343	0.22	

								3903	

Month: December	1987								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	16.	0.706	0.1059	450	0.26
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	86	15.	0.669	0.1003	607	0.25
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	E	-0-	-0-	-0-	227476	3.97
	Lyon's Ferry	Spring Chinook	Tucannon	87	819.	-0-	-0-	1241	0.76
	Lyon's Ferry	Spring Chinook	Tucannon	E	-0-	-0-	-0-	16286	9.68
	Priest Rapids	Fall Chinook	Priest Rapids	E	-0-	-0-	-0-	1410100	5.85
	Rocky Reach	Early Coho	Kalama Falls	86	19.	1.099	0.1293	100	0.02
	Rocky Reach	Fall Chinook	Wells	86	15.	0.712	0.0838	242	0.1
	Tucannon	Spring Chinook	Tucannon	86	10.	-0-	-0-	63	0.04
	Wells Spawning	Summer Chinook	Wells	86	12.	2.094	0.1385	56	0.01
	Wells Spawning	Summer Chinook	Wells	87	830.	0.69	0.1632	425	0.14
Wells Spawning	Summer Chinook	Wells	E	-0-	-0-	-0-	180600	7.07	

								1837646	

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 36

Disease Category: Other

Agent: Pinhead

Basin	Location	Species	Stock	Size Brood	Flow Fish/Lb	Density Index	Number Loss	% Loss
<hr/>								
LCol								
Month: February	1987							
	Grays River	Early Coho	Grays River	86	632. 2.027	0.1244	130	E-2
	Lewis River	Late Coho	Lewis River	85	24. 4.677	0.3015	983	0.02
<hr/>								
							1113	
Month: March	1987							
	Cowlitz	Fall Chinook	Cowlitz	86	356. -0-	-0-	33450	0.38
	Grays River	Early Coho	Grays River	86	340. 1.304	0.0743	1823	0.23
	Grays River	Early Coho	Washougal	86	568. -0-	-0-	269	0.04
	Grays River	Fall Chinook	Grays River	86	231. 0.68	0.0478	10	E-3
	Grays River	Fall Chinook	Washougal	86	668. 1.305	0.0743	30	E-3
	Klickitat	Fall Chinook	Priest Rapids	86	202. 1.296	0.1494	13350	0.29
	Klickitat	Late Coho	Cowlitz	86	462. 1.036	0.1026	1560	0.09
	Klickitat	Spring Chinook	Klickitat	86	120. 1.102	0.1095	750	0.12
	Lewis River	Late Coho	Lewis River	86	970. -0-	-0-	114	E-3
	Lower Kalama	Early Coho	Kalama Falls	86	450. 1.308	0.0123	270	0.05
	Speelyai	Spring Chinook	Lewis River	86	130. 2.15	0.1558	5500	0.79
<hr/>								
							57126	
Month: April	1987							
	Cowlitz	Fall Chinook	Cowlitz	86	164. -0-	-0-	8013	0.09
	Cowlitz	Spring Chinook	Cowlitz	86	79. -0-	-0-	27195	1.02
	Grays River	Fall Chinook	Washougal	86	252. 1.438	0.0383	340	0.03
	Kalama Falls	Fall Chinook	Kalama Falls	86	138. 1.056	0.102	870	0.02
	Klickitat	Fall Chinook	Priest Rapids	86	142. 1.262	0.0643	850	0.02
	Klickitat	Spring Chinook	Klickitat	86	89. 0.692	0.0686	1450	0.23
	Lewis River	Late Coho	Lewis River	85	17. 3.177	0.2392	847	0.02
	Lewis River	Late Coho	Lewis River	86	476. 1.206	0.1138	907	0.02
	Speelyai	Spring Chinook	Lewis River	86	90. 1.085	0.0943	440	0.06
	Washougal	Fall Chinook	Washougal	86	228. 1.642	0.0424	38560	0.61
<hr/>								
							79472	
Month: May	1987							
	Grays River	Fall Chinook	Grays River	86	52. 1.661	0.1136	587	0.11
	Grays River	Fall Chinook	Skamakowa	86	61. 1.28	0.0966	63	0.06
	Grays River	Fall Chinook	Washougal	86	111. 1.559	0.0372	1951	0.23
	Klickitat	Late Coho	Cowlitz	86	106. -0-	-0-	1700	0.11
	Klickitat	Spring Chinook	Klickitat	86	62. -0-	-0-	330	0.05
	Lewis River	Late Coho	Lewis River	85	17. 3.173	0.2257	169	E-3
	Lewis River	Late Coho	Lewis River	86	223. 1.374	0.1889	1649	0.04
	Lewis River	Spring Chinook	Lewis River	86	80. 0.576	0.029	29	E-3
<hr/>								
Month: June	1987							
	Grays River	Fall Chinook	Grays River	86	70. 0.384	0.0217	169	0.16
	Grays River	Fall Chinook	Skamakowa	86	50. 1.948	0.1103	2	E-3

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 37

Grays River	Fall Chinook	Washougal	86	85.	1.876	0.0447	184	0.02
Klickitat	Late Coho	Cowlitz	86	144.	0.853	0.108	750	0.05
Lewis River	Late Coho	Lewis River	86	138.	1.189	0.0616	1886	0.05
Lewis River	Spring Chinook	Lewis River	86	56.	0.728	0.0369	660	0.11
Washougal	Fall Chinook	Washougal	86	82.	3.017	0.0536	6240	0.11
Washougal	Fall Chinook	Washougal	86	78.	0.942	0.0384	2160	0.59

12051

Month: July	1987								
	Grays River	Fall Chinook	Grays River	86	37.	0.591	0.0337	92	0.09
	Klickitat	Late Coho	Cowlitz	86	95.	1.166	0.1458	280	0.02
	Klickitat	Spring Chinook	Klickitat	86	31.	1.34	0.0556	165	0.03
	Lewis River	Late Coho	Lewis River	86	100.	1.137	0.0711	902	0.02
	Lewis River	Spring Chinook	Lewis River	86	34.	0.843	0.0534	247	0.04
	Washougal	Fall Chinook	Washougal	86	50.	1.24	0.0506	2250	0.62
	Washougal	Late Coho	Washougal	86	138.	1.77	0.0604	6820	0.2

10756

Month: August	1987								
	Klickitat	Late Coho	Cowlitz	86	67.	1.451	0.1832	155	E-2
	Klickitat	Spring Chinook	Klickitat	86	20.	1.842	0.0764	160	0.03
	Lewis River	Late Coho	Lewis River	86	72.	1.423	0.0891	1237	0.03
	Lewis River	Late Coho	Lewis River	86	72.	1.423	0.0891	1237	0.03
	Lewis River	Spring Chinook	Lewis River	86	28.	0.91	0.0593	193	0.03

2982

Month: September	1987								
	Kalama Falls	Late Coho	Kalama Falls	86	54.	1.325	0.1534	703	0.06
	Kalama Falls	Spring Chinook	Kalama Falls	86	25.	1.106	0.1397	301	0.1
	Lewis River	Late Coho	Lewis River	86	65.	1.488	0.0997	2057	0.06
	Lewis River	Spring Chinook	Lewis River	86	21.	1.167	0.0739	373	0.06

3434

Month: October	1987								
	Kalama Falls	Late Coho	Kalama Falls	86	42.	0.142	0.0178	378	0.03
	Kalama Falls	Spring Chinook	Kalama Falls	86	23.	1.053	0.133	374	0.12
	Lewis River	Late Coho	Lewis River	86	50.	1.429	0.1151	1869	0.05
	Lewis River	Spring Chinook	Lewis River	86	19.	1.229	0.0778	537	0.09

3158

Month: November	1987								
	Kalama Falls	Late Coho	Kalama Falls	86	36.	0.875	0.1044	250	0.03
	Kalama Falls	Spring Chinook	Kalama Falls	86	19.	1.419	-0-	275	0.09
	Lewis River	Late Coho	Lewis River	86	45.	1.387	0.1105	1750	0.04
	Lewis River	Spring Chinook	Lewis River	86	12.	1.608	0.1018	328	0.06

2603

Month: December	1987								
	Kalama Falls	Late Coho	Kalama Falls	86	30.	0.967	0.1146	23	E-3
	Lewis River	Late Coho	Lewis River	86	38.	1.375	0.1191	1240	0.03
	Lewis River	Spring Chinook	Lewis River	86	12.	1.497	0.0986	391	0.07

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 38

UCol

Month: February	1987								
	Wells Spawning	Summer Chinook	Wells		86	450.	-0-	-0-	1708 0.1
Month: March	1987								
	Rocky Reach	Fall Chinook	Wells		86	340.	0.59	0.1252	1989 0.37
	Wells Spawning	Summer Chinook	Wells		86	230.	0.796	0.1289	3159 0.22

									5148
Month: April	1987								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry		86	178.	0.72	0.12	2982 0.25
	Wells Spawning	Summer Chinook	Wells		85	9.	1.433	0.1877	13 E-3
	Wells Spawning	Summer Chinook	Wells		86	200.	0.903	0.1464	3416 0.24
									6411
Month: May	1987								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry		86	104.	0.583	0.0583	1670 0.29
	Lyon's Ferry	Fall Chinook	Lyon's Ferry		86	48.	0.483	0.0241	1670 0.65
	Lyon's Ferry	Fall Chinook	Lyon's Ferry		86	71.	0.742	0.0742	1670 0.65
	Rocky Reach	Fall Chinook	Wells		86	140.	0.666	0.1399	7449 2.88

									12459
Month: June	1987								
	Rocky Reach	Fall Chinook	Wells		86	85.	0.732	0.1977	6310 2.51

									6310
Month: July	1987								
	Rocky Reach	Fall Chinook	Wells		86	55.	0.524	0.107	2425 0.99

									2425

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 39

Disease Category: Other

Agent: Pre-spawning loss

Basin	Location	Species	Stock	Size	Flow	Density	Number	%
					Brood Fish/Lb	Index	Index	Loss
LCol								
Month: May	1987							
	Cowlitz	Spring Chinook	Cowlitz	A	-0-	-0-	-0-	15 0.73

								15
Month: June	1987							
	Cowlitz	Spring Chinook	Cowlitz	A	-0-	-0-	-0-	111 4.07
								111
Month: July	1987							
	Cowlitz	Spring Chinook	Cowlitz	A	-0-	-0-	-0-	209 6.8

								209
Month: August	1987							
	Cowlitz	Spring Chinook	Cowlitz	A	-0-	-0-	-0-	242 8.61
	Klickitat	Spring Chinook	Klickitat	A	-0-	-0-	-0-	52 7.82
	Speelyai	Spring Chinook	Lewis River	A	-0-	-0-	-0-	53 26.6

								347
Month: September	1987							
	Cowlitz	Fall Chinook	Cowlitz	A	-0-	-0-	-0-	94 2.1
	Cowlitz	Late Coho	Cowlitz	A	-0-	-0-	-0-	1 0.22
	Cowlitz	Spring Chinook	Cowlitz	A	-0-	-0-	-0-	231 13.1
	Grays River	Fall Chinook	Elokomin	A	-0-	-0-	-0-	49 10.2
	Grays River	Fall Chinook	Grays River	A	-0-	-0-	-0-	5 2.21
	Grays River	Fall Chinook	Kalama Falls	A	-0-	-0-	-0-	8 14.8
	Klickitat	Spring Chinook	Klickitat	A	-0-	-0-	-0-	6 0.7
	Lewis River	Spring Chinook	Lewis River	A	-0-	-0-	-0-	3 1.38
	Lower Kalama	Fall Chinook	Kalama Falls	A	-0-	-0-	-0-	17 1.13

								414
Month: October	1987							
	Cowlitz	Fall Chinook	Cowlitz	A	-0-	-0-	-0-	754 18.6
	Cowlitz	Late Coho	Cowlitz	A	-0-	-0-	-0-	54 1.86
	Elokomin	Fall Chinook	Elokomin	A	-0-	-0-	-0-	133 -0-
	Grays River	Fall Chinook	Elokomin	A	-0-	-0-	-0-	108 12.3
	Grays River	Fall Chinook	Grays River	A	-0-	-0-	-0-	36 11.6
	Grays River	Fall Chinook	Kalama Falls	A	-0-	-0-	-0-	20 23.
	Kalama Falls	Fall Chinook	Kalama Falls	A	-0-	-0-	-0-	447 698.
	Kalama Falls	Late Coho	Kalama Falls	A	-0-	-0-	-0-	1 100.
	Lower Kalama	Fall Chinook	Kalama Falls	A	-0-	-0-	-0-	17 100.
	Speelyai	Early Coho	Lewis River	A	-0-	-0-	-0-	42 5.6

								1612
Month: November	1987							

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 40

Cowlitz	Fall Chinook	Cowlitz	A	-0-	-0-	-0-	287	-0-
Cowlitz	Late Coho	Cowlitz	A	-0-	-0-	-0-	933	27.3
Elokomin	Late Coho	Elokomin	A	-0-	-0-	-0-	66	100.
Kalama Falls	Early Coho	Kalama Falls	A	-0-	-0-	-0-	19	-0-
Kalama Falls	Fall Chinook	Kalama Falls	A	-0-	-0-	-0-	31	-0-
Kalama Falls	Late Coho	Kalama Falls	A	-0-	-0-	-0-	44	25.3

Month: December	1987								
	Cowlitz	Late Coho	Cowlitz	A	-0-	-0-	-0-	371	50.8
	Elokomin	Late Coho	Elokomin	A	-0-	-0-	-0-	51	-0-
	Kalama Falls	Late Coho	Kalama Falls	A	-0-	-0-	-0-	22	1.91
	Washougal	Early Coho	Washougal	A	-0-	-0-	-0-	45	8.18
	Washougal	Fall Chinook	Washougal	A	-0-	-0-	-0-	170	2.98
	Washougal	Late Coho	Washougal	A	-0-	-0-	-0-	86	2.69

745

Month: July	1987							
	Wells Spawning	Summer Chinook	Wells	A	-0-	-0-	-0-	2

2

Month: August	1987								
	Lyon's Ferry	Spring Chinook	Tucannon	A	-0-	-0-	-0-	5	4.95
	Wells Spawning	Summer Chinook	Wells	A	-0-	-0-	-0-	4	0.82

-

○

Month: September	1987								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	A	-0-	-0-	-0-	2	0.11
	Priest Rapids	Fall Chinook	Priest Rapids	A	-0-	-0-	-0-	129	5.59
	Wells Spawning	Summer Chinook	Wells	A	-0-	-0-	-0-	14	1.4

145

Month: October	1987								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	A	-0-	-0-	-0-	20	0.78
	Wells Spawning	Summer Chinook	Wells	A	-0-	-0-	-0-	15	1.5

35

Month: November	1987								
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	A	-0-	-0-	-0-	457	99.8
	Priest Rapids	Fall Chinook	Priest Rapids	A	-0-	-0-	-0-	1060	-0-

1517

Month: December	1987							
	Lyon's Ferry	Fall Chinook	Lyon's Ferry	A	-0-	-0-	-0-	213

213

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 41

Disease Category: Other

Agent: soft shell

Basin	Location	Species	Stock	Size	Flow	Density	Number	%	
				Brood	Fish/Lb	Index	Index	Loss	Loss

Month: December	1987								
Klickitat	Fall Chinook	Klickitat	E	-0-	-0-	-0-	5400	6.92	
Klickitat	Fall Chinook	Priest Rapids	87	-0-	-0-	-0-	566310	7.86	
Klickitat	Fall Chinook	Priest Rapids	87	-0-	-0-	-0-	566310	7.86	
Klickitat	Fall Chinook	Priest Rapids	87	-0-	-0-	-0-	566310	7.86	
Klickitat	Fall Chinook	Priest Rapids	87	-0-	-0-	-0-	566310	7.86	
Klickitat	Spring Chinook	Klickitat	E	-0-	-0-	-0-	81420	5.4	
							2352060		

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 42

Disease Category: Other

Agent: Unknown

Basin	Location	Species	Stock	Size Brood Fish/Lb	Flow Index	Density Index	Number Loss	% Loss
UCol								
Month: May	1987							
	Wells Spawning	Summer Chinook	Wells	86	100.	1.194	0.1934	3030 0.21

								3030
Month: December	1987							
	Wells Spawning	Summer Chinook	Wells	86	12.	2.094	0.1385	691 0.18

								691

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 43

Disease Category: Parasite

Agent: Ceratomyxosis

Basin	Location	Species	Stock	Size		Flow Index	Density Index	Number	% Loss	
				Brood	Fish/Lb				Loss	Loss
<hr/>										
LCol										
Month: July	1987									
	Lewis River	Late Coho	Lewis River	86	100.	1.137	0.0711		19	E-3
								19		
Month: August	1987									
	Klickitat	Spring Chinook	Klickitat	A	-0-	-0-	-0-		1	0.15
								1		
Month: November	1987									
	Lewis River	Early Coho	Lewis River	A	-0-	-0-	-0-		7	6.36
Lewis River	Late Coho	Lewis River	A	-0-	-0-	-0-		8	0.32	
								15		

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 44

Disease Category: Parasite

Agent: Costia

Basin	Location	Species	Stock	Size		Flow Index	Density Index	Number	% Loss
				Brood	Fish/Lb				
<hr/>									
LCol									
Month: February	1987								
	Grays River	Early Coho	Grays River	86	632. 2.027	0.1244		1687	0.11
	Grays River	Early Coho	Washougal	86	604. 1.39	0.0879		722	0.1
	Grays River	Fall Chinook	Grays River	86	283. 1.11	0.0628		490	0.11
	Grays River	Fall Chinook	Skamakowa	86	617. 0.739	0.0418		80	0.07
	Kalama Falls	Fall Chinook	Kalama Falls	86	775. 0.68	0.0708		3975	0.1
	Kalama Falls	Spring Chinook	Kalama Falls	86	405. 0.759	0.087		364	0.11
									7318
Month: May	1987								
	Speelyai	Early Coho	Lewis River	86	160. 0.955	0.0623		2080	0.15
									2080
Month: June	1987								
	Kalama Falls	Late Coho	Kalama Falls	86	207. 0.766	0.0792		984	0.09
									984
Month: July	1987								
	Speelyai	Early Coho	Lewis River	86	115. 1.214	0.0796		140	0.01
	Speelyai	Spring Chinook	Kalama Falls	86	36. 0.67	0.0431		320	0.18
									460
Month: August	1987								
	Elokomin	Late Coho	Elokomin	86	79. -0-	-0-		130	E-2

									130

WDF PROGRAM QC01
DISEASE PREVALENCE SUMMARY
March 17, 1989

page: 45

Disease Category: Parasite

Agent: *Sernocystidium*

Basin	Location	Species	Stock	Size	Flow	Density	Number	%
				Brood	Fish/Lb	Index	Index	LOSS
LCOL								
Month: February	1987							
Lewis River		Spring Chinook	Lewis River	85	10.5	1.315	0.0999	75 0.01
								75

WDF PROGRAM QCOI
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 46

Disease Category: Parasite

Agent: Ichthyophthirius

Basin	Location	species	Stock	Size	Flow	Density	Number	%
				Brood	Fish/Lb	Index	Index	LOSS
LCol								
Month: November	1987	Lewis River	Spring Chinook Lewis River	86	12.	1.608	0.1018	1558 0.28
1558								
Month: December	1987	Grays River	Fall Chinook Grays River	a7	1100.	0.727	0.0419	4100 2.8
4100								
UCol								
Month: May	1987	Ringold	Spring Chinook Wind River	86	83.	0.824	0.1988	1221 0.12
1221								
Month: June	1987	Ringold	Spring Chinook Wind River	86	60.	-0.	-0.	790 0.08
790								
Month: July	1987	Ringold	Spring Chinook Wind River	86	40.	1.112	0.2709	850 0.09
a50								
Month: August	1987	Ringold	Spring Chinook Wind River	86	30.	1.246	0.3197	634 0.06
634								
Month: September	1987	Ringold	Spring Chinook Wind River	86	25.	1.093	0.003	172 0.02
172								
Month: October	1987	Wells Spawning	Summer Chinook Wells	86	17.	1.729	0.1144	340 0.09
340								
Month: November	1987	Wells Spawning	Summer Chinook Wells	86	15.	1.898	0.1256	91 0.02
91								

WDF PROGRAM QCII
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 47

Disease Category: Parasite

Agent: Plistophora

Basin	Location	Species	Stock	Size	FLOW	Density	Number	%			
				Brood	Fish/Lb	Index	LOSS	LOSS			
<hr/>											
LCol											
Month: February	1987										
Lewis River	Late Coho	Lewis River	85	24.	4.677	0.3015	378	E-2			
							378				
Month: November	1987										
Lewis River	Late Coho	Lewis River	a6	45.	1.387	0.1105	2109	0.05			
Lewis River	Spring Chinook	Lewis River	86	12.	1.608	0.1018	3700	0.66			
							5809				
Month: December	1987										
Lewis River	Late Coho	Lewis River	86	38.	1.375	0.1191	1411	0.04			
Lewis River	Spring Chinook	Lewis River	86	12.	1.497	0.0986	2190	0.4			
							3601				

WDF PROGRAM QCol
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page 48

Disease Category: Parasite

Agent: Ssnguinicola

Basin	Location	Species	Stock	Size	Flow	Density	Number	%
				Brood	Fish/Lb	Index	Index	Loss
LCOL								
Month: February	1987							
	Lewis River	Spring Chinook	Lewis River	85	10.5	1.315	0.0999	45 E-2
								45
Month: November								
	1987							
	Lewis River	Late Coho	Lewis River	86	45.	1.387	0.1105	2334 0.06
	Lewis River	Spring Chinook	Lewis River	86	12.	1.608	0.1018	1884 0.34
								4218
Month: December								
	1987							
	Lewis River	Late Coho	Lewis River	86	38.	1.375	0.1191	1242 0.03
	Lewis River	Spring Chinook	Lewis River	86	12.	1.497	0.0986	1558 0.28
								2800

WDF PROGRAM QCOI
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 49

Disease Category: Parasite

Agent: Trichophrya

Basin	Location	Species	Stock	Brood	Size Fish/Lb	Flow Index	Density index	Number LOSS	% LOSS
-------	----------	---------	-------	-------	-----------------	---------------	------------------	----------------	-----------

UCol

Month: November	1987	Rocky Reach	Early Coho	Kalama Falls	86	22.	1.022	0.1202	1	E-4
------------------------	-------------	--------------------	-------------------	---------------------	-----------	------------	--------------	---------------	----------	------------

1

VDF PROGRAM QCOI
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 50

Disease Category: Viral

Agent: EIBS

Basin	Location	Species	Stock	Brood	Size Fish/Lb	FLOW index	Density Index	Number	% LOSS
<hr/>									
LCQ,									
Mnth: February	1987								
	Cowlitz	Spring Chinook	Cowlitz		85	9.	-0.	-0.	144 0.02
	Lewis River	Late Coho	Lewis River		85	24.	4.677	0.3015	18 E-4
									162
Mnth: March	1987								
	Cowlitz	Spring Chinook	Cowlitz		85	7.6	-0.	-0.	1142 0.18
									1142

VDF PROGRAM QCOI
DISEASE PREVALENCE SUMMARY
March 17, 1989

Page: 51

Disease Category: Viral

Agent: IHNV

Basin	Location	Species	Stock	Brood	Size	Flow	Density	Number	%
					Fish/Lb	Index	Index	Lossq	LOSS

"CO,

Month: December	1987								
Lyon's Ferry		Spring Chinook	Tucannon		E	-0.	-0.	-0.	12000 7.13
									12000

APPENDIX E

Appendix E contains the Hatchery Rearing Parameters and Mortality Summary Report. Data is presented by location, sorted by species stock and brood. All data available for 1987 and data from January, 1988 are presented.

Abbreviations:

Brood = A - adult
Brood = E - egg

WOF PROGRAM QC02
Hatchery Rearing Parameters and Mortality Summary Report
March 17, 1989

Page: 1

Location: Cowlitz

SPECIES	STOCK	POUNDS			AVERAGE FISH/LB	POND CU FEET	WATER GPM	LBS PER GPM	FLOW INDEX	DENSITY INDEX	FOOD CON"	MONTHLY MORTLTY	
		* BROOD	MT"	YEAR									
Fall	Cowlitz	86	Mar	1987	24482	356.	149000	3600	6.8	-0.	0.	41812	
Fall	Cowlitz	86	Apr	1987	53061	164.	183000	22000	2.41	-0.	-0.	2.4	16025
Fall	Cowlitz	86	May	1987	76545	96.	183000	22000	3.48	-0.	-0.	0.	48270
Fall	Cowlitz	86	Jun	1987	14870	68.	66000	8000	1.86	-0.	-0.	0.	86100
Fall	Cowlitz	86	Jul	1987	12002	39.	83000	10000	1.2	0.3	0.04	0.	17370
Fall	Cowlitz	86	Aug	1987	35648	27.	83000	10000	3.56	0.8	0.1	0.	7847
Fall	Cowlitz	86	Sep	1987	68514	14.	83000	10000	6.85	1.3	0.16	0.9	2418
Fall	Cowlitz	A	Sep	1987	-0.	-0.	60000	12000	-0.	-0.	-0.	0.	94
Fall	Cowlitz	A	Oct	1987	-0.	-0.	60000	12000	-0.	-0.	-0.	-0.	754
Fall	Cowlitz	A	Nov	1987	-0.	-0.	60000	12000	-0.	-0.	-0.	0.	287
Late	Cowlitz	85	Feb	1987	194180	25.	199000	20400	9.52	-0.	-0.	0.	18382
Late	Cowlitz	85	Mar	1987	218040	22.	199000	20400	10.7	-0.	-0.	2.2	42766
Late	Cowlitz	85	Apr	1987	250578	19.	199000	24000	10.4	-0.	-0.	1.2	36100
Late	Cowlitz	86	May	1987	19666	263.	133000	16000	1.23	-0.	-0.	0.	33396
Late	Cowlitz	86	Jun	1987	46780	163.	199000	24000	1.95	0.4	0.04	0.	30400
Late	Cowlitz	86	Jul	1987	64059	106.	183000	22000	2.91	1.2	0.14	0.	14490
Late	Cowlitz	86	Aug	1987	94786	67.	166000	20000	4.74	1.5	0.18	1.6	22995
Late	Cowlitz	86	Sep	1987	107604	49.	166000	20000	5.38	1.5	0.18	0.	6950
Late	Cowlitz	86	Oct	1987	134412	39.	166000	20000	6.72	1.9	0.23	1.9	29143
Late	Cowlitz	86	Nov	1987	154011	34.	166000	20000	7.7	2.2	0.27	1.7	9577
Late	Cowlitz	86	Dec	1987	163218	32.	166000	20000	8.16	2.	0.24	3.2	7463
Late	Cowlitz	A	Sep	1987	-0.	-0.	16600	3000	-0-	-0-	-0-	-0-	1
Late	Cowlitz	A	Oct	1987	-0-	-0-	-0-	6000	-0-	-0-	-0-	0.	54
Late	Cowlitz	A	No"	1987	-0-	-0-	60000	12000	-0-	-0-	-0-	0.	933
Late	Cowlitz	A	Dec	1987	-0-	-0-	-0-	0-	-0-	-0-	-0-	0.	371
Spring	Cowlitz	85	Feb	1987	72011	9.	149000	18000	4.	-0-	-0-	0.	958
Spring	Cowlitz	85	Mar	1987	84000	7.6	149000	18000	4.67	-0-	-0-	1.4	7616
Spring	Cowlitz	86	Mar	1987	28257	114.	99599	12000	2.35	-0-	-0-	0.	15926
Spring	Cowlitz	86	Apr	1987	33806	79.	166000	20000	1.69	-0-	-0-	0.	27195
Spring	Cowlitz	86	May	1987	42293	59.	149000	18000	2.35	-0-	-0-	2.3	87723
Spring	Cowlitz	86	Jun	1987	14464	45.	83000	10000	1.45	0.4	0.04	0.	31400
Spring	Cowlitz	86	JUL	1987	23507	27.	149000	18000	1.31	0.3	0.04	0.8	9560
Spring	Cowlitz	86	Aug	1987	24257	26.	49000	18000	1.35	0.3	0.1	11.	4158
Spring	Cowlitz	86	Sep	1987	30835	20.	149000	18000	1.71	0.4	0.05	1.3	13496
Spring	Cowlitz	86	Oct	1987	40806	15.	149000	18000	2.27	0.5	0.06	1.6	4023
Spring	Cowlitz	86	Nov	1987	50608	12.	149000	18000	2.81	0.6	0.07	1.2	3904
Spring	Cowlitz	86	Dec	1987	50450	12.	149000	18000	2.8	0.5	0.06	E1	1697
Spring	Cowlitz	A	Apr	1987	-0.	-0.	12000	3000	-0.	-0.	-0.	-0.	0
Spring	Cowlitz	A	May	1987	-0.	-0.	36000	9000	-0.	-0.	-0.	0.	15
Spring	Cowlitz	A	JU	1987	-0.	-0-	48000	12000	-0-	-0-	-0-	0.	111
Spring	Cowlitz	A	Jul	1987	-0.	-0.	60000	15000	-0.	-0.	-0.	0.	209
Spring	Cowlitz	A	Aug	1987	-0.	-0.	60000	15000	-0.	-0.	-0.	-0.	242
Spring	Cowlitz	A	Sep	1987	-0.	-0.	60000	12000	-0.	.0.	-0.	0.	231

WOF PROGRAM QC02
Hatchery Rearing Parameters and Mortality Summary Report
March 17, 1989

Page: 2

Location: ELakomin

SPECIES	STOCK	POUNDS			AVERAGE SIZE FISH/LB	POND VOLUME CU FEET	WATER		LBS		OENSITY INDEX	FOOD CON"	MONTHLY MORTLTY
		BROOD	DATE	* OF FISH MTH "EAR ON HAND			INFLOW GPM	PER CPM	FLOW INDEX				
Fall	ELokomin	86	Jan 1987	3519	734.	32400	1800	1. 96	1. 2	0. 07	0.	10108	
Fall	El okomin	86	Feb 1987	5035	456.	25200	1720	2. 93	1. 7	0. 11	0.	10668	
Fall	El okomin	86	Mar 1987	10653	300.	48000	6933	1. 54	0. 9	0. 13	0.	11300	
Fall	ELokomin	86	Apr 1987	28731	111.	40900	7788	3. 69	1. 4	0. 27	0. 2	6700	
Fall	ELokomin	86	Jun 1987	48850	65.	41000	8024	6. 09	1. 8	0. 36	-0.	803	
Fall	ELokomin	A	Sep 1987	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	859	
Fall	ELokomin	A	Oct 1987	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	133	
Fall	ELokomin	E	Dec 1987	-0.	-0.	-0.	-0.	-0.	-0.	-0.	-0.	994000	
Fall	Kalama Falls	86	Feb 1987	238	964.	3599	240	0. 99	-0.	-0.	0.	500	
Fall	Skamkowa	86	Feb 1987	1491	347.	7199	515	2. 9	1. 5	0. 11	0.	2000	
Late	ELokomin	85	Jan 1987	59197	24.	170399	12294	4. 82	1.	0. 07	-0.	1450	
Late	El okomin	85	Feb 1987	67619	21.	170000	12314	5. 49	1. 1	0. 08	1. 1	750	
Late	ELokomin	85	Mar 1987	88568	16.	136000	11692	7. 58	1. 4	0. 12	0. 5	2900	
Late	El okomin	85	Apr 1987	26326	14. 4	49400	7788	3. 38	0. 6	0. 1	0.	400	
Late	ELokomin	85	May 1987	1778	12. 5	49400	8024	0. 22	-2	E-2	0.	236	
Late	ELokomin	85	Jun 1987	102938	13.	49000	8024	12. 8	2. 3	0. 37	0.	10	
Late	ELokomin	86	Mar 1987	565	1238.	7199	550	1. 03	0. 8	0. 06	0.	0	
Late	ELokomin	86	Apr 1987	4490	704.	32400	2430	1. 85	1. 3	0. 1	0.	5800	
Late	El okomin	86	May 1987	4730	382.	36000	2700	1. 75	0.	0. 07	0.	4700	
Late	ELokomin	86	Jun 1987	8612	209.	36000	2700	3. 19	1. 4	0. 11	0. 8	6900	
Late	ELokomin	86	Jul 1987	12458	141.	85000	6648	1. 87	0. 7	0. 06	1. 7	5264	
Late	El okomin	86	Aug 1987	22112	79.	85400	7528	2. 94	-0.	-0.	1. 1	9700	
Late	ELokomin	86	Sep 1987	24694	70.	149000	8195	3. 01	0. 9	0. 05	4. 4	18252	
Late	El okomin	86	Oct 1987	36004	48.	149000	10270	3. 51	0. 9	0. 07	1. 2	428	
Late	El okomin	86	Nov 1987	43190	40.	149000	10550	4. 09	1. 1	0. 08	1. 6	596	
Late	ELokomin	86	Dec 1987	47964	36.	149000	11150	4. 3	1. 1	0. 08	1.	403	
Late	ELokomin	87	Dec 1987	751	1343.	7199	500	1. 5	1. 2	0. 09	-0.	1860	
Late	ELokomin	A	Nov 1987	-0-	-0.	-0.	-0.	-0.	-0.	-0-	0.	66	
Late	ELokomin	A	Dec 1987	-0.	-0.	-0.	-0.	-0.	-0.	-0.	0.	51	
Late	Kalama Falls	86	Apr 1987	910	609.	7199	540	1. 69	1. 1	0. 08	0.	6900	
Late	Kalama Falls	86	May 1987	1743	311.	3599	540	3. 23	1. 5	0. 23	0. 9	12300	
Late	Kalama Falls	86	Jun 1987	2507	212.	4000	540	4. 64	2. 1	0. 28	1. 1	2500	

WDF PROGRAM QC02
Hatchery Rearing Parameters and Mortality Summary Report
March 17, 1989

Page: 3

Location: Greys River

SPECIES	STOCK	POUNDS			AVERAGE SIZE FISH/LB	PONO VOLUME CU FEET	WATER INFLOW GPM	LBS PER GPM	FLOW INDEX	DENSITY INDEX	FOOD CON"	MONTHLY MORTLTY
		* BROOD	DATE	* OF FISH YEAR ON HAND								
Early	Big Creek	E	Dec 1987	-0.	-0.	-0.	-0-	-0-	-0-	-0-	-0-	552000
Early	Grays River	85	Feb 1987	19718	22.	71099	2300	8.57	2.2	0.07	0.	872
Early	Grays River	85	Mar 1987	24027	18.	71099	2400	10.	1.8	0.06	0.9	1445
Early	Grays River	85	Apr 1987	29682	14.5	71099	2300	12.9	2.2	0.07	0.7	1904
Early	Grays River	86	Feb 1987	2321	632.	15800	970	2.39	2.	0.12	0.	4326
Early	Grays River	86	Mar 1987	2310	340.	15800	900	2.57	1.3	0.07	0.	4528
Early	Grays River	86	Apr 1987	4515	173.	15800	900	5.02	2.	0.12	0.7	4600
Early	Grays River	86	May 1987	6562	118.	31600	1800	3.65	1.3	0.08	1.3	6700
Early	Grays River	86	Jun 1987	8505	88.	91599	3080	2.76	0.9	0.03	1.5	2300
Early	Grays River	86	Jul 1987	10670	70.	92000	3080	3.46	1.1	0.04	1.6	1404
Early	Grays River	86	Aug 1987	13800	54.	91699	2940	4.69	-0-	-0-	1.3	1448
Early	Grays River	86	Sep 1987	17690	42.	92000	3050	5.8	1.5	0.05	1.1	2392
Early	Grays River	86	Oct 1987	20600	36.	92000	2250	9.16	2.2	0.05	1.3	1435
Early	Grays River	86	Nov 1987	23134	32.	102000	4100	5.64	1.3	0.05	1.5	887
Early	Grays River	86	Dec 1987	24743	30.	92000	3500	7.07	1.6	0.06	0.	233
Early	Grays River	E	Dec 1987	-0.	-0.	-0-	-0-	-0-	-0-	-0-	-0-	62000
Early	Wasougal	86	Feb 1987	1210	604.	10600	670	1.81	1.4	0.09	0.	1505
Early	Wasougal	86	Mar 1987	1286	568.	10600	600	2.14	-0-	-0-	2.5	359
Fall	Big Creek	E	Dec 1987	-0.	-0-	-0-	-0-	-0-	-0-	-0-	-0-	137130
Fall	Elokomin	A	Sep 1987	-0.	-0-	-0-	-0-	-0-	-0-	-0-	-0-	49
Fall	Elokomin	A	Oct 1987	-0.	-0-	-0-	-0-	-0-	-0-	-0-	0.	108
Fall	Elokomin	E	Dec 1987	-0.	-0-	-0-	-0-	-0-	-0-	-0-	-0-	122000
Fall	Grays River	86	Feb 1987	1520	283.	10600	600	2.53	1.1	0.06	0.	1362
Fall	Grays River	86	Mar 1987	2365	231.	18500	1300	1.82	0.7	0.05	0.	690
Fall	Grays River	86	Apr 1987	6574	83.	26399	1700	3.87	1.4	0.09	0.6	700
Fall	Grays River	86	May 1987	10473	52.	26299	1800	5.82	1.7	0.11	1.2	1112
Fall	Grays River	86	Jun 1987	1507	70.	21299	1200	1.26	0.4	0.02	0.	400
Fall	Grays River	86	Jul 1987	2845	37.	21000	1200	2.37	0.6	0.03	0.9	222
Fall	Grays River	86	Aug 1987	3896	27.	21299	1000	3.9	0.9	0.04	1.2	78
Fall	Grays River	87	Dec 1987	133	1100.	2599	150	0.89	0.7	0.04	0.	4100
Fall	Grays River	A	Sep 1987	-0.	-0-	-0-	-0-	-0-	-0-	-0-	-0-	5
Fall	Grays River	A	Oct 1987	-0.	-0-	-0-	-0-	-0-	-0-	-0-	0.	36
Fall	Grays River	E	Dec 1987	-0.	-0-	-0-	-0-	-0-	-0-	-0-	-0-	47000
Fall	Kalama Falls	A	Sep 1987	-0.	-0-	-0-	-0-	-0-	-0-	-0-	-0-	8
Fall	Kalama Falls	A	Oct 1987	-0.	-0-	-0-	-0-	-0-	-0-	-0-	0.	20
Fall	Kalama Falls	E	Dec 1987	-0.	-0-	-0-	0-	-0-	-0-	-0-	-0-	131000
Fall	Skamakowa	86	Feb 1987	174	617.	5300	300	0.58	0.7	0.04	0.	182
Fall	Skamakowa	86	Mar 1987	406	264.	2599	175	2.32	1.1	0.07	0.4	232
Fall	Skamakowa	86	Apr 1987	844	127.	5300	300	2.81	1.	0.06	0.1	200
Fall	Skamakowa	86	May 1987	1754	61.	5300	400	4.39	1.3	0.1	1.2	200

VDF PROGRAM QC02
Hatchery Rearing Parameters and Mortality Summary Report
March 17, 1989

Page: 4

Location: Grays River

SPECIES	STOCK	BROOD	* DATE	* OF FISH	POUNDS	AVERAGE	POND	WATER	LBS	FLOW	OENSITY	FOOD	MDNTHLY
					MTH	YEAR	ON HAN0	FISH/LB	SIZE				
Fall	Skamakowa	a6	Jun 1987	2140	50.	5300	300	7.13	1.9	0.11	0.	12	
Fall	Washougal	86	Mar 1987	1848	668.	15800	900	2.05	1.3	0.07	0.	1466	
Fall	Washougal	a6	Apr 1987	5072	252.	60000	1600	3.17	1.4	0.04	0.	3400	
Fall	Washougal	86	May 1987	7489	111.	71099	1695	4.42	1.6	0.04	0.	2700	
Fall	Wahougal	86	Jun 1987	9767	85.	71099	1695	5.76	1.9	0.04	0.8	1100	

WDF PROGRAM QC02
Hatchery Rearing Parameters and Mortality Summary Report
 March 17, 1989

Page: 5

Location: Kalama Falls

SPECIES	STOCK	BROOD	* DATE	* OF FISH	POUNDS	AVERAGE	POND	WATER	LBS	FLOW	DENSITY	FOOD	MONTHLY
					FISH/LB	SIZE	VOLUME CU FEET	INFLOW GPM	PER GPM				
Early	Kalama Falls	A	Sep 1987	-0-	-0-	9600	150	-0-	-0-	-0-	-0-	-0-	0
Early	Kalama Falls	A	Oct 1987	-0-	-0-	7199	1000	-0-	-0-	-0-	-0-	0.	10
Early	Kalama Falls	A	"NO" 1987	-0-	-0-	7199	1000	-0-	-0-	-0-	-0-	0.	19
Fall	Kalama Falls	86	Feb 1987	5084	775.	48000	5000	1.02	0.7	0.07	0.	7644	
Fall	Kalama Falls	86	Mar 1987	21129	281.	52799	5750	3.67	1.8	0.19	0.	2980	
Fall	Kalama Falls	86	Apr 1987	25452	138.	88000	8500	2.99	1.1	0.1	0.	7140	
Fall	Kalama Falls	86	May 1987	26861	88.	62400	6500	4.13	1.4	0.14	0.	15455	
Fall	Kalama Falls	86	Jun 1987	33170	71.	58000	7200	4.61	-0-	-0-	1.1	8700	
Fall	Kalama Falls	A	Sep 1987	-0-	-0-	78000	4000	-0-	-0-	-0-	0.	617	
Fall	Kalama Falls	A	Oct 1987	-0-	-0-	9600	1000	-0-	-0-	-0-	0.	547	
Fall	Katama Falls	A	"NO" 1987	-0-	-0-	9600	1000	-0-	-0-	-0-	0.	31	
Fall	Kalama Falls	E	Dec 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	556900	
Late	Elokomin	85	Feb 1987	30985	20.	69000	5800	5.34	1.1	0.09	0.	100	
Late	Elokomin	85	Mar 1987	36423	17.	69000	5800	6.28	1.2	0.1	1.9	505	
Late	Elokomin	85	Apr 1987	9900	15.	24000	2000	4.95	0.	0.08	0.	635	
Late	Elokomin	85	May 1987	4953	15.	9600	1000	4.95	0.	0.1	0.	40	
Late	Elokomin	85	Jun 1987	4985	14.	10000	1000	4.99	-0-	-0-	-0-	103	
Late	Kalama Falls	85	Feb 1987	17095	20.	69000	5800	2.95	0.6	0.05	0.	400	
Late	Kalama Falls	85	Mar 1987	20076	17.	69000	5800	3.46	0.7	0.06	1.9	622	
Late	Kalama Falls	85	Apr 1987	9900	15.	24000	2000	4.95	0.	0.08	0.	600	
Late	Kalama Falls	85	May 1987	4946	15.	9600	1000	4.95	0.	0.1	0.	72	
Late	Kalama Falls	85	Jun 1987	4985	14.	10000	1000	4.99	-0-	-0-	-0-	2	
Late	Kalama Falls	86	Apr 1987	1024	783.	4800	350	2.93	2.8	0.2	0.	4865	
Late	Kalama Falls	86	May 1987	1673	338.	4800	500	3.35	1.8	0.19	0.	12525	
Late	Kalama Falls	86	Jun 1987	5247	207.	29000	3000	1.75	0.8	0.08	0.	3825	
Late	Kalama Falls	86	Jul 1987	8464	131.	38000	3600	2.35	0.9	0.09	0.	9695	
Late	Kalama Falls	86	Aug 1987	13827	80.	38400	4000	3.46	1.1	0.12	1.6	2740	
Late	Kalama Falls	86	Sep 1987	20428	54.	38000	4400	4.64	1.3	0.15	1.2	3055	
Late	Kalama Falls	86	Oct 1987	26236	42.	38400	4800	5.47	0.1	0.02	1.3	1275	
Late	Kalama Falls	86	Nov 1987	26752	36.	62000	7400	3.62	0.9	0.1	0.	910	
Late	Kalama Falls	86	Dec 1987	32101	30.	62400	7400	4.34	0.	0.11	1.4	60	
Late	Kalama Falls	A	Oct 1987	-0-	-0-	7199	1000	-0-	-0-	-0-	0.	1	
Late	Kalama Falls	A	"NO" 1987	-0-	-0-	7199	1000	-0-	-0-	-0-	0.	44	
Late	Kalama Falls	A	Dec 1987	-0-	-0-	7199	1000	-0-	-0-	-0-	0.	22	
Late	Kalama Falls	E	Dec 1987	-0-	-0-	-0-	0-	-0-	-0-	-0-	0.	69900	
Spring	Kalama Falls	86	Feb 1987	788	405.	4800	550	1.43	0.8	0.09	0.	957	
Spring	Kalama Falls	86	Mar 1987	1535	208.	4800	700	2.19	1.2	0.17	0.9	144	
Spring	Kalama Falls	86	Apr 1987	2796	114.	9600	1200	2.33	0.	0.12	0.7	575	
spring	Kalama Falls	86	May 1987	4074	78.	9600	1200	3.39	1.1	0.14	1.2	1035	
Spring	Kalama Falls	86	Jun 1987	4942	64.	14000	2100	2.35	0.7	0.1	1.9	1490	
spring	Kalama Falls	86	Jul 1987	6186	51.	19000	2300	2.69	0.7	0.09	1.7	810	
Spring	Kalama Falls	86	Aug 1987	8922	35.	19200	2000	4.46	1.1	0.11	1.3	3280	
Spring	Kalama Falls	86	Sep 1987	12432	25.	19000	2400	5.18	1.1	0.14	1.1	1490	
Spring	Kalama Falls	86	Oct 1987	13426	23.	19000	2400	5.59	1.1	0.13	4.	1895	
spring	Kalama Falls	86	Nov 1987	16200	19.	-0-	2000	8.1	1.4	-0-	2.3	980	

WDF PROGRAM QC02
Hatchery Rearing Parameters and Mortality Summary Report
March 17, 1989

Page: 6

Location: Kalama Falls

SPECIES	STOCK	POUNDS			AVERAGE SIZE FISH/LB	POND VOLUME CU FEET	WATER INFLOW GPM	LBS PER GPM	FLOW INDEX	DENSITY INDEX	FOOD CON"	MONTHLY MORTLTY	
		* BROOD	MTH	* YEAR ON HAND									
Spring	Kalama Falls	86	Dec	1987	21771	14.	37400	2000	10.9	1.8	0.09	1.4	3000
Spring	Kalama Falls	87	Dec	1987	87	1200.	4800	100	0.87	0.6	0.01	-0-	0
Spring	Kalama Falls	A	May	1987	-0-	-0-	9600	1000	-0-	-0-	-0-	0.	9
Spring	Kalama Falls	A	Jun	1987	-0-	-0-	19000	2000	-0-	-0-	-0-	0.	41
Spring	Kalama Falls	A	Jul	1987	-0-	-0-	9600	1000	-0-	-0-	-0-	0.	39
Spring	Kalama Falls	A	Aug	1987	-0-	-0-	9600	1000	-0-	-0-	-0-	0.	48
Spring	Kalama Falls	A	Sep	1987	-0-	-0-	9600	1000	-0-	-0-	-0-	0.	87
Spring	Kalama Falls	E	Dec	1987	-0	-0-	-0-	-0-	-0-	-0-	-0-	-0-	206100

WDF PROGRAM QC02

Hatchery Rearing Parameters and Mortality Summary Report

March 17, 1989

Page: 7

Location: Klickitat

SPECIES	STOCK	BROOD	MT"	POUNDS	AVERAGE	POND	WATER	LBS	FLOW	DENSITY	FOOD	MONTHLY
				* DATE	* OF FISH	SIZE	VOLUME	PER				
				FISH/LB	CU FEET	GPM	GPM					
Fall	Klickitat	86	Feb 1987	239	402.	3400	302	0.79	-a-	-0-	0.	500
Fall	Klickitat	86	Mar 1987	774	124.	3400	340	2.28	0.9	0.09	0.i	300
Fall	Klickitat	86	Apr 1987	1388	69.	3400	340	4.08	1.2	0.12	1.1	200
Fall	Klickitat	E	Dec 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	9000
Fall	Priest	86	Feb 1987	6984	500.	34299	2460	2.84	-0-	-0-	0.	7800
Fall	Priest	86	Mar 1987	22854	202.	67000	7720	2.96	1.3	0.15	0.	26700
Fall	Priest	86	Apr 1987	26809	142.	126000	6422	4.17	1.3	0.06	0.	1700
Fall	Priest	86	May 1987	17494	115.	82800	3900	4.49	1.5	0.07	0.	1000
Fall	Priest	87	Dec 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0.	943850
Fall	Priest	87	Dec 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0.	943850
Late	Cowlitz	86	Feb 1987	728	1096.	10300	738	0.99	-0-	-0-	0.	3500
Late	Cowlitz	86	Mar 1987	3576	462.	20600	2040	1.75	1.	0.1	0.	15600
Late	Cowlitz	86	Apr 1987	5418	302.	20600	2040	2.66	1.3	0.13	1.	15800
Late	Cowlitz	86	May 1987	14842	106.	39599	5500	2.7	-0-	-0-	0.3	3400
Late	Cowlitz	86	Jun 1987	10915	144.	39500	5000	2.18	0.9	0.11	-1	1500
Late	Cowlitz	86	Jul 1987	16532	95.	40000	5000	3.31	1.2	0.15	1.1	1250
Late	Cowlitz	86	Aug 1987	23419	67.	39599	5000	4.68	1.5	0.18	1.1	1500
Late	Cowlitz	86	Sep 1987	34742	45.	39599	5500	6.32	1.8	0.25	0.	5700
Late	Cowlitz	86	Oct 1987	47284	33.	39599	6668	7.09	1.8	0.3	0.	3000
Late	Cowlitz	86	Nov 1987	62160	25.	39599	6668	9.32	2.2	0.37	0.6	6400
Late	Cowlitz	86	Dec 1987	70090	22.	39500	6668	10.5	2.4	0.4	1.2	11050
Late	Elokomin	85	Feb 1987	63131	22.	80199	6500	9.71	2.1	0.17	0.	19000
Late	Elokomin	85	Mar 1987	66090	21.	80199	10250	6.45	1.3	0.16	3.6	1000
Late	Elokomin	85	Apr 1987	63683	18.	80199	10131	6.29	1.2	0.15	0.	1000
Late	Elokomin	85	May 1987	18200	lb.	80000	10131	1.8	-0-	-0-	0.	2000
Spring	Klickitat	86	Feb 1987	2425	267.	13699	1477	1.64	-0-	-0-	0.	1100
Spring	Klickitat	86	Mar 1987	5383	120.	17100	1700	3.17	1.1	0.11	0.6	1500
Spring	Klickitat	86	Apr 1987	7225	89.	34299	3400	2.13	0.7	0.07	1.3	2900
Spring	Klickitat	86	May 1987	10324	62.	34000	3400	3.04	-0-	-0-	1.1	3000
Spring	Klickitat	86	Jun 1987	13740	45.	a2000	3900	3.52	0.9	0.04	1.2	2200
Spring	Klickitat	86	Jul 1987	19916	31.	82000	3400	5.86	1.3	0.06	1.4	900
Spring	Klickitat	86	Aug 1987	30820	20.	82000	3400	9.06	1.8	0.08	0.7	1000
Spring	Klickitat	86	Sep 1987	34138	18.	82000	4012	8.51	1.7	0.08	10.	1825
Spring	Klickitat	86	Oct 1987	38343	16.	82000	4725	8.11	1.6	0.09	2.	,000
Spring	Klickitat	86	Nov 1987	47115	13.	82000	4725	9.97	1.8	0.1	0.9	1000
Spring	Klickitat	86	Dec 1987	55590	11.	82000	4725	11.8	2.	0.11	0.8	1000
Spring	Klickitat	87	Dec 1987	1527	856.	17000	1250	1.22	-0-	-0-	-0-	9400
Spring	Klickitat	A	Aug 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	63
Spring	Klickitat	A	Sep 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0.	12
Spring	Klickitat	E	Dec 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	135700
Spring	Wind River	85	Feb 1987	47900	14.	82800	5000	9.58	1.8	0.11	0.	1100
Spring	Wind River	85	Mar 1987	60872	11.	82800	5150	11.8	2.	0.12	1.4	1000

WDF PROGRAM QC02
Hatchery Rearing Parameters and Mortality Summary Report
March 17, 1989

Page: a

Location: Lewis River

SPECIES	STOCK	BROOD	MTH	YEAR	* DATE * OF FISH ON HAND	POUNDS	AVERAGE	POND	WATER	LBS	FLOW	DENSITY	FOOD	MONTHLY
							FISH/LB	VOLUME CU FEET	INFLOW GPM	PER GPM	INDEX	INDEX	CON"	MORTLTY
Early	Lewis River	A	Sep	1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0
Early	Lewis River	A	Oct	1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0.	0
Early	Lewis River	A	NO"	1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0.	110
Late	Lewis River	85	Feb	1987	223241	24.	165000	10634	21.	4.7	0.3	0.	5500	
Late	Lewis River	a5	Mar	1987	223025	24.	255000	19200	11.6	2.6	0.19	E2	5300	
Late	Lewis River	85	Apr	1987	314611	17.	255000	19200	16.4	3.2	0.24	0.5	4200	
Late	Lewis River	a5	May	1987	209500	17.	180000	12800	16.4	3.2	0.23	0.	2500	
Late	Lewis River	a6	Mar	1987	4619	970.	44000	2750	1.68	-0-	-0-	0.	3806	
Late	Lewis River	a6	Apr	1987	9892	476.	48000	4528	2.18	1.2	0.11	0.	4717	
Late	Lewis River	a6	May	1987	18977	223.	44000	6050	3.14	1.4	0.19	0.	19901	
Late	Lewis River	a6	Jun	1987	27059	138.	189000	9800	2.76	1.2	0.06	0.	17977	
Late	Lewis River	86	Jul	1907	37302	100.	180000	11264	3.31	1.1	0.07	1.5	4040	
Late	Lewis River	86	Aug	1987	51756	72.	180000	11264	4.59	1.4	0.09	1.2	3680	
Late	Lewis River	86	Sep	1987	57240	65.	180000	12060	4.75	1.5	0.1	3.4	5900	
Late	Lewis River	a6	Oct	1987	74216	50.	180000	14500	5.12	1.4	0.12	1.3	9797	
Late	Lewis River	a6	Nov	1987	87360	45.	216000	17200	5.08	1.4	0.11	0.	15963	
Late	Lewis River	a6	Dec	1987	103268	38.	216000	18700	5.52	1.4	0.12	1.8	6712	
Late	Lewis River	A	Nov	1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	149
Late	Lewis River	A	Dec	1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0.	672
Late	Lewis River	E	Dec	1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0.	895100
Spring	Lewis River	a5	Feb	1987	63590	10.5	103000	7825	8.13	1.3	0.1	0.	1200	
Spring	Lewis River	a5	Mar	1987	50910	10.	79400	5000	10.2	1.8	0.11	0.	1200	
Spring	Lewis River	86	May	1987	7255	80.	79300	4000	1.81	0.6	0.03	0.	130	
Spring	Lewis River	a6	Jun	1987	10320	56.	79000	4000	2.58	0.7	0.04	1.3	2470	
Spring	Lewis River	a6	Jul	1987	16955	34.	79000	5010	3.38	0.8	0.05	0.9	1444	
Spring	Lewis River	a6	Aug	1987	20560	28.	79400	5173	3.97	0.9	0.06	2.	770	
Spring	Lewis River	a6	Sep	1987	27333	21.	79000	5000	5.47	1.2	0.07	1.1	1700	
Spring	Lewis River	86	Oct	1987	29989	19.	79000	5000	6.	1.2	0.08	4.3	4162	
Spring	Lewis River	a6	Nov	1987	46533	12.	79000	5000	9.31	1.6	0.1	0.7	11413	
Spring	Lewis River	a6	Dec	1987	45981	12.	79000	5200	8.84	1.5	0.1	E1	6626	
Spring	Lewis River	A	Sep	1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	4

Location: Lower Kalama

SPECIES	STOCK	BROOD	* DATE	* OF FISH	POUNDS	AVERAGE	POND	WATER	LBS	FLOW	DENSITY	FOOD	MONTHLY
					MTH	YEAR	ON HAND	FISH/LB	CU FEET				
Early	Kalama Falls	a5	Feb 1987	25860	21.5	50000	4500	5.75	1.2	0.11	0.	1000	
Early	Kalama Falls	a5	Mar 1987	34750	16.	50000	4000	8.69	1.7	0.14	0.	550	
Early	Kalama Falls	a5	Apr 1987	35189	15.8	50000	3500	10.1	1.7	0.12	0.	335	
Early	Kalama Falls	86	Feb 1987	570	1050.	6400	600	0.95	0.6	0.06	0.	1000	
Early	Kalama Falls	86	Mar 1987	1328	450.	64000	600	2.21	1.3	0.01	0.6	1082	
Early	Kalama Falls	86	Apr 1987	1708	350.	12800	1200	1.42	0.7	0.07	0.	1072	
Early	Kalama Falls	a6	May 1987	2392	250.	20700	1500	1.59	0.7	0.05	0.	1052	
Early	Kalama Falls	86	Jun 1987	3452	173.	20700	1800	1.92	0.8	0.07	1.2	2601	
Early	Kalama Falls	a6	Jul 1987	3947	151.	48000	4200	0.94	0.4	0.03	2.4	2984	
Early	Kalama Falls	86	Aug 1987	5265	113.	48299	4200	1.25	0.4	0.04	1.8	987	
Early	Kalama Falls	a6	Sep 1987	6036	98.	65000	2500	2.41	0.8	0.03	3.3	3421	
Early	Kalama Falls	a6	Oct 1987	10742	55.	65000	2500	4.3	1.2	0.05	0.4	775	
Early	Kalama Falls	a6	Nov 1987	8492	70.	65000	2500	3.4	1.	0.04	0.	500	
Early	Kalama Falls	86	Dec 1987	13504	44.	65000	2400	5.63	1.5	0.06	0.3	300	
Early	Kalama Falls	A	Nov 1987	-0-	-0-	72000	2500	-0-	-0-	-0-	0.	1	
Early	Kalama Falls	E	Dec 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0.	108800	
Fall	Kalama Falls	86	Feb 1987	5534	644.	44799	4200	1.32	0.8	0.08	0.	6000	
Fall	Kalama Falls	a6	Mar 1987	9478	376.	117000	7600	1.25	0.7	0.04	0.	2564	
Fall	Kalama Falls	a6	Apr 1987	21765	162.	160000	11300	1.93	0.9	0.06	0.9	3790	
Fall	Kalama Falls	86	May 1987	35646	92.	142000	a500	4.19	1.5	0.09	1.4	5236	
Fall	Kalama Falls	A	Sep 1987	-0-	-0-	72000	2500	-0-	-0-	-0-	-0-	17	
Fall	Kalama Falls	A	Oct 1987	-0-	-0-	72000	2500	-0-	-0-	-0-	0.	17	
Fall	Kalama Falls	A	Nov 1987	-0-	-a-	72000	2500	-0-	-0-	-0-	0.	197	
Fall	Kalama Falls	E	Dec 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0.	652000	

WDF PROGRAM QC02
Hatchery Rearing Parameters and Mortality Summary Report
March 17, 1989

Page: 10

Location: Lyon's Ferry

SPECIES	STOCK	* DATE *			POUNDS	AVERAGE	POND	WATER	LBS	FLOW	DENSITY	FOOD	MONTHLY
		BROOD	MTH	YEAR	ON HAND	SIZE	VOLUME	INFLOW	PER				
Fall	Lyon's Ferry	85	Feb	1987	6898	11.	13300	1800	3.83	0.6	0.09	0.	112
Fall	Lyon's Ferry	a5	Feb	1987	15730	10.	40000	6000	2.62	0.4	0.06	0.	434
Fall	Lyon's Ferry	a5	Feb	1987	15437	10.	60000	5712	2.7	0.4	0.04	0.	1047
Fall	Lyon's Ferry	a5	Mar	1987	19619	a.	36000	6000	3.27	0.5	0.08	0.	370
Fall	Lyon's Ferry	a5	Mar	1987	21987	7.	60000	5712	3.85	0.6	0.05	0.8	458
Fall	Lyon's Ferry	a5	Mar	1987	7507	10.	12000	2000	3.75	0.6	0.1	4.	741
Fall	Lyon's Ferry	85	Apr	1987	4052	9.	6000	1000	4.05	0.6	0.1	0.	182
Fall	Lyon's Ferry	a5	Apr	1987	4534	9.	6000	1000	4.53	0.7	0.12	0.	434
Fall	Lyon's Ferry	a5	Apr	1987	25611	6.	60000	5712	4.48	0.6	0.06	1.2	360
Fall	Lyon's Ferry	85	Apr	1987	22380	7.	36000	6000	3.73	0.5	0.09	0.	431
Fall	Lyon's Ferry	86	Feb	1987	1719	676.	26700	2400	0.72	-0-	-0-	0.	4193
Fall	Lyon's Ferry	a6	Mar	1987	4189	293.	26700	2400	1.75	-0-	-0-	0.	4455
Fall	Lyon's Ferry	86	Apr	1987	6801	178.	24000	4000	1.7	0.7	0.12	1.1	19020
Fall	Lyon's Ferry	86	May	1987	3635	71.	15000	1500	2.42	0.7	0.07	0.	205
Fall	Lyon's Ferry	a6	May	1987	5362	48.	60000	3000	1.79	0.5	0.02	0.	57
Fall	Lyon's Ferry	a6	May	1987	5607	104.	33000	3300	1.7	0.6	0.06	0.	2522
Fall	Lyon's Ferry	86	Jun	1987	3634	71.	15000	1500	2.42	0.7	0.07	0.	79
Fall	Lyon's Ferry	a6	Jun	1987	1059	76.	6000	600	1.76	0.6	0.06	0.	13
Fall	Lyon's Ferry	86	Jun	1987	5498	77.	21000	3150	1.75	0.5	0.08	0.	1088
Fall	Lyon's Ferry	a6	Jul	1987	8111	52.	21000	3150	2.57	0.7	0.11	-0-	1592
Fall	Lyon's Ferry	a6	Aug	1987	a725	41.	24000	3600	2.42	0.6	0.09	-0-	2503
Fall	Lyon's Ferry	a6	Aug	1987	1678	37.	9000	1350	1.24	0.3	0.04	-0-	15
Fall	Lyon's Ferry	86	Sep	1987	9277	27.	30000	4500	2.06	0.5	0.07	-0-	359
Fall	Lyon's Ferry	86	Sep	1987	6269	28.	18000	2700	2.32	0.5	0.08	0.	905
Fall	Lyon's Ferry	86	Oct	1987	11906	21.	30000	4500	2.65	0.5	0.08	1.2	470
Fall	Lyon's Ferry	86	Oct	1987	7614	23.	18000	2700	2.82	0.6	0.09	1.6	405
Fall	Lyon's Ferry	a6	Nov	1987	15542	16.	30000	4500	3.45	0.6	0.1	0.	1348
Fall	Lyon's Ferry	86	Nov	1987	9166	19.	18000	2700	3.39	0.7	0.1	1.6	981
Fall	Lyon's Ferry	a6	Dec	1987	16470	15.	30000	4500	3.66	0.7	0.1	4.2	1626
Fall	Lyon's Ferry	86	Dec	1987	10810	16.	18000	2700	4.	0.7	0.11	1.6	1186
Fall	Lyon's Ferry A	Sep	1987	0-	-0-	-0-	0-	-0-	-0-	-0-	-0-	0.	4
Fall	Lyon's Ferry A	Oct	1987	0-	-0-	60000	6000	-0-	-0-	-0-	-0-	0.	50
Fall	Lyon's Ferry A	No"	1987	0-	-0-	30000	3000	-0-	-0-	-0-	-0-	0.	764
Fall	Lyon's Ferry A	Dec	1987	0-	-0-	-0-	0-	-0-	-0-	-0-	-0-	0.	213
Fall	Lyon's Ferry E	Dec	1987	-0	-0-	-0-	0-	-0-	-0-	-0-	-0-	-0-	227476
Spring	Tucannon	a5	Feb	1987	1851	7.	8100	2244	0.82	0.1	0.03	0.	16
Spring	Tucannon	85	Mar	1987	1846	7.	8100	2244	0.82	0.1	0.03	E1	33
Spring	Tucannon	a5	Apr	1987	2153	6.	8000	2244	0.96	0.1	0.04	0.5	2
Spring	Tucannon	86	Feb	1987	731	237.	6699	550	1.33	0.6	0.05	0.	1191
Spring	Tucannon	a6	Mar	1987	1280	135.	6699	765	1.67	0.6	0.07	1.	599
Spring	Tucannon	a6	Apr	1987	1984	87.	6000	1075	1.85	0.6	0.11	1.2	182
Spring	Tucannon	a6	May	1987	2562	62.	30000	3000	0.85	0.2	0.02	1.3	407
Spring	Tucannon	a6	Jun	1987	11784	44.	30000	3000	3.93	1.	0.1	0.	330
Spring	Tucannon	a6	Jul	1987	5261	30.	30000	3000	1.75	0.4	0.04	0.	689
Spring	Tucannon	86	Aug	1987	7168	22.	30000	3000	2.39	0.5	0.05	1.2	134
Spring	Tucannon	86	Sep	1987	10487	15.	30000	3900	2.69	0.5	0.06	0.8	375
Spring	Tucannon	86	Oct	1987	13078	12.	30000	3900	3.35	0.6	0.07	-0-	371
Spring	Tucannon	a7	Dec	1987	199	819.	6000	500	0.4	-0-	-0-	0.	1241

WDF PROGRAM QC02
Hatchery Rearing Parameters and Mortality Summary Report
 March 17, 1989

Page: 11

Location: Lyon's Ferry

SPECIES	STOCK	BROOD	MTH	YEAR	ON HAND	POUNDS	AVERAGE	POND	WATER	LBS	DENSITY	FOOD	MDNTHLY
						* DATE	* OF FISH	SIZE	VOLUME	INFLOW			
						FISH/LB	CU FEET	GPM	GPM	INDEX			
spring	Tucannon	A	Aug	1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	18
Spring	Tucannon	E	Dec	1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	28286

WDF PROGRAM QC02
Hatchery Rearing Parameters and Mortality Summary Report
 March 17, 1989

Page: 12

Location: Priest Rapids

SPECIES	STOCK	POUNDS		AVERAGE	POND	WATER	LBS	FLOW	DENSITY	FOOD	MONTHLY	
		BROOD	MT"	* DATE	* OF FISH	SIZE	VOLUME	INFLOW	PER	INDEX	INDEX	CON"
Fall	Priest	a6	Mar 1987	23607	300.	-0-	-0-	-0-	-0-	-0-	0.	56450
Fall	Priest	a6	Apr 1987	59926	118.	180000	24200	2.48	0.9	0.13	0.8	9102
Fall	Priest	a6	May 1987	79734	76.	180000	27500	2.9	-0-	-0-	0.	10900
Fall	Priest	A	Sep 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	129
Fall	Priest	A	Nov 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	1060
Fall	Priest	E	Dec 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	1410100

WDF PROGRAM QC02
Hatchery Rearing Parameters and Mortality Summary Report
 March 17, 1989

Page: 13

Location: Ringold

SPECIES	STOCK	POUNDS			AVERAGE SIZE FISH/LB	POND VOLUME CU FEET	WATER		LBS INFLOW GPM	FLOW PER GPM	DENSITY INDEX	FOOD CON"	MONTHLY MORTLTY
		BROOD	DATE	* MTH YEAR	ON HAND								
Early	Klickitat	86	Feb	1987	212	612.	1700	250	0.85	0.7	0.1	0.	100
Early	Klickitat	86	Mar	1987	762	170.	3299	500	1.52	1.	0.15	1.4	200
Early	Klickitat	86	Apr	1987	1726	75.	3299	600	2.88	0.	0.18	0.9	200
Early	Klickitat	a6	May	1987	3921	33.	3299	800	4.9	1.1	0.27	0.8	100
Early	Klickitat	a6	Jun	1987	4788	27.	3000	800	5.99	-0-	-0-	0.	100
Fall	Priest	85	Feb	1987	167142	7.	1568000	3300	50.6	7.8	0.02	0.	10000
Fall	Priest	85	Mar	1987	183333	6.	1568000	3500	52.4	5.9	0.01	1.7	70000
Spring	Wind River	86	Feb	1987	2325	430.	a300	1250	1.86	1.2	0.19	0.	4800
Spring	Wind River	86	Mar	1987	3740	267.	19899	3000	1.25	0.8	0.13	1.7	1200
Spring	Wind River	a6	Apr	1987	6650	150.	19899	3600	1.85	0.8	0.14	1.2	1200
Spring	Wind River	86	May	1987	11995	83.	19899	4800	2.5	0.8	0.2	1.2	1996
Spring	Wind River	86	Jun	1987	16540	60.	20000	4800	3.45	-0-	-0-	1.8	3199
Spring	Wind River	a6	Jul	1987	24771	40.	23000	5600	4.42	1.1	0.27	1.5	1550
Spring	Wind River	86	Aug	1987	32994	30.	23200	5950	5.55	1.2	0.32	1.6	1014
Spring	Wind River	86	Sep	1987	39400	25.	2940000	8100	4.86	1.1	E-3	1.7	4837
Spring	Wind River	a6	Oct	1987	48750	20.	2940000	8100	6.02	1.2	E-3	1.3	10000
Spring	Wind River	a6	Nov	1987	80416	12.	2940000	8100	9.93	1.8	E-3	0.6	10000
Spring	Wind River	86	Dec	1987	95500	10.	2940000	5730	16.7	2.6	E-2	1.3	10000

WDF PROGRAM QC02

Hatchery Rearing Parameters and Mortality Summary Report

March 17, 1989

Page: 14

Location: Rocky Reach

SPECIES	STOCK	BROOD	MTH	YEAR	POUNDS	AVERAGE	POND	WATER	LBS	FLOW	DENSITY	FOOD	MONTHLY
					* OF FISH ON HAND	SIZE FISH/LB	VOLUME CU FEET	INFLOW CPM	PER GPM				
Early	Kalama Falls	85	Jan	1987	614	789.	3299	500	1.23	-0-	-0-	0.	11146
Early	Kalama Falls	86	Feb	1987	1117	428.	3299	700	1.6	0.9	0.2	0.	6647
Early	Kalama Falls	a6	Mar	1987	1665	285.	6599	1400	1.19	0.6	0.13	0.9	3630
Early	Kalama Falls	86	Apr	1987	2253	209.	6599	1400	1.61	0.7	0.15	0.	3635
Early	Kalama Falls	a6	May	1987	3751	123.	a300	1750	2.14	0.8	0.17	0.7	9528
Early	Kalama Falls	a6	Jun	1987	5515	83.	36000	4100	1.35	0.4	0.05	1.2	3637
Early	Kalama Falls	a6	Jul	1987	7926	57.	36000	4340	1.83	0.5	0.06	1.2	930
Early	Kalama Falls	a6	Aug	1987	9907	45.	35599	4340	2.28	0.6	0.08	1.9	1548
Early	Kalama Falls	a6	Sep	1987	12660	33.	34000	4000	3.16	1.1	0.12	1.5	2172
Early	Kalama Falls	a6	Oct	1987	16707	25.	34000	4000	4.18	0.	0.11	1.1	105
Early	Kalama Falls	86	Nov	1987	18983	22.	34000	4000	4.75	1.	0.12	1.8	43
Early	Kalama Falls	a6	Dec	1987	21976	19.	34000	4000	5.49	1.1	0.13	1.3	100
Fall	Priest	a5	Jan	1987	18327	13.	33900	3500	5.24	0.9	0.1	0.	178
Fall	Priest	a5	Feb	1987	19050	12.5	33900	3500	5.44	0.	0.1	3.6	124
Fall	Priest	a5	Mar	1987	21064	11.3	33900	3500	6.02	1.	0.1	1.6	97
Fall	Priest	85	Apr	1987	27975	a.5	33900	5200	5.38	0.8	0.13	0.8	237
Fall	Wells	86	Feb	1987	1001	556.	5000	750	1.33	0.8	0.13	0.	15447
Fall	Wells	a6	Mar	1987	1562	340.	6599	1400	1.12	0.6	0.13	1.3	2894
Fall	Wells	86	Apr	1987	2478	213.	6599	1400	1.77	0.8	0.17	1.1	3113
Fall	Wells	a6	May	1987	1844	140.	5000	1050	1.76	0.7	0.14	0.	7956
Fall	Wells	a6	Jun	1987	2958	85.	5000	1350	2.19	0.7	0.2	0.	6852
Fall	Wells	86	Jul	1987	4448	55.	12000	2450	1.82	0.5	0.11	1.2	13481
Fall	Wells	a6	Aug	1987	6100	40.	11600	2450	2.49	0.6	0.13	1.6	650
Fall	Wells	a6	Sep	1987	8120	30.	11600	2800	2.9	0.7	0.16	1.5	381
Fall	Wells	a6	Oct	1987	11027	22.	12000	2800	3.94	0.8	0.19	1.3	1023
Fall	Wells	a6	Nov	1987	13349	1a.	34000	4000	3.34	0.6	0.08	2.	2313
Fall	Wells	a6	Dec	1987	15696	15.	34000	4000	3.92	0.7	0.08	1.8	4845
Late	Rocky Reach	a5	Jan	1987	26319	18.	33900	4700	5.6	1.1	0.15	0.	65
Late	Rocky Reach	a5	Feb	1987	28883	16.4	33900	4700	6.15	1.2	0.16	1.2	65
Late	Rocky Reach	a5	Mar	1987	30558	15.5	33900	4700	6.5	1.2	0.17	2.1	36
Late	Rocky Reach	a5	Apr	1987	36994	12.8	33900	4700	7.87	1.4	0.19	0.6	122

WF PROGRAM QC02
Hatchery Rearing Parameters and Mortality Summary Report
March 17, 1989

Page: 15

Location: Speelyai

SPECIES	STOCK	BROOD	* DATE	* OF FISH	POUNDS	AVERAGE	POND	WATER	LBS	FLOW	DENSITY	FOOD	MONTHLY
					MTH	YEAR	ON HAND	SIZE	VOLUME				
					FISH/LB	CU FEET	GPM	GPM	
Early	Big Creek	E	Dec 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0
Early	Lewis River	a6	Mar 1987	3998	390.	20700	1500	2.67	-0-	-0-	0.	0.	12100
Early	Lewis River	a6	Apr 1987	6230	219.	41400	2650	2.35	1.1	0.07	0.	0.	11000
Early	Lewis River	a6	May 1987	8526	160.	55200	3600	2.37	0.	0.06	1.3	5200	
Early	Lewis River	a6	Jun 1987	9595	142.	55200	3600	2.67	1.	0.07	3.2	1750	
Early	Lewis River	a6	Jul 1987	10534	115.	48000	3150	3.34	1.2	0.08	0.	1400	
Early	Lewis River	a6	Aug 1987	14211	85.	55200	3600	3.95	1.3	0.08	1.3	700	
Early	Lewis River	86	Sep 1987	20140	60.	48000	2800	7.19	2.1	0.12	0.	1500	
Early	Lewis River	a6	Oct 1987	25158	48.	48000	3325	7.57	2.1	0.14	1.8	1400	
Early	Lewis River	a6	Nov 1987	30172	40.	48000	3325	9.07	2.3	0.16	1.8	700	
Early	Lewis River	a6	Dec 1987	36533	33.	55000	3800	9.61	2.3	0.16	1.2	1000	
Early	Lewis River	A	Sep 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0
Early	Lewis River	A	Oct 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0.	77
Early	Lewis River	E	Dec 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	211000
Spring	Kalama Falls	a6	May 1987	2480	72.	27600	1400	1.77	0.6	0.03	0.	300	
Spring	Kalama Falls	a6	Jun 1987	3562	50.	27600	1400	2.54	0.7	0.04	1.	500	
Spring	Kalama Falls	a6	Jul 1987	4888	36.	28000	1800	2.72	0.7	0.04	1.4	800	
Spring	Kalama Falls	a6	Aug 1987	5677	31.	27600	2000	2.84	0.6	0.04	0.	600	
Spring	Kalama Falls	a6	Sep 1987	6518	27.	28000	2000	3.26	0.7	0.05	0.	132	
Spring	Kalama Falls	a6	Oct 1987	7656	23.	18000	2000	3.83	0.8	0.09	0.	200	
Spring	Kalama Falls	86	Nov 1987	9257	19.	18000	2000	4.63	0.9	0.1	1.7	200	
Spring	Kalama Falls	a6	Dec 1987	9766	1a.	18000	2000	4.88	0.	0.11	5.3	36	
Spring	Lewis River	a6	Mar 1987	5331	130.	13800	1000	5.33	2.1	0.16	0.	5500	
Spring	Lewis River	a6	Apr 1987	7688	90.	27600	2400	3.2	1.1	0.09	0.8	1100	
Spring	Lewis River	A	Aug 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	53

March 17, 1989

Page: 16

Location: Tucannon

SPECIES	STOCK	BROOD	MTH	YEAR	ON HAND	POUNDS	AVERAGE	POND	WATER	LBS	FLOW	DENSITY	FOOD	MNTHLY
						* DATE	* OF FISH	SIZE	VOLUME	INFLOW	PER	INDEX	INDEX	CON"
						FISH/LB	CU FEET	GPM	GPM					
Spring	Tucannon	a6	Nov	1987	15652	10.	8100	2244	6.90	-0-	-0-	0.	418	
Spring	Tucannon	a6	Dec	1987	15646	10.	8000	2244	6.97	-0-	-0-	E2	63	

WDF PROGRAM QC02

Hatchery Rearing Parameters and Mortality Summary Report

March 17, 1989

Page: 17

Location: Washougal

SPECIES	STOCK	BROOD	* DATE	* OF FISH	POUNDS	AVERAGE	POND	WATER	LBS	MONTHLY											
										MTH	YEAR	ON HAND	SIZE	VOLUME	INFLOW	PER	FLOW	DENSITY	FOOD	CON"	MORTLTY

Early	Washougal	a5	Feb 1987	6815	25.5	20799	640	10.6	2.4	0.07	0.	600									
Early	Washougal	a5	Apr 1987	127879	20.	422000	9500	13.5	2.7	0.06	0.	6300									
Early	Washougal	86	Feb 1987	1688	718.	10399	320	5.20	-0-	-0-	-0-	30000									
Early	Washougal	A	Dec 1987	-0-	-II-	-0-	6000	-0-	-0-	-0-	-0-	-0-	45								
Early	Washougal	E	Dec 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	31500								
Fall	Washougal	a6	Feb 1987	7384	854.	77400	3180	2.32	-0-	-0-	0.	27000									
Fall	Washougal	86	Mar 1987	11783	540.	291000	all5	1.45	-0-	-0-	0.	13100									
Fall	Washougal	a6	Apr 1987	27696	228.	291000	7515	3.69	1.6	0.04	0.8	48200									
Fall	Washougal	a6	May 1987	53246	117.	461000	10990	4.84	1.8	0.04	0.9	34000									
Fall	Washougal	a6	Jun 1987	4715	78.	39000	1590	2.97	0.9	0.04	0.	2400									
Fall	Washougal	a6	Jun 1987	71268	82.	422000	7500	9.5	3.	0.05	0.	15600									
Fall	Washougal	86	Jul 1987	7296	50.	39000	1590	4.59	1.2	0.05	1.5	3000									
Fall	Washougal	a6	Aug 1987	7408	49.	39000	1590	4.66	1.2	0.05	5.9	1800									
Fall	Washougal	A	Dec 1987	-0-	-0-	-0-	6000	-0-	-0-	-0-	-0-	-0-	243								
Fall	Washougal	E	Dec 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	390000								
Late	Cowlitz	a5	Mar 1987	1008	23.	20799	640	1.58	0.3	0.01	0.	100									
Late	Washougal	85	Feb 1987	19784	26.	93800	2880	6.87	1.6	0.05	0.	2100									
Late	Washougal	a5	Feb 1987	105200	25.	422000	10000	10.5	2.4	0.06	0.	5000									
Late	Washougal	a5	Mar 1987	22204	22.	72900	2240	9.91	2.1	0.06	2.8	1600									
Late	Washougal	a5	Mar 1987	119318	22.	42200	10000	11.9	2.5	0.59	2.5	5000									
Late	Washougal	a5	Apr 1987	25654	19.7	70000	2240	11.5	2.2	0.07	0.	6300									
Late	Washougal	a6	Mar 1987	3018	1164.	52000	1600	1.89	-0-	-0-	0.	6800									
Late	Washougal	a6	Apr 1987	8059	496.	56500	1865	4.32	-0-	-0-	0.	6500									
Late	Washougal	a6	May 1987	12317	299.	a2500	2925	4.21	2.1	0.07	1.8	115800									
Late	Washougal	a6	Jun 1987	17486	192.	159000	5430	3.22	1.4	0.05	1.7	29500									
Late	Washougal	a6	Jul 1987	24213	138.	159000	5430	4.46	1.8	0.06	2.1	16000									
Late	Washougal	a6	Aug 1987	34636	96.	178000	4000	0.66	3.1	0.07	1.5	16300									
Late	Washougal	a6	Sep 1987	44716	74.	178000	7000	6.39	2.1	0.08	1.8	a404									
Late	Washougal	a6	Oct 1987	61085	54.	460000	7600	8.04	2.3	0.04	0.	916									
Late	Washougal	a6	Nov 1987	60656	46.	490000	a200	a.37	2.2	0.04	2.5	950									
Late	Washougal	a6	Dec 1987	78912	40.	490000	8500	9.28	2.4	0.04	1.9	500									
Late	Washougal	A	Dec 1987	-0-	-0-	-0-	6000	-0-	-0-	-0-	-0-	-0-	86								
Late	Washougal	E	Dec 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	128000								

WDF PROGRAM QC02
Hatchery Rearing Parameters and Mortality Summary Report
 March 17 1989

Page: 18

Location: Wells Spawning

SPECIES	STOCK	BROOD	* DATE MTH	* OF FISH YEAR	POUNDS	AVERAGE	POND	WATER	LBS	FLOW	DENSITY	FOOD	MONTHLY
					ON HAND	SIZE FISH/LB	VOLUME CU FEET	INFLOW GPM	PER GPM	INDEX	INDEX	CON"	MORTLTY
Spring	Leavenworth	a7	Dec 1987	493	240.	1a99	449	1.1	0.8	0.19	-0-	2072	
Summer	Wells	a5	Feb 1987	32885	12.	38000	5388	6.1	1.	0.14	0.	99	
Summer	Wells	85	Mar 1987	39445	10.	38000	5388	7.32	1.2	0.17	0.7	174	
Summer	Wells	a5	Apr 1987	43817	9.	38000	4980	8.8	1.4	0.19	1.1	a5	
Summer	Wells	a6	Feb 1987	3924	450.	25000	4050	0.97	-0-	-0-	0.	12908	
Summer	Wells	86	Mar 1987	6343	230.	25000	4050	1.57	0.8	0.13	0.	9211	
Summer	Wells	a6	Apr 1987	7202	200.	25000	4050	1.78	0.9	0.15	6.3	18282	
Summer	Wells	a6	May 1987	14274	100.	25000	4050	3.52	1.2	0.19	1.1	11358	
Summer	Wells	a6	Jun 1987	7613	70.	25000	4050	1.88	0.6	0.1	0.	9325	
Summer	Wells	a6	Jul 1987	5774	68.	25000	2500	2.31	0.7	0.07	0.	6463	
Summer	Wells	86	Aug 1987	10290	38.	25000	4725	2.18	-0-	-0-	0.8	1666	
Summer	Wells	a6	Sep 1987	16273	24.	38000	2559	6.36	1.1	0.07	1.	472	
Summer	Wells	a6	Oct 1987	22931	17.	38000	2514	9.12	1.7	0.11	1.2	725	
Summer	Wells	86	Nov 1987	25921	15.	38000	2514	10.3	1.9	0.13	2.7	1017	
Summer	Wells	86	Dec 1987	32325	12.	38000	2514	12.9	2.1	0.14	1.1	921	
Summer	Wells	a7	Dec 1987	366	830.	1899	449	0.82	0.7	0.16	-0-	1300	
Summer	Wells	A	Jul 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	2	
Summer	Wells	A	Aug 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0.	4	
Summer	Wells	A	Sep 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0.	14	
Summer	Wells	A	Oct 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	0.	15	
Summer	Wells	E	Dec 1987	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	180600	

APPENDIX F

Appendix F contains the Yearly Medication Report. Medication usage is listed by type of medication for each pathogen for the calendar year 1987.

Dosage:

Formalin = parts per million (ppm)

Diquat = ppm

Romet = % body weight fed of medicated feed

TM50 = % body weight fed of medicated feed

Gallimycin = % body weight fed of medicated feed

Sulmet = % body weight fed of medicated feed

Malachite = # of treatments per month

Epsom salts = % of feed by weight

Erythromycin = # of injections per month

Amount:

Formalin = gallons

Diquat = gallons

Romet = pounds

TM50 = pounds

Gallimycin = pounds

Sulmet = pounds

Malachite = gallons

Epsom salts = pounds

Erythromycin = none

WDF PROGRAM MEDREP
Yearly Medication Report
March 16, 1989

Page: 1

Agent: Gill Amoeba

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Formalin	250	144G	Wells	Summer	Wells	86	70.

WDF PROGRAM MEDREP
Yearly Medication Report
March 16, 1989

Page: 2

Agent: Bacterial Gill Dis

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Diquat	8ppm	.20G	Lyon's Ferry	Fall	Lyon's	86	178.
	16ppm	.34G	Lyon's Ferry	Fall	Lyon's	86	178.

WDF PROGRAM MEDREP
Yearly Medication Report
March 16, 1989

Page: 3

Agent: BHS

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
—							
Romet							
2%	2300	Cowlitz	Spring	Cowlitz	86	27.	
1.5%	3800	Klickitat	Spring	Klickitat	86	18.	
1-2%	351	Washougal	Fall	Washougal	86	82.	
2%	296	Washougal	Fall	Washougal	86	50.	
1.25%	665	Washougal	Fall	Washougal	86	49.	
TM50							
2%	12660	Cowlitz	Fall	Cowlitz	86	96.	
2%	5225	Cowlitz	Fall	Cowlitz	86	39.	
2%	6650	Cowlitz	Spring	Cowlitz	86	59.	
2%	7040	Cowlitz	Spring	Cowlitz	86	45.	
2%	1652	Kalama Falls	Spring	Kalama	86	35.	
2%	758	Kalama Falls	Spring	Kalama		25.	
2%	140	Lower Kalama	Early	Kalama	86	350.	

WDF PROGRAM MEDREP
Yearly Medication Report
March 16, 1989

Page: 4

Agent: Bacterial Kidney Dis

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Gallimycin							
2%	433	Kalama Falls	Spring	Kalama	86	64.	
2%	967	Kalama Falls	Spring	Kalama	86	51.	
1%	3000	Klickitat	Late	Elokomin	85	22.	
2%	6650	Klickitat	Spring	Klickitat	86	31.	
1.25%	1150	Lewis River	Spring	Lewis River	86	56.	
1.25%	3150	Lewis River	Spring	Lewis River	86	34.	
1.5%	3950	Lewis River	Spring	Lewis River	86	12.	
2%	440	Lyon's Ferry	Fall	Lyon's	85	11.	
2%	440	Lyon's Ferry	Fall	Lyon's	85	11.	
2%	219	Lyon's Ferry	Fall	Lyon's	85	9.	
2%	366	Lyon's Ferry	Fall	Lyon's	85	9.	
2%	1073	Lyon's Ferry	Fall	Lyon's	86	178.	
2%	2200	Lyon's Ferry	Fall	Lyon's	86	52.	
2%	1420	Lyon's Ferry	Spring	Tucannon	86	30.	
2%	5016	Ringold	Spring	Wind River	86	60.	
2%	384	Ringold	Spring	Wind River	86	40.	
2%	334	Rocky Reach	Fall	Wells	86	85.	
1.25%	1500	Speelyai	Spring	Kalama	86	50.	
1.25%	1500	Speelyai	Spring	Kalama	86	36.	
2%	288	Washougal	Fall	Washougal	86	82.	
2%	1952	Washougal	Fall	Washougal	86	50.	
2%	950	Wells	Summer	Wells	86	230.	
2%	150	Wells	Summer	Wells	86	200.	
2%	1450	Wells	Summer	Wells	86	70.	
2%	2800	Wells	Summer	Wells	86	38.	
1%	300	Wells	Summer	Wells	86	24.	
2%	3000	Wells	Summer	Wells	86	15.	

WDF PROGRAM MEDREP
Yearly Medication Report
March 16, 1989

Page: 5

Agent: *Columellaris*

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Diquat	30PPM	22.5G	Rocky Reach	Early	Kalama	86	57.
	30PPM	22.56;	Rocky Reach	Fall	Wells	86	55.
TM50	2.4%	1600	Rocky Reach	Early	Kalama	86	45.
	2%	2519	Washougal	Late	Washougal	86	96.

WDF PROGRAM MEDREP
Yearly Medication Report
March 16, 1989

Page: 6

Agent: Costia

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Formalin							
166	147G	Cowlitz	Fall	Cowlitz	86		96.
166	84G	Cowlitz	Fall	Cowlitz	86		68.
166	42G	Cowlitz	Fall	Cowlitz	86		39.
166	231G	Cowlitz	Late	Cowlitz	86		106.
166	84G	Cowlitz	Spring	Cowlitz	86		45.
166	20G	Elokomin	Late	Elokomin	86		382.
28.5	17G	Elokomin	Late	Elokomin	86		79.
166	12G	Grays River	Early	Grays River	86		632.
166	8 G	Grays River	Early	Washougal	86		604.
166	16G	Grays River	Early	Grays River	86		118.
166	1G	Grays River	Fall	Skamakowa	86		617.
166	12G	Grays River	Fall	Grays River	86		83.
166	27G	Grays River	Fall	Washougal	86		111.
166	40G	Kalama Falls	Fall	Kalama	86		775.
166	12G	Kalama Falls	Late	Kalama	86		207.
166	4G	Kalama Falls	Spring	Kalama	86		405.
40	25G	Klickitat	Spring	Klickitat	86		20.
166	50G	Lewis River	Late	Lewis River	86		476.
166	3G	Lower Kalama	Early	Kalama	86		450.
166	9G	Lower Kalama	Early	Kalama	86		250.
166	3G	Lower Kalama	Fall	Kalama	86		376.
166	18G	Lower Kalama	Fall	Kalama	86		162.
125	370	Priest Rapids	Fall	Priest	86		118.
166	75G	Speelyai	Early	Lewis River	86		160.
166	4G	Speelyai	Spring	Kalama	86		36.
25	90G	Washougal	Fall	Washougal	86		82.

WDF PROGRAM MEDREP
Yearly Medication Report
March 16, 1989

Page: 7

Agent: Cold Water Disease

							Fish Size
	Medication	Dosage	Amount	Location	Species	Stock	Brood
Romet							
	1.5%	30	Elokomin	Late	Kalama	86	609.
	1%	76	Elokomin	Late	Kalama	86	311.
	2%	150	Kalama Falls	Late	Kalama	86	338.
	2%	150	Kalama Falls	Late	Kalama	85	15.
	2%	700	Klickitat	Late	Cowlitz	86	302.
	2%	612	Klickitat	Late	Cowlitz	86	106.
Sulmet							
	2%	241	Klickitat	Late	Cowlitz	86	462.
	2%	700	Klickitat	Late	Cowlitz	86	302.
TM50							
	1%	27020	Cowlitz	Late	Cowlitz	85	22.
	2%	30365	Cowlitz	Late	Cowlitz	86	39.
	2%	16085	Cowlitz	Late	Cowlitz	86	34.
	2.5%	350	Elokomin	Late	Kalama	86	311.
	2%	362	Kalama Falls	Late	Kalama	85	15.
	2%	362	Kalama Falls	Late	Kalama	86	338.
	2%	266	Kalama Falls	Late	Kalama	86	207.
	1.6%	149	Lewis River	Late	Lewis River	86	970.
	1.6%	2428	Lewis River	Late	Lewis River	86	
	1.6%	240	Lewis River	Late	Lewis River	86	476. 476.
	2%	10000	Lewis River	Late	Lewis River	86	138.
	1.5%	200	Lower Kalama	Early	Kalama	86	450.
	2%	18000	Ringold	Fall	Priest	85	7.
	2%	178	Rocky Reach	Early	Kalama	86	-0-
	2%	282	Rocky Reach	Early	Kalama	86	
	2.4%	882	Rocky Reach	Early	Kalama	86	428. 123.
	2%	485	Speelyai	Early	Lewis River	86	
	2%	116	Washougal	Early	Washougal	86	390. 718.
	2%	3165	Washougal	Late	Washougal	86	299.
	2%	2071	Washougal	Late	Washougal	86	192.

WDF PROGRAM MEDREP
Yearly Medication Report
March 16, 1989

Page: 8

Agent: Enteric Redmouth Dis

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Romet	2%	3850	Cowlitz	Fall	Cowlitz	86	27.
TM50	2%	2380	Cowlitz	Spring	Cowlitz	86	20.
	2%	3350	Cowlitz	Spring	Cowlitz	86	15.
	2%	1800	Lewis River	Spring	Lewis River	86	21.

WDF PROGRAM MEDREP
Yearly Medication Report
March 16, 1989

Page: 9

Agent: Saprolegnia

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Diquat							
	24	18G	Rocky Reach	Fall	Wells	86	18.
Formalin							
	166	60G	Cowlitz	Spring	Cowlitz	A	-0-
	200	180G	Cowlitz	Spring	Cowlitz	A	-0-
	200	584G	Cowlitz	Spring	Cowlitz	A	-0-
	200	696G	Cowlitz	Spring	Cowlitz	A	-0-
	166	32G	Kalama Falls	Spring	Kalama	A	-0-
	166	24G	Kalama Falls	Spring	Kalama	A	-0-
	1666	157G	Klickitat	Fall	Priest	87	-0-
	1666	30G	Lower Kalama	Early	Kalama	87	-0-
	1666	190G	Lower Kalama	Fall	Kalama	87	-0-
Malachite							
	20	2.6G	Cowlitz	Fall	Cowlitz	A	-0-
	10	2G	Cowlitz	Fall	Cowlitz	A	-0-
	19	3.4G	Cowlitz	Late	Cowlitz	A	-0-
	6	.6G	Cowlitz	Spring	Cowlitz	A	-0-
	12	6.6G	Cowlitz	Spring	Cowlitz	A	-0-
	12	6.9G	Cowlitz	Spring	Cowlitz	A	-0-
	2	.6G	Cowlitz	Spring	Cowlitz	A	-0-
	4	.5G	Kalama Falls	Early	Kalama	A	-0-
	8	2G	Kalama Falls	Fall	Kalama	A	-0-
	4	.7G	Kalama Falls	Fall	Kalama	A	-0-
	4	1G	Kalama Falls	Spring	Kalama	A	-0-
	8	2G	Kalama Falls	Spring	Kalama	A	-0-
	a	2G	Kalama Falls	Spring	Kalama	A	-0-
	4	.5G	Kalama Falls	Spring	Kalama	A	-0-
	2	1.5G	Klickitat	Spring	Klickitat	A	-0-
	5	.68G	Klickitat	Spring	Klickitat	A	-0-
	16	4.5G	Lewis River	Late	Lewis River	A	-0-
	20	7.6G	Lyon's Ferry	Fall	Lyon's	A	-0-
	4	7.9G	Lyon's Ferry	Fall	Lyon's	A	-0-
	4	1.4G	Lyon's Ferry	Fall	Lyon's	A	-0-
	30	5.3G	Priest Rapids	Fall	Priest	A	-0-
	15	8G	Priest Rapids	Fall	Priest	A	-0-
	2	1G	Speelyai	Early	Lewis River	A	-0-
	8	1G	Speelyai	Spring	Lewis River	A	-0-

WDF PROGRAM MEDREP
Yearly Medication Report
March 16, 1989

Page: 10

Agent: Furunculosis

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
<hr/>							
Romet							
	1%	1700	Elokomin	Late	Elokomin	86	79.
	1%	1200	Elokomin	Late	Elokomin	86	70.
	1&2%	498	Kalama Falls	Spring	Kalama	86	64.
	2%	550	Lower Kalama	Early	Kalama	86	98.
	1.25%	1638	Washougal	Late	Washougal	86	96.
<hr/>							
TM50							
	2.1%		Elokomin	Late	Elokomin	86	209.
	2%	2000	Elokomin	Late	Elokomin	86	141.
	2%	3000	Elokomin	Late	Elokomin	86	70.
	2%	1591	Grays River	Fall	Kalama	A	-0-
	2%	610	Kalama Falls	Late	Kalama	86	131.
	2%	90	Kalama Falls	Late	Kalama	86	80.
	2%	18850	Lewis River	Late	Lewis River	86	50.
	2%	4700	Lewis River	Spring	Lewis River	86	19.
	2%	5567	Lower Kalama	Early	Kalama	86	173.
	2%	281	Lower Kalama	Early	Kalama	86	151.
	2%	4056	Washougal	Late	Washougal	86	138.
	2%	1591	Washougal	Late	Washougal	86	74.

WDF PROGRAM MEDREP
Yearly Medication Report
March 16, 1989

Page: 11

Agent: Hexamita

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Epsom salts	3%	4	Grays River	Fall	Grays River	86	27.

WDF PROGRAM MEDREP
Yearly Medication Report
March 16, 1989

Page: 12

Agent: Ichthyophthirius

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Formalin							
166	126G	Cowlitz	Spring	Cowlitz	86	79.	
166	2G	Grays River	Fall	Grays River	87	1100.	
166	96G	Kalama Falls	Spring	Kalama	86	51.	
166	96G	Kalama Falls	Spring	Kalama	86	23.	
166	825G	Lewis River	Spring	Lewis River	86	19.	
166	495G	Lewis River	Spring	Lewis River	86	12.	
166	14G	Ringold	Spring	Wind River	86	60.	
166	44G	Ringold	Spring	Wind River	86	40.	
166	62G	Ringold	Spring	Wind River	86	30.	
125	577G	Wells	Summer	Wells	86	15.	

WDF PROGRAM MEDREP
Yearly Medication Report
March 16, 1989

Page: 13

Agent: Prophylactic

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Erythromycin							
	2		Cowlitz	Fall	Cowlitz	A	-0-
	1		Cowlitz	Spring	Cowlitz	A	-0-
	1		Cowlitz	Spring	Cowlitz	A	-0-
	1		Cowlitz	Spring	Cowlitz	A	-0-
	1		Cowlitz	Spring	Cowlitz	A	-0-
	1		IZalama Falls	Spring	Kalama	A	-0-
	1		Kalama Falls	Spring	Kalama	A	-0-
	1		IZalama Falls	Spring	IZalama	A	-0-
	1		IZalama Falls	Spring	Kalama	A	-0-
	4		IZlickitat	Spring	Klickitat	A	-0-
	1		Lewis River	Early	Lewis River	A	-0-
	1		Lewis River	Early	Lewis River	A	-0-
	1		Lewis River	Early	Lewis River	A	-0-
	1		Lewis River	Late	Lewis River	A	-0-
	1		Lewis River	Spring	Lewis River	A	-0-
	2		Lyon's Ferry	Spring	Tucannon	A	-0-
	1		Priest Rapids	Fall	Priest	A	-0-
	1		Speelyai	Early	Lewis River	A	-0-
	1		Speelyai	Early	Lewis River	A	-0-
	2		Speelyai	Spring	Lewis River	A	-0-
Formalin							
	166	190G	Cowlitz	Fall	Cowlitz	86	356.
	1666	396G	Elokomin	Fall	Elokomin	E	-0-
	1666		Grays River	Early	Big Creek	E	-0-
	1666		Grays River	Early	Grays River	E	-0-
	1666		Grays River	Fall	Elokomin	E	-0-
	1666		Grays River	Fall	Kalama	E	-0-
	1666		Grays River	Fall	Grays River	E	-0-
	1666		Grays River	Fall	Big Creek	E	-0-
	1666	7G	Klickitat	Fall	IZlickitat	E	-0-
	1666	36G	Klickitat	Spring	IZlickitat	E	-0-
	1666	275G	Lyon's Ferry	Fall	Lyon's	E	-0-
	200	31G	Lyon's Ferry	Spring	Tucannon	A	-0-
	1666	7.5G	Lyon's Ferry	Spring	Tucannon	E	-0-
	1666	155G	Priest Rapids	Fall	Priest	E	-0-
	166	336G	Ringold	Spring	Wind River	86	25.
	1666	25G	Speelyai	Early	Lewis River	E	-0-
	1666	25G	Washougal	Early	Washougal	E	-0-
	1666	205G	Washougal	Fall	Washougal	E	-0-
	1666	25G	Washougal	Late	Washougal	E	-0-
	1666	125G	Wells	Summer	Wells	E	-0-
Gallimycin							
	1.5%	8730	Cowlitz	Spring	Cowlitz	86	15.
	1.5%	5250	Cowlitz	Spring	Cowlitz	86	12.
	1.5%	6650	Lewis River	Spring	Lewis River	86	19.
	2%	124	Rocky Reach	Fall	Wells	86	30.
	1.5%	1800	Speelyai	Spring	IZalama	86	23.
	1.5%	700	Speelyai	Spring	Kalama	86	19.

WDF PROGRAM MEDREP
Yearly Medication Report
March 16, 1989

Page: 14

Agent: Prophylactic

							Fish Size
Medication	Dosage	Amount	Location	Species	Stock	Brood	
<hr/>							
Malachite							
	5	.5G	Grays River	Fall	Kalama	A	
	2	.25G	Grays River	Fall	Grays River	A	-0-
	5	.5G	Grays River	Fall	Elokomin	A	-0-
	37	4.3	Lyon's Ferry	Spring	Tucannon	A	-0-
	4	1.2G	Wells	Summer	Wells	A	-0-
	12	3.7G	Wells	Summer	Wells	A	-0-
	13	3.5G	Wells	Summer	Wells	A	-0-
	13	3.5G	Wells	Summer	Wells	A	-0-
Romet							
	1.25%	320	Lyon's Ferry	Spring	Tucannon	86	12.
	1.25%	1180	Tucannon	Spring	Tucannon	86	10.
TM50							
	2%	1200	Cowlitz	Fall	Cowlitz	86	68.
	2%	962	Rocky Reach	Early	Kalama	86	83.
	2.4%	1380	Rocky Reach	Early	Kalama	86	57.
	2%	1875	Rocky Reach	Early	Kalama	86	33.
	2%	2050	Rocky Reach	Early	Kalama	86	25.
	2%	1295	Rocky Reach	Early	Kalama	86	22.
	2.4%	1380	Rocky Reach	Fall	Wells	86	55.
	2.5%	1600	Rocky Reach	Fall	Wells	86	18.

WDF PROGRAM MEDREP
Yearly Medication Report
March 16, 1989

Page: 15

Agent: Trichodina

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Formalin	166	40G	Elokomin	Late	Elokomin	86	36.

WDF PROGRAM MEDREP
Yearly Medication Report
March 16, 1989

Page: 16

Agent: Trichophrya

Medication	Dosage	Amount	Location	Species	Stock	Brood	Fish Size
Formalin							
100	25.5G		Rocky Reach	Early	Kalama	86	45.
166	42G		Rocky Reach	Early	Kalama	86	33.
200	50G		Rocky Reach	Early	Kalama	86	22.

APPENDIX G

Appendix G shows a standard Viral Certification form. These are generated by the computer for the hatchery, species and stock requested.

Fish Health Certification Report
Jan 25, 1988

For: Elokomin
1318 State Highway 407
Cathlamet, Washington 98612

Species: Coho
Stock: Elokomin
Brood: Adult
Life Stage: Adult

Number in lot: 1267

Year last observed		
Virus	In watershed	In Stock
IHNV	1983	Neg
IPNV	Neg	Neg

This year's testing		
Virus	# sampled	Results
IHNV	60	Neg
IPNV	60	Neg
VHSV	0	NA

Myxobolus cerebralis check date: 1986(chinook)

Kathleen Hopper
Pathologist's Signature

State of Washington
Department of Fisheries
Room 115, Gen Admn Bldg
Olympia, Washington 98504

Remarks:

PATHOGEN ABBREVIATIONS:

IHNV - Infectious Hematopoietic Necrosis Virus

IPNV - Infectious Pancreatic Necrosis Virus

VHSV - Viral Hemorrhagic Septicemia Virus

APPENDIX H

Appendix H contains historical data compiled from numerous WDF hatchery forms. The historical information is divided into two sections, Historical Fish Health Data By Location from January, 1983 to January, 1987 and Loss By Life Stage for the same time period.

The Historical Fish Health Data details the amount of medication used per pathogen for each species by brood year over the artificial rearing period. Feed conversion efficiency is also listed.

The second section, Loss By Life Stage, presents total number and percent loss by species for brood years 1982 to 1986. This information encompasses the normal artificial production period for each facility. Species listed at each facility are in the following order: Spring chinook, Upriver Brights Fall chinook (U.B. Fall chinook), Fall(Tule) chinook, Late coho (Type-N), and Early coho (Type-S). Life stage losses are identified as EGG, ALEVIN, JUVENILE, YEARLING, and ADULT and are defined as:

EGG (All species) - That period from day of spawn to hatch (or transfer if prior to hatch).

ALEVIN (All species) - From hatch to ponding (or transfer of unfed fry).

JUVENILE (Chinook "0") - From ponding to release as 0's, or transfer;

(Chinook delayed) - That period from normal "0" release to delayed "0" release:

(Coho) - From ponding through end of first calendar year.

YEARLING (Chinook) - The period from "0" release to yearling release or transfer. If no "0" release occurred, then the period from ponding to yearling release or transfer is used to account for loss.

YEARLING (Coho) - That period from January 1 of the second calendar year to yearling release or transfer.

ADULT (All species) - Prespawning mortality by return year.

Appendix H.

Historical Fish Health Data By Location
January, 1983 - January, 1987

Hatchery: Cowlitz				Amount Used**	Feed Conversion
Species	Brood Year	Pathogen*	Medication		
Spring chinook	82	Costia	formalin	504 g	1.6:1
		BHS	TM50	17560 #	
		CWD	TM50	6025 #	
		BKD	Gallimycin	2800 #	
		Ceratomyxa	---	---	
Spring chinook	83	Shasta	formalin	126 g	1.52:1
		Costia	TM50	9714 #	
		BHS	Gallimycin	720 #	
		BKD	Malachite	4.8 #	
		Fungus	formalin	147 g	1.62:1
Spring chinook	84	Costia	TM50	15335 #	
		CWD	Gallimycin	22137 #	
		BKD	Destroyed	1.4 million eggs.	
Spring chinook	85	IHNV	TM50	5440 #	1.60:1
		CWD	Gallimycin	3305 #	
Fall chinook	82	Costia	formalin	357 g	1.43:1
		BHS	TM50	14770 #	
Fall chinook	83	Costia	formalin	232 g	1.36:1
		BHS	TM50	1323 #	
		fungus	Malachite	1 #	
Fall chinook	84	Costia	formalin	275 g	1.35:1
		CWD	TM50	3615 #	
		BKD	Gallimycin	12128 #	
Fall chinook	85	Costia	formalin	105 g	1.32:1
		CWD	TM50	11425 #	
		BKD	Gallimycin	8850 #	
Late Coho	82	Costia .	formalin	228 g	1.40:1
		CWD	TM50	25650 #	
Late Coho	83	Costia	formalin	192 g	1.60:1
		CWD	TM50	8920 #	
		BKD	Gallimycin	6950 #	
Late Coho	84	Costia	formalin	5.4 g	1.59:1
		CWD	TM50	103070 #	
Late Coho	85	Costia	formalin	105 g	1.10:1
		Trichodina	formalin	21 g	
		Furunculosis	TM50	1000 #	
		CWD	TM50	27325 #	
		BKD	Gallimycin	32400 #	
Hatchery: Elokomin					
Fall chinook	82	ERM	Sulmet	1250 #	0.85:1
		ERM	Furox50	50 #	
Fall chinook	83	Costia	formalin	26 g	1.23:1
Fall chinook	84	ERM	none	---	1.01:1
Fall chinook	85	Costia	formalin	136 g	0.96:1

Hatchery: Elokomin				Amount	Feed
Species	Year	Pathogen	Medication	Used	Conversion
Late Coho	82	Trichodina	formalin	105 g	1.43:1
Late Coho	83	Trichodina	formalin	14 g	1.57:1
Late Coho	84	Costia	formalin	65 g	1.36:1
		Furunculosis	TM50	2500 #	
Late Coho	85	Costia	formalin	88 4	1.23:1
		Furunculosis	Romet	240 #	
		Furunculosis	TM50	2600 #	
Hatchery: Grays River					
Fall chinook	82	septicemia	Furox50	53 #	1.08:1
		septicemia	TM50	1592 #	
		septicemia	Sulmet	1370 #	
		Costia	formalin	29 g	
		fungus	Diquat	3 g	
		fungus	malachite	6 #	
Fall chinook	83	Costia	formalin	1 g	1.07:1
		CWD	TM50	560 #	
		Furunculosis	Furox50	1 #	
Fall chinook	84	CWD	Sulmet	486 #	1.15:1
Fall chinook	85	Costia	formalin	16 g	1.26:1
		BKD	Sulmet	155 #	
Late Coho	82	Costia	formalin	21 g	1.21:1
		CWD	TM50	130 #	
Late Coho	83	Hexamita	Salt	13 #	1.29:1
		CWD	TM50	1064 #	
Late Coho	84	Costia	formalin	42 4	1.10:1
		CWD	Sulmet	57 #	
		CWD	TM50	500 #	
Late Coho	85	Trichodina	formalin	14 g	1.10:1
		Costia	formalin	14 g	
		Furunculosis	TM50	250 #	
		CWD	TM50	78 #	
Hatchery: Kalama Falls					
Spring chinook	82	Costia	formalin	3 g	1.50:1
		BHS	Sulmet	300 #	
		BHS	TM50	3500 #	
		BKD	Gallimycin	800 #	
Spring chinook	83	Furunculosis	TM50	3450 #	1.59:1
		BKD	Gallimycin	150 #	
Spring chinook	84	Costia	formalin	12 g	1.46:1
		BHS	TM50	1900 #	
		Columnaris	Diquat	12 4	
		Columnaris	TM50	750 #	
Spring chinook	85	Costia	formalin	3 g	1.32:1
		Furunculosis	TM50	1844 #	

Hatchery: Kalama Falls

Species	Year	Brood	Pathogen	Medication	Amount Used	Feed Conversion
Fall chinook	82		BHS	Sulmet	1550 #	
			BKD	Gallimycin	800 #	
			fungus	Malachite	NA	
Fall chinook	83		no medication used		NA	
Fall chinook	84		Costia	formalin	78 g	0.96:1
Fall chinook	85		Costia	formalin	NA	
			Furunculosis	TM50	5047 #	1.11:1
Early Coho	83		Costia	formalin	15 g	NA
			Furunculosis	TM50	200 #	
			CWD	TM50	506 #	
Early Coho	85		No disease problems.			0.88:1
Late Coho	83		---	TM50	750 #	1.39:1
Late Coho	85		Costia	formalin	3 g	1.43:1
			CWD	TM50	1891 #	
			CWD	Romet	750 #	

Hatchery: Klickitat

Spring chinook	82		prophylactic	Sulmet	288 #	1.19:1
			BHS	Sulmet	2925 #	
			BKD	Gallimycin	441 #	
Spring chinook	83		BHS	Sulmet	5575 #	1.30:1
			BKD	Gallimycin	389 #	
			fungus	malachite	8 #	
Spring chinook	84		BHS	Romet	1800 #	1.23:1
			BKD	Gallimycin	8165 #	
Spring chinook	85		Costia	formalin	14 g	1.54:1
			BKD	Gallimycin	537 #	
Fall chinook	82		BHS	Sulmet	825 #	1.01:1
Fall chinook	83		No medication required.			1.50:1
Fall chinook	84		BHS	Sulmet	1339 #	1.28:1
Fall chinook	85		BHS	Romet	3595 #	0.93:1
			Costia	formalin	66 g	
Early Coho	82		CWD	TM50	4976 #	1.33:1
			CWD	Sulmet	1139 #	
Early Coho	83		CWD	TM50	9800 #	1.20:1
			CWD	Sulmet	1000 #	
Early Coho	84		CWD	Sulmet	448 #	0.73:1
Early Coho	85		No medication required.		NA	
Late Coho	82		CWD	TM50	604 #	1.25:1
			CWD	sulmet	361 #	
Late Coho	84		CWD	Sulmet	269 #	1.33:1
Late Coho	85		CWD	Sulmet	344 #	1.36:1
			CWD	Romet	5222 #	
			CWD	TM50	6006 #	
			BKD	Gallimycin	10560 #	

Hatchery: Lower Kalama

Species	Year	Pathogen	Medication	Amount Used	Feed Conversion
Fall chinook	82	BHS	Sulmet	2750 #	1.25:1
		Costia	formalin	20 g	
Fall chinook	83	BHS	Sulmet	1473 #	0.90:1
		Costia	formalin	89 g	
Fall chinook	84	BHS	TM50	5278 #	1.00:1
		Costia	formalin	143 g	
Fall chinook	85	BHS	TM50	3165 #	1.17:1
		Costia	formalin	8 g	
Late Coho	82	Costia	formalin	15 4	1.03:1
		CWD	TM50	2139 #	
Late Coho	83	---	TM50	400 #	0.96:1
Early Coho	82	Costia	formalin	NA	1.30:1
		CWD	TM50	1261 #	
Early Coho	84	Costia	formalin	53 g	0.83:1
		Columnaris	TM50	900 #	
		Columnaris	Diquat	8 g	
Early Coho	85	Costia	formalin	15 g	1.60:1
		Furunculosis	TM50	2900 #	

Hatchery: Lyons Ferry

Fall chinook	83	ERM	Sulmet	4120 #	1.70:1
		Chills	no treatment		
Fall chinook	84	BKD	Gallimycin	5250 #	1.39:1
		BGD	Diquat	4 g	
		CWD	TM50	5600 #	
Fall chinook	85	BKD	Gallimycin	13113 #	1.28:1
		BGD	Diquat	1.8 g	
		ERM	Remet	3172 #	
		ERM	TM50	150 #	
		ERM	Romet	2415 #	
Spring chinook	85	No disease problems.			
					1.16:1

Hatchery: Lewis River

Spring chinook	82	Costia	formalin	9 g	1.49:1
		Furunculosis	TM50	6018 #	
		Ichthyophthirius	formalin	1320 g	
		BKD	Gallimycin	1000 #	
		fungus	Malachite	NA	
Spring chinook	83	Ichthyophthirius	formalin	1858 g	1.18:1
		Furunculosis	Gallimycin	750 #	
		Furunculosis	TM50	1600 #	
		BKD	Gallimycin	1000 #	
		BHS	TM50	1407 #	
Spring chinook	84	Sanguinicola	none - 28 % of loss for the year		
		Furunculosis	TM50	3000 #	1.23:1
		CWD	TM50	3067 #	
		BKD	Gallimycin	6029 #	
		fungus	Malachite	15 #	
Spring chinook	85	Ichthyophthirius	formalin	NA	1.80:1
		BKD	Gallimycin	13673 #	
		Furunculosis	TM50	8000 #	

Hatchery: Lewis River				Amount Used	Feed Conversion
Species	Year	Pathogen	Medication		
Fall chinook	82	Costia	formalin	3 g	1.38:1
Fall chinook	83	Costia	formalin	5 g	1.16:1
		CWD	TM50	750 #	
Fall chinook	84	Costia	formalin	20 g	1.11:1
		BKD	Gallimycin	170 #	
		ERM	TM50	1678 #	
Fall chinook	85	Costia	formalin	55 g	1.14:1
		BKD	Gallimycin	3577 #	
Late Coho	82	Costia	formalin	61 g	1.08:1
		CWD	TM50	9300 #	
Late Coho	83	Costia	formalin	60 g	1.12:1
		CWD	TM50	17756 #	
		CWD	Sulmet	725 #	
Late Coho	84	Sanauinicola	no treatment		
		Cosfia	formalin	100 g	1.17:1
		CWD	TM50	22050 #	
Late Coho	85	CWD	Romet	1048 #	1.19:1
		CWD	TM50	10924 #	
		Furunculosis	TM50	13100 #	
Early Coho	84	CWD	TM50	200 #	1.41:1
Hatchery: Priest Rapids					
Fall chinook	82	soft shell	formalin	19 g	0.86:1
Bonneville stock		ERM	Sulmet	1259 #	0.93:1
Bonneville stock		ERM	TM50	2041 #	
Fall chinook	83	soft shell	formalin	25 g	0.92:1
		BGD	Hyamine	3 g	
Fall chinook	84	soft shell	formalin	NA	1.02:1
		Costia	formalin	10 g	
yearlings		CWD	Sulmet	500 #	1.80:1
yearlings		CWD	Romet	700 #	
yearlings		CWD	TM50	2600 #	
Fall chinook	85	Ichthyophthirius	formalin	NA	1.09:1
Hatchery: Ringold					
Spring chinook	82	Gill Amoeba	formalin	36 g	1.00:1
		ERM	Sulmet	400 #	
		CWD	sulmet	1250 #	
		BKD	Gallimycin	78 #	
Fall chinook	83	Gill Amoeba	formalin	84 g	1.07:1
		prophylactic	Sulmet	1450 #	
Fall chinook	84	Ichthyophthirius	formalin	5901 g	1.11:1
		CWD	TM50	4100 #	
		BKD	Gallimycin	7000 #	
Fall chinook	85	Ichthyophthirius	formalin	1540 g	1.21:1
		BKD	Gallimycin	6000 #	
		ERM	Romet	1000 #	
		fungus	Malachite	4 #	

Hatchery: Rocky Reach				Amount Used	Feed Conversion
Species	Year	Pathogen	Medication		
Fall chinook	82	Columnaris prophyl	TM50	380 #	1.50:1
Fall chinook	83	Coagulated yolk	no treatment		1.10:1
Fall chinook	84	Columnaris prophyl	TM50	1000 #	1.45:1
		BKD	Gallimycin	NA	
Fall chinook	85	no disease problems			1.23:1
Late Coho	82	Columnaris prophyl	TM50	17265 #	1.14:1
Late Coho	83	Columnaris prophyl	TM50	6000 #	1.29:1
		CWD	TM50	300 #	
Late Coho	84	Columnaris prophyl	TM50	19060 #	1.62:1
		CWD	TM50	700 #	
Late Coho	85	Columnaris prophyl	TM50	9335 #	1.18:1
		CWD	TM50	2732 #	
Hatchery: Speelyai					
Spring chinook	82	BKD	Gallimycin	600 #	1.41:1
		IHNV - no treatment	18000 eggs destroyed		
Spring chinook	83	Costia	formalin	NA	0.94:1
		fungus	Malachite	10 #	
Spring chinook	83	Costia	formalin	NA	1.17:1
Cowlitz stock		BHS	TM50	300 #	
Spring chinook	84	Costia	formalin	.3 g	0.82:1
Kalama stock		fungus (eggs)	Malachite	.5 #	
Spring chinook	84	Costia	formalin	6 g	1.33:1
		fungus (eggs)	Malachite	1.5 #	
Spring chinook	85	Costia	formalin	10 g	1.30:1
		Ichthyophthirus	formalin	300 g	
Early Coho	82	CWD	TM50	17000 #	1.24:1
Early Coho	83	Costia	formalin	NA	1.17:1
		CWD	TM50	680 #	
Early Coho	83	Costia	formalin	NA	1.21:1
Kalama stock		CWD	TM50	320 #	
Early Coho	84	CWD	TM50	2322 #	1.10:1
Early Coho	85	CWD	TM50	1852 #	1.27:1
Late Coho	83	CWD	TM50	500 #	1.32:1
Fall chinook	84	no disease problems			1.10:1
Fall chinook	85	Costia	formalin	6 g	1.20:1
		BHS	TM50	148 #	
Hathcery: Washougal					
Fall chinook	82	Costia	fomalin	63 g	0.90:1
		Furunculosis	TM50	2600 #	
Fall chinook	82	Costia	fomalin	6 g	0.99:1
Bonneville		BHS	Sulmet	39 #	
Fall chinook	83	Furunculosis	TM50	1150 #	0.95:1
Fall chinook	84	Costia	formalin	20 g	1.03:1
		Columnaris	TM50	1870 #	
		Columnaris	Diquat	5.4 g	
		Furunculosis	TM50	1000 #	
Fall chinook	84	Costia	formalin	20 g	0.94:1
Kalama stock		BGD	no treatment		

Hatchery: Washougal				Amount Used	Feed Conversion
Species	Year	Pathogen	Medication		
Fall chinook	85	Ichthyophthirius	formalin	875 g	0.99:1
		Furunculosis	TM50	1266 #	
		Columnaris	TM50	1428 #	
Early Coho	82	Costia	fomalin	12 4	1.07:1
		CWD	TM50	1138 #	
		Furunculosis	TM50	760 #	
Early Coho	83	Costia	formalin	12 g	1.26:1
		CWD	TM50	450 #	
		Furunculosis	TM50	470 #	
Early Coho	84	Costia	formalin	37 g	1.34:1
		CWD	Sulmet	760 #	
		CWD	TM50	4536 #	
		Columnaris	Diquat	7 g	
		Columnaris	formalin	37 g	
Early Coho	85	Costia	formalin	39 g	1.48:1
		Furunculosis	TM50	2140 #	
		Columnaris	TM50	1500 #	
		CWD	TM50	222 #	
Late Coho	82	Costia	formalin	22 4	1.14:1
		CWD	Furanace	3 g	
		CWD	TM50	6001 #	
		Furunculosis	TM50	1860 #	
Late Coho	83	Costia	formalin	36 g	1.41:1
		CWD	Sulmet	521 #	
		CWD	TM50	1500 #	
		Furunculosis	TM50	1644 #	
Late Coho Lewis stock	83	Costia	formalin	12 g	1.17:1
		CWD	TM50	500 #	
		Furunculosis	TM50	504 #	
Late Coho Cowlitz stock	83	Costia	formalin	12 g	1.21:1
		CWD	TM50	600 #	
		Furunculosis	TM50	516 #	
Late Coho	84	Costia	formalin	21 4	1.32:1
		CWD	TM50	3552 #	
		Columnaris	TM50	3412 #	
		Columnaris	Diquat	2.3 g	
Late Coho	85	Costia	formalin	60 g	1.38:1
		CWD	TM50	598 #	
		Furunculosis	TM50	1874 #	
		Furunculosis	Remet	339 #	
		Columnaris	TM50	1875 #	
 Hatchery: Wells					
Summer chinook	82	fungus (eggs)	formalin	30 g	1.01:1
		fungus (eggs)	Malachite	3 #	
Summer chinook	83	fungus (eggs)	formalin	NA	0.74:1
		Costia	formalin	50 g	
		Ichthyophthirius	formalin	488 g	
		CWD	TM50	2000 #	
		Columnaris	TM50	2000 #	

Hatchery: Wells		Brood		Amount Used	Feed Conversion
Species	Year	Pathogen	Medication		
Summer chinook	84	fungus (eggs)	formalin	25 g	1.90:1
		BKD	Gallimycin	3000 #	
		Ichthyophthirius	formalin	2400 g	
		CWD	TM50	3500 #	
Summer chinook	85	Ichthyophthirius	formalin	NA	1.11:1
		CWD	TM50	3500 #	
		IHNV	In returning adults		

* Pathogen Abbreviations

BGD - Bacterial Gill Disease
 BHS - Bacterial Hemorrhagic Septicemia
 BKD - Bacterial Kidney Disease
 CWD - Coldwater Disease
 ERM - Enteric Red Mouth
 IHNV - Infectious Hematopoietic Necrosis Virus

** Amount Used symbols

g = gallons
 # = pounds of feed with medication fed

HISTORICAL LOSSES: YEARS 1983 TO 1987

LOSS BY LIFE STAGE

FACILITY: COWLITZ		SPECIES: SPRINGS		ADULTS BY RETURN YEAR									
BRD	YEAR			EGG		ALEVIN		JUVENILE		YEARLING		NUM	PCT
		STOCK	EGG TAKE/REC	NUM	PCT	NUM	PCT	NUM	PCT	NUM	PCT		
1982	COWLITZ		8655000	820000	9.5	95000	1.6	1427000	29.5	18700	2.9	2088	17.1
1983	COWLITZ		9747000	405000	4.2	102000	2.1	790600	16.3	60600	9.1	1843	13.8
1984	COWLITZ		7490000	262000	3.5	19000	0.3	238200	6.1	41900	5.9	1068	7.8
1985	COWLITZ		3844000	307000	8.0	149000	4.2	392300	11.6	31000	4.6	956	14.1
1986	COWLITZ		4079000	451000	11.1	75000	2.1	240400	7.0	46000*	14.1	948	17.0
SPECIES: FALLS													
1982	COWLITZ		8037000	217000	2.7	71000	0.9	1664200	22.2	151300	13.5	942	22.0
1983	COWLITZ		8360000	318000	3.8	88000	1.1	436500	5.5	22600	2.3	1196	20.0
1984	COWLITZ		8980000	1374000	15.3	339000	4.5	634900	9.3	54500	5.3	606	11.8
1985	COWLITZ		9979000	695000	7.0	130000	1.5	240100	2.7	17100	1.7	1491	23.2
1986	COWLITZ		14566000	974000	7.0	314000	3.5	234600	2.7	11700	1.2	1240	11.5
SPECIES: COHO(N)													
1982	COWLITZ		12671000	414000	3.3	150000	1.4	1086800	10.5	46400	1.0	1256	5.6
1983	COWLITZ		17099000	538000	3.2	130000	1.1	1241200	10.5	206100	4.6	781	3.2
1984	COWLITZ		17426000	807000	4.6	253000	2.0	1122500	9.6	48100	1.0	1163	4.4
1985	COWLITZ		14299000	777000	5.4	328000	2.7	362900	3.1	120600	0.7	611	3.3
1986	COWLITZ		14756000	1234000	9.6	193000	1.7	186200	1.7	6300*	0.1	1775	3.3

* YEARLING LOSS THROUGH JANUARY 1988

LOSS BY LIFE STAGE

FACILITY: ELOKOMIN		SPECIES: FALLS										ADULTS BY RETRUN YEAR	
BRD	YEAR			EGG		ALEVIN		JUVENILE		YEARLING		NUM	PCT
		STOCK		EGG	TAKE/REC	NUM	PCT	NUM	PCT	NUM	PCT		
1982	EIOKOMIN	2882000	183000	6.3	51750	1.9	89250	3.4	---	---	---	337	16.4
1983	ELOKOMIN	3194000	234000	7.3	110000	3.7	81000	2.8	---	---	---	1944	23.5
1984	ELOKOMIN	1875300	188800	10.1	64800	3.8	39700	2.5	---	---	---	642	37.6
	KALAMA	1377000	158000	13.3	39200	3.8	7800	0.8	---	---	---		
1985	ELIKOMIN	2592000	108000	4.2	104000	4.5	60580	2.6	---	---	---	244	16.7
	KALAMA	445000	10000	2.3	42000	9.7	5400	2.2	---	---	---	---	---
1986	ELOKOMIN	2572700	256000	10.0	4247	0.2	61805	1.9	---	---	---	260	17.2
	KALAMA	394500	No RECORD		500	0.1	INCLUDED IN LOSS		---	---	---	---	---
	SKAMOKOWA	485500	NO RECORD		700	0.1	ABOVE		---	---	---	---	---
SPECIES: COHO(N)													
1982	ELOK/COW	3095350	87750	4.4	102400	3.4	50700	1.8	26000	1.0	45	2.4	
1983	ELOK/LEWIS	2691700	349100	13.0	64600	2.8	21000	0.9	23000	1.3	457	23.5	
1984	ELOLOMIN	2212000	276000	12.5	72600	3.6	51700	2.6	50900	2.9	143	4.6	
	COWLITZ	2123900	NO RECORD		79500	3.7	TRANSFER/PLANT AS FRY			---	---	---	
1985	ELOKOMIN	5272500	545000	10.3	134500	5.7	78868	5.3	5740	0.4	54	1.0	
1986	ELOKOMIN	3758300	511620	13.6	76380	2.4	51297	1.6	531*	.01	685	12.6	
	KALAMA	605200	200	.03	43500	7.2	21700	3.8	TRANS To KAL 6/87		---	---	

* YEARLING LOSS THROUGH JANUARY 1988

LOSS BY LIFE STAGE

FACILITY: GRAYS		SPECIES: FALLS										ADULTS BY RETURN YEAR	
BRD	YEAR	STOCK	EGG TAKE/REC	EGG		ALEVIN		JUVENILE		YEARLING		NUM	PCT
				EGG	TAKE/REC	NUM	PCT	NUM	PCT	NUM	PCT		
	1982	GRAYS	1104700	62700	5.7	30000	2.9	109600	10.8	---	---	75	11.1
		ABERNATHY	1637500	37500	2.3	94000	5.9	100700	11.7	---	---	---	---
	1983	GRAYS	524000	30000	5.7	15900	3.2	52800	10.6	---	---	39	14.5
		BIG CREEK	490000	NO RECORD		20000	4.1	75500	11.1	FEB TRANSFER TO GRAYS RELEASE POND.		---	---
		BONNEVILLE	1503000	NO RECORD		98000	6.5	158600	7.9	RELEASED IN JUNE 84		129	17.3 HAUL FROM ELOK
		ELOKOMIN	1498000	81000	5.4	46000	4.7	156500	10.8	RELEASED IN JUNE 84		---	---
		KALAMA	1969500	NO RECORD		130000	6.6	60800	4.8	RELEASED IN JUNE 84		---	---
		WASHOUGAL	558000	NO RECORD		16000	2.9	54900	10.2	RELEASED IN JUNE 84		---	---
	1984	GRAYS	415000	35000	8.4	20000	5.3	9164	3.1	1600 delayed	1.6 rel	8	4.7
		KALAMA	1852000	97000	5.2	19000	4.9	8950	2.4	---	---	---	---
	1985	GRAYS	327000	10000	3.1	9700	3.6	13275	4.1	---	---	23	10.2
		COWLITZ	154000	NO RECORD		7000	4.6	2000	1.4	---	---	---	---
		ELOKOMIN	855000	35000	4.0	25000	3.4	72705	9.8	---	---	---	---
		KALAMA	1259800	36000	2.9	59400	4.9	8751	2.5	1500 delayed	1.5 rel	---	---
	1986	GRAYS	1938800	97200	5.0	22500	3.9	5800	1.1	700 delayed	0.7 rel	103	8.5
		KALAMA	1029000	91600	8.9	TRANS TO BONNEVILLE				---	---	---	---
		SKAMOKOWA	669200	72700	10.9	3000	2.7	1000	0.9	---	---	---	---
		WASHOUGAL	1310000	NO RECORD		37000	2.9	7900	0.9	---	---	---	---

LOSS BY LIFE STAGE

FACILITY: GRAYS		SPECIES: COHO(S)										ADULTS BY RETURN YEAR	
BRD	YEAR	STOCK	EGG TAKE/REC	EGG		ALEVIN		JUVENILE		YEARLING		NUM	PCT
				NUM	PCT	NUM	PCT	NUM	PCT	NUM	PCT		
1982	GRAYS	2880500	232500	13.8		19870	2.8	11600	1.8	8400	2.0	141	3.5
1983	GRAYS	126000	14000	11.1		29000	25.9	3417	4.0	2208	2.8	21	11.8
	KALAMA			REC'D IN MAY 84						10884	5.5	---	---
1984	GRAYS	3705000	227000	6.1	182000	5.2	60500	1.7	9900	2.3	30	1.1	
1985	GRAYS	1218000	79000	6.5	49900	4.4	31558	2.9	5400	1.2	28	3.4	
1986	GRAYS	1892000	237000	12.5	82000	4.9	32200	2.2	300*	.06	74	3.9	
	WASHOUGAL	1771200	944000	53.3	30000	3.6	2400	0.3	RELEASE	3/87		---	
FACILITY: KALAMA		SPECIES: SPRINGS											
1982	KALAMA	390200	38300	9.8		6900	1.9	---	---	19100	5.5	243	7.0
1983	KALAMA	954400	168400	17.6		97500	12.4	---	---	37600	6.2	90	5.1
1984	KALAMA	1123800	71700	6.4		5000	0.8	---	---	60900	11.7	167	20.8
1985	KALAMA	200000	7700	3.9		6100	3.2	---	---	10200	5.5	12	12.5
1986	KALAMA	584800	52200	8.9		6600	2.0	---	---	20700	6.5	66	13.9
SPECIES: U.B.FALLS													
1982	SNAKE	200000	20900	10.5		--- EYED EGGS TRANS TO KLICKITAT -----							
1983	SNAKE	60000	16000	26.7		--- EYED EGGS TRANS TO KLICKITAT -----							
	SNAKE/PRIEST	795200	68400	8.6		--- EYED EGGS TRANS TO KLICK/PRIEST -----							
1984	SNAKE	243300	23500	9.7		--- EYED EGGS TRANS TO LYONS -----							
	SNAKE/PRIEST	451000	69400	15.3		--- EYED EGGS TRANS TO ROCKY REACH -----							
1985	SNAKE	530000				--- EYED EGGS TRANS TO LYONS -----							
	SNAKE/PRIEST	782900	246100	18.7		--- EYED EGGS TRANS TO LYONS -----							
1986	SNAKE	840000	107200	12.8		--- EYED EGGS TRANS TO LYONS -----							
	SNAKE/PRIEST					--- EYED EGGS TRANS TO LYONS -----							

LOSS BY LIFE STAGE

FACILITY: KALAMA		SPECIES: FALLS										ADULTS BY RETURN YEAR	
BRD	YEAR	STOCK	EGG TAKE/REC	EGG		ALEVIN		JUVENILE		YEARLING		NUM	PCT
				NUM	PCT	NUM	PCT	NUM	PCT	NUM	PCT		
1982	KALAMA		966600	46600	4.8	13200	1.4	-----	TRANS TO L.KAL	-----	-----	394	48.5
1983	KALAMA		7323300	197300	2.7	EYED EGGS	TRANS TO L.KAL, GRAYS, WASH	-----	-----	-----	-----	732	19.4
1984	KALAMA		9247000	745700	8.1	19500	0.5	104400	2.6	---	---	377	9.7
1985	KALAMA		8488200	482000	5.7	81600	1.8	55200	1.4	---	---	410	11.9
1986	KALAMA		7049000	695200	9.9	17800	0.4	43100	1.2	---	---	284	7.7
SPECIES: COHO(N)													
1982	KALAMA		1465000	133000	9.1	9000	0.7	-----	TRANS TO L.KAL 4/83	-----	-----	214	5.1
1983	KALAMA		1287500	231600	17.9	52900	5.2	15700	3.0	4100	0.8	76	3.2
1984	KALAMA		86200	16200	18.8	1000	1.3	24000	32.4	RELEASE 5/85	-----	134	10.2
	COWLITZ		REC'D IN MAY 85				-----	-----	-----	27200	2.6	-----	-----
1985	KALAMA		426900	63900	16.2	5500	1.5	14200	4.0	1700	0.5	44	7.5
	ELOKOMIN		200000	47400	23.7	2600	1.7	17300	2.7	1500	0.2	---	---
1986	KALAMA		1635000	206200	12.6	16500	2.0	39600	3.9	1300*	0.1	191	2.8
SPECIES: COHO(S)													
1983	KALAMA		974900	174900	17.9	68900	11.0	18400	5.3	1400	4.1	3	0.4
1984	KALAMA		396700	21400	5.4	6100	2.2	-----	TRANS AS FRY 3/85	---	-----	19	10.3
1985	KALAMA		459000	89400	9.0	15100	1.8	4000	0.4	RELEASE 4/86	-----	18	4.1
1986	KALAMA		4310600	506300	11.7	-----	EYED EGGS	TRANS TO L.KAL	---	---	---	605	10.9

* YEARLING LOSS THROUGH JANUARY 1988

H14

LOSS BY LIFE STAGE

FACILITY: KLICKITAT SPECIES: SPRINGS

BRD	YEAR	STOCK	EGG TAKE/REC	ALEVIN				JUVENILE		YEARLING		ADULTS BY RETURN YEAR		
				m	NUM	PCT	NUM	PCT	NUM	PCT	NUM	PCT	NUM	PCT
	1982	KLICKITAT	3088600	98600	3.2	34600	1.2	142279	5.0	32620	1.2	120	8.9	
	1983	KLICKITAT	1254000	54000	4.3	24000	2.0	35900	3.1	48100	5.3	48	7.9	
		COWLIT	1184000	No RECORD		25000	2.1	42900	3.7	---	---	---	---	
	1984	KLICKITAT	1073000	78000	7.3	32500	3.3	15200	1.6	27700	4.2	40	7.7	
	1985	KLICKITAT	83500	3200	3.8	4800	6.0	---	---	19200	24.5	8	13.3	
	1986	KLICKITAT	747200	47600	6.4	30600	4.4	---	---	38700*	6.0	48	9.9	
		CARSON	1008000	No RECORD		20600	2.0	---	TRANS TO RINGOLD	2/87		---		
		SPECIES: U.B.FALLS												
	1983	SMAKE	1048000	39800	3.8	19500	2.1	95000	11.4	TRANS TO LYONS 10/84		---	---	
		SPECIES: FALLS												
	1982	KLICKITAT	487457	42068	8.6	9376	2.1	9506	2.2	---	---	44	14.0	
		SPRING CRK	5800367	633853	10.9	299478	5.8	293463	6.2	---	---	---	---	
	1983	KLICKITAT	218400	6600	3.0	4300	2.0	6800	3.8	---	---	12	8.2	
		KALAMA	1140000	No RECORD		22600	2.0	70600	6.5	---	---	---	---	
	1984	KLICKITAT	159600	9100	5.7	4200	2.8	4300	3.4	---	---	14	10.2	
	1985	KLICKITAT	NO EGG TAKE											
		BIG CREEK	4203900	11000	0.3	169800	4.0	179500		---	---	---	---	
		" & i WHITE	REC'D IN MARCH 86											
	1986	KLICKITAT	117900	7600	6.4	12000	10.9	2500	2.5	---	---	27	13.4	
		E'RIEST	5041000	1541000	30.6	372000	10.6	64400	1.8	---	---	---	---	

* YEARLING LOSS THROUGH JANUARY 1988

LOSS BY LIFE STAGE													
FACILITY: KLICKITAT		SPECIES: COHO(N)		EGG		ALEVIN		JUVENILE		YEARLING		ADULTS BY RETURN YEAR	
BRD	YEAR	STOCK	EGG TAKE/REC	NUM	PCT	NUM	PCT	NUM	PCT	NUM	PCT	NUM	PCT
1982	COWLITZ	702100	NO RECORD	10200	1.5	49500	7.4	9400	1.7	---	---	---	---
1984	COWLITZ	1022500	NO RECORD	52000	5.1	30100	3.2	83600	13.9	---	---	---	---
	WASHOUGAL	500000	NO RECORD	31000	6.2	14500	2.9	43200	10.2	---	---	---	---
1985	COWLITZ	208800	NO RECORD	2000	1.0	24200	12.8	3600	2.1	---	---	---	---
	ELOKOMIN	1872000	302900 16.2	169100	10.8	138600	10.0	26400	2.2	---	---	---	---
1986	COWLITZ	1826000	NO RECORD	154600	8.5	69600	4.3	16000*	1.0	---	---	---	---
SPECIES: COHO(S)													
1982	WASH/GRAYS	1171600	NO RECORD	27700	2.4	160900	15.0	14200	1.7	---	---	---	---
1983	WASHOUGAL	1615000	NO RECORD	50000	3.1	119500	7.4	39900	3.3	---	---	---	---
1984	WASHOUGAL	1818500	270300 14.9	54200	3.3	85200	5.9	RELEASE 5/85		---	---	---	---
1986	KLICKITAT	367900	51700 14.1	18900	6.0	4000	2.0	TO RINGOLD 2/87		---	---	---	---
FACILITY: LEWIS	SPECIES: SPRINGS												
1982	LEWIS	----- REC'D FROM SPEELYAI 4/83	-----	-----	-----	-----	-----	27420	4.0	ADULTS HAULED TO SPEELYAI	-----	-----	
	COWLITZ	----- REC'D FROM COWLITZ 12/82	-----	-----	-----	-----	-----	171500	48.0	-----	-----	-----	
1983	LEWIS	----- REC'D FROM SPEELYAI 4/84	-----	-----	-----	-----	-----	15100	8.4	ADULTS HAULED TO SPEELYAI	-----	-----	
	COWLITZ	----- REC'D FROM COWLITZ 12/83	-----	-----	-----	-----	-----	77300	8.1	-----	-----	-----	
1984	LEWIS	----- REC'D FROM SPEELYAI 5/85	-----	-----	-----	-----	-----	19100	4.4	ADULTS HAULED TO SPEELYAI	-----	-----	
	KALAMA	----- REC'D FROM KALAMA 5/85	-----	-----	-----	-----	-----	14500	4.0	-----	-----	-----	
1985	LEWIS	----- REC'D FROM SPEELYAI 6/86	-----	-----	-----	-----	-----	39400	5.6	ADULTS HAULED TO SPEELYAI	-----	-----	
1986	LEWIS	----- REC'D FROM SPEELYAI 5/87	-----	-----	-----	-----	-----	29900*	5.2	ADULTS HAULED TO SPEELYAI	-----	-----	

* YEARLING LOSS THROUGH JANUARY 1988

LOSS BY LIFE STAGE

FACILITY: LEWIS		SPECIES: FALLS										ADULTS BY RETURN YEAR			
BRD	YEAR	STOCK	EGG TAKE/REC	EGG		ALEVIN		JUVENILE		YEARLING		NUM	PCT		
				NUM	PCT	NUM	PCT	NUM	PCT	NUM	PCT				
1982	LEWIS		205000	78300	38.0	5200	4.3	7000	5.6	---	---	109	53.2		
1983	LEWIS		438800	51800	11.8	16000	4.1	---	---	25600	8.2	189	43.5		
1984	LEWIS		----- REC'D FROM SPEELYAI 6/85 -----				-----				delayed rel 7300 4.3	34	26.2		
1985	LEWIS		EGGS REC'D FROM SPEELYAI			45500	9.5	---	---	3800	1.1	ADULTS HAULED TO SPEELYAI			
1986	LEWIS		----- NO EGGS TAKEN -----				-----				ADULTS RELEASED UPSTREAM				
<u>SPECIES: COHO(N)</u>															
1982	LEWIS		3732100	214900	5.8	46700	1.3	70800	2.1	12500	0.4	1425	13.2		
1983	LEWIS		9543000	380300	7.5	65000	1.4	253700	5.5	33900	0.8	245	1.8		
1984	LEWIS		6362500	590200	9.8	185300	3.2	124500	2.4	17300	0.4	337	3.5		
1985	LEWIS		6070500	254900	4.2	56600	1.0	98000	1.6	24600	0.6	150	1.6		
1986	LEWIS		6814500	561500	8.2	85200	1.6	90100	1.9	4000*	0.1	441	0.9		
<u>SPECIES: COHO(S)</u>															
1982	LEWIS		422000	----- GREEN EGGS TRANS TO SPEELYAI -----								441	3.9		
1983	LEWIS		1182400	446400	37.8	REC'D FROM SPEELYAI 1/85---		3200	0.8	1652	38.3				
1984	LEWIS		1893300	123700	6.5	10000	1.8	3200	0.6	4800	0.4	225	8.1		
1985	LEWIS		263600	47600	18.0	----- TRANS TO SPEELYAI -----				73	11.0				
	WASHOUGAL		----- REC'D FROM WASHOUGAL 1/87 -----				-----				2200	0.2	---		
1986	LEWIS		465100	93100	20.0	----- EYED EGGS TRANS TO SPEELYAI -----				105	4.0				

* YEARLING LOSS THROUGH JANUARY 1988

LOSS BY LIFE STAGE

FACILITY: LOW KALAMA		SPECIES: FALLS										ADULTS BY RETURN YEAR		
BRD	YEAR	STOCK	EGG TAKE/REC	EGG		ALEVIN		JUVENILE		YEARLING		NUM	PCT	
				NUM	PCT	NUM	PCT	NUM	PCT	NUM	PCT			
1982	KALAMA		836700	57200	3.3	19100	1.1	59200	3.6	---	---	145	19.1	
1983	KALAMA		3821500	70000	1.8	70500	1.9	47500	1.3	---	---	40	6.1	
1984	KALAMA		2930000	30100	0.8	68500	1.9	63290	1.8	---	---	118	8.8	
1985	KALAMA		2096000	31000	1.5	240000	6.9	22000	0.6	---	---	46	3.6	
1986	KALAMA		3850000	280000	6.5	NO RECORD		11500	0.3	---	---	50	2.0	
SPECIES: COHO(N)														
1982	KALAMA		753400	64900	8.6	18500	2.7	13200	0.6	800	0.2	53	3.8	
1983	KALAMA		222000	80000	36.0	NO RECORD		13400	2.5	1000	0.2	16	4.2	
1984	KALAMA		----- NO EGG TAKE -----						ADULTS UPSTRM					
SPECIES: COHO(S)														
1982	KALAMA		42000	----- GREEN EGGS TRANS TO KALAMA -----						NO RECORD				
1983	KALAMA		99000	32000	32.3	--- EYED EGGS TRANS TO KALAMA ---						5	4.7	
1984	KALAMA		369200	----- NO RECORD -----				6200	1.7	NO RECORD		---	---	
	WASHOUGAL		--- REC'D FROM WASHOUGAL 3/85 -----						4500	1.3	NO RECORD		---	---
1985	KALAMA		1373000	37000	2.7	80000	12.4	8000	1.4	1000	0.2	8	0.8	
1986	KALAMA		631640	NO RECORD		31640	5.0	5800	1.0	300*	.05	---	---	

* YEARLING LOSS THROUGH JANUARY 1988

LOSS BY LIFE STAGE

FACILITY: LYONS FERRY SPECIES: SPRINGS

BRD	YEAR	STOCK	EGG		ALEVIN		JLNENILE		YEARLING		ADULTS BY RETURN YEAR		
			EGG	TAKE/REC	NUM	PCT	NUM	PCT	NUM	PCT	MUM	PCT	
1985	TUCANNON		14800	1200	8.1	200	1.5	---	---	522	3.9	13	59.1
1986	TUCANNON		188000	3800	2.1	6923	3.8	---	---	7895*	4.8	28	21.4
SPECIES: U.B.FALLS													
1983	SNAKE		----- REC'D FROM KLICKITAT 10/84 -----						22300	3.3			
1984	LYONS		1567800	342200	21.8	52533	4.3	43900	4.0	26950	5.3	171	24.5
1985	LYONS		2596500	161900	9.7	57014	2.3	110436	4.8	20875	5.1	141	23.7
1986	LYONS		1341300	63800	4.8	41200	3.2	32406	2.9	14515*	3.4	25	5.5
<u>FACILITY:</u> PRIEST		<u>SPECIES: FALLS</u>											
1982	PRIEST		4906400	516500	10.2	81900	1.8	80800	1.9	---	---	327	12.5
	BONNEVILLE		5149000	311400	6.0	104400	2.2	131600	2.1	---	---	---	---
1983	PRIEST		6354800	710700	11.1	139900	2.5	137480	2.5	---	---	256	8.4
1984	PRIEST		10493000	1475500	14.0	192300	2.1	139100	1.9	30500	13.5	1421	22.4
1985	PRIEST		10632000	1962500	18.4	204600	3.0	242800	3.7	---	---	2905	24.3
1986	PRIEST		22126100	1964700	20.1	222600	2.9	310000	4.9	---	---	1749	11.8

* YEARLING LOSS THROUGH JANUARY 1988

LOSS BY LIFE STAGE													
FACILITY: RINGOLD		SPECIES: SPRINGS										ADULTS BY RETURN YEAR	
BRD	YEAR	STOCK	EGG		ALEVIN		JUVENILE		YEARLING		NUM	PCT	
			EGG	TAKE/REC	NUM	PCT	NUM	PCT	NUM	PCT			
1982	KLICKITAT				REC'D FROM KLICKITAT 4/83		99388	9.5	---	---	---	---	
1986	CARSON				REC'D FROM KLICKITAT 2/87				59796*	6.0	---	---	
			SPECIES: FALLS										
1983	BONNEVILLE				REC'D FROM KLICK 4/84		46400	2.2	76690	6.0	---	---	
	SNAKE		1022400	100875	9.4		---	EYED EGGS TRANSFERRED				ADS HAULED IN	
1984	PRIEST				REC'D FROM PRIEST RAPIDS 2/85				99754	7.1	---	---	
1985	PRIEST				REC'D FROM PRIEST RAPIDS 2/86				206100	15.8	---	---	
FACILITY: ROCKY REACH		SPECIES: FALLS											
1982	BONNEVILLE		1188035	58310	4.9	NO RECORD	---	---	31512	12.2	---	---	
1983	PRIEST/SNAKE		800985	51000	6.4	ALEVIN AND EGG LOSSES	---	---	28499	3.5	---	---	
1984	PRIEST/SNAKE		381600	8000	2.1	LOSSES COMBINED	17455	4.7	8377	3.2	---	---	
1985	PRIEST		250000	6500	2.6		---	---	6033	2.5	---	---	
1986	WELLS				REC'D FROM WELLS 2/87		29410	5.5	30117*	11.4	---	---	
			SPECIES: COHO(N)										
1982	COWLITZ		540000	25000	4.6	NO RECORD	60531	10.5	460	.08	---	---	
1983	WASHOUGAL		490000	8000	1.6	ALEVIN AND EGG LOSSES	52301	11.8	916	0.2	---	---	
1984	WASHOUGAL		550000	10000	1.8	COMBINED	61606	10.0	117	.02	---	---	
1985	ROCKY REACH		405030	133243	32.9		16205	6.0	239	0.1	---	---	
	ELOKOMIN		300000	70158	23.4		11602	5.0	462	0.2	---	---	
1986	ROCKY REACH		10000	10000	100	---	---	---	---	---	37	50.0	
			SPECIES: COHO(S)										
1986	KALAMA		531260	NO RECORD	35260	7.1	43121	9.4	100*	.02	---	---	

* YEAR END LOSS THROUGH JANUARY 1988

LOSS BY LIFE STAGE

FACILITY: SPEELYAI		SPECIES: SPRINGS										ADULTS BY RETURN YEAR		
BRD	YEAR			EGG		ALEVIN		JUVENILE		YEARLING		NUM	PCT	
		STOCK		EGG	TAKE/REC	NUN	PCT	NUN	P m	NUM	PCT			
1982	LEWIS			902000	118000	13.1	32000	4.1	11100	14.8	7800	3.2	179	36.7
1983	LEWIS			210000	18000	8.5	4000	2.1	7200	3.9	TRANS m LEWIS		19	23.8
	COWLITZ			1441000	NO RECORD		102000	6.6	54000	6.3	TRANS To LEWIS		---	---
1984	LEWIS			855000	102000	11.9	34000	4.0	25800	3.5	1480	0.5	51	11.3
	KALAMA			402100	No RECORD		28000	7.0	13100	3.5	TRANS m LEWIS		---	---
1985	LEWIS			961000	19000	2.0	9700	1.0	17300	3.1	TRANS m LEWIS		24	5.9
	COWLITZ			REC'D FROM COWLITZ 1/86						20050	7.9			
1986	LEWIS			793000	57000	7.2	24000	3.3	22000	3.7	TRANS m LEWIS		66	16.9
	KALAMA			205100	NO RECORD		13000	6.3	---	---	6400*	3.5	---	---
<u>SPECIES: FALLS</u>														
1984	LEWIS			255000	43000	16.8	25000	11.8	2900	1.7	TRANS TO LEWIS		---	---
1985	LEWIS			790000	47000	5.9	63500	8.6	5660	1.6	—	—	51	12.3
<u>SPECIES: COHO(N)</u>														
1983	LEWIS			811200	NO RECORD		19200	2.3	36700	10.8	TRANS m LEWIS		---	---
<u>SPECIES: COHO(S)</u>														
1982	LEWIS			1600000	180000	11.3	34000	2.4	31100	2.3	10385	0.9	253	18.8
1983	LEWIS			775000	8500	1.1	309100	40.3	35800	8.2	TRANS TO LEWIS		---	---
	KALAMA			238100	NO RECORD		22100	9.3	9700	4.6	TRANS TO LEWIS		---	---
	WASHOUGAL			96000	NO RECORD		7000	7.3	5100	5.7	TRANS m LEWIS		---	---
1984	LEWIS			1937000	434000	13.8	98600	3.6	24220	0.9	TRANS m LEWIS		280	11.1
1985	LEWIS			691000	92000	13.3	18000	3.0	17400	3.0	300	0.2	85	11.8
	WASHOUGAL			1153000	118000	9.7	12000	1.2	10800	1.9	TRANS m LEWIS		---	---
1986	LEWIS			2146000	351000	16.4	218000	12.1	42700	2.9	700*	0.5	51	3.3

LOSS BY LIFE STAGE

FACILITY: TOUTLE		SPECIES: FALLS								ADULTS BY RETURN YEAR	
BRD YEAR	STOCK			EGG		ALEVIN		JUVENILE		YEARLING	
		EGG TAKE/REC	NUM	PCT	NUM	PCT	NUM	PCT	NUM	PCT	NUM
1986	KALAMA	----- REC'D FROM KALAMA 4/87 -----				1900	0.4	---	---	---	---
	WASHOUGAL	----- REC'D FROM WASHOUGAL 4/87 -----				1600	0.4	---	---	---	---
<u>SPECIES: COHO(S)</u>											
1984	GRAYS	----- REC'D FROM GRAYS 1/86 -----				250	0.2	---	---	---	---
1985	GRAYS	----- REC'D FROM GRAYS 1/87 -----				10150	6.4	---	---	---	---
	WASHOUGAL	----- REC'D FROM WASHOUGAL 3/87 -----				400	2.2	---	---	---	---
FACILITY: WASHOUGAL		SPECIES: FALLS									
1982	WASHOUGAL	4686400	193400	4.1	NO RECORD	122218	2.6	---	---	203	7.9
	BONNEVILLE	2826000	160000	5.7	NO RECORD	78395	3.6	---	---	---	---
1983	WASHOUGAL	6449500	311500	4.8	45000 0.8	84938	1.4	2174 delayed	0.5 rel	166	4.2
	KALAMA	1721500	191500	11.1	NO RECORD	5900	1.5	---	---	---	---
1984	WASHOUGAL	4499000	206000	4.6	21000 0.5	80600	1.9	39800 delayed	8.7 rel	95	4.9
	KALAMA	1929000	NO RECORD	1000	.05	31500	1.6	---	---	---	---
1985	WASHOUGAL	4138800	199800	4.8	NO RECORD	60100	1.5	16700 delayed	4.5 rel	51	2.2
	ABERNATHY	1828000	236000	12.9	NO RECORD	48900	2.9	---	---	---	---
	COWLITZ	555000	NO RECORD	.	NO RECORD	14100	2.4	---	---	---	---
1986	WASHOUGAL	11790000	439000	3.7	NO RECORD	161600	2.6	---	---	171	1.6

* YEARLING LOSS THROUGH JANUARY 1988

H22

WSS BY LIFE STAGE

FACILITY: WAHSOUGAL		SPECIES: COHO(N)								ADULTS BY RETURN YEAR		
				EGG		ALEVIN		JUVENILE		YEARLING		
BRDYEAR												
1982	WASHOUGAL	3140800	145800	4.6	No RECORD	154200	5.5	11200	0.5	41	0.9	
1983	WASHOUGAL	1551500	80500	5.2	N RECORD	49600	3.8	24300	1.9	10	0.2	
	COWLITZ	500000	NO RECORD		20000 4.0	12100	2.7	2800	0.7	---	---	
	LEWIS	702000	46000	6.6	No RECORD	15300	2.4	2900	0.7	---	---	
1984	WAHOUGAL	2773000	96000	3.5	No RECORD	83148	3.9	28100	1.4	134	2.1	
1985	WASHOUGAL	1800000	146000	8.1	No RECORD	78927	4.9	22910	1.7	92	3.4	
	COWLITZ	1250000	NO REOCRD		27000 2.2	38941	3.2	7055	0.9	---	---	
1986	WASHOUGAL	4239000	199000	4.5	No RECORD	259350	7.1	12200*	0.4	34	0.3	
<hr/>												
<hr/>												
		<u>SPECIES: COHO(S)</u>										
1982	WASHOUGAL	2729000	208000	7.6	16000 1.0	68100	4.4	3000	0.3	1399	10.0	
1983	WASHOUGAL	3554000	233000	6.6	3000 0.3	44100	3.9	8140	0.8	139	3.1	
1984	WASHOUGAL	6399000	224000	4.9	No RECORK	207831	7.5	10200	0.9	151	2.3.	
1985	WASHOUGAL	4391000	147000	5.1	NO RECORD	91100	5.7	9835	1.0	142	3.2	
1986	WASHOUGAL	8688000	133000	9.7	No RECORD	35000	2.8	TO TOUTLE 3/88		724	4.3	
<hr/>												
<hr/>		<u>SPECIES: SUMMER CHINOOK</u>										
1982	WELLS	1790000	300500	17.0	27100	1.8	29500	2.0	---	---	53	7.6
1983	WELLS	1975000	322700	16.0	L23700	7.5	28219	2.2	72989	28.2	60	7.1
1984	WELLS	2397400	334900	14.0	154800	7.5	41650	2.2	116510	36.6	82	7.5
1985	WELLS	3585000	848676	23.7	395812	14.5	150713	6.8	4530	1.1	130	9.4
1986	WELLS	4651000	780460	16.8	164408	4.0	105351	2.9	11823*	3.0	201	10.6

* YEARLING WSS THROUGH JANUARY 1988

APPENDIX I

Adult contribution of Index station stocks is presented in Appendix I. Index stations and stocks are; Cowlitz Spring and Fall chinook, Speelyai* Early coho and Lyons Ferry Fall (UpRiver Bright) chinook. Contribution is shown as percent survival calculated from coded wire tag recoveries from all fisheries and hatchery rack returns.

* Speelyai Early coho will replace the Lower Kalama Early coho as an Index stock beginning in 1988. Lower Kalama was incorrectly selected as an Index station, no coded wire tagging is conducted at Lower Kalama.

Appendix I. Adult Contribution of Index Station Stocks.

Hatchery: Cowlitz

<u>Species</u>	<u>Tag Code</u>	<u>Brood '82</u>	<u>% Survival</u>	<u>Tag Code</u>	<u>Brood '83</u>	<u>% Survival</u>	<u>Tag Code</u>	<u>Brood '84</u>	<u>% Survival</u>
Spring	63 28/34		1.19	63 27/48		3.22	63 35/5		.52
	63 28/35		.82	63 27/47		2.74	63 35/6		.59
	63 28/36		.82	63 30/54		1.66	63 35/7		.70
				63 30/55		1.79	63 35/8		.77
				63 30/56		3.81	63 35/9		.85
							63 35/10		.64
							63 35/11		.71
							63 35/12		.69
							63 34/37		.55
Fall	63 26/10		.17	63 30/19		.58	63 32/35		.27
	63 25/3		.82	63 30/20		.76	63 32/36		.33
				63 31/24		.57	63 32/37		.25
				63 31/25		.80	63 32/38		.32
Fall Delayed				63 23/27		.65	63 34/48		.38
				63 23/28		.63	63 34/49		.22
							63 34/50		.56
							63 34/51		.80

Hatchery: Cowlitz

<u>Species</u>	<u>Tag Code</u>	<u>Brood '85</u>	<u>% Survival</u>	<u>Tag Code</u>	<u>Brood '86</u>	<u>% Survival</u>
Spring	63 38/33		NA	63 41/61R3		NA
	63 38/34		NA			
	63 38/35		NA			
Fall	63 41/8R4		NA	63 41/26R4		NA

Hatchery: Speelyai

<u>Species</u>	<u>Tag Code</u>	<u>Brood '82</u>	<u>% Survival</u>	<u>Tag Code</u>	<u>Brood '85</u>	<u>% Survival</u>	<u>Tag Code</u>	<u>Brood '86</u>	<u>% Survival</u>
Early	63 30/15		.16	63 37/1		NA	63 44/50R3		NA
Coho	63 30/16		.58	63 37/2		NA	63 36/63		NA

Appendix I. Adult Contribution of Index Station Stocks.

Hatchery: Lyons Ferry

<u>Species</u>	Tag Code Brood '83	% Survival	Tag Code Brood '84	% Survival	Tag Code Brood '85	% Survival
Fall	63 32/18	5.25	63 28/41	.11	63 36/38	NA
	63 21/52	5.16	63 32/26	.27	63 36/39	NA
			63 32/27	.20	63 36/40	NA
			63 32/28	.22	63 36/41	NA
					63 36/42	NA
					63 41/56R3	NA
					63 41/59R3	NA
Fall					63 36/33	NA
Barge Transport					63 36/34	NA
					63 36/35	NA
					63 36/36	NA
					63 36/37	NA

Hatchery: Lyons Ferry

<u>Species</u>	Tag Code Brood '86	% Survival
Fall	63 42/59R6	NA
	63 42/61R6	NA
	63 42/62R6	NA
	63 44/1R6	NA
	63 44/11R6	NA
	63 44/13R6	NA
Fall	63 44/7R6	NA
Barged	63 44/8R6	NA

APPENDIX J

Appendix J contains the summary report and raw data for the Organosomatic Analysis exams conducted on Index station stocks. All Organosomatic Analysis exams were conducted at approximately two weeks before release.

SUMMARY OF FISH AUTOPSY

LOCATION: Cowlitz

QUAL. CONTROL INSPECT. NO.: 603

Species: chinook Autopsy Date: 03-10-87 Sample Size: 60
 Strain: spring Age: yearling Tissue Collection No.: 603
 Mark/Lot: 63 38733,34,35 Disease Survey No.: NA
 Unit: NA Water Temp.: NA NA Case History No.: 603
 Fish Source: Cowlitz Water Hardness: NA ppm Custody No.: NA
 Egg Source: Cowlitz Investigator: PM/BR/KH
 Hatching Date: NA Reason for Autopsy: Pre-lib exam
 Remarks: Brood '85 yearlings

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
Length	169.250 mm	20.65 mm	12%
Weight	62.400 gr	21.22 gr	34%
Ktl*	1.290	0.07	5%
Ctl**	4.660		
Hematocrit	36.160	4.77	
Leucocrit	1.330	0.75	
Serum Protein	NA	NA	

*Expressed as Ktl times 10 to the fifth power

**Converted from Ktl; expressed as Ctl times 10 to the fourth power

VALUES AS PERCENT OF TOTAL SAMPLE

		PSEUDO-		MESEN.		HIND		KIDNEY		LIVER		BILE	
EYES	GILLS	BRANCHS	THYMUS	FAT	SPLEEN	GUT						NA	
N	98%	N	93%	N	100%	O	90%	O	0%	B	0%	0	NA
B1	0%	F	0%	S	0%	I	10%	1	75%	R	60%	1	NA
B2	0%	C	0%	L	0%	2	0%	2	25%	G	0%	2	NA
E1	0%	M	0%	S&L	0%	x	0.1	3	0%	NO	0%	M	0%
E2	2%	P	7%	I	0%			4	0%	E	40%	G	0%
H1	0%	OT	0%	OT	0%			x	1.3	OT	0%	U	0%
H2	0%											F	0%
M1	0%											OT	0%
M2	0%												
OT	0%												

Summary of Normals

98%	93%	100%	90%	60%	100%	98%	100%
-----	-----	------	-----	-----	------	-----	------

Summary of Means

	0.1	1.3		0.0				NA
--	-----	-----	--	-----	--	--	--	----

SEX: M: 50% F: 50% U: 0%

GENERAL REMARKS

FINS NA

SKIN NA

GONADS NA

OTHER NA

Qual.Qual. Control N603 86-8A

	LGH	WGT	Kt1	EYE	GILL	PSBR	THY	FAT	SPL	GU	KID	LIV	MES	SEX	HEM	LEU	SPR
1	187	79.6	1.2	n	n	n	n	0	r		n	a		f			
2	183	77.6	1.3	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
3	182	82.8	1.4	e2	n	n	n	010	r		n	aaaa		ff		1.0	1.0
4	185	68.8	1.1	n	n	n	n	101	r		n	aaaa		ff		1.0	1.0
5	199	103	1.3	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
6	170	60.9	1.2	n	n	n	n	101	r		n	aaaa		ff		0.0	1.0
7	170	56.5	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
8	175	64	1.2	n	n	n	n	100	r		n	aaaa		ff		1.0	1.0
9	200	90.2	1.1	n	n	n	n	000	r		n	aaaa		ff		0.0	1.0
10	193	101	1.4	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
11	170	59.6	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
12	171	63.6	1.3	n	n	n	n	000	r		n	aaaa		ff		2.0	1.0
13	173	62.5	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
14	199	91.4	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
15	185	80.8	1.3	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
16	185	75.3	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
17	168	59.9	1.3	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
18	194	92.6	1.3	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
19	137	30.6	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
20	122	21	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
21	173	62.3	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
22	170	56.5	1.3	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
23	172	67.9	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
24	160	49.4	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
25	160	51.8	1.3	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
26	171	64.4	1.3	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
27	168	58.6	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
28	156	46.8	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
29	170	59.4	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
30	123	21.3	1.1	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
31	181	72.3	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
32	136	31.2	1.4	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
33	187	89.6	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
34	166	55.3	1.3	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
35	179	72.2	1.3	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
36	186	72.8	1.1	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
37	166	53.6	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
38	160	51.2	1.3	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
39	160	48.5	1.2	n	n	n	n	000	r		n	aaaa		ff		2.0	1.0
40	133	28.1	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
41	185	78.2	1.3	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
42	197	97.6	1.3	n	n	n	n	000	r		n	aaaa		ff		2.0	1.0
43	185	82.4	1.3	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
44	180	74	1.3	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
45	185	79.8	1.3	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
46	173	66.8	1.3	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
47	186	76.1	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
48	181	71.2	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
49	137	31.6	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
50	121	20.1	1.1	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
51	161	49.4	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
52	159	47.3	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
53	166	54.4	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
54	131	25.7	1.1	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
55	165	57.6	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
56	157	47.9	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
57	198	99.6	1.3	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
58	158	51.2	1.3	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
59	119	18.3	1.1	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0
60	186	79.7	1.2	n	n	n	n	000	r		n	aaaa		ff		1.0	1.0

SUMMARY OF FISH AUTOPSY

LOCATION: Cowlitz

QUAL. CONTROL INSPECT. NO.: 632

Species: Chinook	Autopsy Date: 06-17-87	Sample Size: 60
Strain: springs	Age: zeros	Tissue Collection No.: 632
Mark/Lot: NA		Disease Survey No.: 632
Unit: NA	Water Temp.: NA NA	Case History No.: 632
Fish Source: Cowlitz	Water Hardness: NA ppm	Custody No.: 632
Egg Source: Cowlitz	Investigator: BR/PM/JH	
Hatching Date: NA	Reason for Autopsy: Pre-lib exam	
Remarks: Brood '86 sub-yearling		

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
Length	101.970 mm	11.92 mm	12%
Weight	9.560 gr	3.15 gr	33%
Ktl*	0.900	0.05	5%
Ctl**	3.252		
Hematocrit	33.170	3.84	12%
Leucocrit	1.000	0	0%
Serum Protein	NA	NA	NA

*Expressed as Ktl times 10 to the fifth power
 **Converted from Ktl; expressed as Ctl times 10 to the fourth power

VALUES AS PERCENT OF TOTAL SAMPLE

EYES	GILLS	PSEUDO-BRANCHS	THYMUS	MESEN.	HIND GUT	KIDNEY	LIVER	BILE
N 100%	N 100%	N 97%	0 98%	0 25%	B 0%	0 100%	N 100%	A 5% O NA
B1 0%	F 0%	S 0%	I 2%	I 75%	R 87%	1 0%	S 0%	B 93% 1 NA
B2 0%	C 0%	L 0%	2 0%	2 0%	G 0%	2 0%	M 0%	C 2% 2 NA
E1 0%	M 0%	S&L 0%	x 0.0	3 0%	NO 0%	x 0.0	G 0%	D 0% 3 NA
E2 0%	P 0%	I 0%		4 0%	E 13%		U 0%	E 0% x NA
H1 0%	OT 0%	OT 0%		x 0.8	OT 0%		OT 0%	F 0% OT 0%
H2 0%								
M1 0%								
M2 0%								
OT 0%								

Summary of Normals

100%	100%	97%	98%	87%	100%	100%	98%
------	------	-----	-----	-----	------	------	-----

Summary of Means

		0.0	0.8		0.0			NA
--	--	-----	-----	--	-----	--	--	----

SEX: M: 47% F: 53% U: 0%

GENERAL REMARKS

FINS NA

SKIN NA

GONADS NA

OTHER one gall bladder appeared to be full of stones

Qual.Qual. Control N627 86-8A

SN	LGH	WGT	Ktl	EYE	GILL	PSBR	THY	FAT	SPL	GUT	KID	LIV	MES	SEX	HEM	LEU	SPR
1	97	8.6	0.9	N	N	N	N	0	R	O	N	B	m	45			
2	103	9.5	0.9	N	N	N	N	0	R	O	N	B	u	43			
3	97	7.9	0.9	N	N	N	N	1	R	O	N	B	u	44			
4	105	9.6	0.8	N	N	N	N	1	R	O	N	B	u	40			
5	100	8.1	0.8	N	N	N	N	1	R	O	N	B	u	41			
6	100	8.5	0.9	N	N	N	N	1	R	O	N	B	u	42			
7	108	10.5	0.8	N	N	N	N	1	R	O	N	B	u	41			
8	108	10.1	0.8	N	N	N	N	1	R	O	N	B	u	38			
9	92	6.2	0.8	N	N	N	N	1	R	O	N	B	u	36			
10	90	6.6	0.8	N	N	N	N	1	R	O	N	B	u	43			
11	122	15.7	0.9	N	N	N	N	1	R	O	N	B	u	41			
12	100	8.3	0.8	N	N	N	N	1	R	O	N	B	u	37			
13	106	10.5	0.9	N	N	N	N	1	R	O	N	B	u	36			
14	114	12.8	0.9	N	N	N	N	1	R	O	N	B	u	41			
15	99	7.9	0.8	N	N	N	N	1	R	O	N	B	u	39			
16	98	7.9	0.8	N	N	N	N	1	R	O	N	B	u	42			
17	101	8.5	0.8	N	N	N	N	1	R	O	N	B	u	44			
18	100	8.6	0.9	N	N	N	N	1	R	O	N	B	u	42			
19	95	6.2	0.7	N	N	N	N	1	R	O	N	B	u	37			
20	93	5.7	0.7	N	N	N	N	1	R	O	N	B	u	46			
21	110	11.3	0.8	N	N	N	N	1	R	O	N	B	u	39			
22	105	9.9	0.9	N	N	N	N	1	R	O	N	B	u	41			
23	84	5.2	0.9	N	N	N	N	1	R	O	N	B	u	39			
24	110	11.3	1.0	N	N	N	N	1	R	O	N	B	u	44			
25	105	11.4	1.0	N	N	N	N	1	R	O	N	B	u	44			
26	107	10.1	0.8	N	N	N	N	1	R	O	N	B	u	43			
27	86	5.1	0.8	N	N	N	N	1	R	O	N	B	u	31			
28	96	6.7	0.8	N	N	N	N	1	R	O	N	B	u	41			
29	99	8	0.8	N	N	N	N	1	R	O	N	B	u	43			
30	90	5.6	0.9	N	N	N	N	1	R	O	N	B	u	40			
31	118	14.7	0.8	N	N	N	N	1	R	O	N	B	u	39			
32	87	5.5	0.8	N	N	N	N	1	R	O	N	B	u	43			
33	108	9.9	0.8	N	N	N	N	1	R	O	N	B	u	42			
34	100	8.1	0.8	N	N	N	N	1	R	O	N	B	u	44			
35	108	10.2	0.8	N	N	N	N	1	R	O	N	B	u	45			
36	98	7.9	0.8	N	N	N	N	1	R	O	N	B	u	40			
37	98	7.5	0.8	N	N	N	N	1	R	O	N	B	u	42			
38	105	9.6	0.8	N	N	N	N	1	R	O	N	B	u	45			
39	100	9	0.9	N	N	N	N	1	R	O	N	B	u	42			
40	98	7.6	0.8	N	N	N	N	1	R	O	N	B	u	42			
41	106	10.5	0.9	N	N	N	N	1	R	O	N	B	u	42			
42	112	11.9	0.8	N	N	N	N	1	R	O	N	B	u	42			
43	105	9.6	0.8	N	N	N	N	1	R	O	N	B	u	42			
44	106	10	0.8	N	N	N	N	1	R	O	N	B	u	38			
45	95	7.4	0.9	N	N	N	N	1	R	O	N	B	u	40			
46	95	6.9	0.8	N	N	N	N	1	R	O	N	B	u	44			
47	101	8.5	0.8	N	N	N	N	1	R	O	N	B	u	46			
48	91	5.9	0.8	N	N	N	N	1	R	O	N	B	u	44			
49	92	6.1	0.8	N	N	N	N	1	R	O	N	B	u	46			
50	91	6.6	0.8	N	N	N	N	1	R	O	N	B	u	44			
51	99	8.5	0.9	N	N	N	N	1	R	O	N	B	u	42			
52	114	12.8	0.8	N	N	N	N	1	R	O	N	B	u	47			
53	104	9.5	0.8	N	N	N	N	1	R	O	N	B	u	44			
54	111	12.1	0.8	N	N	N	N	1	R	O	N	B	u	40			
55	100	7.8	0.8	N	N	N	N	1	R	O	N	B	u	45			
56	98	7.5	0.8	N	N	N	N	1	R	O	N	B	u	51			
57	102	8.9	0.8	N	N	N	N	1	R	O	N	B	u	43			
58	100	8	0.8	N	N	N	N	1	R	O	N	B	u	39			
59	113	12.3	0.8	N	N	N	N	1	R	O	N	B	u	48			
60	100	7.8	0.8	N	N	N	N	1	R	O	N	B	u				