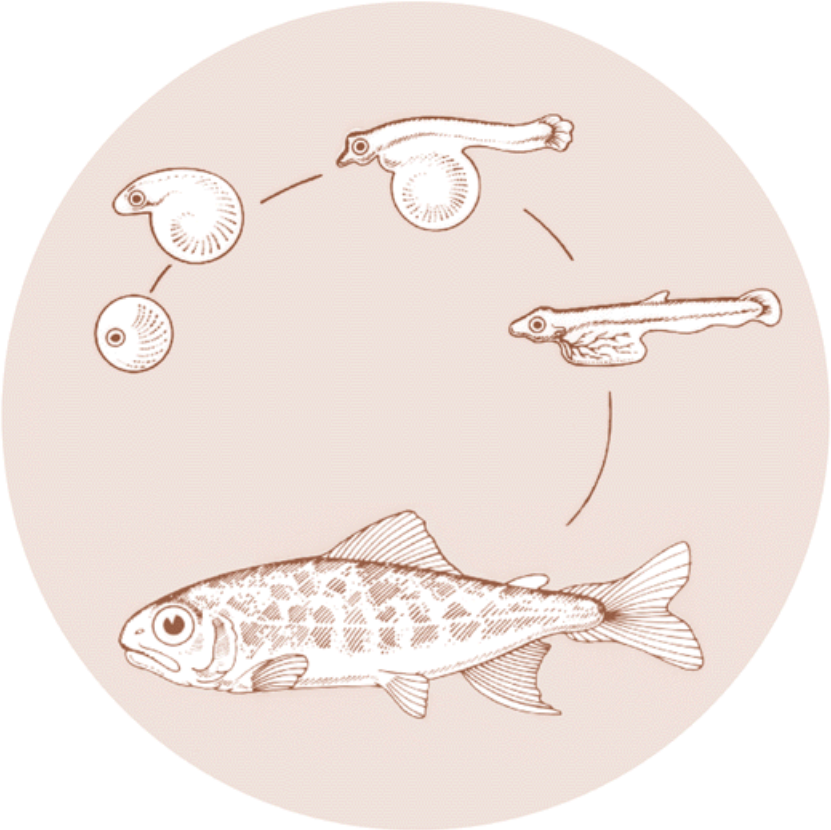
May 1995

MINTHORN SPRINGS CREEK SUMMER JUVENILE RELEASE & ADULT COLLECTION FACILITY

Annual Report 1994



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MINTHORN SPRINGS CREEK SUMMER JUVENILE RELEASE AND ADULT COLLECTION FACILITY

Annual Report 1994

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ABSTRACT

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and Oregon Department of Fish and Wildlife (ODFW) are cooperating in a joint effort to enhance steelhead and re-establish salmon runs in the Umatilla River Basin. As an integral part of this program, Bonifer Pond, Minthorn Springs and Imeques C-mem-ini-kern acclimation facilities are operated for acclimation and release of juvenile summer steelhead (Oncorhvnchus mykiss), fall and spring chinook salmon (O. tshawvtscha) and coho salmon (O. kisutch). Minthorn is also used for holding and spawning summer steelhead, fall chinook and coho salmon.

In the spring of 1994, juvenile summer steelhead were acclimated at Bonifer (103,500) and Minthorn (49,598). At Imeques C-mem-ini-kern, juvenile spring chinook were acclimated in the spring (839,377) and fall (378,225).

A total of 92 unmarked and 42 marked summer steelhead were collected for broodstock at Three Mile Dam from October 1, 1993 through May 2, 1994 and held at Minthorn. Utilizing a 3 x 3 spawning matrix, an estimated 234,432 green eggs were taken from 48 females. The eggs were transferred to Irrigon Hatchery for incubation and early rearing. Fingerlings were transferred to Umatilla Hatchery for final rearing and release into the Umatilla River in 1995. Fall chinook and coho salmon broodstock were not collected in 1994.

Personnel from the ODFW Eastern Oregon Fish Pathology Laboratory in La Grande took samples of tissues and reproductive fluids from Umatilla River summer steelhead broodstock for monitoring and evaluation purposes. Cell culture assays for replicating agents, including infectious hematopoietic necrosis virus and infectious pancreatic necrosis virus, on all spawned fish were negative.

Regularly scheduled maintenance of pumps, equipment and facilities was performed in 1994. Routine facility maintenance work consisted mostly of weed abatement and maintenance of the electric fence at Bonifer.

Coded-wire tag recovery information was accessed to determine the contribution of Umatilla River releases to ocean, Columbia River and Umatilla River fisheries. Total estimated adult survival rates for summer steelhead releases made from 1988 to 1991 have ranged from 0.04 to 0.97%. Survival rates to the Umatilla River have ranged from 0.03 to 0.72%. Total estimated adult coho survival rates for releases made from 1987 to 1993 have ranged from 0.16 to 4.49%. Survival rates to the Umatilla River have ranged from 0.02 to 0.99%. Total estimated survival rates (through age-6, preliminary data) for spring chinook yearlings released in the spring from 1988 to 1991 have ranged from 0.28 to 0.95%. Survival rates to the Umatilla River have ranged from 0.24 to 0.77%. The total estimated adult survival rates for spring chinook released in the fall of 1988 and 1989 have ranged from 0.08 to 0.10% while escapement to the Umatilla River has ranged from 0.05 to 0.08%. Total

cstimatcd survival rates (through age-7, preliminary data) for fall chinook yearling releases made from 1983 to 1988 have ranged from 0.08 to 3.23%. Umatilla River survival rates have ranged from 0.00 to 0.89%. Total estimated survival rates (through age-7, preliminary data) for fall chinook subyearling spring releases made from 1982 to 1988 have ranged from 0.07 to 0.87%. Umatilla River survival rates have ranged from 0.00 to 0.02%. The total cstimatcd adult survival rates for fall chinook subyearlings released in the fall of 1985 and 1988 have ranged from 0.43 to 0.67%. Escapement to the Umatilla River has ranged from less than 0.01 to 0.07%.

The progress of outmigration for juvenile releases was monitored at the Westland <‘anal fish trapping facility by CTUIR and ODFW personnel. The majority of the juveniles migrated downstream by the end of May.

ACKNOWLEDGEMENTS

This project was funded by Bonneville Power Administration (BPA). The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) thank Jerry Bauer, Jay Marcotte and other BPA personnel for their assistance. Thanks are extended to Ray Hill, Jack Hurst, Randy Winters, Warren Groberg, Sam Onjukka and other Oregon Department of Fish and Wildlife (ODFW) personnel for providing assistance in the spawning of summer steelhead and for monitoring the fish for the presence of fish pathogens. Bill Duke (ODFW) assisted in the collection and transport of steelhead broodstock and the collection of data at Three Mile Dam and Westland Canal. Dennis Issac and Bill Murray (ODFW) retrieved and decoded coded-wire tags from adult fish snouts and Bob Becker (ODFW) supervised and coordinated fish transfers to the acclimation facilities. Thanks go to Mike 1 layes, Shannon Focher Candi Healy and Bill Gibbs (ODFW) for sharing their data collected from juveniles prior to release. We thank landowners Rosemary and Wes Gladow and Richard Kaye for their cooperation and Union Pacific Railroad for providing access to the acclimation facilities.

Thanks go to the CTUIR staff for their cooperation and contributions to this report. Brian Zimmerman, Brian Conner, Larry Cowapoo, Vern Spencer and Brent Spencer collected much of the data from adults returning to Three Mile Dam and migration data for juvenile salmonids captured at the Westland Canal fish trapping facility and assisted in the collection and transport of steelhead broodstock. Paul Kissner and Melvin Farrow collected much of the data and snouts from spawning ground surveys. Other biologists and technicians assisted in field sampling. Joe Richards provided the administration of the agreement and Julie Burke and Celeste Reves provided secretarial services. Gary James provided technical oversite and critical review of this report and Brian Zimmerman also provided critical review.

Thanks go to Mike McCloud and Louis Case for the long hours and weekends spent running the acclimation facilities and for collecting much of the data.

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INTRODUCTION

Background

The Umatilla River Basin historically supported large runs of anadromous salmonids, including summer steelhead (Oncorhvnchus mykiss), fall and spring chinook salmon (0. tshawytscha) and coho salmon (0. kisutch). The runs of chinook and coho salmon were essentially eliminated in the early 1900's. The losses have generally been attributed to the development of hydroelectric dams and to forestry, agriculture and irrigation practices. The single indigenous naturally spawning anadromous stock left in the Umatilla River Basin is a run of approximately 1,000 to 3,000 summer steelhead (Figure 1). This steelhead run was supplemented with stocks from Washington (Skamania) and Idaho (Oxbow) from 1967 through 1970 (Table 1). Fish of Umatilla River origin were used in 1975 and from 1981 to the present. Run composition has varied from 6.7% hatchery fish in 1987-88 (the first season that fin-clipped fish were differentiated), to 34.8% in the 1990-91 season. The natural run in 1990-91 however, was one of the lowest on record. Returns of hatchery steelhead have ranged from 166 adults in 1987-88 to 616 adults in 1992-93 (Figure 1). Runs of coho and chinook salmon have been rebuilt using various stocks (Tables 2, 3 and 4).

A comprehensive plan developed by the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and Oregon Department of Fish and Wildlife (ODFW) was implemented to enhance steelhead and re-establish salmon runs in the Umatilla River Basin. As an integral part of this program, Bonifer Pond, Minthom Springs and Imeques C-mem-ini-kem acclimation facilities were constructed on the Umatilla Indian Reservation. The facilities were constructed and are operated under the Fish and Wildlife Program of the Northwest Power Planning Council, and are funded by Bonneville Power Administration (BPA).

Facility Descriptions and Operations

The Bonifer Pond Facility (Bonifer) is located adjacent to Meacham Creek at rivermile (RM) 2 (Figure 2). The pond spills into Boston Canyon Creek which flows approximately 20 yards before entering Meacham Creek. Meacham Creek flows into the Umatilla River at RM 79. The facility consists of a 1.75acre earthen pond and concrete outlet water control structure which also functions as a fish trap. The pond holds approximately 4.5 acre-feet of water and is fed by three springs that originate from l/8 to l/2 mile away. Operations began in 1984.

The Minthorn Springs Facility (Minthorn) is located approximately four miles east of Mission, Oregon (Figure 2). The facility is located on Minthorn Springs Creek which is formed from the inflow of several springheads located immediately south of the Umatilla River. The creek is approximately one mile long, with the facility located near the mouth at Umatilla RM 63.8. The facility includes two concrete raceways (120 x 12 feet), pump station, and concrete outlet water control structure which also functions as a fish trap and

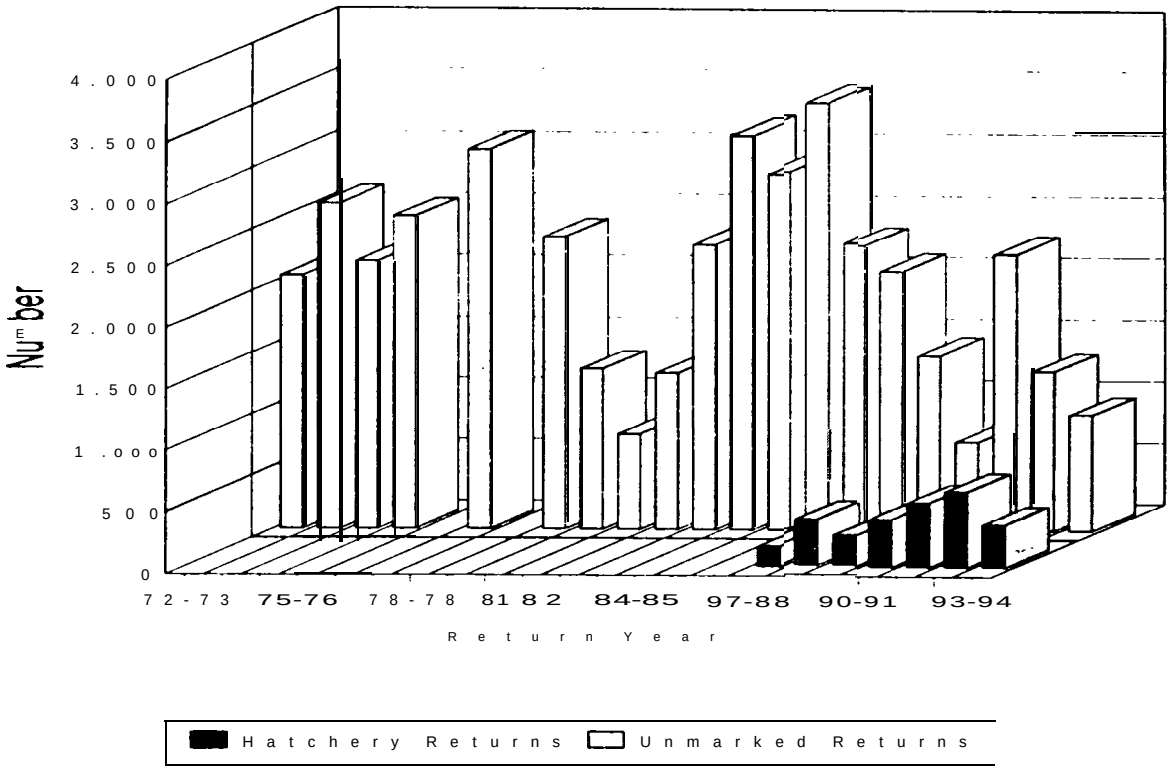

Figure 1. Returns of wild and hatchery summer steelhead to Three Mile Dam on the Umatilla River, 1972-1994 (Return numbers from the fall of 1972 to the spring of 1987 are estimates. while return numbers beginning in the fall of 1987 are from actual counts).

summer steelhead broodstock holding area. Water through the brood holding area is supplied by gravity. Water supply to the raceways is pumped from the creek. Water depth is usually held at three feet with a single-pass water pumping rare of 800 gallons per minute through each raceway. Two valves control the effluent water to allow for either recycling of flows into the intake pond or discharge downstream of the intake and adult holding area. Minthorn was completed in 1985 and first operated in 1986.

The lmeques C-mem-ini-kern Facility is located on the upper Cmatilla River at RM 79.5. The facility includes a concrete water intake structure with automatic screen cleaner, concrete water headbox/distribution system, four concrete acclimation ponds (approximately 13,000 cubic feet each) and concrete water outlet and fish release structures. Water is supplied by gravity flow (approximately 1,600 gpm per pond). Imeques C-mem-ini-kern was completed and began operations in 1994.

Table 1. Hatchery releases of summer steelhead in the Umatilla River.

Year of Release	Hatchery	No. Released	No/lb.	Stock
1967	Gnat Creek	109,805	75.0	Skamania
1967	Oak Springs	238,020	117.0	Idaho (Oxbow)
1967	Wallowa	142,240	240.0	Idaho (Oxbow)
1968	Gnat Creek	23,100	66.0	Skamania
1968	Gnat Creek	150,000	Eggs	Skamania
1969	Oak Springs	174,341	145.0	Skamania
1970	Carson	23,400	9.0	Skamania
1970	Carson	16,089	8.0	Skamania
1975	Wizard Falls	11,094	9.0	Umatilla River
1981	Oak Springs	17,558	6.0-9.0	Umatilla River
1981	Oak Springs	9,400	145.0	Umatilh River
1982	Oak Springs	59,494	7.0-8.0	Umatilla River
1982	Oak Springs	67,940	124.0	Umatilb River
1983	Oak Springs	60,500	11 .o	Umatilla River
1983	Oak Springs	52,700	62.0	Umatilla River
1984	Oak Springs	57,939	6.5	Umatilla River
1984	Oak Springs	22,000	135.0	Umatilla River
1985	Oak Springs	53,850	7.0	Umatilh River
1985	Oak Springs	39,134	150.0	Umatilla River
1986	Oak Springs	54,137	8.4	Umatilia River
1987	Oak Springs	1,485	5.5	Umatilla River
1988	Oak Springs	95,290	6.5-10.3	Umatilla River
1988	Oak Springs	10,033	57.5	Umatilla River
1988	Irrigon	24,618	3200.0	Umatilla River
1989	Oak Springs	29,852	6.6	Umatilla River
1989	Oak Springs	29.586	5.6	Umatilla River
1989	Oak Springs	22,274	5.5	Umatilb River
1990	Oak Springs	29,522	7.7	Umatilla River
1990	Oak Springs	30,225	5.9	Umatilla River
1990	Oak Springs	29,446	5.5	Umatilla River
1991	Oak Springs	30,221	6.2	Umatilla River
1991	Oak Springs	29,325	8.7	Umatilla River
1991	Oak Springs	12,389	7.5	Umatilh River
1991	Oak Springs	3,998	12.5	Umatilla River
1992	Umatilia	19,977	5.8	Umatilb River
1992	Umatilla	47,458	5.8	Umatilla River
1992	Umatilla	64,550	5.0	Umatilla River
1992	Umatilla	67,419	5.5	Umatilla River
1992	Umatilla	5,443	5.8	Umatilia River
1993	Umatilb	44,824	4.5	Umatilh River
1993	Umatilla	47,979	5.6	Umatilla River
1993	Umatilia	65,465	6.1	Umatilla River
1994	Umatilb	51,403	4.9	Umatilla River
1994	Umatilb	49,598	5.1	Umatilla River
1994	Umatilla	52,097	5.2	Umatilla River
1994	Umatilla	1,732	5.7	Umatilb River

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Table 2. Hatchery releases of fall chinook salmon In the Umatilla RIver.

Year of Release	Hatchery	No. Released	No./lb.	Stock
1982	Bonneville	978,336	79.0	Tule
1982	Bonneville	2,828,835	92.0	Tule
1983	Bonneville	100.564	5.9	Bonneville URB
1984	Bonneville	228,412	8.6	Bonneville URB
1984	Bonneville	966,250	85.1	Bonneville URB
1985	Bonneville	3,223,172	92.3	Bonneville URB
1985	Bonneville	198,162	7.8	Bonneville URB
1985	Bonneville	51,000	16.2	Bonneville URB
1986	lrrigon	91,036	5.0	Bonneville URB
1986	lrrigon	115,779	4.7	Bonneville URB
1986	lrrigon	2,029,602	86.0	Bonneville URB
1986	lrrlgon	35,574	11.6	Bonneville URB
1987	lrrigon	1.476.830	60.4	Priest Rapids URB
1987	Bonneville	109,143	8.1	Bonneville URB
1987	Bonneville	102,363	8.6	Bonneville URB
1987	lrrigon	2,000	20.0	Priest Rapids URB
1988	lrrigon	1,886,757	68.3	Priest Rapids URB
1988	lrrigon	1,429.250	93.1	Bonneville URB
1988	lrrigon	14,408	9.8	Priest Rapids URB
1988	lrrigon	79,681	8.6	Priest Rapids URB
1988	Bonnevllle	99,550	10.2	Bonneville URB
1988	Bonneville	100,791	8.8	Bonneville URB
1989	Bonneville	217,443	8.6	Bonneville URB
1989	lrrlgon	2,393.710	66.6	Priest Rapids URB
1989	lrrigon	156,957	10.9-11.1	Priest Rapids URB
1990	Bonneville	255,614	8.2	Bonneville URB
1990	Bonneville	2,425,681	87.5	Bonneville URB
1990	lrrigon	629,800	82.4	Prlest Rapids URB
1990	lrrigon	71.864	9.2	Bonneville URB
1990	lrrigon	76,646	8.8	Bonneville URB
1991	Bonneville	194,847	7.8	Upriver Brights
1991	lrrigon	3.091.214	81.8	Upriver Brights
1991	lrrigon	2,774	194.0	Upriver Brights
1991	lrrigon	7,688	80.0	Upriver Brights
1991	lrrigon	79,672	80.5	Upriver Brights
1991	lrrigon	74,865	86.0	Upriver Brights
1992	Bonneville	122.639	7.7	Uprtver Brights
1992	Bonneville	97,801	7.6	Upriver Brights
1992	Umatilla	2.678.343	55.2- 70.6	Upriver Brights
1992	Umatilla	2,670	112.0	Upriver Brights
1992	Irrigon	504.369	53.4	Umatilla River
1992	lrrlgon	5.167	62.8	Umatilla River
1993	Bonneville	134,837	9.1	Upriver Brights
1993	Umatilla	2,629.917	62.7	Uprlver Brights /a
1993	Umatilla	29.681	95.5 142.0	Upriver Brights /a
1994	Bonneville	283,453	8.5- 10.4	Upriver Brights
1994	Umatilla	2,843.212	65.2	Upriver Brights /a
1994	Umatilla	22,174	85.0- 171.0	Upriver Brights /a

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/a Bonneville and Umatilla River stock.

Table 3. Hatchery releases of spring chinook salmon in the Umatilla River.

Year of Release	Hatchery	No. Released	No./lb.	Stock
1986	Carson	99,970	22.8	Carson
1986	lrrigon	300,438	87.0	Carson
1986	lrrigon	75,000	15.0	Carson
1987	Carson	99,897	10.4	Carson
1987	oxbow	169,100	199.0	Carson
1988	Bonneville	1,196	21.4	Carson
1988	Carson	99,895	20.6	Carson
1988	Bonneville	297,377	8.3- 10.3	Carson
1988	Bonneville	75,767	11.1	Carson
1989	Bonneville	160,917	10.6	Carson
1989	Bonneville	164,603	12.0	Carson
1990	Carson	99,775	18.6	Carson
1990	Bonneville	231,772	9.0-9.6	Carson
1990	Bonneville	80,438	11.5	Carson
1990	Bonneville	77,998	13.4	Carson
1991	Carson	90,796	20.6	Carson
1991	Carson	5,937	16.9	Carson
1991	Bonneville	100,505	10.1	Carson /a
1991	Bonneville	96,152	11.8	Carson /a
1991	Bonneville	81,144	16.5	Carson
1991	Bonneville	78.480	16.8	Carson
1992	Carson	90,982	18.7	Carson
1992	Carson	5,272	18.7	Carson
1992	Bonneville	109,101	9.2	Carson /a
1992	Bonneville	98,928	8.5	Carson /a
1992	Umatilla	955,752	35.4	Carson
1992	lrrigon	294,458	32.5	Carson
1992	Bonneville	132,929	11.5	Carson
1992	Umatilla	101,416	19.4	Carson
1993	Bonneville	186,948	14.5	Carson
1993	Umatilla	208,782	8.3	Carson
1993	Carson	85,134	20.3	Carson
1993	Carson	10,952	20.0-20.5	Carson
1993	Umatilla	667,367	27.6	Carson
1993	Umatilla	460,809	19.9	Carson
1994	Umatilla	205,143	8.4	Carson
1994	Bonneville	152,854	11.5	Carson
1994	Bonneville	252,248	12.3	Carson
1994	Umatilla	8,890	8.1-8.3	Carson
1994	Umatilla	839,377	30.4	Carson
1994	Umatilla	378,225	8.7	Carson

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/a Carson via Lookingglass stock.

Table 4. Hatchery releases of coho salmon in the Umatilla River.

Year of Release	Hatchery	No. Released	No./lb.	stock
1966	Little White Salmon	500,000	1312.0	Little White Salmon
1967	Little White Salmon	200,000	1087.0	Little White Salmon
1967	Cascade	500,000	Eggs	Tanner Creek
1968	Little White Salmon	750,000	Eggs	Little White Salmon
1969	Carson	200,040	23.0	Little White Salmon
1987	Cascade	948,549	13.5-14.0	Tanner Creek
1988	Cascade	996,433	16.6	Tanner Creek
1989	Cascade	753,637	15.3-19.7	Tanner Creek
1989	Cascade	233,269	17.2-19.1	Tanner Creek
1990	Cascade	796,842	14.7	Tanner Creek
1990	Cascade	192,086	11.2-13.5	Tanner Creek
1991	Cascade	152,974	15.4	Tanner Creek
1991	Cascade	228,293	16.5	Tanner Creek
1991	Cascade	221,385	16.6	Tanner Creek
1991	Cascade	143,054	16.4	Tanner Creek
1991	Cascade	209,923	17.1	Tanner Creek
1992	Cascade	489,165	15.7	Tanner Creek
1992	Cascade	472,221	15.5	Tanner Creek
1993	Cascade	437,884	17.5	Tanner Creek
1993	Cascade	454,794	17.6	Tanner Creek
1994	Cascade	465,883	17.1	Tanner Creek
1994	Cascade	418,222	18.1	Tanner Creek

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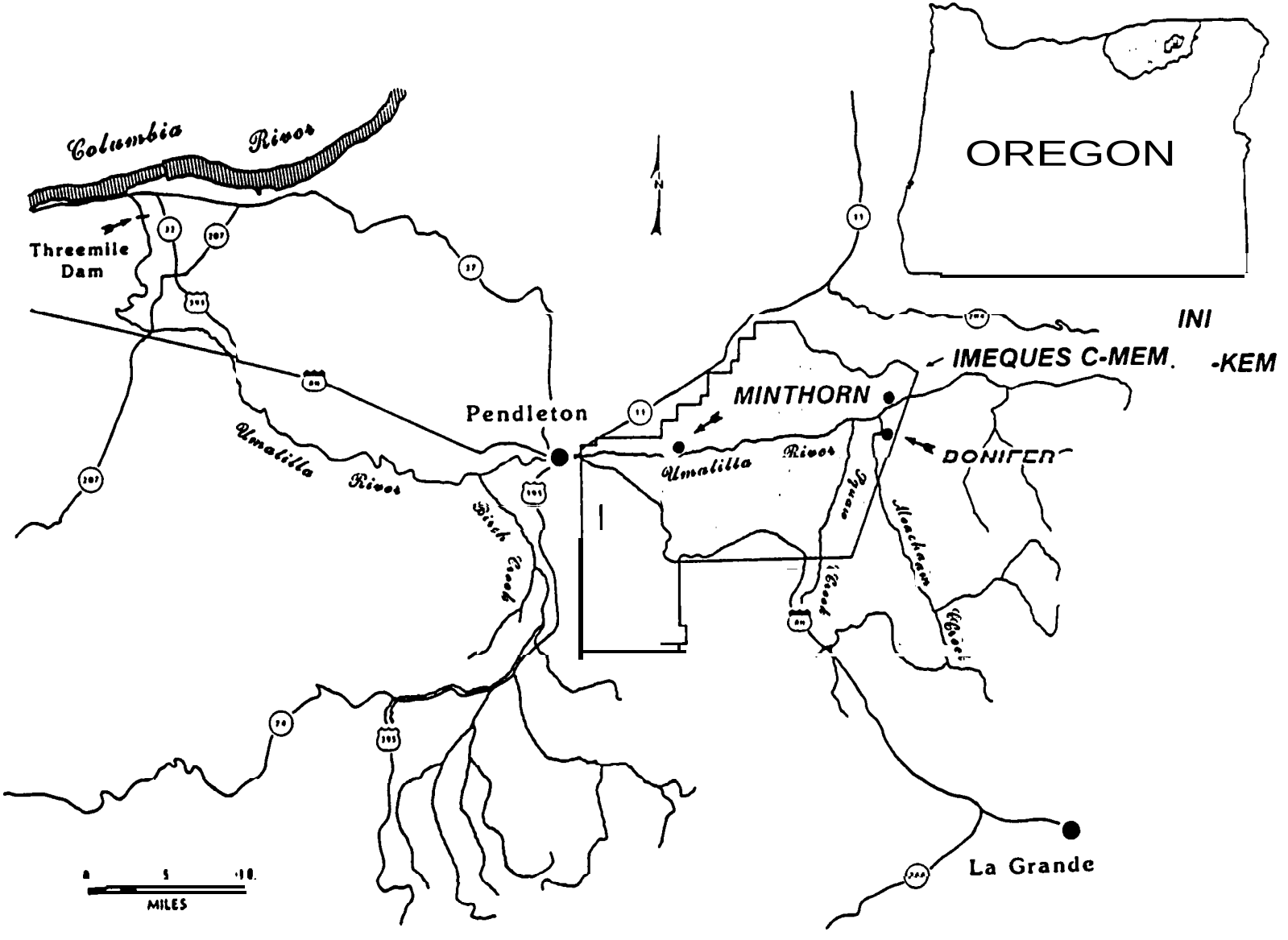

Figure 2. Confederated Tribes of the Umatilla Indian Reservation and Bonifer, Minthorn and Imeques C-mem-ini-kern Acclimation Facilities.

The facilities are operated by CTUIR in cooperation with ODFW. Bonifer, Minthorn and Imeques C-mem-ini-kern Acclimation Facilities are operated for acclimation and release of juvenile salmon and steelhead and Minthorn is also used for holding and spawning summer steelhead, fall chinook and coho salmon. The main goal of acclimation is to reduce stress from trucking prior to release and improve imprinting of juvenile salmonids in the Umatilla River. Juveniles are transported to the acclimation facilities primarily from Umatilla and Bonneville Hatcheries. This report details activities associated with operation, maintenance and evaluation of the Bonifer, Minthorn and Imeques C-mem-ini-kem Acclimation Facilities in 1994.

Project Objectives

The following project objectives for 1994 are part of overall objectives to operate, maintain and evaluate the acclimation facilities:

Objective 1: Hold groups of juvenile salmonids at Bonifet-, Minthorn and Imeques C-mem-ini-kern Acclimation Facilities prior to release into the Umatilla River.

Task 1.1: Hold juvenile salmon and steelhead in facilities prior to release into the Umatilla River.

Task 1.2: Monitor temperature and dissolved oxygen daily during acclimation.

Objective 2: Provide summer steelhead, fall chinook and coho salmon eggs to ODFW for rearing and later release into the Umatilla River.

Task 2.1: Collect, transport, hold and spawn summer steelhead, fall chinook and coho salmon.

Objective 3: Maintain the facilities in good working order.

Task 3.1: Repair, maintain and service electrical and mechanical equipment, ponds, pumps, water supply systems, screens, fencing, fishways, buildings and grounds.

Objective 4: Determine the benefits of acclimating salmon and steelhead at Bonifer and Minthorn and return rates for fish acclimated at lmeques C-mem-ini-kem.

Subobjective 4.1: Determine contribution of adults to ocean and Columbia River fisheries and survival to the Umatilla River for all acclimated and control releases.

Task 4.1.1: Collect snouts and physical data from coded-wire tagged fish and deliver snouts to ODFW for retrieval and decoding.

Task 4.1.2: Determine contribution of adults to ocean and in-river fisheries by collecting and organizing data from appropriate sources and by calculating expansion factors based on marked to unmarked ratios.

Task 4.1.3: Determine adult survivals to the Umatilla River for. all acclimated and control groups.

Subobjective 4.2: Monitor outmigration characteristics of fish captured at lower Umatilla River fish traps.

Task 4.2.1: Cooperate in operation of Westland and/or Three Mile Dam juvenile salmonid traps during outmigration periods to collect species compositon numbers of fish trapped and marks.

Task 4.2.2: Compare information collected at the traps with pre-release data to give an indication of outmigration timing.

Objective 5: Disseminate information associated with the completion of above tasks.

Task 5.1: Write and submit an Annual Report to BPA summarizing operation, maintenance and evaluation of the juvenile acclimation and adult holding and spawning facilities.

Objective 6: Participate in planning process for new Umatilla Hatchery satellite facilities.

Task 6.1: Review and comment on engineering designs and follow up with engineer as necessary during planning and construction of Umatilla Hatchery satellite facilities located in the Umatilia and Walla Walla River Basins.

METHODS

Objective 1: Juvenile Acclimation

Task 1.1: Juvenile Holding

Juvenile spring chinook salmon and summer steelhead were transported from Umatilla Hatchery to the acclimation facilities using 3,000 and 5,000 gallon fish liberation trucks. The fish were fed Biomoist Feed (Bioproducts Inc., Warrenton, Oregon) twice each day at a rate of approximately 1% body weight per day (BWD). Mortalities were removed daily at all facilities. Transfer mortality was defined as all fish that died within five days of the last transfer date. ODFW pathology personnel were available to address specific disease problems.

The total number of fish at release was estimated using ODFW Fish Liberation Reports and acclimation mortality records. The number of fish reported as tagged was estimated using ODFW Coded-Wire Tagging Operation Summaries, hatchery and acclimation facility mortality records and tag retention sampling prior to release.

ODFW personnel sampled the fish prior to release for weight, fork length and dcscaling. Partial descaling was defined as loss of greater than 3.0% and less than 16.0% of the scales on at least one side of the fish. Severe descaling was defined as loss of greater than 16.0% of the scales on at least one side.

Task 1.2: Water Quality Monitoring

Temperature and dissolved oxygen (D.O.) measurements taken at the facilities during acclimation are reported in association with each particular acclimation. Temperatures were recorded hourly by automatic digital temperature recorders (Ryan TempMentors). Dissolved oxygen measurements were taken with a Hach portable D.O. meter.

Objective 2: Summer Steelhead, Fall Chinook and Coho Salmon Spawning

Task 2.1: Adult Collection, Holding and Spawning

<u>Collection. Holding and Spawning of Summer Steelhead</u>

Summer steelhead were collected for broodstock through the cooperative efforts of CTUIR and ODFW. Fish were collected in the adult trap at Three Mile Darn, located approximately four miles upstream from the mouth of the Umatilla River, during the period October 1, 1993 through May 2, 1994. The fish were transported to Minthorn by CTUIR and ODFW Trap and Haul personnel using 370 or 3,000 gallon fish liberation units.

To help maintain the genetic integrity of the hatchery population, the first priority for broodstock was to collect unmarked fish at a male to female ratio of 1:l and at a rate of 10% of the total unmarked run by month. Coded-wire tagged hatchery fish (adipose and left ventral clipped) were also collected to ensure meeting the broodstock goal of 106 adults (227,000 eggs). The collection rate for coded-wire tagged fish was one coded-wire tagged fish for every two wild fish collected and a male to female ratio of 1:l. One hatchery female (adipose clipped only) captured at Minthorn in March was mistakenly removed from the trap and placed in with the broodstock.

To evaluate adult return time versus spawn time and to ensure that a representative cross-section of the population was spawned, broodstock were differentially marked during each month in which they were collected. A single hole paper punch was used to punch one, two or three holes in either the right, left or both opercles of the fish.

Beginning in early February, 1994, broodstock were treated twice per week with formalin (Paracide-F, Argent Chemical Laboratories) at 1:6,000 for one hour to help control fungus. After spawning began, treatments were increased to three times per week through the end of the spawning season. Fish were not treated during periods of high flow and turbidity.

Beginning on April 6, 1994, broodstock were sorted weekly to determine maturation. Ripe fish were spawned by CTUIR and Umatilla and Irrigon Hatchery personnel using standard hatchery practices. A 3 x 3 spawning matrix was utilized whenever possible. Eggs from each family group were water hardened in iodophor (Argentyne, Argent Chemical Laboratories) at 75 ppm for one hour and transferred to Irrigon Hatchery for incubation and early rearing. Fingerlings were transported to Umatilla Hatchery for final rearing and later release into the Umatilla River.

After the spawning season was completed, all remaining fish were sacrificed. Fork and MEHP lengths were taken on prespawn mortalities, spawned fish and excess sacrificed fish. MEHP length was defined as the distance from the middle of the eye to the end of the hypural plate. Weights[1] were recorded, except on four days when the scale was not working. Fin marks and opercle marks were recorded on all fish and snouts were collected from all coded-wire tagged fish. Scale samples were also collected from both hatchery and unmarked fish.

Adult Returns to Minthorn

An adult V-trap was placed in the outlet water control structure at Minthorn in October, 1993, and was in operation through May, 1994. The trap was monitored daily and all adult returns were removed and marks and sex were recorded. The fish were then

[1] Weights on spawned fish were taken after spawning.

released into Minthorn Springs Creek. Adults trapped at Minthorn were not used for broodstock.

Adult Returns to Bonifer

An adult V-trap was placed in the outlet water control structure at Bonifer in October, 1993, and was in operation through June, 1994. The trap was monitored daily and all adult returns were removed and marks and sex were recorded. The fish were then released into Meacham Creek adjacent to the facility. Adults trapped at Bonifer were also not used for broodstock.

Disease Sampling of Summer Steelhead Broodstock

All spawned adult steelhead were sampled for the presence of selected pathogens by ODFW Northeast Oregon Fish Pathology Laboratory (NOFPL) in La Grande for monitoring and evaluation purposes as part of the Umatilla Hatchery Fish Health Monitoring Program. All 96 spawned fish were sampled for replicating viral agents. Reproductive fluid (ovarian fluid from females or milt from males), pyloric caeca, kidney and spleen were sampled for infectious hematopoietic necrosis virus (IHNV) and infectious pancreatic necrosis virus (IPNV). Kidney samples from all fish killed for spawning were also examined for bacterial kidney disease (BKD).

Sixteen steelhead prespawn mortalities were also sampled. Kidney samples were taken to test for BKD and samples of the lower intestine were examined for Ceratomvxa Shasta.

Collection. Holding and Spawning of Fall Chinook and Coho Salmon

Fall chinook and coho salmon broodstock were not collected. Oregon Department of Fish and Wildlife hatcheries supplied all 1994 broodstock egg needs for the Umatilla River program.

Objective 3: Facility Maintenance

Task 3.1: Facility Maintenance and Repair

Maintenance, repair and service of electrical and mechanical equipment, ponds, pumps, water supply systems, screens, fencing, fishways, buildings and grounds was performed. Other maintenance was conducted as necessary.

Objective 4: Acclimation Evaluation

Subojcctive 4.1: Adult Survival and Contribution

Task 4.1.1: Snout and Data Collection

Snouts and associated biological data from coded-wire tagged salmonids were collected at Three Mile Dam and Minthorn. Snouts were also collected from Umatilla River creel and spawning ground surveys conducted through other CTUIR and ODFW programs. Snouts were sent to ODFW for tag removal and decoding.

Task 4.1.2 and 4.1.3: Coded-Wire Tag Analysis

Acclimation Research

A research program was initiated in 1987 to determine the effects of acclimation on juvenile salmon and summer steelhead releases in the Umatilla River Basin. Control (non-acclimated) groups were released instream concurrent with test (acclimated) groups to compare survival differences. The last experiment was conducted in 1992 and adults from these releases are expected to return to the Umatilla River through 1995.

Adult Survival and Umatilla River Returns

Data was accessed to compile adult survival and return information for all groups of coded-wire tagged fish released in the Umatilla River. Coded-wire tagged recoveries from 1983 through 1994 were retrieved from the Pacific States Marine Fisheries Commission (Ken Johnson, Regional Mark Processing Center). Additional Oregon and Washington freshwater recoveries from 1994 were obtained from ODFW (Pat Frazier) and the Washington Department of Fish and Wildlife (Susan Markey). Some data are incomplete and should be considered as such. When no expanded coded-wire tagged recovery number was available, the observed number was used.

Expanded estimates of all recoveries in the ocean, Columbia River and Umatilla River are calculated. All age groups are used in the expansion estimates[2]. In instances where untagged fish were not treated the same as tagged fish (e.g. untagged fish were reared at a different hatchery or were released at a different age than the tagged fish), these fish were not used in calculating expansions. Detailed information on recoveries is presented in Appendices A, B, C and D.

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2 Subjacks were not included in estimates of fall chinook straying but are included in survival and contribution estimates.

Exploitation rates were calculated for all representative release groups. Total exploitation rate is defined as all harvest and is divided into ocean commercial, Columbia Kivcr gillnet, ocean and freshwater sport, and ceremonial and subsistence treaty catches. Individual exploitation rates are calculated as a percent of the total exploitation rate.

Subojective 4.2: Juvenile Outmigration Monitoring

Task 4.2.1 and 4.2.2: Outmigration Data Collection and Analysis

Juvenile salmonids were collected at the Westland Canal trapping facility (RM 27) from May 2 to May 19 and from May 30 to August 4, 1994. The trap is approximately 36.8, 52.5 and 54.0 rivermiles downstream from Minthorn, Imeques C-mem-ini-kern and Bonifer, respectively and is operated by CTUIR and ODFW Trap and Haul personnel.

Juveniles were hauled to the mouth of the Umatilla River on 49 days during this period. The fish were loaded into 370 and 3.000 gallon fish liberation units and total pounds loaded was estimated by water displacement. On nine occasions, weight samples were taken using standard hatchery practices to estimate the average size of the fish. The number of fish loaded was then calculated by multiplying the number of fish per pound by the number of pounds loaded. Species and fin marks were recorded on all fish sampled and lengths were recorded on a portion of them. Unclipped juvenile chinook salmon were passed through a tag detector to try and distinguish naturally produced juveniles from unmarked, body tagged hatchery fish. Data was compared to pre-release data to give an indication of outmigration timing.

Objective 5: Information Dissemination

Task 5.1: Annual Report

Data and information associated with the above tasks was compiled and this annual report, summarizing operation, maintenance and evaluation of the juvenile acclimation and adult holding and spawning facilities, was written and submitted to BPA for dissemination.

0bjectivc 6: Umatilla Satellite Facilities Planning

Task 6.1: Planning Activities Participation

Meetings with CTUIR, BPA, ODFW and engineering and architectural firms were held to discuss designs for new Umatilla Hatchery satellite facilities scheduled for completion in the Umatilla and Walla Walla River Basins.

RESULTS AND DISCUSSION

Objective 1: Juvenile Acclimation

Task 1.1 and 1.2: Juvenile Holding and Water Quality Monitoring

Acclimation and Release of Juvenile Salmonids

Fall chinook salmon have been released in the Umatilla River every year since 1982 and from acclimation facilities from 1983 to 1991 (Table 5). The 1982 release was from Spring Creek tule stock (Table 2). Since then, all releases have been of upriver bright stock. Spring chinook salmon from Carson stock have been released since 1986 and from acclimation facilities from 1986 to 1992 and in 1994 (Tables 3 and 5). Summer steelhead of Skamania and Oxbow stocks were released from 1967 through 1970 (Table 1). In 1975, one release of Umatilla stock steelhead occurred and fish releases every year since 1981 have been from this stock. Summer steelhead have been released from acclimation facilities since 1984 (Table 6). Coho salmon have been released since 1987, and a portion have been acclimated when facilities and fish were available (Tables 4 and 6).

Three groups of acclimated summer steelhead (153,098 fish) and two groups of acclimated spring chinook (1,217,602 fish) were among the 6,024,511 salmon and steelhead released into the Umatilla River in 1994 (Table 7). No releases of non-acclimated summer steelhead occurred in 1994, except for 1,732 fish released as part of an ODFW fish passage study. No fall chinook or coho salmon were acclimated in 1994.

Acclimation at Minthorn

Summer steelhead

A group of 49,598 summer steelhead was acclimated at Minthorn for 28 days and released on April 14, 1994, at 5.1/lb. (Table 7). Included were 19,917 coded-wire tagged (adipose and left ventral clipped) fish (Appendix G) and 29,681 adipose clipped only fish. They were fed 0.94% BWD and total mortality was 2.35% (Table 8). Following release, fish congregated at the end of the outlet channel and an estimated 1,046 fish (87.6% of the total mortality) died as a result of suffocation. The mean temperature and D.O. during acclimation was 8.1 degrees C and 7.4 mg/l, respectively (Table 8).

The average length was 198 mm (Table 9). The length frequency distribution for this group of fish is shown in Figure 3. An estimated 49.8% of the fish were considered partially descaled at release and 1.4% were considered severely descaled (Table 9).

Table 5. Juvenile fall and spring chinook salmon releases in the Umatilla River Basin (1982- 1994). [1]

Species	Fall Chinook				Spring Chinook			
Area	Lower umatilla	Upper Umatilla	Bonifer	Minthom	Lower U matilla	Upper Umatilla	Bonifer	Imeques C-mem-ion-kem
Year								
1982	3.807.171 (sy) (2)	0	0	0	0	0	0	0
1983	0	80.564 (y)	20,000 (y)	0	0	0	0	0
1984	966,250 (sy) [3]	175,104 (y)	53.308 (y)	0	0	0	0	0
1985	X223.172 (sy) [3]	80.507 (y)	137.655 (y)	0	0	0	0	0
1986	2,029,602 (sy) [3]	0	51 .000 (sy) [4] 115.779 (y)	91,036 (y) 35,574 (sy) [4]	0	300,438 (sy)	98.970 (y) 75.000 [4]	0
1987	1.476 ,830 (sy)[5]	0	102,363 (y)	111.143 [6]	0	169,100 (sy)	99,897 (y)	0
1988	3,316,007 (sy) [5&7]	79.681 (sy) [8]	99,550 (y)	115.199 [6]	156.312 (y)[7]	210,496 [9]	107.427 [9]	0
1989	2,393,710 (sy)	285,575 [6]	0	78.825 (sy) [6]	0	164.786 [9]	160,734 [9]	0
1990	0	255.814 (y) X132.127 (sy) [10]	0	71,864 (sy) [8]	99.775 (y)	1 CU.425 [9]	194,783 [9]	0
1991	10.462 [11](sy)	194,847 (y) 3,168,079 (sy)	0	70.672 (sy)	5,937 [11] (y)	265,428 [9]	181,649 [9]	0
1992	7.837 [11] (sy)	220.440 (y) 3,182,712 [13] (sy)	0	0	5272 [11] (y)	1.674.465 [12]	100.101 (y)	0
1993	29.691 [14](sy)	2.629.917 (sy) 134,837 (y)	0	0	10.952 [14] (y)	400.064 (y) 1.128.176 [12]	0	0
1994	22.174 [14](sy)	2,843,212 (sy) 283.453 (y)			8,890 [14](Y)	610.245 (y)	0	1.217.602 (15)

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[1] y = yearling releases; sy = subyearling releases
[2] Releases in 1982 were Tule stock; all others have been upriver brights
[3] Released below Threemile Dam to avoid loss in irrigation diversions.
[4] Acclimated during the summer and released in the fall
[5] Released at Steelhead Park near Hermiston
[6] includes yearling spring and subyearling fall releases
[7] Released below Westland Dam
[8] Released in the fall
[9] includes yearling spring and fall releases.
[10] Includes subyearling spring and fall releases
[11] passage evaluation releases at Threemile Dam
[12] Includes yearling spring and fall releases and subyearling spring releases
[13] Released at Barnhart (Rm 42. 5).
[14] Passage evaluation releases.
[15] Includes subyearling spring and yearling fall releases

Table6. Juvenile steelhead and coho salmon releases in the Umatilla River Basin (1961-1994) [1].

Species	Summer Steethead				Coho		
Area	Lower Umatilla	Upper Umatilla	Minthorn	Bonifer	Lower Umatilla	Upper Umatilla	Minthorn
Year							
1981	0	17.556 (y) 9.400 (sy)	0	0	0	0	0
1982	0	59.494 (y) 67.940 (sy)	0	0	0	0	0
1983	0	60,500 (Y) 52.700 (sy)	0	0	0	0	0
1984	0	0	0	57.939 (Y) 22,000 (sy)	0	0	0
1985	0	0	0	53.850 (Y) 39.134 (sy)	0	0	0
1986	0	0	0	54.137 (Y)	0	0	0
1987	0	1.465 (Y) [2]	0	0	786.660 (y) [3]	0	161.669 (Y)
1988	33,984 (y) [3]	40.790 [4&5]	30.549 (Y)	0	996.433 (y) [3]	0	0
1989	0	29.586 (Y)	29.652 (Y)	22.274 (Y)	0	629.607 (Y)	157.299 (Y)
1990	0	29,446 (Y)	0	59,747 (Y)	202.315 [6] (y)	654.209 (Y)	132.404 (Y)
1991	3.998 [7] (y)	29.325 (Y)	0	42.610 (Y)	0	802.655 (Y)	162.974 (Y)
1992	5.443 [7] (y)	131.969 (Y)	47,456 (Y)	19.977 (Y)	0	961.366 (Y)	0
1993	0	0	47.979 (Y)	110269 (Y)	437.664 [6] (y)	454,794 (Y)	0
1994	1.732 [7] (y)		49.598 (Y)	103.500 (y)	416.222 [6] (y)	465.663 (Y)	

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[1] y = yearling releases; sy = subyearling releases
[2] Small release due to IHN & IPN problems in eggs
[3] fish released bebw Westland Dam.
[4] Includes both experimental control group and gradeouts from 66 brood year
[5] Does not include any unfed fry that were released.
[6] Released at RM 42.5
[7] Passage evaluation releases

Table 7. Juvenile salmon and summer steelhead releases in the Umatilla River in 1994.

Species	Brood	Stock	Hatchery	Number	#/lb	Location	In Facility	In River	Fish Mark	# Marked
Fall Chin	92	URB	Bonneville	233,629	10.4	Uma. RM 73.5	-------	March 22/23	AdCWTRV	23,699
									RV	209,930
Fall Chin.	92	URB	Bonneville	49,824	8.5	Uma. RM 73.5	-------	April 19	AdCWTRV	23,470
									RV	26,354
Fall Chin	93	URB	Umatilla	2,843,212	65.2	Uma. RM 73.5	-------	May 23/24	AdCWTRV	308,481
									RV	2,463,455
									LV	71,276
Fall Chin	93	URB	Umatilla	7,209 /a	171.0	Uma. RM 29.2	-------	April 5/9	BWTRV	7,209
Fall Chin	93	URB	Umatilla	5,225 /a	154.3	Uma. RM 31	-------	April 20/22	BWTRV	5,225
Fall Chin	93	URB	Umatilla	3,371 /a	85.0	Uma. RM 27.3	-------	May 25/27	BWTRV	3,371
Fall Chin.	93	URB	Umatilla	6,369 /a	90.0	Uma. RM 32.5	-------	May 10/19	BWTRV	6,369
Subtotal				3,148,839						
Spring Chin.	92	Carson	Umatilla	205,143	8.4	Uma. RM 80	-------	March 21/22	AdCWTLV	81,943
									LV	123,200
Spring Chin.	92	Carson	Bonneville	152,854	11.5	Uma. RM 73.5	-------	March 23/24	AdCWTLV	53,021
									LV	99,833
Spring Chin.	92	Carson	Bonneville	252,248	12.3	Uma. RM 80	-------	March 24/25	AdCWTLV	40,328
									LV	211,920
Spring Chin.	92	Carson	Umatilla	6,556 /a	8.3	Uma. RM 29.2	-------	March 22/April 2	LV	6,556
Spring Chin.	92	Carson	Umatilla	2,334 /a	8.1	Uma. RM 3	-------	March 31/April 1	LV	2,334
Spring Chin.	93	Carson	Umatilla	839,377	30.4	Uma. RM 80 /b	May 2/3	May 20	AdCWTRV	311,191
									RV	528,186
Spring Chin.	93	Carson	Umatilla	378,225	8.7	Uma. RM 80 /b	Oct 25	Nov 15	AdCWTRV	346,030
									RV	32,195
Subtotal				1,836,737						
Coho	92	Tanner Creek	Cascade	465,883	17.1	Uma. RM 60	-------	April 4/5	AdCWT	54,462
Coho	92	Tanner Creek	Cascade	418,222	18.1	Uma. RM 42.5	-------	April 5/7	AdCWT	27,166
Subtotal				884,105						
Sum. Sthd.	93	Umatilla R	Umatilla	49,596	5.1	Minthorn RM (63.8)	March 16/17	April 14	Ad only	29,681
									Ad+CWT+LV	19,917
Sum. Sthd.	93	Umatilla R	Umatilla	51,403	4.9	Bonifer (RM 2)	March 16	April 11	Ad only	31,281
									Ad+CWT+LV	20,122
Sum. Sthd	93	Umatilla R	Umatilla	52,097	5.2	Bonifer (RM 2)	April 14	May 12	Ad only	35,102
									Ad+CWT+LV	16,995
Sum. Sthd.	93	Umatilla R	Umatilla	1,732 /a	5.7	Uma. RM 27.3	-------	Aril 15/16	Ad only	1,732
Subtotal				154,830						
TOTAL				6,024,511						

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/a ODFW Fish Passage Study Releases
/b Acclimated at Imeques C-mem-hi-kem Acclimation Facility prior to release

Table 8. Food rations, mortalities, temperatures and D.O. concentrations during acclimation of juvenile spring chinook and summer steelhead at Boniler, Minthorn and Imeques C-mem-ini-kem Acclimation Facilities in 1994.

Species	Release Location	Release Date	Days Held	Food Fed (%/day)	Mortality			Temperature (C)			D.O. (mg/l)		
					5 Day	Total	%	Min.	Max.	Mean	Min.	Max.	Mean
Summer Steelhead	Minthorn	April 14	28	0.94	127	1,194 /a	2.35	5.3	12.6	8.1	6.2	10.4	7.4
Summer Steelhead	Boniler	April 11	26	0.63	5	124 /b	0.24	5.1	14.4	8.4	6.5	9.6	7.7
Summer Steelhead	Boniler	May 12	29	1.12	7	212 /c	0.41	7.4	18.3	12.1	6.0	11.2	7.7
Spring Chinook	Imeques C-mem-ini-kem	May 20	17	0.72	71	725	0.09	7.2	12.0	9.3	7.7	10.8	9.1
Spring Chinook	Imeques C-mem-ini-kem	Nov 15	21	0.61	547	946	0.25	4.9	10.1	7.0	8.0	10.6	9.5

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/a An estimated 1,046 fish suffocated at the end of the outlet channel after release
/b An estimated 100 fish were left stranded in the pond after release
/c An estimated 200 fish were left stranded in the pond after release

Table 9. Size and descaling data for juvenile spring chinook and summer steelhead released in the Umatilla River Basin in 1994.

Species	Release Location	Release Date	Days Held	No./lb.			Fork Ln. (mm)			Descaling (%)			
				Mean	Std.	n=	Mean	Std.	n=	Total	Partial	None	n=
Summer Steelhead	Minthorn	April 14	29	5.1	1.6	125	198	21	312	1.4	49.8	48.8	209
Summer Steelhead	Boniler	April 11	26	4.9	1.2	106	214	19	315	11.3	33.0	55.7	203
Summer Steelhead	Boniler	May 12	29	5.2	1.5	103	206	18	319	5.0	13.4	81.6	201
Spring Chinook	Imeques C-mem-ini-kem	May 20	17	30.4	6.2	337	110	7	950	24.4	21.5	54.1	595
Spring Chinook	Imeques C-mem-ini-kem	Nov 15	21	8.7	4.7	211	155	29	423	--	--	--	--

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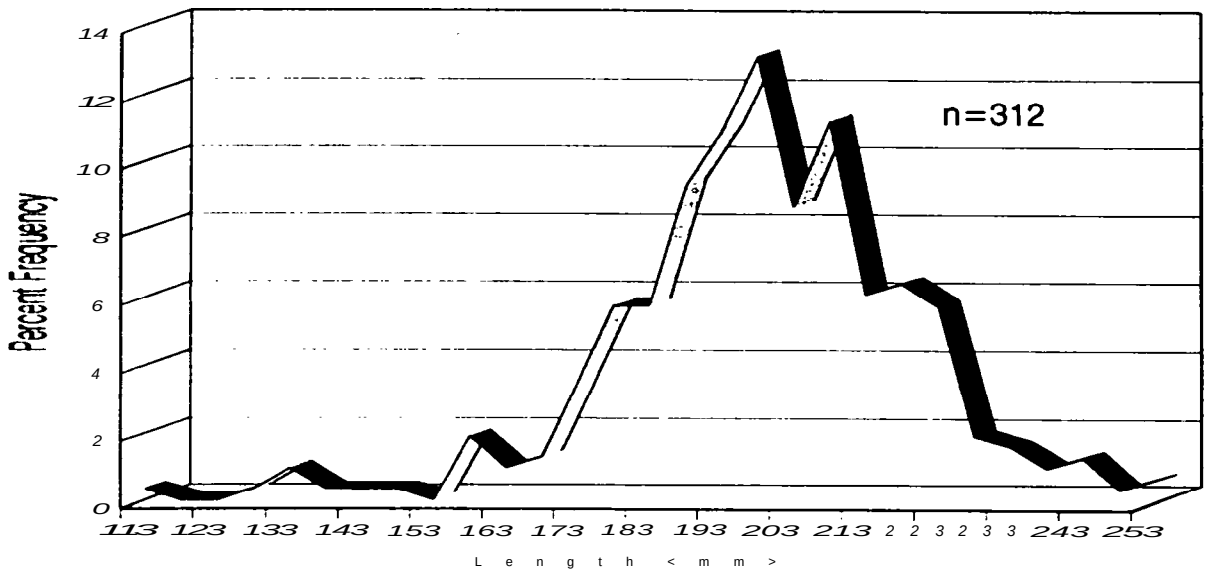

Figure 3. Length frequency distribution of juvenile summer steelhead released at Minthorn Acclimation Facility on 4/14/94.

Acclimation at Bonifer

Summer steelhead

An estimated 51,403 fish at 4.9/lb. were released from Bonifer on April 11, 1994, after being acclimated for 26 days (Table 7). This included 20,122 coded-wire tagged fish (Appendix G) and 31,281 adipose clipped only fish. They were fed 0.63% BWD and total mortality was 0.24% (Table 8). An estimated 100 fish (80.6% of the total mortality) were left stranded in the pond after release. The mean temperature and D.O. was 8.4 degrees C and 7.7 mg/l, respectively (Table 8).

The average fork length was 214 mm (Table 9). The length frequency distribution of this group (Figure 4), when compared to the group of fish released at Minthorn, is shifted to the right as would be expected due to their larger size at release. An estimated 11.3 and 33.0% of the fish were considered severely and partially descaled, respectively (Table 9).

A second group of summer steelhead (52,097 fish at 5.2/lb.) was released from Bonifer on May 12, 1994, after being acclimated for 29 days (Table 7). Included were an estimated 16,995 coded-wire tagged fish (Appendix G) and 35,102 adipose clipped only fish.

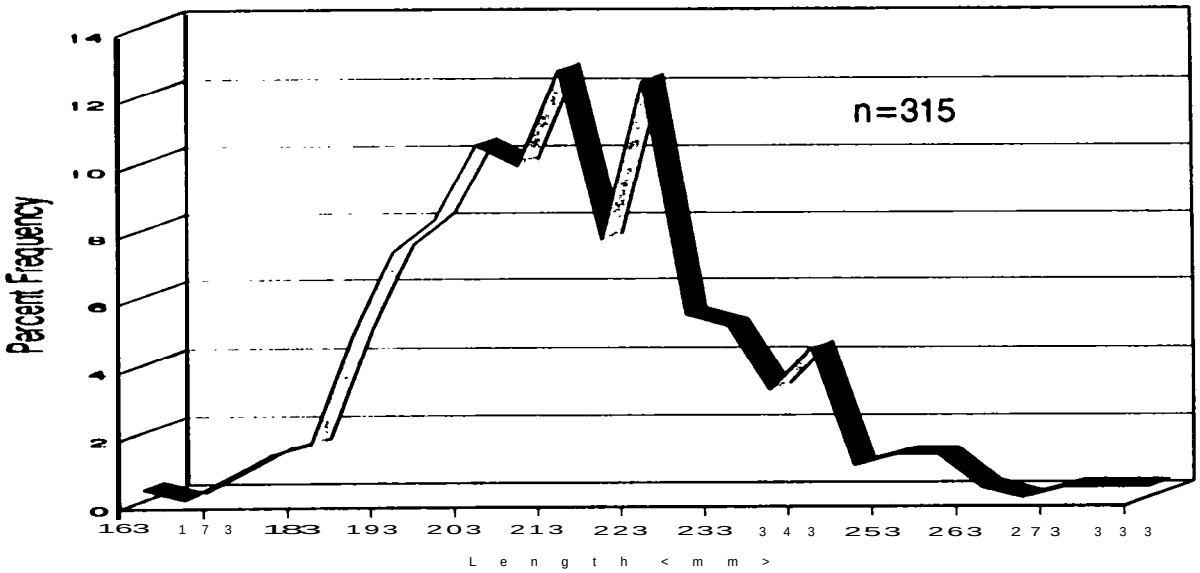

Figure 4. Length frequency distribution of juvenile summer steelhead released at Bonifer Acclimation Facility on 4/11/94

They were fed 1.12% BWD and total mortality was 0.41% (Table 8). An estimated 200 fish (94.3% of the total mortality) were left stranded in the pond after release. The mean temperature and D.0. was 12.1 degrees C and 7.7 mg/l, respectively (Table 8).

The average fork length was 206 mm (Table 9). The length frequency distribution of this group (Figure 5) is similar to that for the first group released at Bonifer. An estimated 5.0 and 13.4% of the fish were considered severely and partially descaled, respectively (Table 9).

Acclimation at lmeaues C-mem-ini-kern

Spring chinook

An estimated 839,377 subyearling fish at 30.4/lb. were released from Imeques C-mem-ini-kern on May 20, 1994, after being acclimated for 17 days (Table 7). This included 3 11,191 coded-wire tagged fish (Appendix H) and 528,186 right ventral clipped fish. They were fed 0.72% BWD and total mortality was 0.09% (Table 8). The mean temperature and D.0. was 9.3 degrees C and 9.1 mg/l, respectively (Table 8).

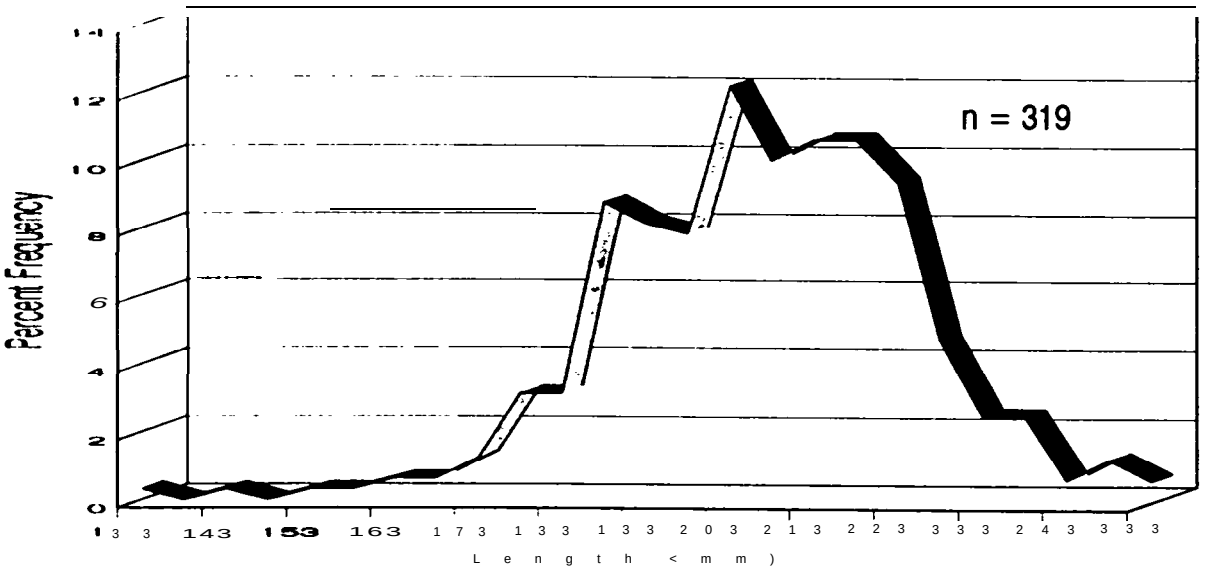

Figure 5. Length frequency distribution of juvenile summer steelhead released at Bonifer Acclimation Facility on 5/12/94.

The average fork length was 110 mm (Table 9). The length frequency distribution of this group is shown in Figure 6. An estimated 24.4 and 21.5% of the fish were considered severely and partially descaled, respectively (Table 9).

Spring chinook

An estimated 378,225 fish at 8.7/lb. were released from Imeques C-mem-ini-kern on November 15, 1994, after being acclimated for 21 days (Table 7). This included 346,030 coded-wire tagged fish (Appendix H) and 32,195 right ventral clipped fish. They were fed 0.61% BWD and total mortality was 0.25% (Table 8). The mean temperature and D.O. was 7.0 degrees C and 9.5 mg/l, respectively (Table 8).

The average fork length was 155 mm (Table 9). The length frequency distribution of this group was bimodal and is shown in Figure 7. These fish were not examined for descaling prior to release.

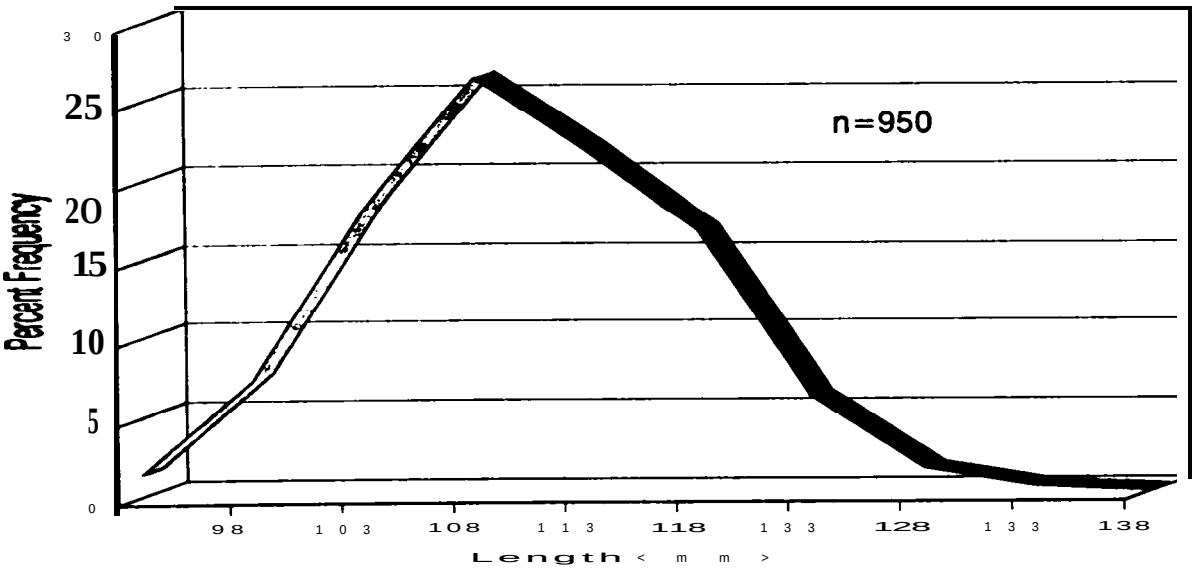

Figure 6. Length frequency distribution of juvenile spring chinook salmon released at Imeques C-mem-ini-kern Acclimation Facility on 5/20/94.

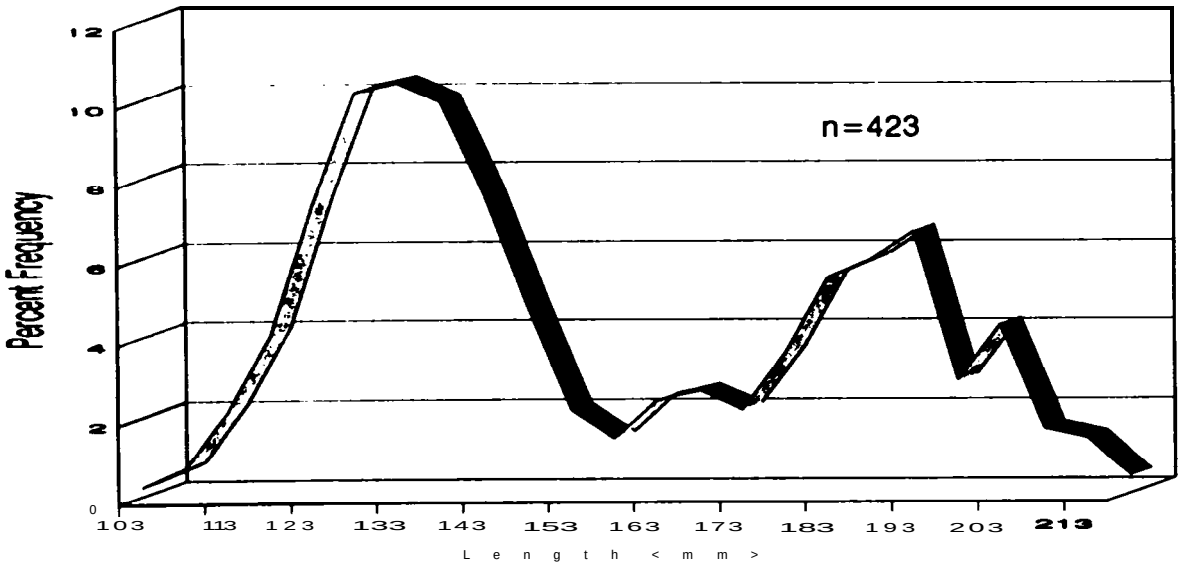

Figure 7. Length frequency distribution of juvenile spring chinook salmon released at Imeques C-mem-ini-kern Acclimation Facility on 11/15/94.

Direct Stream Releases

Groups of juvenile spring chinook, fail chinook and coho salmon were representively coded-wire tagged and released directly into the Umatilla River in 1994 (Table 7 and Appendices H, I and J, respectively). Three groups of coho salmon from Cascade Hatchery were coded-wire tagged for stock identification, while all other groups were coded-wire tagged as part of the Umatilla Hatchery Monitoring and Evaluation Program. In addition, all fall and spring chinook juveniles were either right or left ventral fin clipped and a portion of the fall chinook subyearlings were also blank wire tagged.

Objective 2: Summer Steelhead, Fall Chinook and Coho Salmon Spawning

Task 2.1: Adult Collection, Holding and Spawning

Collection, Holdine and Spawning of Summer Steelhead

Forty-two hatchery and 92 unmarked steelhead were collected for broodstock at Three Mile Dam and transported to Minthorn. Broodstock collected by month and associated opercle marks are listed in Appendix E.

A total of 48 females (31 wild and 17 hatchery including the one trapped at Minthorn) were spawned with 48 wild males (Table 10 and Appendix F). No hatchery males were spawned. This resulted in a shortage of mature wild males and 11 were spawned a second time. A 3 x 3 spawning matrix was utilized whenever possible and an estimated 234,432 green eggs were taken with a mean fecundity of 4,884.

Broodstock were selected throughout the run to provide a representative cross-section of the population (Figure 8). They were differentially marked to evaluate return time versus spawn time and to determine whether a representative cross-section of the run was spawned. However, comparison of these data was difficult because of discrepanacies in opercle marks at Three Mile Dam with those observed at spawning.

Total prespawn mortality during the adult holding period was 17.2% (Table 10). In comparison, prespawn mortality at Minthorn has ranged from 7.6% to 39.0% for previous brood years. Prespawn mortality was higher in males (26.2%) than it was in females (8.7%). The high number of male mortalities was primarily due to live spawning.

Adult Returns to Minthorn

A total of 345 hatchery summer steelhead returned to Three Mile Dam on the Umatilla River in 1993-94 and 252 were released upriver. One hatchery steelhead was trapped at Minthorn. Two other steelhead were observed in the ladder below the V-trap but it is unknown whether they were marked or unmarked.

Table 10. Summer steelhead broodstock collection, spawning and mortality in 1993-94. /a

No of Females Coll.	Number of females spawned and eggs taken on individual spawn days												Total Spawned	%	Total Eggs Taken	Mortality	%	Excess Killed	%
	April 6		April 13		April 20		April 27		May 4		May 11								
	No.	Eggs	No.	Eggs	No.	Eggs	No.	Eggs	No.	Eggs	No.	Eggs							
7/b	10 /b	45,423	9	47,092	4	21,525	11	56,700	7	28,607	7	35,085	48/b	68.6	234.432	6	8.6	16	22.9

No. of Males Coll.	Number of males spawned on individual spawn days						Total Spawned	%	Mortality	%	Excess Killed	%
	April 6	April 13	April 20	April 27	May 4	May 11						
65	10/c	9/d	4/e	11 /f	7/g	7	48/ h	73.8	17	26.2	22	33.8

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a/ Broodstock were collected at Three Mile Dam and transported to Minthorn Acclimation Facility.
b/ Includes one hatchery female that returned to Minthorn.
c/ Includes four males spawned live.
d/ Includes six males spawned live.
e/ Includes two males spawned live.
f/ Includes six males spawned live. It does not include three green males.
g/ All spawned live.
h/ Includes 25 males live spawned.

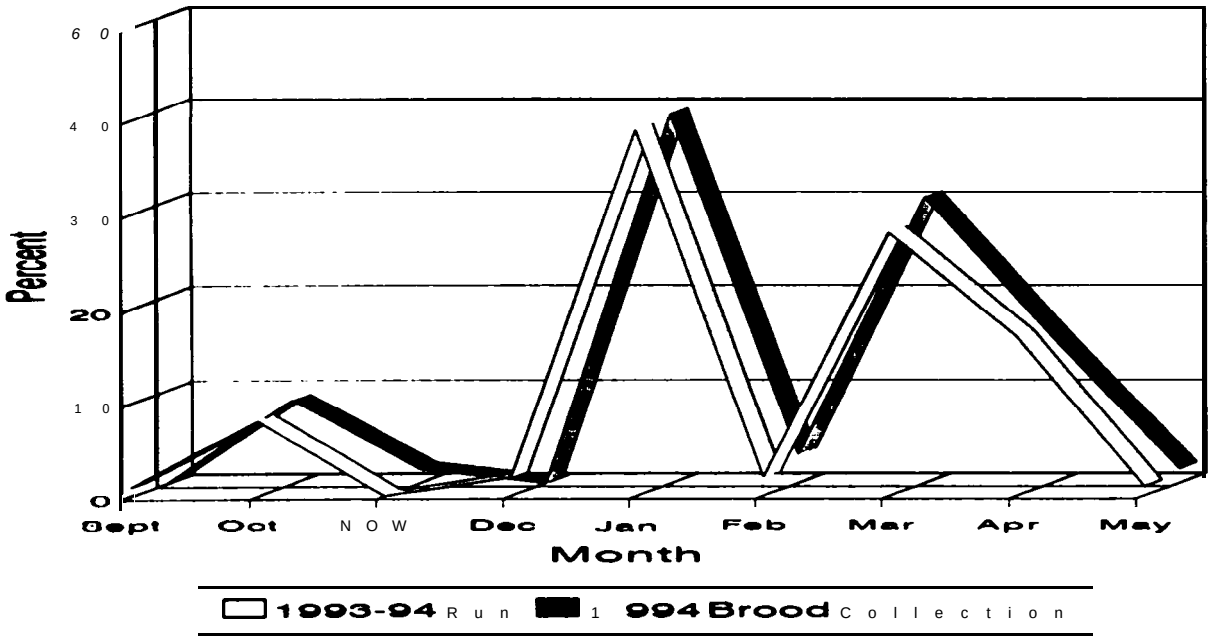

Figure II. Return timing of summer steelhead to the Umatilla River in 1993-94 and **percentage of 1994 summer steelhead broodstock collected by month.**

Adult Returns to Bonifer

Two hatchery summer steelhead were trapped at Bonifer. At least five other fish were observed in the ladder below the V-trap and in Boston Canyon Creek. Several fish were observed in Meacham Creek at the mouth of Boston Canyon Creek. It is unknown whether these fish were marked or unmarked.

Disease Sampling of Summer Steelhead Broodstock

Cell culture assays for replicating agents, including IHNV and IPNV virus, on all spawned fish were negative (Table 11). Kidney samples from 71 spawned fish were taken to test for BKD. Sixty-eight fish had ELISA readings (OD,) of 0.137 or less, indicating low or negative Rs antigen levels. Two fish had a moderate level (0.409 and 0.480) and one fish had a high, clinical level (1.348).

Spores of C. Shasta were detected in 10 of 16 prespawn mortalities sampled. Levels were considered to be low in five fish, moderate in three fish and high in two fish. Mortalities were also sampled for BKD and all had OD, readings of 0.056 or less, indicating very low or negative antigen levels. Aeromonad-pseudomonad bacteria were cultured from the kidneys of all 16 mortalities.

Collection. Holding and Spawning of Fall Chinook and Coho Salmon

Fall chinook and coho salmon broodstock were not collected. Oregon Department of Fish and Wildlife hatcheries supplied all 1994 broodstock egg needs for the Umatilla River program.

Objective 3: Facility Maintenance

Task 3.1: Facility Maintenance and Repair

Repair and maintenance were performed at Bonifer, Minthorn and Imeques C-mem-ini-kem in 1994. Routine maintenance work consisted mostly of weed abatement and maintenance of the electric fence at Bonifer.

Objective 4: Acclimation Evaluation

Subobjective 4.1: Adult Survival and Contribution

Task 4.1.1: Snout and Data Collection

Snouts were collected from 28 spring chinook, 164 fall chinook and 113 coho salmon at Three Mile Dam in 1994. Additional snouts were collected from 54 spring chinook and two fall chinook during spawning ground surveys. Snouts from 51 summer steelhead were

Table 11. Results of disease Sampling of Umatilla River summer steelhead broodstock In 1994. /a

	Test	Incidence	Comments
Spawned Fish	IHNV	01%	
	IPNV	0/96	
	BKD	3/71	Two fish had moderate EUSA (OD405) readings (0.409 and 0.480) and one fish had a high reading (1.349)
Mortalitles	BKD	0/1 6	All had low OD406 readings (0.066 or less), indicating low or negative Rs antigen levels
	Ceratomvxa Shasta	10/16	Detected at a low level In flve fish. moderate level in three fish and high level in two fish
	Aeromonas Pseudomonas	16/16	

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/a Data provided by ODFW Eastern Oregon Fish Pathology Laboratory.
All broodstock were held and spawned at Minthorn Acclimation Facility.

collected at Three Mile Dam in 1993-94 and 42 snouts were collected from broodstock held at Minthorn. Ten snouts were also collected during creel and spawning ground surveys.

Snouts were collected at Three Mile Dam by Trap and Haul personnel, on spawning ground surveys by CTUIR Natural Production Monitoring and Evaluation personnel, and on creel surveys by other CTUIR and ODFW personnel. Snouts were delivered to ODFW in Clackamas, Oregon for code identification.

Task 4.1.2 and 4.1.3: Coded-Wire Tag Data Analysis

Adult Survival and Umatilla River Returns

Summer Steelhead

Since 1975, all Umatilla River summer steelhead releases have been from Umatilla River broodstock. The first coded-wire tagged releases were in April of 1988 (Table 12). An acclimated group was released from Minthorn while a control group was released into the Umatilla River near Minthorn.

Table 12. Liberation and survival information for summer steelhead released in the Umatilla River.

Brood Year	Number of Juveniles Released		size at Release	Release Location	Date of Release	Number of Adults Recovered	% survival
87	30.549		7.4	Minthorn	Apr 88	212	0.69
87	64.741	/a	6.5	Nr. Minthorn	Apr 88	341	0.53
88	10.033	/b	57.5	Umatilla RM 89	Dec 88	NA	NA
88	52.126	/C	6.6	Minthorn	May89	20	0.04
88	29.586		5.6	Nr. Minthorn	May89	21	0.07
89	59.747	/d	5.9	Bonifer	May 90	553	0.93
89	29.446		5.5	Nr. Bonifer	May 90	287	0.07
90	42.610	/e	6 2	Bonifer	May91	360	0.04
90	33.323	If	0.7	Nr Bonifer	May91	274	0.02
91	67.435		5.0	Bonifer & Minthorn	Mar92	47	0.07
91	64.550		5.0	Meacham creek	Apr92	0	0.00
91	72.662	/g	5.5	Meacham Creek	Apr/May 92	2	0.00

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/a The number released includes 33.984 adipose clipped fish at 10.3/lb. released at Umatilla RM 23 in May
/b None of these fish were coded-wire tagged
/c The number released includes 22,274 adipose clipped fish at 55/lb. acclimated and released at Bonifer in May
/d The number released Includes 29.522 adipose clipped fish at 7.7/lb. acclimated and released with the coded-wire tagged fish in May
/e The number released includes 12.389 adipose clipped fish at 7.5/lb. acclimated and released with the coded-wire tagged fish in May
/f The number released includes 3.998 adipose clipped fish at 12.5/lb. released at Umatilla RM 3 in April
/g The number released includes 5.443 adipose clipped fish at 5.8/lb. released at Umatilla RM 3 in April

The estimated recovery of adults from the acclimated group was higher than from the control group (0.69 versus 0.53%) despite the larger size of the non-acclimated group at release (Table 12 and Figure 9). Adult returns to the Umatilla River however, were only slightly higher from the acclimated release than from the control release (0.46 versus 0.41%) (Appendix L and Figure 10). An estimated 73.6% of the adults recovered from both releases were captured at Three Mile Dam on the Umatilla River and 19.7% were recovered in the Columbia River gillnet fishery (Appendix L). An estimated 5.4% were caught in the Columbia River sport fishery.

A second acclimation evaluation study was conducted at Minthorn in May of 1989 (Table 12). Although no apparent problems were encountered with these releases, (Lofy et al. 1990). recoveries were poor. Estimated adult recoveries from the acclimated and control groups were 0.04 and 0.07%, respectively (Table 12 and Figure 9). An estimated 85.4% of all recoveries were from the Umatilla River and 14.6% were from the Columbia River sport fishery (Appendix L).

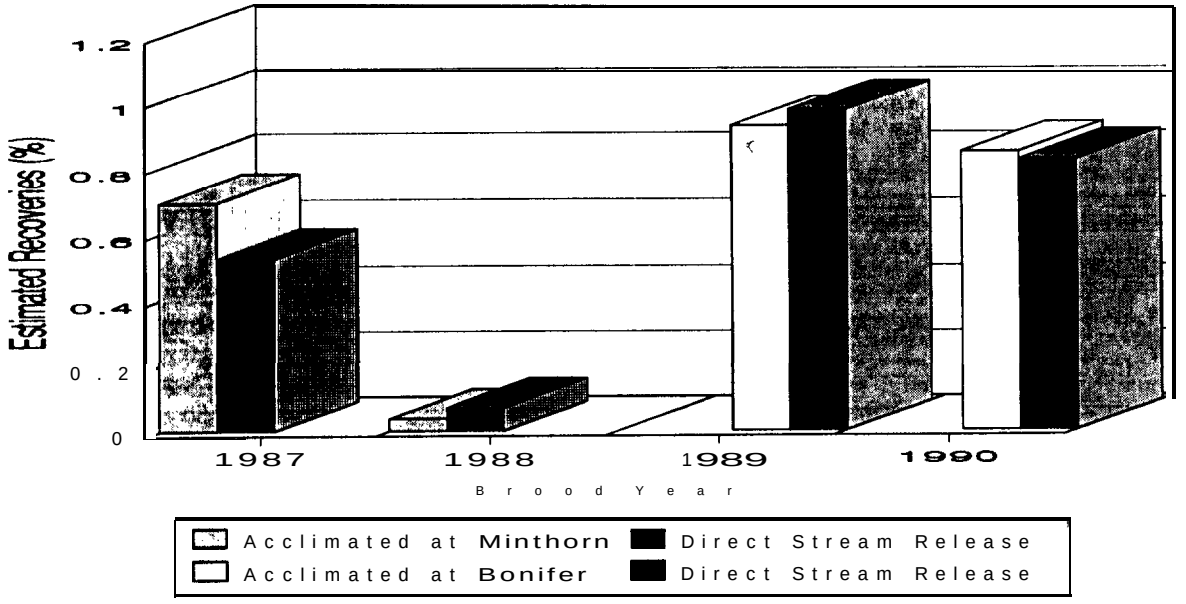

Figure 9. Estimated ocean and Columbia River Basin recoveries of adult summer steelhead from releases of acclimated and non-acclimated juveniles in the Umatilla River (1987- 1990 brood years).

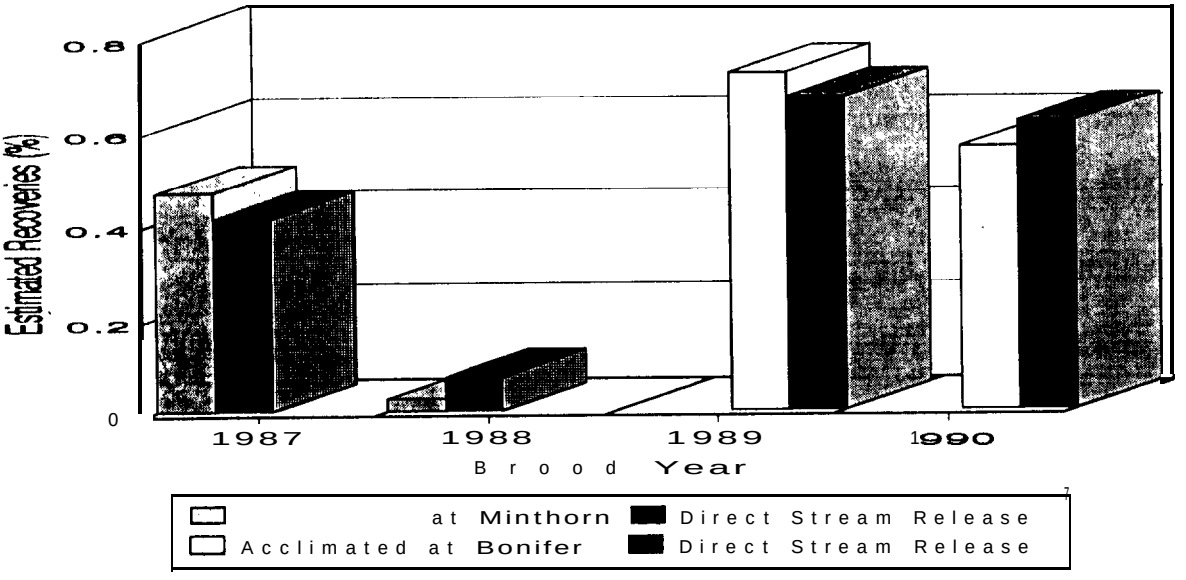

Figure 10. Estimated Umatilla River recoveries of adult summer steelhead from releases of acclimated and non-acclimated juveniles in the Umatilla River (1987-1990 brood years).

Summer steelhead releases in 1990 were also made in May (Table 12). An acclimated group was released from Bonifer and a control group was released into Meacham Creek concurrent with the acclimated group. Recoveries from the acclimated group (0.93%) were similar to the control group (0.97%) even though the control group was slightly larger at release (Table 12 and Figure 9). Umatilla River recoveries from the acclimated and control groups were also similar (0.72 and 0.67%, respectively) (Appendix L and Figure 10). An estimated 74.8% of the recoveries from both releases were from the Umatilla River, while an estimated 16.4 and 8.8% of the recoveries were from the Columbia River gillnet and Columbia River sport fisheries, respectively (Appendix L).

A fourth acclimation study was conducted at Bonifer in May of 1991. Recoveries were similar for both the acclimated and control groups (0.84 and 0.82%, respectively), although the fish from the control group were significantly smaller at release (Table 12 and Figure 9). Recoveries in the Umatilla River from the acclimated and control groups were also similar (0.56 and 0.62%, respectively) (Appendix L and Figure 10). An estimated 69.9% of the recoveries from both releases were from the Umatilla River, while an estimated 19.4 and 10.7% of the recoveries have been from the Columbia River gillnet and Columbia River sport fisheries, respectively (Appendix L).

Three coded-wire tagged groups of summer steelhead were released in 1992 (Table 12). One group was acclimated at both Bonifer and Minthorn and released in late March. The other two groups were released directly into Meacham Creek in late April. Estimated adult recoveries from all groups are preliminary. Recoveries from the acclimated group are 0.07%, while recoveries from the non-acclimated groups are 0.00 and less than 0.01%.

Results from the summer steelhead acclimation studies are inconclusive. Survival rates for both the acclimated and control groups in the 1989 study were poor, and survival rates for the acclimated and control groups were similar in both the 1990 and 1991 studies. The 1988 study however, suggests that acclimation may have provided a benefit in both total survival and Umatilla River escapement.

Fall Chinook - Spring Creek Tule Stock

Releases in 1982 of fall chinook salmon in the Umatilla River were subyearlings from Spring Creek tule stock (Table 13). One group of fish was tagged by the National Marine Fisheries Service and reared at Spring Creek Hatchery and one group was tagged by ODFW and reared at Bonneville Hatchery (Appendix M). All fish were from eggs collected at Spring Creek Hatchery. The Spring Creek Hatchery fish were released at 79.0/lb. at Umatilla RM 1.5 and 51.5. The Bonneville Hatchery fish were released at 92.0/lb. at Umatilla RM 1.5.

Total survival rates for the groups reared at Spring Creek and Bonneville Hatcheries were 0.53 and 0.46%, respectively (Table 13). These rates are at the lower end of the range experienced by Spring Creek Hatchery (O-2.1%), but higher than many other releases of

Table 13. Liberation and survival information for fall chinook salmon (Spring Creek tule stock) released in the Umatilla River (1982).

Brood Year	Number of Juveniles Released	Size at Release	Release Location	Date of Release	Number of Adults Recovered	% Survival
1981	978,336	79.0	Umatilla RM 1.5 & 51.5	Apr 82	5,153	0.53
1981	2,828,835	92.0	Umatilla RM 1.5	Apr 82	12,930	0.46

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Spring Creek tule stock made at other locations. Most fish were recovered as age-3 fish, similar to reports for fish from the 1978 and 1979 brood years released elsewhere (Howell et al. 1985) (Appendix M).

Total exploitation rate of Spring Creek tule stock was 98.9%. Individual exploitation rates for ocean commercial and Columbia River gillnet catches were 47.1 and 38.2%, respectively. Sport and treaty exploitation rates were 12.3 and 24%.

Fall Chinook -Bonneville Upriver Bright (URB) Stock

Yearling releases have been made in the upper Umatilla River (RM 56 to RM 87) and in Meacham Creek (RM 2 and RM 30) (Table 14). Releases in 1983, 1984 andsome releases in 1994 were made in April All other releases have been made in March. Fish have ranged in size from 5.0 to 10.4/lb..

The estimated total survival rates (through age-7) from yearling releases made from 1983 to 1988 (1981 to 1986 brood years) have ranged from 0.08 to 323% (Table 14). Yearling releases made from 1989 through 1991 were not representively coded-wire tagged, Recovery data for the 1992, 1993 and 1994 releases (1990 to 1992 brood years) is incomplete. Preliminary survival rates are 0.01, 0.03 and 0.12%, respectively. Survival rates to the Umatilla River have ranged from 0.00 to 0.89% (Appendix N).

Total exploitation of yearlings (through 1986 brood) is 845%. Individual exploitation rates for ocean commercial and Columbia River gillnet catches are 493 and 37.4%, respectively. Sport and treaty exploitation rates are 11.0 and 23%.

Prior to 1990, all spring subyearling releases were made near the mouth of the river because of potential for fish loss due to unscreened or partially screened irrigation diversions and low stream flows (Table 14). All groups were released in June. Fish ranged in size from 85.1 to 93.1/lb..

Table 14. Liberation and survival information for fall chinook salmon (Bonneville URB and Umatilla River stock) released in the Umatilla River (1983 – 1994).

Brood Year	Stock /a	Number of Juveniles Released	Size at Release	Release Location	Date of Release	Number of Adults Recovered	% Survival
81	B	100,564	5.9	Bonifer & Meacham Cr.	Apr 83	169	0.17
82	B	2aB.412	8.6	Bonifer & Meacham Cr.	Apr 84	178	0.08
83	B	966,250	m.l	Umatilla RM 1.5	June 84	7,594	0.79
83	B	198,162	76	Umatilla RM 87 & Bonifer	Mar 85	1,593	0.80
84	B	3,223,172	92.3	Umatilla RM 1.5	June 85	28,170	0.87
84	B	51,000	16.2	Bonifer	Oct 85	342	0.67
84	B	206,815	5.0	Bonifer & Minthorn	Mar 86	6,580	2.17
85	B	2,029,602	06.0	Umatilla RM 1.5	June 86	10,252	051
85	B	35,574 /b	11.6	Minthorn	Oct 86	NA	NA
85	B	18.143	8.1	Minthorn	Mar 87	2,408	221
85	B	102,363	8.6	Bonifer	Mar 87	2,442	2.39
86	B	100,791	8.8	Minthorn	Mar 88	3,255	3.23
86	B	99,550	10.2	Bonifer	Mar 88	2,495	2.51
87	B	1,429,250 /b,c	93.1	Umatilla RM 9	June 88	NA	NA
87	B	217,443 /b	8.6	Umatilla RM 63 – 70	Mar 89	NA	NA
88	B	255,614 /b	8.2	Umatilla RM 70	Mar 90	NA	NA
89	B	3,055,481 /d	87.5	Umatilla RM 70 – 79	May–June 90	5,284	0.17
89	B	71.063	92	Minthorn	Oct 90	48	0.07
89	B	76,646	8.8	Nr. Minthorn	Oct 90	26	0.03
89	B	194,847 /b	7.8	Umatilla RM 56 – 79	Mar 91	NA	NA
90	B	3,101,676 /e	73–82	Umatilla RM 70 – 79	May 91	2,576	0.00
90	B	79,672	80.5	Minthorn	May 91	118	0.15
90	B	74,865	86.0	Nr. Minthorn	May 91	101	0.15
SO	B	220,440	7.7	Umatilla RM 56 – 70	Mar 92	24	0.01
91	B	2,681,013 /f	55.2–70.6	Umatilla RM 42.5	May 92	16	4.01
91	u	504,369 /b	53.4	Umatilla RM 42.5	May 92	NA	NA
91	u	5,167 /b	62.8	Umatilla RM 3	Apr – May 92	NA	NA
91	B	134,837	0.1	Umatilla RM 73.5	Mar 93	45	0.03

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Table 14. (cont.)

Brood Year/Stock /a	Number of Juveniles Released	Size at Release	Release Location	Date of Release	Number of Adults Recovered	% Survival
92 B & U	2,859,598 /g	59.3–68.0	Umatilla RM 73.5	May 93	204	0.01
92 B	233,629	10.4	Umatilla RM 73.5	Mar 94	316	0.14
92 B	49,824	8.5	Umatilla RM 73.5	Apr 94	32	0.06

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/a B = Bonneville URB stock; U = Umatilla River stock
/b These fish were not coded–wire tagged.
/c To estimate adult contribution, these fish were included in the Priest Rapids URB stock subyearling release in 1988 (075007). Both stocks were reared at Irrigon Hatchery.
/d The number released includes 629,800 non–tagged Priest Rapids URB stock subyearlings released at 82.4/lb. in May at Umatilla RM 70–79.
/e The number released includes 10,462 non–tagged fish at 80–194/lb. released at Umatilla RM 3 in April and May.
/f The number released includes 2,670 non–tagged fish at 112/lb. released at Umatilla RM 3 in April and May.
/g The number released includes 29,681 non–tagged fish at 95.5–142.0/lb. released between Umatilla RM 0 and RM 27.3 in March, April and May.

The estimated total survival rates (through age-7) from spring subyearling releases in 1984, 1985 and 1986 (1983 through 1985 brood years) were 0.79, 0.87 and 0.5196, respectively (Table 14). Releases made in 1988 were not representively coded-wire tagged. Survival rates to the Umatilla River have ranged from 0.00 to less than 0.01% (Appendix 0).

Beginning in 1990, all spring subyearling releases have been in the upper Umatilla River (RM 42.5 to RM 79), other than a small number of non-tagged fish released at Three Mile Dam as part of ODFW juvenile passage evaluation studies (Table 14). AU releases have been made in May or June. Fish have ranged in size from 53.4 to 87.5/lb.. An acclimation evaluation experiment was conducted in May, 1991. One group of fish was acclimated at Minthom and a control group was released concurrently.

Recovery data for the 1990 through 1993 direct stream releases (1989 through 1992 brood years) is incomplete. Preliminary survival rates for the 1990 and 1991 releases are 0.17 and 0.09% respectively (Table 14). Survival rates to the Umatilla River are less than 0.02% for both releases (Appendix 0). Preliminary recoveries for the 1992 and 1993 releases include age-2 and age-3 fish only and are not discussed in this report.

Recoveries from the acclituated group are similar to the control group (0.15 versus 0.13%. respectively). Umatilla River recoveries are less than 0.02% for both groups (Appendix 0).

Estimated total exploitation of spring subyearling releases (through 1990 brood) is 83.9%. Individual exploitation rates for ocean commercial and Columbia River gillnet catches are 43.1 and 52.l%, respectively. Sport and treaty exploitation rates are 4.1 and 0.6%.

Subyearling fall releases have all occurred in October at either Bonifer or Minthorn acclimation facilities (Table 14). Fish ranged in size from 8.8 to 16.2/lb.. One acclimation evaluation experiment was conducted at Minthom in 1990.

The estimated total survival rate (through age-7) from the 1985 subyearling fall release (1984 brood year) was 0.67% (Table 14). Survival rate to the Umatilla River was 0.006% (Appendix 0). Recovery data for the 1990 acclimation evaluation releases is incomplete. Preliminary survival rates for the acclimated and non-acclimated groups are 0.07 and 0.03%. respectively. Survival rates to the Umatilla River are 0.01 and 0.001%.

Total exploitation of the subyearling fall releases (1984 and 1989 brood years) is 91.8%. Individual exploitation rates for ocean commercial and Columbia River gillnet catches are 433 and 53.3%, respectively. Sport and treaty exploitation rates are 2.6 and 0.8%.

Survivals (through age-7 fish) of the 1984,1985 and 1986 subyearling spring releases (1983 through 1985 brood years) and the 1985 subyearling fall release (1984 brood year) were 0.79, 0.87, 0.51 and 0.67%, respectively (Table 14). In comparison, survival of the same brood years released as yearlings in 19851986 and 1987, were 0.80,3.17 and 2.29% respectively. Although the survival rates of the 1983 brood subycarling and yearling releases are similar, data from the 1984 and 1985 brood and prehiminary data from subsequent brood years suggest that yearlings survive at a higher rate than either spring or fall subyearling releases.

Data from early releases (1986 brood and earlier) of yearling and subyearling fall chinook salmon show that most are recovered as age-4 fish (Appendix B), similar to results from this stock released elsewhere (Howell et al. 1985). Very few age-7 adults have been recovered.

Fall chinook - Priest Rapids URB Stuck

Releases of Priest Rapids URBstock were made from 1987 to 1990 (Table 15). Fish were released as subyearlings from spring through fall. Subyearling spring releases made from 1987 through 1989 all occurred in May in the lower Umatilla River. Releases in 1990 were made in the upper Umatilla River. fish ranged in size from 60.4 to 82.4/lb.. The estimated total survival rates (through age-7) for the 1987 and 1988 spring releases (1986 and 1987 brood years) are 0.82 and 0.07%, respectively (Table 15). Survival rates to the Umatilla River are 0.017 and O.008% (Appendix P). Recovery data for the 1989 release

Table 15. Liberation and survival information for fall chinook salmon (Priest Rapids URB stock) released in the Umatilla River (1987–1990).

Brood Year	Number of Juveniles Released	Size at Release	Release Location	Date of Release	Number of Adults Recovered	% Survival
86	1,476,830	60.4	Umatilla RM 1.5	May 87	12,039	0.82
86	2,000	20.0	Minthorn	July 87	5	0.25
87	3,316,007 /a	68.3	Umatilla RM 23	May 88	2,458	0.07
87	14,408	9.8	Minthorn	Nov 88	62	0.43
87	79,681	8.6	Nr. Minthorn	Nov 88	405	0.51
88	2,393,710	66.6	Umatilla RM 23	May 89	2,826	0.12
88	78,825	10.9	Minthorn	Oct 89	79	0.10
88	78,132	11.1	Nr. Minthorn	Oct 89	67	0.09
89	629,800 /b	82.4	Umatilla RM 70 – 79	May 90	NA	NA

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/a The number released includes 1,429,250 Bonneville URB stock subyearlings released at 93.1/lb, in June at Umatilla RM 9.
/b These fish were not coded–wire tagged. To estimate adult contribution, they were included in the Bonneville URB stock subyearling release in 1990. Both stocks were reared at Irrigon Hatchery.

(1988 brood year) is incomplete. The total survival rate is 0.12%. The survival rate to the Umatilla River is 0.008%. Releases in 1990 were not representively coded-wire tagged.

Total estimated exploitation of the subyearling spring releases (1986 through 1988 brood years) is 826%. Individual exploitation rates for ocean commercial and Columbia River gillnet catches arc 53.6 and 40.196, respectively. Sport and treaty exploitation rates are 5.5 and 0.8%.

One group of subyearling fish was acclimated at Minthorn and released in July, 1987 (Table 15). Due to low dissolved oxygen levels and pump failure (Lofy et al. 1988), very few juveniles were released and total recovery is estimated to be five adults.

Subyearling fall releases have occurred in October and November at, or near, Minthom Acclimation Facility (Table 15). Fish ranged in size from 8.6 to 11.1/lb..

Two groups of fish (1987 brood) were released at Minthom in November, 1988, as part of an acclimation evaluation study (Table 15). The acclimated group suffered severe

losses due to Ichthyophthirius multifilis (Lofy 1989). Estimated total survival rates (through age-7) for the acclimated and control groups are 0.43 and 0.51%, respectively. Survival rates to the Umatilla River are 0.01 and 0.07% (Appendix P).

A second acclimation experiment was conducted at Minthom in October, 1989 (Table 15). Recovery data for these releases is incomplete. Estimated total survival rates (through age-6) for the acclimated and control groups are 0.10 and 0.09%, respectively. Survival rates to the Umatilla River are 0.02 and 0.01% (Appendix P).

Total estimated exploitation of the subyearling fall releases (1987 and 1988 brood years) is 77.6 % Individual exploitation rates for ocean commercial and Columbia River gillnet catches are 50.0 and 33.5 %, respectively. Sport and treaty exploitation rates are 13.8 and 27%.

The total estimated exploitation rate of Priest Rapids URB subyearling spring releases (82.6%) IS similar to the exploitation rate of Bonneville URB subyearling spring , releases (83.9%).

Fall Chinook - Straying

Returning adults from juvenile URB stock fall chinook salmon releases in the Umatilla River have strayed above McNary Dam to Columbia and Snake River terminal locations (hatcheries, fish traps and spawning grounds). It is believed that straying is partially the result of low attraction flow at the mouth of the Umatilla River during the adult return season and, in the case of subyearling spring releases made from 1982 through 1989, lack of imprinting because they were released in the lower river (below RM 23).

Stray levels appear to be affected by age at release. When comparing estimated adult recoveries from the Umatilla River with recoveries above McNary Dam, the data indicates that releases of subyearlings have resulted in higher levels of adult straying than releases of yearling fish. Adult recoveries above McNary Dam have been the highest from subyearling spring releases (Bonneville and Priest Rapids URB stock) made From 1984 through 1992. An estimated 84.6% of the terminal recoveries from those releases have been from terminal locations above McNary Dam (Table 16). Adult recoveries above McNary Dam from subyearling fall releases (Bonneville and Priest Rapids URR stock) made from 1985 through 1990 has averaged 627%. Adult recoveries above McNary Dam from yearling releases (Bonneville URB stock) made from 1983 through 1988 have been the lowest and has averaged 38.8%.

Release location (upper versus lower river) also appears to affect stray levels. Prior to 1990, all subyearling spring releases were made in the lower Umatilla River. An estimated 8.1% of the terminal recoveries from those releases have been from the Umatilla River (Table 16). In comparison, Umatilla recoveries from the 1990 through 1992

Table 16. Straying of adult fall chinook salmon from juvenile releases in the Umatilla River (1982 – 1993). /1

					Estimated Adult Survival															
							Washington													
Brood Year	Number Released	Date of Release	Size at Release	Release Location	Umatilla River No	Umatilla River %	Washington /2 No	Washington /2 %	Lyons Ferry Hatchery No	Lyons Ferry Hatchery %	Snake River /3 No	Snake River /3 %	Priest Rapids /4 No	Priest Rapids /4 %	Hanford Reach No	Hanford Reach %	Wells Dam Hatchery No	Wells Dam Hatchery %	Yakima River No.	Yakima River %
Subyearling spring releases (Tule stock)																				
81	978,336	Apr 82	79.0	Uma. RM 1.5 & 51.5	0	0.0	0	0.0												
81	2,828,835	Apr 82	92.0	Umatilla RM 1.5	0	0.0	111	100.0	83	75			28	25						
	3,807,171				0	0.0	111	100.0	83	75			28	25						
Subyearling spring releases (Bonneville URB stock)																				
83	988,250	June 84	85.1	Umatilla RM 1.5	0	0.0	1,648	100.0	133	8			60	4	1,456	88				
84	3,223,172	June 85	92.3	Umatilla RM 1.5	47	2.0	2,260	98.0	125	6			62	3	2,073	92				
85	2,029,602	June 86	88.0	Umatilla RM 1.5	0	0.0	2,116	100.0	417	20			136	6	1,562	74				
89	2,425,681	May–Jun 90	87.5	Umatilla RM 70 & 79	412	36.5	717	63.5	92	13	442	62		.	46	6			137	19
90	3,101,676	May 91	81.8	Umatilla RM 70 & 79	571	45.5	685	54.5	61	9	483	71	61	9	44	6			36	5
90	79,672	May 91	80.5	Minthorn	15	46.9	17	53.1	2	12	14	82							1	6
90	74,865	May 91	88.0	Nr. Minthorn	14	41.2	20	58.8	1	5	12	60	5	25					2	10
91	2,881,013	May 92	66.2 - 70.6	Umatilla RM 42.5	16	100.0	0	0.0												
	14,581,931				1,075	12.6	7,463	87.4	831	11	951	13	324	4	5,181	69			175	2
Subyearling spring releases (Priest Rapids URB stock)																				
86	1,476,830	May 87	80.4	Umatilla RM 1.5	244	14.7	1,415	85.3	622	44	97	7	342	24	317	22	12	1	24	2
86	2,000	July 87	20.0	Minthorn	0	0.0	1	100.0	1	100										
87	1,886,757	May 88	88.3	Umatilla RM 23	251	60.8	162	39.2	67	41	67	41	19	12					10	6
88	2,393,710	May 89	88.6	Umatilla RM 23	186	22.6	636	77.4	140	22	279	44	124	19	16	3			78	12
	5,759,297				681	23.5	2,214	76.5	830	37	443	20	485	22	333	15	12	1	112	5
Subyearling fall releases (Bonneville URB stock)																				
84	51,000	Oct 85	16.2	Bonifer	3	15.0	17	85.0	17	100										
89	71,863	Oct 90	9.2	Minthorn	5	71.4	2	28.6			1	50							1	50
89	76,646	Oct 90	8.8	Nr. Minthorn	1	20.0	4	80.0			4	100								
	199,509				9	28.1	23	71.9	17	74	5	29							1	4

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Table 16. (cont.)

					Estimated Adult Survival															
							Washington													
Brood Year	Number Released	Date of Release	Size at Release	Release Location	Umatilla River		Washington /2		Lyons Ferry Hatchery		Snake River /3		Priest Rapids /4		Hanford Reach		Wells Dam Hatchery		Yakima River	
					No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Subyearling fall releases (Priest Rapids URB stock)																				
87	14,408	Nov 88	9.8	Minthorn	2	3.4	57	96.6	10	18	38	67	10	18						
87	79,681	Nov 88	8.6	Nr. Minthorn	46	64.9	26	35.1	8	31	13	50	1	4					4	15
88	78,825	Oct 89	10.9	Minthorn	8	42.1	11	57.9	4	36	7	64								
88	78,132	Oct 89	11.1	Nr Minthorn	9	45.0	11	55.0	3	27	7	64	1	9						
	251,046				67	39.0	105	61.0	25	24	65	62	12	11					4	4
Yearling spring releases (Bonneville URB stock)																				
81	100,564	April 83	5.9	Bonifer & Meacham Cr	0	0.0	2	100.0	2	100										
82	228,412	April 84	8.8	Bonifer & Meacham Cr	0	0.0	7	100.0	7	100										
83	198,162	Mar 85	7.8	Uma. RM 87 & Bonifer	2	3.6	54	96.4	54	100										
84	206,815	Mar 86	5.0	Bonifer & Minthorn	129	35.1	239	64.9	105	44			2	1	131	55				
85	109,143	Mar 87	8.1	Minthorn	220	65.3	117	34.7	18	15	2	2	4	3	92	79				
85	102,363	Mar 87	8.6	Bonifer	128	63.7	73	36.3	67	92	6	8								
86	100,791	Mar 88	8.8	Minthorn	291	77.8	83	22.2	20	24	39	47			24	29				
86	99,550	Mar 88	10.2	Bonifer	216	81.2	50	18.8	13	26	36	72	1	2						
90	220,440	Mar 92	7.7	Uma. RM 56-70	5	100.0	0	0.0												
91	134,837	Mar 93	9.1	Uma. RM 73.5	31	91.2	3	8.8	3	100										
	1,501,077				1,022	61.9	628	38.1	269	48	83	13	7	1	247	39				

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/1 Subjacks are not included.
/2 Estimated Washington recoveries above McNary Dam.
/3 Estimated recoveries from Snake and Tucannon River spawning ground surveys and fish traps.
/4 Estimated recoveries from Priest Rapids spawning channel and fish trap.

subyearling spring releases made in the upper Umatilla River are 41.7%. This would suggest that releases made into the upper Umatilla River increase homing.

An estimated 66.1% of all adult strays recovered above McNary Dam from Umatilla River juvenile fall chinook releases (Bonneville and Priest Rapids URB stock made from 1983 through 1993) have been recovered from Columbia River terminal locations (Table 16). An estimated 339% have been recovered from Snake River terminal locations.

Beginning in 1990, all releases of fall chinook salmon juveniles have been in the upper Umatilla River (RM 56 to RM 79) and all future releases will be in the upper river. Fall chinook salmon from Umatilla River broodstock have been released in the Umatilla River since 1992 Permanent adult fall chinook broodstock holding and spawning facilities, capable of meeting full Umatilla River production goals, are scheduled for completion at Three Mile Dam on the Umatilla River in 1995. All fall chinook juvenile releases in the Umatilla River will eventually be progeny of Umatilla River broodstock. Proposed acclimation facilities are scheduled for completion in 1995 through 1996 and will be used to acclimate juvenile fall chinook salmon prior to release. 'IbeUmatilla Basin Project will help to provide better attraction and fish passage flows in the Umatilla River. Phase I of the project is currently in operation and exchanges Columbia River water for water wbicb is currently being taken directly from the Umatilla River for irrigation and provides flow from Three Mile Dam to the mouth of the river during the adult return season. Phase II, scheduled for completion in 1997, will be an exchange of Columbia River water for natural stream flow and McKay Resetvoir storage water and will increase flow in the lower Umatilla River (below McKay Creek confluence) during the adult return and juvenile outmigration seasons.

Spring Chinook

Beginning in 1988, spring chinook have been released in the Umatilla River as. yearlings and subyearlings in the spring and fall. All releases have been from Carson stock

Yearling releases have been made in the mainstem Umatilla River from RM 23 to RM 89 and in Meacham Creek at RM 2 (Table 17). In addition, a small number have been released at Three Mile Dam as part of ODFW passage evaluation studies. Releases have occurred from March through May and fish have ranged in size from 8.3 to 20.5/lb..

The estimated total survival rates (through age-6) from yearling releases made in 1988,1989 and 1990 (1986 through 1988 brood years) are 0.74 0.31 and 0.61%, respectively (Table 17). Survival rates to the Umatilla River are 0.64,0.25 and 0.46% (Appendix Q). Recovery data for the 1991 and 1992 releases is incomplete. Preliminary survival rates are 021 and 0.01%, respectively. Survival rates to the Umatilla River are 0.18 and 0.01%. An estimated 802% of all recoveries are from the Umatilla River, 17.2% are from Columbia River fisheries, and 2.5% are from terminal areas outside the Umatilla River. Recoveries for the 1993 release are not discussed in this report.

Table 17. Liberation and survival information for spring chinook salmon released in the Umatilla River.

Brood Year	Number of Juveniles Released	size at Release	Release Location	Date d Release	Number of Adults Recovered	96 survival
86	99.895 /a	20.5	Umatilla RM 23	Apr 88	NA	NA
86	106,231	10.1	Bonifer	Mar-Apr 88	1,006	0.95
86	191.146 /b	6.6	Umatilla RM 23&89	Apr 88	1,311	0.69
87	1,196	21.4	Bonifer	Nov 88	2	0.17
87	75,767	11.1	Umatilla RM 89	Nov 88	65	0.09
87	79.984	10.6	Bonifer	Mar-May 89	227	0.28
87	80,932	10.6	Nr. Bonifer	Mar 89	270	0.33
88	80,750	12.0	bonifer	Oct 89	77	0.10
88	83,853	12.0	Nr. Bonifer	Oct 89	63	0.00
88	99.775 /a	16.6	Umatilla RM 89	Apr 90	NA	NA
88	114,345	9.0	Bonifer	Mar 90	613	0.54
88	117,427	9.6	Nr. Bonifer	Mar 90	799	0.68
89	80,438	11.5	Bonifer	Oct90	5	0.01
89	77,998	13.4	Nr. Bonifer	Oct90	4	0.01
89	100,506	10.1	Bonifer	Mar91	237	0.24
89	96,151	11.6	Nr. Bonifer	Mer91	167	0.17
89	96,733	20.3	Umatilla RM 3 & 89	Apr-May 91	NA/c	NA/c
90	81,145	16.5	Bonifer	Nov 91	61	0.08
90	78,480	16.8	Nr. Bonifer	Nov 91	36	0.05
90	96,254	18.7	UmatillaRM3&89	Apr92	0	0.00
90	109,101	9.2	Bonifer	Apr92	23	0.02
90	98,929	8.5	Nr. Bonifer	Apr92	21	0.02
91	955,752	35.4	UmatillaRM80	May92	0	0.00
91	294,458 /a	32.5	UmatillaRM 80	may92	NA	NA
91	132,929	11.5	Umatilla RM 80	Nov92	6	0.00
91	101,416	19.4	Umatilla RM 80	Nov92	0	0.00
91	186,948	14.5	Umatilla RM 80	Mar93	5	0.00
91	208,782	8.3	Umatilla RM 80	Mar93	0	0.00
91	96,086	20.3	Uma.RM3,27.3&89	Apr93	0	0.00
92	667,367	27.6	Umatilla RM 80	June93	0	0.00
92	460,809	19.9	Umatilla RM 80	Nov93	0	0.00

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/a None of these fish were coded-wire tagged.
/b The number released includes 89,268 non-tagged fish at 10.3/lb. released in the upper Umatilla River in May, 1988.
/c The same coded-wire tag code was released both in the wind River (Wastington) and Umatilla River This eliminates any possible evaluation of surivial from Umatilla River releases

An acclimation evaluation study has been conducted with yearlings every year from 1988 through 1992 (Table 17). All test groups were acclimated at Bonifer, while all control groups were released in Meacham Creek (adjacent to Bonifer), or in the Umatilla River.

The 1988 and 1989 studies encountered several problems (Lofy 1989 and Lofy et al. 1990) which essentially eliminates any possible evaluation of acclimation. The 1990 study shows that the estimated survival rate of the acclimated group is lower than the survival rate of the non-acclimated group (0.54 versus 0.68%) (Table 17 and Figure 11). Umatilla River recoveries from the acclimated group are also lower than from the control group (0.41 versus 0.50%) (Appendix Q and Figure 12). The 1991 study shows that the estimated survival rate (preliminary data) of the acclimated group (0.24%) is higher than the survival rate of the non-acclimated group (0.17%) (Figure 11). Umatilla River recoveries from the acclimated group are also higher than from the non-acclimated group (0.21 versus 0.16%) (Figure 12). The estimated survival rates (preliminary data) for the acclimated and non-acclimated groups released in 1992 are both 0.02% (Figure 11). Survival rates to the Umatilla River are 0.018 and 0.014%.

Fall releases have been made in the mainstem Umatilla River (RM 80 and 89) and in Meacham Creek at RM 2 (Table 17). Releases have occurred in October and November and fish have ranged in size from 11.1 to 21.4/lb..

The estimated total survival rates (through age-6) from the 1988 and 1989 fall releases (1987 and 1988 brood years) are 0.09% for both groups (Table 17). Survival rates to the Umatilla River are 0.08 and 0.06% (Appendix Q). Recovery data for the 1990 and 1991 releases is incomplete. Preliminary survival rates are 0.006 and 0.06%. respectively. Survival rates to the Umatilla River are 0.004 and 0.06%. An estimated 86.3% of all recoveries are from the Umatilla River, 9.9% are from Columbia River fisheries, and 3.8% are from terminal areas outside the Umatilla River. Recoveries from the 1992 releases are not discussed in this report.

Acclimation evaluation studies were conducted with fall releases every year from 1988 through 1991 (Table 17). All test groups were acclimated at Bonifer, while all control groups were released in Meacham Creek (adjacent to Bonifer), or in the Umatilla River.

The 1988 study encountered disease problems (Lofy 1989) which essentially eliminates any possible evaluation of acclimation. The 1989 study shows that the estimated survival rates of the acclimated and non-acclimated groups were similar (0.10 and 0.08% respectively) (Table 17 and Figure 11). Umatilla River recoveries from both groups were also similar (0.07 and 0.05%) (Appendix Q and Figure 12). Survival rates of the 1990 study were poor and only an estimated nine adults were recovered from both groups. The 1991 study shows that the estimated survival rate (preliminary data) of the acclimated group (0.08%) is slightly higher than the survival rate of the non-acclimated group (0.05%). All recoveries have been from the Umatilla River.

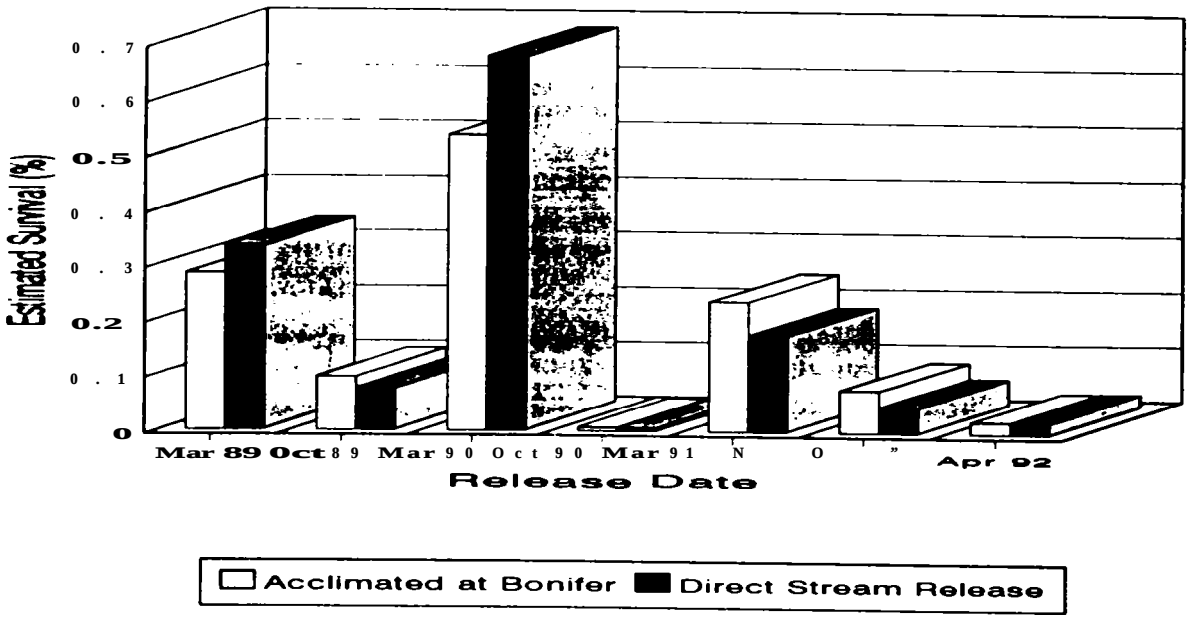

Figure 11. Estimated Columbia River Basin recoveries of adult spring chinook salmon from releases of acclimated and non-acclimated juveniles in the Umatilla River (1987-1990 brood years).

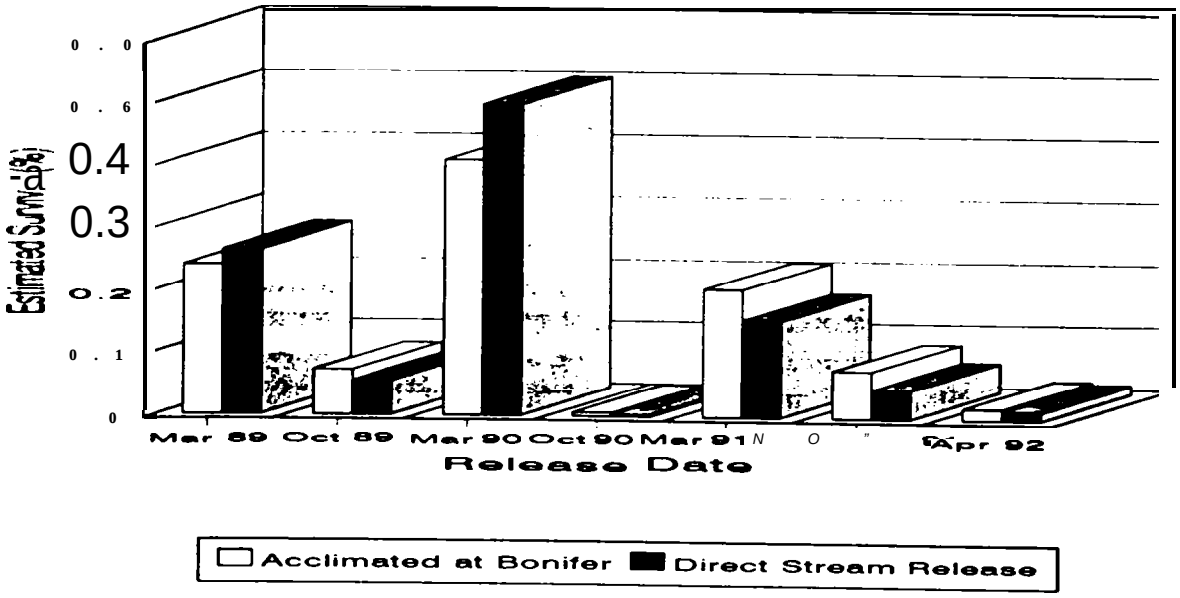

Figure 12. Estimated Umatilla River recoveries of adult spring chinook salmon from releases of acclimated and non-acclimated juveniles in the Umatilla River (1987-1990 brood years).

Spring releases of subyearlings began in 1992. All releases have occur&d at RM 80 in May and June and fish have ranged in size from 27.6 to 35.4/lb No recoveries have yet been reported.

Comparison of fall releases and yearling releases from the 1987 through 1989 broods shows that the survival rates of the yearling releases have been higher. The survival rates have been 3.5 to 36.0 times higher for yearlings and have averaged 73 times higher.

Results from spring, chinook acclimation studies are incondusive. The estimated survival rate of the acclimated group released in the spring of 1990 was lower than the survival rate of the control group. However, survival rates of the acclimated groups released in the fall of 1989 through 1991 and spring of 1991 and 1992 were similar to or higher than the survival rates of the control groups.

Coho

Coho salmon have been released in the Umatilla River every year beginning in 1987 (Table 18). All fish have been released as yearlings in the spring and have been from Tanner Creek stock reared at Cascade Hatchery. Releases have been made in the mainstem Umatilla River from RM 9 to RM 70. Releases have occurred in March and April and fish have ranged in size from 112 to 19.1/lb..

The estimated total survival rates of releases made from 1987 through 1993 have ranged from 0.16 to 4.49% (Table 18). Survival rates to the Umatilla River have ranged from 0.02 to 0.99% (Appendix R). Recovery data for the 1994 release is incomplete and is not discussed in this report.

Total exploitation of coho (through 1991 brood) is 81.0%. Individual exploitation rates for ocean commercial and Columbia River gillnet catches are 30.7 and 24.8%, respectively. Sport and treaty exploitation rates are 433 and 1.2%.

Acclimation evaluation studies were conducted from 1989 through 1991 (Table 18). Test groups were acclimated at Minthorn, while control groups were released at Minthorn and in the Umatilla from RM 56 to RM 70.

The 1989 study shows that the estimated survival rate of the acclimated group was nearly twice that of the control group (1.06 versus 057%) (Table 18 and Figure l3). Umatilla River recoveries from the acclimated group (0.14%) were twice that of the control group (0.07%) (Appendix R and Figure 14). Three groups of coho were released as part of the 1990 study (Table 18). One group was acclimated for 21 days and released in March, while a control group was released concurrently. A third group was given the opportunity to release volitionally (Rowan 1991). Few fish volitionally migrated from the pond and they were force released in April after being held for 36 days. Estimated survival rates for the test and control groups released concurrently were similar (3.07 and 3.11%, respectively)

Table 18. Liberation and survival information for coho salmon released in the Umatilla River./a

Brood Year	Number of Juveniles Released	Size at Release	Release Location	Date of Release	Number of Adults Recovered	% Survival
65	948,549 /b	13.5	Minthom	Apr 87	15,936	1.66
66	996,433	15.7-17.3	Uma Rm 9-23	Mar–Apr 66	44,725	4.49
87	157,299	17.3-19.1	Mhthom	Mar 89	1.674	1.06
a7	829.607	17.2	Nr. Minthom	Mar 89	4,690	0.57
60	67.309	13.5	Minthom	Mar 90	2,069	3.07
66	856,524 /c	13.3	Uma Rm 63-70	Mar 90	26,606	3.11
66	65,095	11.2	Minthom	Apr 90	2,628	4.04
69	152974	15.4	Minthom	Mar 91	305	0.20
69	802,655	16.5–16.8	Uma Rm 56-70	Mar 91	1,302	0.16
90	961.306	15.5-15.7	Uma Rm 56–60	Mar 92	7,824	0.81
91	892,678	17.6	Uma Rm 425-60	Apr 93	1.676	0.19
92	884.105	17.6	Uma Rm 425-60	Apr 94	122	0.01

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/a Survival data for the 1992 brood includes age-2 fish only (1994 returns).
/b The number released Includes 766.660 non-tagged fish at 14.0/lb. released at Umatilla RM 23 In April
/c The number released Includes 594,527 non-tagged fish at 14.8/lb. released at Umatilla RM 76 in March and April. and 202,315 non-tagged fish at 14.5/lb. released at Umatilla RM 23 in March

(Table 18 and Figure 13). Umatilla River recoveries were also similar for both groups (0.29 and 0.27%) (Appendix R and Figure 14). Total survival of the volitional release group was much higher (4.04%) (Figure 13). Umatilla River recoveries were also higher (035%) . (Figure 14). However, it is difficult to know whether the increase in survival of the volitional group was a result of increased acclimation time, later release time, or larger size at release. The size of the volitional group (11.2/lb.) was larger than the size of the acclimated and control groups (13.5 and 13.3/lb., respectively). The estimated survival rates of both groups in the 1991 study were low. The estimated survival rate of the acclimated

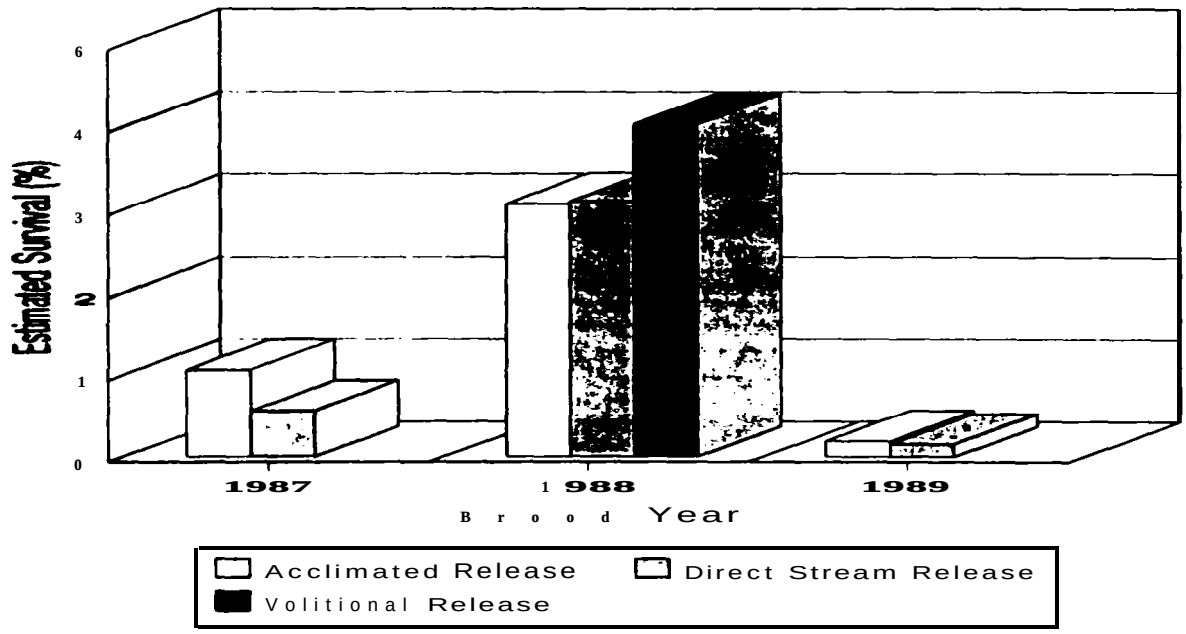

Figure 13. Estimated ocean and Columbia River Basin recoveries of adult coho salmon from releases of acclimated and non-acclimated juveniles in the Umatilla River (1987-1989 brood years).

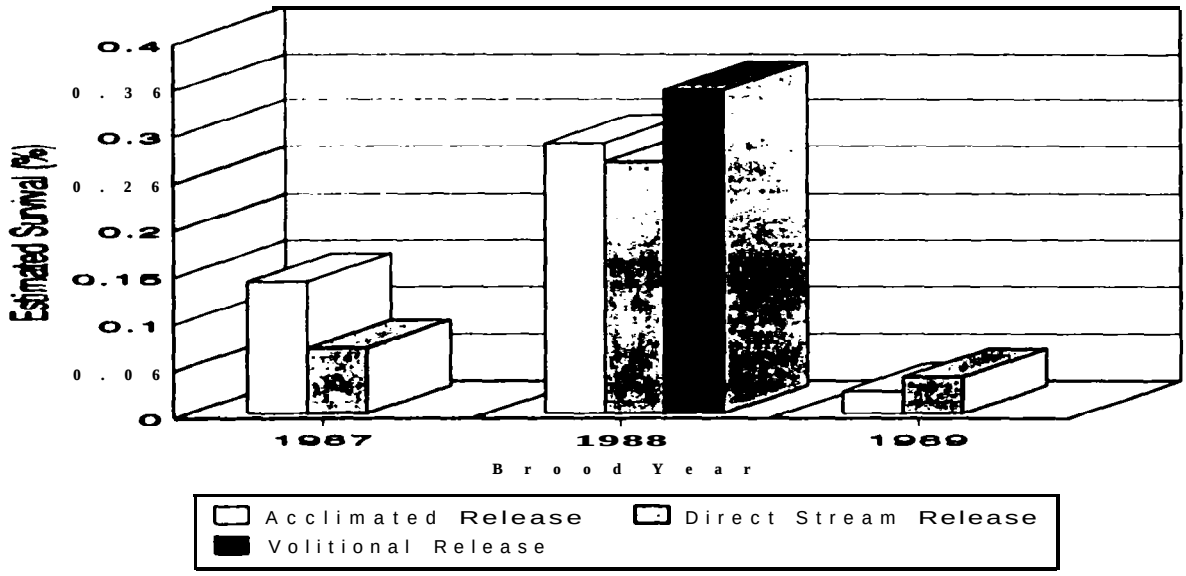

Figure 14. Estimated Umatilla River recoveries of adult coho salmon from releases of acclimated and non-acclimated juveniles in the Umatilla River (1987-1989 brood years).

group (0.20%) was higher than the survival rate of the control group (0.16%) (Table 18 and Figure 13). Conversely, Umatilla River recoveries from the acclimated group (O.02%) were lower than recoveries from the control group (0.04%) (Appendix R and Figure 14).

Survival rates from the coho acclimation studies suggest that acclimation may provide a benefit in both total survival and Umatilla River escapement However, other factors such as time and size at release may be more important than acclimation in increasing survival. Additional survival benefits from acclimation may be. dependent upon releasing juveniles at the proper time and size. For example, the additional increase in survival realized from acclimation may be higher for coho released in April at 10/lb. than for fish released in March at 2O/lb.

Subobjective 4.2: Juvenile Outmigration Monitoring

Task 4.2.1 and 4.2.2 Outmigration Data Collection and Analysis

In 1994, juveniles were trapped at the Westland Canal facility from May 3 to May 19 and from May 31 to August 4. Heavy rains in mid-May allowed the facility to operate in the bypass mode from May 20 through May 30. An estimated 31,800 pounds of fish were hauled prior to the trap being closed in mid-May and an estimated 4,042 pounds were, hauled after the trap was reopened, indicating the majority of the juveniles migrated downstream by the end of May (Table 19).

A total of 3,470 juveniles were sampled (Appendix K). An estimated 83.4% were from fall and spring chinook subyearling hatchery releases. It was not possible to distmguish by mark between the two species, but the small size of the fish suggested that most were fall chinook. An estimated 9.0% were from yearling coho hatchery releases. No known hatchery released coho were observed after the trap was reopened in late May. Three unmarked coho yearlings were sampled in June, but based on size, coloration and fin quality, they were believed to be from natural production. An estimated 1.9% of the fish sampled were from summer steelhead hatchery releases. Most of these (74.5%) were sampled prior to the trap being closed in mid-May. Only 19 naturally produced summer steelhead (0.5%) and two fall chinook yearlings from hatchery releases were sampled. No summer steelhead were observed after the first week in June and no spring chinook yearlings from hatchery releases were observed in any of the samples. An estimated 4.4% of the fish were unmarked chinook. Some of these were probably unmarked fish from hatchery releases, however, based on colortion and body conformity, most were thought to be naturally produced spring chinook yearlings. Forty-two non-game and warm water species (1.2%) were also sampled.

Table 19. Estimated number of fish captured at the Westland Canal fish trapping facility in 1994. /a

				Salmonids											
				Hatchery Production					Natural Production						
	All Species /b														
Date	Lbs.	No./lb.	Number	Coho (Y)	Fall Chinook (Y)	Spring Chinook (Y)	Spring & Fall Chinook (SY)	STS (Y)	STS (Y)	STS (SY)	Coho (Y)	Coho (SY)	Chinook /c	Total Salmonids	Hatchery Releases Only
5/3 to 5/17	29,850														
5/18	1,200	11.6	13920	11588	37	0	185	1296	461	0	0	0	333	13920	13106
5/19	750														
5/20 to 5/30	All fish were bypassed during this period														
5/31	425														
6/1	400	63.4	25360	0	0	0	24778	29	58	0	0	0	465	25330	24807
6/2 to 6/6	1,950														
6/7	50	43.0	2150	0	0	0	1965	36	24	0	0	0	119	2144	2001
6/8	50														
6/9	30	54.5	1635	0	5	0	1562	5	0	0	0	0	44	1616	1572
6/10 to 6/14	575														
6/15	50	48.2	2410	0	0	0	2218	8	0	0	15 /c	0	169	2410	2226
6/16 to 6/17	50	52.0	2600	0	0	0	2462	0	0	0	0	0	131	2593	2462
6/18 to 6/20	75	38.7	2903	0	0	0	2749	10	0	0	10 /c	0	82	2851	2759
6/21 to 6/23	90														
6/24	10	50.6	506	0	0	0	438	3	0	0	0	0	51	492	441
6/25 to 6/27	30	33.5	1005	0	0	0	845	0	0	0	0	0	67	912	845
6/28 to8/4	257														
Total /d	35842		52489	11588	42	0	37202	1387	563	0	25	0	1461	52268	50219

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/a Y = yearling; Sy = subyearling
Fish were hauled on 49 days, but sampled on only nine days.
/b Includes non-game and warmwater game fish.
/c Some of these could be hatchery fish.
/d The fish totals are only for the days the fish were sampled.

Objective 5: Information Dissemination

Task 5.1: Annual Report

Data and information associated with the operation, maintenance and evaluation of Minthorn, Bonifer and Imeques C-mem-ini-kern Acclimation Facilities was compiled and summarized. This annual report was written and submitted to BPA for dissemination.

Objective 6: Umatilla Satellite Facilities Planning

Task 6.1: Planning Activities Participation

Meetings with CTUIR, BPA, ODFW and engineering and architectural firms were held to discuss designs for new Umatilla Hatchery satellite facilities. These include three acclimation facilities located near Mission, ODFW and Barnhart on the Umatilla River and two adult holding and spawning facilities located at Three Mile Dam and on the South Fork Walla Walla River. Review and comments were provided. In addition, follow ups with cnginecrs were performed as necessary during construction of Imeques C-mem-ini-kern Acclimation Facility.

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APPENDICES

Appendix A. Liberation and survival information for summer steelhead released in the Umatilla River.

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries Number	Estimated Recoveries %	Year Recovered	Age at Recovery	Oregon Col. R. Net /1	Oregon Col. R. Sport /2	Oregon Umatilla River	Other
87	073859	9829	10187	24	0.24	89	2	6		18	
				32	0.33	90	3	6		26	
			Totals	56	0.57						
87	073860	9721	10075	34	0.35	89	2	14		20	
				45	0.46	90	3	20		25	
			Totals	79	0.81						
87	073861	9925	10287	37	0.37	89	2	10		27	
				32	0.32	90	3	10	2	20	
			Totals	69	0.70						
87	073856	9689	21940	36	0.37	89	2		10	26	
				36	0.37	90	3	11		23	2 /3
			Totals	72	0.74						
87	073857	9455	21409	32	0.34	89	2	7		25	
				13	0.14	90	3			13	
				3	0.03	91	4			2	1 /4
			Totals	48	0.51						
87	073858	9448	21392	9	0.10	89	2			9	
				21	0.22	90	3		2	19	
			Totals	30	0.32						
88	074720	8784	17372	0	0.00	90	2				
				5	0.06	91	3		3	2	
			Totals	5	0.06						
88	074723	8789	17382	0	0.00	90	2				
				2	0.02	91	3			2	
			Totals	2	0.02						
88	074724	8784	17372	0	0.00	90	2				
				3	0.03	91	3			3	
			Totals	3	0.03						
88	074715	8800	9873	1	0.01	90	2			1	
				7	0.08	91	3			7	
			Totals	8	0.09						
88	074717	8791	9864	1	0.01	90	2			1	
				9	0.10	91	3			9	
			Totals	10	0.11						
88	074718	8778	9849	0	0.00	90	2				
				1	0.01	91	3			1	
			Totals	1	0.01						
89	075212	9331	20240	57	0.61	91	2	5	9	43	
				24	0.26	92	3	5		19	
			Totals	81	0.87						

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Appendix A (cont.)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries Number	Estimated Recoveries %	Year Recovered	Age at Recovery	Oregon Col. R. Net /1	Oregon Sport /2	Oregon Umatilla River	Other
89	075213	9133	19811	63	0.69	91	2	5	2	56	
				28	0.31	92	3	2		26	
			Totals	91	1.00						
89	075214	9080	19696	45	0.50	91	2	7	6	32	
				38	0.42	92	3	15		23	
			Totals	83	0.91						
89	075215	9511	9830	67	0.70	91	2	9	5	53	
				27	0.28	92	3	9	2	16	
			Totals	94	0.99						
89	075216	9525	9845	62	0.65	91	2	5	2	55	
				39	0.41	92	3	14	2	23	
				1	0.01	93	4			1	
			Totals	102	1.07						
89	075217	9454	9771	56	0.59	91	2		25	31	
				26	0.28	92	3	14		12	
			Totals	82	0.87						
90	075340	9835	14221	35	0.36	92	2	7	7	21	
				47	0.48	93	3	7	9	31	
			Totals	82	0.83						
90	075341	9819	14198	32	0.33	92	2	2	4	26	
				40	0.41	93	3	15	3	22	
			Totals	72	0.73						
90	075342	9814	14191	47	0.48	92	2	4	7	36	
				48	0.49	93	3	13	6	29	
			Totals	95	0.97						
90	075343	9432	11084	46	0.49	92	2	10	4	32	
				37	0.39	93	3	6	2	29	
			Totals	83	0.88						
90	075344	9467	11125	30	0.32	92	2	3	1	26	
				36	0.38	93	3	5	5	26	
			Totals	66	0.70						
90	075345	9458	11114	42	0.44	92	2	14		28	
				42	0.44	93	3	7	2	33	
			Totals	84	0.89						
91	075838	10562	24283	1	0.01	93	2			1	
				0	0.00	94	3				
			Totals	1	0.01						
91	075839	10275	24492	0	0.00	93	2				
				0	0.00	94	3				
			Totals	0	0.00						

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Appendix A (cont.)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries Number	Estimated Recoveries %	Year Recovered	Age at Recovery	Oregon Col. R. Net /1	Oregon Col. R. Sport /2	Oregon Umatilla River	Other
91	075840	10105	24087	0	0.00	93	2				
				0	0.00	94	3				
			Totals	0	0.00						
91	075841	10108	22262	0	0.00	93	2				
				0	0.00	94	3				
			Totals	0	0.00						
91	075842	9498	21365	0	0.00	93	2				
				0	0.00	94	3				
			Totals	0	0.00						
91	075843	9747	20923	0	0.00	93	2				
				0	0.00	94	3				
			Totals	0	0.00						
91	074127	10203	22059	5	0.05	93	2			5	
				0	0.00	94	3				
			Totals	5	0.05						
91	073862	10594	22902	2	0.02	93	2			2	
				0	0.00	94	3				
			Totals	2	0.02						
91	073759	10394	22474	15	0.14	93	2	6		9	
				0	0.00	94	3				
			Totals	15	0.14						

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/1 Bonneville, Dalles and John Day Pools
/2 Columbia River and fresh water sport
/3 CDFO Net & Seine
/4 Dworshak National Fish Hatchery

Appendix B Liberation and survival information for fall chinook salmon released in the Umatilla River /1

Br Yr	CWT Code	CWT Rel	Total Rel	Estimated Recoveries No	Estimated Recoveries %	Year Rec.	Age	Oregon Ocean Com	Oregon Ocean Trawl	Oregon Ocean Spt	Oregon Freshwater Col R Gillnet	Oregon Freshwater Test Net Fishery	Oregon Freshwater Spt	Oregon Freshwater Hatch	Oregon Freshwater Trap	Oregon Freshwater Treaty Subsis	Oregon Freshwater Spawn Ground
81	050851	46707	306279	19	0.04	83	2			2	10						
				178	0.38	84	3	10			69						2
				20	0.04	85	4				16						
			Totals	217	0.46												
81	051057	102331	672057	52	0.05	83	2				8						
				480	0.45	84	3	27	1		181		3				9
				50	0.05	85	4				39		1				
				6	0.01	86	5				5						
			Totals	588	0.56												
81	072863	102388	2828835	39	0.04	83	2				2						
				357	0.35	84	3	14			120		3				7
				63	0.06	85	4			2	52			1			
				9	0.01	86	5							Boss			
			Totals	468	0.46												
81	072741	99570	100564	7	0.01	83	2				4			3			
				16	0.02	84	3			2	11			Boss			1
				104	0.10	85	4	2		2	27	1		1	1	Boss. Ladder	
				40	0.04	86	5				27			Boss	1	Boss. Ladder	
			Totals	167	0.17												
82	072829	96448	228412	12	0.01	85	3	3									
				54	0.06	86	4	3			15						
				5	0.01	87	5										
				4	0.00	88	6				4						
			Totals	75	0.08												
83	073124	210441	966250	2	0.00	84	1										2
				82	0.04	85	2				18						
				501	0.24	86	3	18			205						
				873	0.41	87	4	3			419	1	3		1	Boss. Ladder	
				195	0.09	88	5				115		4				
				1	0.00	89	6										
			Totals	1654	0.79												
83	073127	88306	198162	28	0.03	85	2				13						
				116	0.13	86	3	5			27				1		
				484	0.55	87	4	51		6	185		6		1	Boss. Ladder	
				82	0.09	88	5	4			31						
				0	0.00	89	6										
			Totals	710	0.80												
84	073326	206756	3223172	34	0.02	86	2				13				2		
				358	0.17	87	3	11			128						
				853	0.41	88	4	9			509		7				
				537	0.26	89	5	6			239		3		1		
				25	0.01	90	6				9						
			Totals	1807	0.87												
84	073162	30838	51000	18	0.06	87	3				4						
				83	0.27	88	4				38						
				98	0.32	89	5	8			56				2		
				8	0.03	90	6				8						
			Totals	207	0.67												

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Appendix B (cont.)

CWT Code	Year Rec	Washington Ocean Com	Washington Ocean Spt	Washington Ocean Net & Seine	Washington Ocean Treaty Troll	Washington Freshwater Spt	Washington Freshwater Hatch	Washington Freshwater Trap	Washington Freshwater Spawn Ground	Calif Ocean Com	Calif Ocean Spt	Canada Ocean Com	Canada Ocean Net & Seine	Canada Ocean Spt	Alaska Ocean Com	Alaska Ocean Spt	FWS Freshwater Hatch	FWS Freshwater Trap	NMFS Marine
050851	83		7																
	84	6			4	3						77	3	4					
	85											4							
051067	83		32	2								6		4			SCNFH		
	84	24	17	2		12						197		4			1		2
	85		6									4							
	86																	1	
																	NB Bypass		
072683	83		21	1								7		8			SCNFH		
	84	14	11		5	6	2					170	4				1		
	85	2					2					4							
	86		6							3									
072741	83																		
	84														2				
	85				20		2					32		4	12				
	86											11			1				
072829	85		7										2						
	86	4	2				1					19		4	6				
	87						2					3							
	88																		
073124	84																		
	85					5	8		44				2		5				2
	86	4	6				8		86			155	5	4	9	1			
	87		2		2		18	1	187			142	6		88				
	88	2					6					28	3		36	1			
	89						1												
073127	85						15												
	86	5	4			7						37	19	4	2				5
	87	6	23		2	8	17					165			12				2
	88				6		7			9		23	2						
	89																		
073328	86												14						5
	87	3				22	2		21	5		127	6	4	26	1			2
	88	21			2	7	5		43			157	5	7	79	2	LWSH		
	89	7				8	5		69			68	5		125		1		
	90											13			3				
073162	87											9	4			1			
	88				2		3					30		4	6				
	89						7					20	2		3				
	90																		

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Appendix B (cont.)

Br Yr	CWT Code	CWT Rel	Total Rel.	Estimated Recoveries No.	Estimated Recoveries %	Year Rec.	Age	Oregon Ocean Com	Oregon Ocean Trawl	Oregon Ocean Spt	Oregon Freshwater Col. R Gillnet	Oregon Freshwater Test Net Fishery	Oregon Freshwater Spt	Oregon Freshwater Hatch	Oregon Freshwater Trap	Oregon Freshwater Treaty Subsis	Oregon Freshwater Spawn Ground
84	073327	88396	208815	123	0.14	86	2				29				70		
				331	0.37	87	3	4		13	93		5				
				1556	1.76	88	4	38		4	476	1	17		32		
				712	0.81	89	5	2		4	339				13		9
				81	0.09	90	6				34				1		
				1	0.00	91	7										
			Totals	2804	3.17												
85	073833	20836	197432	2	0.01	87	2										
				50	0.24	88	3				17						
				59	0.29	89	4				34						
				22	0.11	90	5										
				21	0.10	91	6										
			Totals	154	0.75												
85	073834	21335	198153	16	0.07	88	3						9				
				45	0.21	89	4				20						
				18	0.08	90	5				10						
				0	0.00	91	6										
			Totals	79	0.37												
85	073835	20890	197488	4	0.02	87	2			4							
				8	0.04	88	3	4									
				24	0.12	89	4				15						
				37	0.18	90	5				14						
				4	0.02	91	6										
			Totals	77	0.37												
85	073836	20170	198952	26	0.13	88	3	2			7		3				
				60	0.30	89	4				29						
				13	0.06	90	5				13						
				3	0.01	91	6				3						
			Totals	102	0.51												
85	073837	20982	197788	5	0.02	87	2										
				34	0.16	88	3				7						
				35	0.17	89	4				7						
				32	0.15	90	5				22						
				1	0.00	91	6										
			Totals	107	0.51												
85	073838	20815	208103	2	0.01	87	2										
				13	0.06	88	3				6						
				40	0.19	89	4				18						
				25	0.12	90	5				13						
				1	0.00	91	6										
			Totals	81	0.39												
85	073839	21659	208958	5	0.02	87	2				4						
				22	0.10	88	3	4			15						
				60	0.28	89	4				40						
				29	0.13	90	5				24						
				3	0.01	91	6										
			Totals	119	0.55												
85	073840	20269	207550	5	0.02	87	2										
				15	0.07	88	3	1			4						
				68	0.34	89	4				25						
				25	0.12	90	5				13						
				0	0.00	91	6										
			Totals	113	0.56												

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Appendix B (cont.)

CWT Code	Year Rec.	Washington Ocean Com	Washington Ocean Spt.	Washington Ocean Net & Seine	Washington Ocean Treaty Troll	Washington Freshwater Spt	Washington Freshwater Hatch	Washington Freshwater Trap	Washington Freshwater Spawn Ground	Calif Ocean Com	Calif Ocean Spt	Canada Ocean Com.	Canada Ocean Net & Seine	Canada Ocean Spt.	Alaska Ocean Com.	Alaska Ocean Spt.	FWS Freshwater Hatch.	FWS Freshwater Trap	NMFS Marine
073327	86						3	8				5	9		1				
	87		22	2	10	18	8					25	68	38	9	2			14
	88	89	28	1	69	24	17		21			680	1	8	49	1			
	89	12	9			14	20		35			198	4	8	49				
	90											11		4	31				
	91						1												
073833	87														2				
	88				2		1		21			4	5						
	89						3					17			5				
	90						2					15			5				
	91								21										
073834	88						1					2		4					
	89				1							22			2				
	90											6			2				
	91																		
073835	87																		
	88						4												
	89						3					4			2				
	90		8				2					3			10				
	91											4							
073836	88											12			2				
	89						4		17			3	2		5				
	90																		
	91																		
073837	87												5						
	88						1		21			5							
	89						3		17			8							
	90						1					3			6				
	91						1												
073838	87												2						
	88					5	2												
	89						3					4			15				
	90						1					11							
	91														1				
073839	87						1												
	88											3							
	89					1	3	Strom Col River @ PR				11			5				
	90						1					4							
	91											3							
073840	87						1							4					
	88						2					8							
	89						5					36			2				
	90						2								10				
	91																		

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Appendix B (cont.)

Br. Yr	CWT Code	CWT Rel	Total Rel	Estimated Recoveries No	Estimated Recoveries %	Year Rec	Age	Oregon Ocean Com	Oregon Ocean Trawl	Oregon Ocean Spt	Oregon Freshwater Col. R Gillnet	Oregon Freshwater Test Net Fishery	Oregon Freshwater Spt	Oregon Freshwater Hatch	Oregon Freshwater Trap	Oregon Freshwater Treaty Subsis	Oregon Freshwater Spawn Ground
85	073841	20895	208184	37	0.18	88	3				12						
				44	0.21	89	4				19						
				46	0.22	90	5				8						
				0	0.00	91	6										
			Totals	127	0.61												
85	073842	21694	208994	17	0.08	88	3	4			13						
				45	0.21	89	4				31						
				34	0.16	90	5				17						
				0	0.00	91	6										
			Totals	96	0.44												
85	073823	10103	22216	4	0.04	87	2				4						
				24	0.24	88	3			4					4		
				113	1.12	89	4	2			43				9		2
				71	0.70	90	5				36				4		3
				12	0.12	91	6				3				3		1
			Totals	224	2.22												
85	073824	10243	22523	4	0.04	87	2				3			1			
				27	0.26	88	3						4	[illegible]	4		
				122	1.19	89	4	5		2	55				3		2
				58	0.57	90	5				23			1	1		4
				1	0.01	91	6							[illegible]	1		
			Totals	212	2.07												
85	073825	9917	21807	5	0.05	87	2				3			1			
				23	0.23	88	3				7			[illegible]	8		
				102	1.03	89	4	9			30				8		4
				85	0.86	90	5				45				4		3
				4	0.04	91	6										
				1	0.01	92	7										
			Totals	220	2.22												
85	073826	9496	20881	4	0.04	87	2				3			1			
				26	0.27	88	3				9			[illegible]	5		
				92	0.97	89	4	1			31		3		7		
				92	0.97	90	5				28				2		
				7	0.07	91	6				3						
				4	0.04	92	7				4						
			Totals	225	2.37												
85	073827	9876	21716	8	0.08	87	2				8						
				12	0.12	88	3			2					7		
				107	1.08	89	4			1	36				8		
				43	0.44	90	5	3			11				3		
				44	0.45	91	6				2						
			Totals	214	2.17												
85	073828	10253	20786	15	0.15	88	3				4				1		
				111	1.08	89	4	10		1	35		3		2		
				100	0.98	90	5				45		15		2		3
				7	0.07	91	6										
			Totals	233	2.27												
85	073829	9970	20212	26	0.26	88	3				7		4		1		
				117	1.17	89	4	6			27		10		1		
				75	0.75	90	5				35				2		4
				8	0.08	91	6				5						
			Totals	226	2.27												

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Appendix B (cont.)

CWT Code	Year Rec	Washington Ocean Com	Washington Ocean Spt	Washington Ocean Net & Seine	Washington Ocean Treaty Troll	Washington Freshwater Spt	Washington Freshwater Hatch	Washington Freshwater Trap	Washington Freshwater Spawn Ground	Calif Ocean Com	Calif Ocean Spt	Canada Ocean Com	Canada Ocean Net & Seine	Canada Ocean Spt	Alaska Ocean Com.	Alaska Ocean Spt	FWS Freshwater Hatch	FWS Freshwater Trap	NMFS Marine
073841	88			1			2		21			1							
	89						3		17			3			2				
	90					4			26			3			5				
	91																		
073842	88																		
	89				1		5					7			1				
	90											9			8				
	91																		
073823	87																		
	88			3			1						5	4	1	2			
	89	2			2	2	1					39	4		6	1			
	90					3						8		7	10				
	91											4				1			
073824	87																		
	88					10						6	2		1				
	89	5	4		3	5	1					24			13				
	90						1					19			9				
	91																		
073825	87															1			
	88					2							2	4					
	89	2	8		1		1					31			7				
	90						1					22			10				
	91											4							
	92						1												
073826	87																		
	88		2			5							3		2				
	89	5				5	1					31	3	4	1				
	90					43						9			10				
	91													4					
	92																		
073827	87																		
	88												2			1			
	89	2	6		7	5	1					31			10				
	90						1		1			13	2	4	5				
	91								42										
073828	88		3									2	4			1			
	89	2			1	9						40	5		2	1			
	90	2					2					20	4		7				
	91											3			4				
073829	88		2										3	8			1		
	89	7				4	2					48			12		N Bons Bypass		
	90				1		5					9			18	1			
	91							2				1							

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Appendix B (cont.)

Br Yr	CWT Code	CWT Rel	Total Rel.	Estimated Recoveries No.	Estimated Recoveries %	Year Rec.	Age	Oregon Ocean Com	Oregon Ocean Trawl	Oregon Ocean Spt	Oregon Freshwater Col. R Gillnet	Oregon Freshwater Test Net Fishery	Oregon Freshwater Spt	Oregon Freshwater Hatch	Oregon Freshwater Trap	Oregon Freshwater Treaty Subsis	Oregon Freshwater Spawn Ground
85	073830	10135	20546	9	0.09	87	2										
				29	0.29	88	3				4				3		
				130	1.28	89	4				82			1	3		
				95	0.94	90	5				25		16	Bonus	3		2
				14	0.14	91	6				10						Includes 1 Creel
			Totals	277	2.73												
85	073831	10053	20381	27	0.27	88	3				7				7		
				109	1.08	89	4	2			33				8		2
				82	0.82	90	5				40				1		3
				4	0.04	91	6				4						
			Totals	222	2.21												
85	073832	10081	20438	6	0.06	87	2				4						
				16	0.16	88	3						3		1		
				109	1.08	89	4	3			55				7		2
				93	0.92	90	5				35						3
				23	0.23	91	6				14			1	2		
														Bonus			
			Totals	247	2.45												
86	073912	40793	497572	10	0.02	88	2				3				3		
				88	0.22	89	3				39						2
				168	0.41	90	4	7			71						1
				27	0.07	91	5				10						Creel
				0	0.00	92	6										
			Totals	291	0.71												
86	073913	41096	501266	17	0.04	88	2				4						
				108	0.26	89	3			2	42	1			1		
				201	0.49	90	4				88				3		
				34	0.08	91	5				6						
				0	0.00	92	6										
			Totals	360	0.88												
86	073914	39187	477992	16	0.04	88	2				4				7		
				96	0.24	89	3	5		2	24		6		3		
				194	0.50	90	4				69						
				30	0.08	91	5				8						
				0	0.00	92	6										
			Totals	336	0.86												
86	073915	843	670	0	0.00	90	4										
				0	0.00	91	5										
				0	0.00	92	6										
			Totals	0	0.00												
86	073916	845	672	0	0.00	90	4										
				0	0.00	91	5										
				0	0.00	92	6										
			Totals	0	0.00												
86	074035	632	658	5	0.79	89	3				4						
				0	0.00	90	4										
				0	0.00	91	5										
				0	0.00	92	6										
			Totals	5	0.79												
86	074038	42068	52317	279	0.66	88	2				3		18		258		
				150	0.36	89	3	5		4	40				37		
				764	1.82	90	4	25		6	223		8		46		6
				179	0.43	91	5	2			45		9		31		1
				26	0.06	92	6				4				3		
			Totals	1398	3.32												

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Appendix B (cont.)

CWT Code	Year Rec	Washington Ocean Com	Washington Ocean Spt	Washington Ocean Net & Seine	Washington Ocean Treaty Troll	Washington Freshwater Spt.	Washington Freshwater Hatch.	Washington Freshwater Trap	Washington Freshwater Spawn Ground	Calif Ocean Com	Calif Ocean Spt.	Canada Ocean Com	Canada Ocean Net & Seine	Canada Ocean Spt	Alaska Ocean Com.	Alaska Ocean Spt.	FWS Freshwater Hatch	FWS Freshwater Trap	NMFS Marine
073830	87					3							6						
	88											6	6	6	4				
	89	5	2			15	4					28		4	8				
	90						4					18			27				
	91						1					3							
073831	88					5							8						
	89	7	5			1	5					31		6	8	1			
	90						7					21			10				
	91																		
073832	87																		2
	88		5		7														
	89					4	1					19	2	10	6				
	90						2					23	6		24				
	91							1				4			1				
073912	88						1						3						
	89		2		1		17		1			24			2				
	90		4			3	8		1			38			33				
	91						3	2				6	3			1			
	92																		
073913	88						2						3	4	4				
	89		1		1	6	9					30	6		8	1			
	90	2					9		27			47	3		22				
	91	2					2	1				3		4	16				
	92																		
073914	88						2						3						
	89				5		13				5	32			1				
	90				2	11	13		1			51	2		44	1			
	91						1	3				11			7				
	92																		
073915	90																		
	91																		
	92																		
073916	90																		
	91																		
	92																		
074035	89						1												
	90																		
	91																		
074038	88																		
	89		5	6	9	6						3	25	4	4				2
	90	23	20		20	10	6					301	6		61	1			2
	91	1					3	11	7			41		4	24				
	92								19										

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Appendix B. (cont.)

Br Yr.	CWT Code	CWT Rel	Total Rel	Estimated Recoveries No	Estimated Recoveries %	Year Rec.	Age	Oregon Ocean Com	Oregon Ocean Trawl	Oregon Ocean Spt	Oregon Freshwater Col R Gillnet	Oregon Freshwater Test Net Fishery	Oregon Freshwater Spt	Oregon Freshwater Hatch	Oregon Freshwater Trap	Oregon Freshwater Treaty Subsis	Oregon Freshwater Spawn Ground
86	074039	38978	48474	237	0.81	88	2					2			233		
				119	0.31	89	3				7				53		
				701	1.80	90	4	27		5	230		3		34		5
				154	0.40	91	5				39		9	1	15		2
				9	0.02	92	6							Boas	1		
			Totals	1220	3.13												
86	074036	38509	50480	175	0.44	88	2								174		
				147	0.37	89	3			7	29				44	Tech. dest 1 C lanteo	
				505	1.28	90	4	13		2	132		22		21		4
				120	0.30	91	5			2	40				13		
				5	0.01	92	6								1		
			Totals	952	2.41												
86	074037	38405	49070	168	0.44	88	2				3				165		
				110	0.29	89	3			12	26				34		
				527	1.37	90	4	27		5	145				30		4
				191	0.50	91	5				77		19		18		1
				5	0.01	92	6										
			Totals	1001	2.61												
87	075007	198285	3316007	20	0.01	89	2								10		
				44	0.02	90	3				13				1		
				67	0.03	91	4				23				4		
				16	0.01	92	5										
				0	0.00	93	6										
			Totals	147	0.07												
87	074539	4436	4823	1	0.02	90	3										
				17	0.38	91	4				5				1		
				1	0.02	92	5										
				0	0.00	93	6										
			Totals	19	0.43												
87	074540	4289	4880	2	0.05	90	3								1		
				5	0.12	91	4				2						
				3	0.07	92	5				2						
				0	0.00	93	6										
			Totals	10	0.23												
87	074541	4533	4925	10	0.22	90	3				3						
				14	0.31	91	4										
				4	0.09	92	5				4						
				0	0.00	93	6										
			Totals	28	0.62												
87	074538	24856	26858	2	0.01	89	2								2		
				16	0.06	90	3				5				4		
				67	0.27	91	4				22			1	6		
				12	0.05	92	5				7				1		
				0	0.00	93	6										
			Totals	97	0.39												
87	074537	23403	25493	3	0.01	89	2								1		
				33	0.14	90	3				2				8		
				89	0.38	91	4	3			26				6		
				19	0.08	92	5				2				1		
				0	0.00	93	6										
			Totals	144	0.62												

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Appendix B (cont.)

CWT Code	Year Rec	Washington Ocean Com	Washington Ocean Spt	Washington Ocean Net & Seine	Washington Ocean Treaty Troll	Washington Freshwater Spt	Washington Freshwater Hatch	Washington Freshwater Trap	Washington Freshwater Spawn Ground	Calif. Ocean Com	Calif. Ocean Spt	Canada Ocean Com	Canada Ocean Net & Seine	Canada Ocean Spt	Alaska Ocean Com	Alaska Ocean Spt	FWS Freshwater Hatch	FWS Freshwater Trap	NMFS Marine
074039	88						2												
	89		2	2	11		1					6	26	4	5				2
	90	14	21		23	16	5					224	11		83				
	91	2	2				1	7	7		2	37		7	23				
	92											6			2				
074036	88						1												
	89		23		6	5							22	6	2	1			2
	90	15	27		6	6	4				4	201	3		45				
	91							9				40			16				
	92							1				3							
074037	88																		
	89		4		1	12	1					4	15		1				
	90	4	22		9	1	6				4	210	3	5	52				
	91	2	5					10	7			29	4		19				
	92							1				4							
075007	89						4						6						
	90		2				1					16	3		8				
	91						2	4				17			17				
	92						2	3	1			7			3				
	93																		
074539	90												1						
	91						1	1				9							
	92							1											
	93																		
074540	90				1														
	91											3							
	92							1											
	93																		
074541	90						1					6							
	91							1				11			2				
	92																		
	93																		
074538	89																		
	90						3	2							1	1			
	91					2		4				14		12	6				
	92											3			1				
	93																		
074537	89												2						
	90		9		1			1		2		4	6						
	91		3				1	3	1			24			22				
	92						1	1				7			7				
	93																		

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Appendix B (cont.)

Br Yr	CWT Code	CWT Rel	Total Rel	Estimated Recoveries No	Estimated Recoveries %	Year Rec	Age	Oregon Ocean Com	Oregon Ocean Trawl	Oregon Ocean Spt	Oregon Freshwater Col. R Gillnet	Oregon Freshwater Test Net Fishery	Oregon Freshwater Spt	Oregon Freshwater Hatch	Oregon Freshwater Trap	Oregon Freshwater Treaty Subsis	Oregon Freshwater Spawn Ground
87	074538	25089	27330	2	0.01	89	2								2		
				32	0.13	90	3	15			2				4		
				69	0.26	91	4			1	18	1	2		11		
				26	0.10	92	5				8				3		
				3	0.01	93	6				2						
			Totals	132	0.53												
88	074758	26790	27071	0	0.00	90	2										
				1	0.00	91	3								1		
				13	0.05	92	4				6						
				12	0.04	93	5								2		
				1	0.00	94	6								1		
			Totals	27	0.10												
88	074760	24285	25428	0	0.00	90	2										
				1	0.00	91	3										
				18	0.07	92	4				4						
				4	0.02	93	5								1		
				0	0.00	94	6										
			Totals	23	0.09												
88	074763	25350	25633	0	0.00	90	2										
				3	0.01	91	3								2		
				13	0.05	92	4				3				2		
				0	0.00	93	5										
				0	0.00	94	6										
			Totals	16	0.06												
88	074753	26358	26770	2	0.01	90	2										
				7	0.03	91	3			3	3				1		
				14	0.05	92	4	2			5						
				9	0.03	93	5				6						
				1	0.00	94	6								1		
			Totals	33	0.13												
88	074754	25028	26617	6	0.02	90	2								6		
				10	0.04	91	3				4				1		
				5	0.02	92	4				2						
				5	0.02	93	5				2						
				0	0.00	94	6										
			Totals	26	0.10												
88	074757	25438	25438	2	0.01	90	2								2		
				4	0.02	91	3				2				2		
				12	0.05	92	4				2						3
				1	0.00	93	5										
				0	0.00	94	6										
			Totals	19	0.07												
88	074646	52228	797904	4	0.01	90	2								2		
				12	0.02	91	3				7				3		
				46	0.09	92	4				11				1		
				2	0.00	93	5								1		
				0	0.00	94	6										
			Totals	64	0.12												
88	074647	49771	797903	8	0.02	90	2				3				1		
				9	0.02	91	3								2		
				34	0.07	92	4				4				1		
				9	0.02	93	5				6						
				0	0.00	94	6										
			Totals	60	0.12												

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Appendix B (cont.)

CWT Code	Year Rec	Washington Ocean Com	Washington Ocean Spt	Washington Ocean Net & Seine	Washington Ocean Treaty Troll	Washington Freshwater Spt	Washington Freshwater Hatch	Washington Freshwater Trap	Washington Freshwater Spawn Ground	Calif Ocean Com	Calif Ocean Spt	Canada Ocean Com	Canada Ocean Net & Seine	Canada Ocean Spt	Alaska Ocean Com	Alaska Ocean Spt	FWS Freshwater Hatch	FWS Freshwater Trap	NMFS Marine
074538	89																		
	90			6	3		2												
	91				3	7	1	1	2			15			7				
	92					8						5			2				
	93								1										
	94																		
074758	90																		
	91																		
	92						1	2				3			1				
	93							3				3		4					
	94																		
074760	90																		
	91						1												
	92				2		1	1				10							
	93														3				
	94																		
074763	90																		
	91						1												
	92							1				6			1				
	93																		
	94																		
074753	90												2						
	91																		
	92							2				5							
	93														3				
	94																		
074754	90																		
	91						1							4					
	92				2			1											
	93						1	2											
	94																		
074757	90																		
	91																		
	92						1	2					4						
	93						1												
	94																		
074646	90						1						1						
	91						1	1											
	92						3	2	1			12			16				
	93							1											
	94																		
074647	90												1	3					
	91						3	1				3							
	92					3	3	3				11	2		7				
	93					1		2											
	94																		

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Appendix B. (cont.)

Br Yr	CWT Code	CWT Rel	Total Rel	Estimated Recoveries No.	Estimated Recoveries %	Year Rec.	Age	Oregon Ocean Com	Ocean Trawl	Ocean Spt	Freshwater Col R Gillnet	Freshwater Test Net Fishery	Freshwater Spt	Freshwater Hatch	Freshwater Trap	Freshwater Treaty Subsis	Freshwater Spawn Ground
88	074648	52244	797903	5	0.01	90	2										
				14	0.03	91	3				7						
				30	0.08	92	4				2						
				9	0.02	93	5				2				1		
				0	0.00	94	6										
			Totals	58	0.11												
89	075403	52612	1018502	8	0.02	91	2				3				5		
				24	0.05	92	3				2				1		
				47	0.09	93	4				13				5		
				14	0.03	94	5				3						
			Totals	93	0.18												
89	075404	53160	1018493	12	0.02	91	2				6				3		
				18	0.03	92	3				2						
				64	0.12	93	4				24		4				
				18	0.03	94	5				6				3		
			Totals	112	0.21												
89	075405	53248	1018486	8	0.02	91	2								7		
				10	0.02	92	3				3						
				41	0.08	93	4				6				2		
				11	0.02	94	5				4				1		
			Totals	70	0.13												
89	075325	23396	25311	4	0.02	91	2										
				1	0.00	92	3										1
				2	0.01	93	4				2						Creel
				0	0.00	94	5										
			Totals	7	0.03												
89	075326	21929	23724	2	0.01	91	2										
				10	0.05	92	3								1		
				11	0.05	93	4				10						
				1	0.00	94	5								1		
			Totals	24	0.11												
89	075327	21101	22828	2	0.01	91	2								2		
				4	0.02	92	3				3						
				7	0.03	93	4				4				1		
				1	0.00	94	5								1		
			Totals	14	0.07												
89	075322	23413	25472	0	0.00	91	2										
				2	0.01	92	3										
				7	0.03	93	4				3						
				2	0.01	94	5				2						
			Totals	11	0.05												
89	075323	23817	25694	0	0.00	91	2										
				1	0.00	92	3										
				0	0.00	93	4										
				0	0.00	94	5										
			Totals	1	0.00												
89	075324	23420	25480	0	0.00	91	2										
				2	0.01	92	3				2						
				10	0.04	93	4								1		
				0	0.00	94	5										
			Totals	12	0.05												

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Appendix B (cont.)

CWT Code	Year Rec	Washington Ocean Com	Washington Ocean Spt	Washington Ocean Net & Seine	Washington Ocean Treaty Troll	Washington Ocean Spt	Washington Freshwater Hatch	Washington Freshwater Trap	Washington Freshwater Spawn Ground	Calif Ocean Com	Calif Ocean Spt	Canada Ocean Com	Canada Ocean Net & Seine	Canada Ocean Spt	Alaska Ocean Com	Alaska Ocean Spt	FWS Freshwater Hatch	FWS Freshwater Trap	NMFS Marine
074048	90						1	1					3						
	91						3	3	1										
	92						2	3	2			13			8				
	93							2				4							
	94																		
075403	91																		
	92						1	3				13			4				
	93						2	10	4			13							
	94								1			6			4				
075404	91											3							
	92				2		1	4	2			7							
	93				2	1	2	4	1			17	3		6				
	94							2					1	4	2				
075405	91							1											
	92			4				3											
	93							4	1			18		4	6				
	94											3			3				
075325	91												4						
	92																		
	93																		
	94																		
075326	91												2						
	92											3			6				
	93							1											
	94																		
075327	91																		
	92							1											
	93			2															
	94																		
075322	91																		
	92							2											
	93							1				3							
	94																		
075323	91																		
	92							1											
	93																		
	94																		
075324	91																		
	92																		
	93											5	4						
	94																		

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Appendix B (cont.)

Br Yr	CWT Code	CWT Rel	Total Rel	Estimated Recoveries No	Estimated Recoveries %	Year Rec	Age	Oregon Ocean Com	Ocean Trawl	Ocean Spt	Freshwater Col. R. Gillnet	Freshwater Test Net Fishery	Freshwater Spt	Freshwater Hatch	Freshwater Trap	Treaty Subsis	Spawn Ground
90	075225	52252	1347858	1	0.00	92	2										
				5	0.01	93	3								1		
				29	0.08	94	4				5				12		
			Totals	35	0.07												
90	075226	51728	1347587	0	0.00	92	2										
				6	0.01	93	3								2		
				34	0.07	94	4				3				3		
			Totals	40	0.08												
90	075328	48266	100983	3	0.01	92	2								3		
				29	0.06	93	3				8				3		
				102	0.21	94	4				8				7	54	
			Totals	134	0.28												
90	075449	48481	100300	7	0.01	92	2						3		2		
				15	0.03	93	3								1		
				44	0.09	94	4				11				12		1
			Totals	66	0.14												
90	070018	48301	99561	1	0.00	92	2										
				17	0.04	93	3				10				1		
				45	0.09	94	4				9				6		
			Totals	63	0.13												
90	075450	51814	52503	2	0.00	92	2								1		
				16	0.03	93	3				2		2		2		
				72	0.14	94	4				11				17		
			Totals	90	0.17												
90	075451	52444	52884	8	0.02	92	2								2		
				27	0.05	93	3				5				3		
				60	0.11	94	4				17				7		
			Totals	95	0.18												
90	075583	26173	26481	0	0.00	92	2										
				5	0.02	93	3								3		
				23	0.09	94	4				8				2		
			Totals	28	0.11												
90	075601	24762	26585	1	0.00	92	2										
				11	0.04	93	3				7				1		
				27	0.11	94	4				2				1		
			Totals	39	0.16												
90	075602	25478	26606	2	0.01	92	2								1		
				15	0.06	93	3	4					3		3		
				29	0.11	94	4				6			1	4		
														Elk R.			
			Totals	46	0.18												
90	075560	25720	25862	7	0.03	92	2				6						
				6	0.02	93	3								1		
				18	0.07	94	4				1				4		
			Totals	31	0.12												
90	075561	25425	25708	1	0.00	92	2										
				17	0.07	93	3				6				2		
				15	0.06	94	4				6				1		
			Totals	33	0.13												

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Appendix B (cont.)

CWT Code	Year Rec	Washington Ocean Com	Washington Ocean Spt	Washington Ocean Net & Seine	Washington Ocean Treaty Troll	Washington Freshwater Spt	Washington Freshwater Hatch	Washington Freshwater Trap	Washington Freshwater Spawn Ground	Calif. Ocean Com	Calif. Ocean Spt	Canada Ocean Com	Canada Ocean Net & Seine	Canada Ocean Spt	Alaska Ocean Com.	Alaska Ocean Spt.	FWS Freshwater Hatch	FWS Freshwater Trap	NMFS Marine
075225	92							1											
	93						1								3				
	94					1	2	2	1						8				
075226	92																		
	93							4											
	94							3	1			13			11				
075328	92																		
	93						1					6			11				
	94							12	1			6			14				
075449	92						1	1											
	93						1	1				6			6				
	94					1		5	1			9			4				
070016	92							1											
	93		3					1							2				
	94					1	3	7	1			11			6	1			
075450	92		1																
	93						2	2				5			1				
	94						1	9				23			10	1			
075451	92							3					3						
	93		4					1				9		4	1				
	94						2	2	1			19	1		11				
075583	92																		
	93							2											
	94							2				8	1		2				
075601	92							1											
	93							1							2				
	94							4	1			11			8				
075602	92							1											
	93						1							4					
	94						1	2				11			4				
075580	92							1											
	93							1				1			3				
	94						1	5				7							
075581	92														1				
	93											9							
	94						2					4			2				

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Appendix B. (cont.)

Br. Yr.	CWT Code	CWT Rel	Total Rel.	Estimated Recoveries No.	Estimated Recoveries %	Year Rec.	Age	Oregon Ocean Com	Oregon Ocean Trawl	Oregon Ocean Spt	Oregon Freshwater Col. R. Gillnet	Oregon Freshwater Test Net Fishery	Oregon Freshwater Spt	Oregon Freshwater Hatch	Oregon Freshwater Trap	Oregon Freshwater Treaty Subsis	Oregon Freshwater Spawn Ground
90	075562	22309	23295	3	0.01	92	2										
				8	0.04	93	3				3				2		
				24	0.11	94	4				2				4		
			Totals	35	0.16												
90	075618	26178	97801	0	0.00	93	3										
				5	0.02	94	4										
			Totals	5	0.02												
90	075619	26160	122639	0	0.00	93	3										
				1	0.00	94	4								1		
			Totals	1	0.00												
91	071460	23863	68492	3	0.01	93	2								3		
				1	0.00	94	3								1		
			Totals	4	0.02												
91	071461	23239	86345	3	0.01	93	2								3		
				9	0.04	94	3								4		
			Totals	12	0.05												
91	071429	31892	288884	1	0.00	94	3								1		
91	071430	32287	281830	0	0.00	94	3										
91	071431	28951	183113	0	0.00	94	3										
91	071432	29425	191448	0	0.00	94	3										
91	071433	29066	304181	0	0.00	94	3										
91	071434	31224	307108	0	0.00	94	3										
91	071435	30328	297627	0	0.00	94	3										
91	071436	30365	302857	0	0.00	94	3										
91	071437	30508	224053	1	0.00	94	3								1		
91	071438	30924	302132	0	0.00	94	3										
92	070125	29360	275571	6	0.02	94	2								2		
92	076329	30708	206030	1	0.00	94	2				1						
92	076330	28984	298200	3	0.01	94	2								2		
92	076331	29537	285309	2	0.01	94	2								1		
92	076332	29451	281068	4	0.01	94	2								4		
92	076333	29718	276750	2	0.01	94	2				1						
92	076334	29958	285360	2	0.01	94	2								2		
92	076335	30462	209908	2	0.01	94	2								2		
92	070252	23470	49824	15	0.06	94	2								15		
92	070255	23699	233629	32	0.14	94	2								31		

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/1 Adult returns from the 1987 to 1992 brood years are incomplete.

Appendix B (cont.)

CWT Code	Year Rec	Washington Ocean Com	Washington Ocean Spt	Washington Ocean Net & Seine	Washington Ocean Treaty Troll	Washington Freshwater Spt	Washington Freshwater Hatch	Washington Freshwater Trap	Washington Freshwater Spawn Ground	Calif Ocean Com	Calif Ocean Spt	Canada Ocean Com	Canada Ocean Net & Seine	Canada Ocean Spt.	Alaska Ocean Com	Alaska Ocean Spt	FWS Freshwater Hatch.	FWS Freshwater Trap	NMFS Marine
075562	92				2				1										
	93							3											
	94						3	3				8			4				
075618	93																		
	94											5							
075619	93																		
	94																		
071460	93																		
	94																		
071461	93																		
	94						1						4						
071429	94																		
071430	94																		
071431	94																		
071432	94																		
071433	94																		
071434	94																		
071435	94																		
071436	94																		
071437	94																		
071438	94																		
070125	94											4							
076329	94																		
076330	94							1											
076331	94							1											
076332	94																		
076333	94					1													
076334	94																		
076335	94																		
070252	94																		
070255	94						1												

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Appendix C. Liberation and survival information for spring chinook salmon released in the Umatilla River.

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries Number	Estimated Recoveries %	Year Recov.	Age at Recov.	Oregon Hatchery/Trap/ Spawn Ground	Oregon Col. R. Sport	Oregon Col. R. Gillnet
86	074325	26640	35946	3	0.011	88	2	2		
				8	0.030	89	3	Boss.		
				177	0.664	90	4		1	2
				65	0.244	91	5			2
			Totals	253	0.950					
86	074326	25863	35148	0	0.000	88	2			
				4	0.015	89	3			
				173	0.669	90	4		26	3
				67	0.259	91	5		13	6
			Totals	244	0.943					
86	074327	25853	35137	0	0.000	88	2			
				4	0.015	89	3			
				166	0.642	90	4		7	
				74	0.286	91	5		1	
			Totals	244	0.944					
86	074328	26319	64142	1	0.004	88	2	1		
				6	0.023	89	3	Boss.		
				125	0.475	90	4	2		
				40	0.152	91	5	1 Boss.		
								1 LG		
			Totals	172	0.654					
86	074329	25722	62991	2	0.008	88	2	2		
				4	0.016	89	3	Boss.		
				80	0.311	90	4	2		
				38	0.148	91	5	1 LG	1	4
								1 Hells Canyon Dam trap		
			Totals	124	0.482					
86	074330	26252	64013	0	0.000	88	2			
				0	0.000	89	3			
				169	0.644	90	4		1	
				72	0.274	91	5		12	
			Totals	241	0.918					
87	074420	410	416	0	0.000	89	2			
				0	0.000	90	3			
				0	0.000	91	4			
			Totals	0	0.000					
87	074423	393	399	0	0.000	89	2			
				0	0.000	90	3			
				1	0.254	91	4			
			Totals	1	0.254					
87	074424	376	381	0	0.000	89	2			
				0	0.000	90	3			
				1	0.266	91	4			
			Totals	1	0.266					

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Appendix C (cont)

CWT Code	Year Recov	Oregon: Test Net Fishery /1	Oregon: Indian Ceremonial /1	Oregon: Umatilla R. Fish Trap	Oregon: Uma. R. Spawn Surveys/Sport	Wash.: Sport	Wash.: Treaty Troll	Wash./Idaho: Hatchery/Trap/ Spawn Ground	Alaska Ocean Comm.
074325	88							1	
	89			8				Cowlitz	
	90		11	15	148				
	91		6	2	55				
074326	88								
	89			4					
	90		12	15	114	3	Freshwater		
	91	1	8	10	29		42001 R67		
074327	88								
	89			4					
	90	1	17	9	125			7	
	91		6	8	59			Tucannon	
074328	88								
	89			6					
	90	1	11	9	102				
	91	1	6	12	21				
074329	88								
	89			4					
	90		15	16	46			1	
	91	1	9	10	13			IDFG Hatch.	
								4F - 1706030503600.00	
074330	88								
	89								
	90	2	11	17	137			1	
	91	1	11	14	34			IDFG Hatch.	
								4F - 1706020106901.25	
074420	89								
	90								
	91								
074423	89								
	90								
	91			1					
074424	89								
	90								
	91			1					

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Appendix C (cont)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries Number	Estimated Recoveries %	Year Recov	Age at Recov.	Oregon Hatchery/Trap/ Spawn Ground	Oregon Col. R Sport	Oregon Col. R Gillnet
87	074427	25987	26109	0	0.000	89	2			
				0	0.000	90	3			
				15	0.058	91	4			
			Totals	15	0.058					
87	074429	24070	24183	0	0.000	89	2			
				2	0.008	90	3			
				21	0.087	91	4			
				5	0.021	92	5			
			Totals	28	0.116					
87	074430	25356	25475	0	0.000	89	2			
				0	0.000	90	3			
				21	0.083	91	4			
				1	0.004	92	5			
			Totals	22	0.087					
87	074433	25427	26135	0	0.000	89	2			
				5	0.020	90	3			
				85	0.334	91	4			
				0	0.000	92	5			
			Totals	90	0.354					
87	074434	27004	27756	0	0.000	89	2			
				2	0.007	90	3			
				57	0.211	91	4			
				8	0.030	92	5			
			Totals	67	0.248					
87	074436	25386	26093	0	0.000	89	2			
				3	0.012	90	3			
				54	0.213	91	4			
				8	0.032	92	5			
			Totals	65	0.256					
87	074439	27585	28153	1	0.004	89	2	1		
				0	0.000	90	3	Boss.		
				76	0.276	91	4			
				12	0.044	92	5		10	
			Totals	89	0.323					
87	074440	27550	28116	0	0.000	89	2			
				3	0.011	90	3			
				84	0.305	91	4			
				5	0.018	92	5			
			Totals	92	0.334					
87	074443	24165	24663	2	0.008	89	2	2		
				2	0.008	90	3	Boss.		
				74	0.306	91	4			
				7	0.029	92	5			
			Totals	85	0.352					

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Appendix C (cont)

CWT Code	Year Recov	Oregon Test Net Fishery /1	Oregon Indian Ceremonial /1	Oregon Umatilla R Fish Trap	Oregon Uma. R Spawn Surveys/Sport	Wash. Sport	Wash. Treaty Troll	Wash./Idaho Hatchery/Trap/ Spawn Ground	Alaska Ocean Comm
074427	89								
	90								
	91			7	8				
074429	89								
	90			2					
	91		3	5	13				
	92				5				
074430	89								
	90								
	91			8	13				
	92			1					
074433	89								
	90			5					
	91		11	19	55				
	92								
074434	89								
	90			2					
	91		9	23	25				
	92			3	5				
074436	89								
	90			3					
	91	1	11	13	29				
	92		2	1	5				
074439	89								
	90								
	91	1	10	23	42				
	92		2						
074440	89								
	90			2	1				
	91	1	11	30	42				
	92		2	1		2			
						Ocean			
074443	89								
	90			2					
	91	2	11	19	42				
	92			2	5				

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Appendix C (cont)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries Number	Estimated Recoveries %	Year Recov.	Age at Recov.	Oregon Hatchery/Trap/ Spawn Ground	Oregon Col. R Sport	Oregon Col. R Gillnet
88	075063	24801	24968	1	0.004	90	2	1	Boas.	
				2	0.008	91	3	1	Boas.	
				9	0.036	92	4	1	Pelton Dam trap	
				5	0.020	93	5			
			Totals	17	0.069					
88	075101	28109	28299	1	0.004	90	2			
				0	0.000	91	3			
				12	0.043	92	4	2	Pelton Dam trap	
				22	0.078	93	5			
			Totals	35	0.125					
88	075102	27299	27483	1	0.004	90	2	1	Boas.	
				2	0.007	91	3			
				10	0.037	92	4			
				12	0.044	93	5			
			Totals	25	0.092					
88	075103	27137	27287	2	0.007	91	3			
				6	0.022	92	4			
				10	0.037	93	5			
			Totals	18	0.066					
88	075104	28560	28718	5	0.018	91	3			
				18	0.063	92	4			7
				9	0.032	93	5			
			Totals	32	0.112					
88	075105	27695	27848	1	0.004	91	3			
				4	0.014	92	4			
				8	0.029	93	5			
			Totals	13	0.047					
88	075106	26638	38224	3	0.011	90	2	1	Boas.	
				2	0.008	91	3			
				67	0.252	92	4			2
				58	0.218	93	5			
			Totals	130	0.488					
88	075107	26160	37538	1	0.004	91	3			
				86	0.329	92	4			10
				83	0.317	93	5			
			Totals	170	0.650					
88	075108	26888	38583	0	0.000	91	3			
				58	0.216	92	4	1		16
				70	0.260	93	5	Snake R. spawn ground		
			Totals	128	0.476					

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Appendix C (cont)

CWT Code	Year Recov	Oregon Test Net Fishery /1	Oregon Indian Ceremonial /1	Oregon Umatilla R. Fish Trap	Oregon Uma. R. Spawn Surveys/Sport	Wash. Sport	Wash. Treaty Troll	Wash./Idaho Hatchery/Trap/ Spawn Ground	Alaska Ocean Comm.
075063	91			1					
	92	1	2	2				3	
	93		2	1	2			Tucannon R. Spawn Ground	
075101	90							1	
	91							Dworshak Hatch.	
	92			4	5			1	
	93			2	20			Dworshak Hatch.	
075102	90								
	91			2					
	92		4	6					
	93			2	10				
075103	91			2					
	92			6					
	93		2		8				
075104	91			5					
	92		7	4					
	93		2	1	6				
075105	91			1					
	92			4					
	93				8				
075106	90							2	
	91			2				Dworshak Hatch.	
	92	1	13	28	23				
	93		7	5	46				
075107	91			1					
	92		17	22	32			5	
	93		9	4	70			1 Tucannon Hatch. 1 Dworshak Hatch. 3 Tucannon River Spawn Ground	
075108	91								
	92		7	24	9			1	
	93		9	7	54			Chemeck R. gaff	

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Appendix C (cont.)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries Number	Estimated Recoveries %	Year Recov	Age at Recov.	Oregon Hatchery/Trap/ Spawn Ground	Oregon Col. R Sport	Oregon Col. R Gillnet
88	075109	25611	39012	3	0.012	90	2	2		
				2	0.008	91	3	Bonn.		
				73	0.285	92	4			20
				108	0.422	93	5	1		
								LG		
			Totals	186	0.726					
88	075110	26307	40072	6	0.023	91	3			
				87	0.331	92	4			9
				109	0.414	93	5		5	
			Totals	202	0.768					
88	075111	25172	38343	2	0.008	90	2			
				3	0.012	91	3			
				54	0.215	92	4			2
				77	0.306	93	5			3
			Totals	136	0.540					
89	075114	25947	33473	0	0.000	92	3			
				59	0.227	93	4	1	5	
				5	0.019	94	5	Walla Walla		
			Totals	64	0.247					
89	075115	25921	33440	2	0.008	92	3			
				45	0.174	93	4			
				9	0.035	94	5			
			Totals	56	0.216					
89	075116	26039	33593	0	0.000	92	3			
				62	0.238	93	4			
				3	0.012	94	5			
			Totals	65	0.250					
89	075440	24365	31932	30	0.123	93	4			
				3	0.012	94	5			
			Totals	33	0.135					
89	075441	24559	32187	34	0.138	93	4			
				16	0.065	94	5		5	
			Totals	50	0.204					
89	075442	24441	32032	32	0.131	93	4			
				12	0.049	94	5			
			Totals	44	0.180					
89	074505	26670	26757	3	0.011	93	4			
				0	0.000	94	5			
			Totals	3	0.011					
89	074506	26717	26805	2	0.007	93	4			
				0	0.000	94	5			
			Totals	2	0.007					

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Appendix C (cont)

CWT Code	Year Recov	Oregon: Test Net Fishery /1	Oregon: Indian Ceremonial /1	Oregon: Umatilla R. Fish Trap	Oregon: Uma. R. Spawn Surveys/Sport	Wash.: Sport	Wash.: Treaty Troll	Wash./Idaho: Hatchery/Trap/ Spawn Ground	Alaska Ocean Comm.
075109	90							1	
	91			2				Dworshak Hatch.	
	92		7	31	14			1	
	93	1	7	11	88			Chinook R. Spawn Ground	
								1 Dworshak H.	
075110	91			6				1 Nason Cr. Spawn Gr.	
	92	2	22	24	27		1	2	
	93		13	10	76			5	
								Tucannon Hatch.	
075111	90							2	
	91			3				Dworshak Hatch.	
	92	1	11	22	9			9	
	93		11	5	58			1 Kooskia Hatch.	
								1 Leavenworth Hatch.	
								1 Dworshak Hatch.	
								1 Wells Dam sp. ch.	
075114	92							3 Tuc. R. Spawn Gr.	
	93		9	12	32			1 Nason Cr. Spawn Gr.	
	94			2	3			1 Icicle Cr. Spawn Gr.	
075115	92			2					
	93		5	14	26				
	94			1	8				
075116	92								
	93		5	29	28				
	94				3				
075440	93			12	18				
	94				3				
075441	93			17	14				3
	94				11				
075442	93		5	13	14				
	94			1	11				
074505	93			1	2				
	94								
074506	93				2				
	94								

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Appendix C (cont)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries Number	Estimated Recoveries %	Year Recov	Age at Recov.	Oregon Hatchery/Trap/ Spawn Ground	Oregon Col. R Sport	Oregon Col. R Gillnet
89	074507	26788	26876	0	0.000	93	4			
				0	0.000	94	5			
			Totals	0	0.000					
89	074508	25876	26050	2	0.008	93	4			
				0	0.000	94	5			
			Totals	2	0.008					
89	074509	26104	26279	0	0.000	93	4			
				0	0.000	94	5			
			Totals	0	0.000					
89	074510	25497	25669	2	0.008	93	4			
				0	0.000	94	5			
			Totals	2	0.008					
89	635661	23797	96733	72	0.303	93	4			
				19	0.080	94	5			4
			Totals	91	0.382					
90	075826	26769	27040	3	0.011	93	3			
				19	0.071	94	4			
			Totals	22	0.082					
90	075827	26737	27007	4	0.015	93	3			
				12	0.045	94	4			
			Totals	16	0.060					
90	075828	26827	27098	2	0.007	93	3			
				21	0.078	94	4			
			Totals	23	0.086					
90	075829	25499	26019	0	0.000	93	3			
				12	0.047	94	4			
			Totals	12	0.047					
90	075830	25382	25900	1	0.004	93	3			
				12	0.047	94	4			
			Totals	13	0.051					
90	075831	26029	26561	1	0.004	93	3			
				10	0.038	94	4			
			Totals	11	0.042					
90	075835	26570	36351	1	0.004	93	3			
				5	0.019	94	4			
			Totals	6	0.023					

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Appendix C (cont)

CWT Code	Year Recov.	Oregon: Test Net Fishery /1	Oregon: Indian Ceremonial /1	Oregon: Umatilla R. Fish Trap	Oregon: Uma. R. Spawn Surveys/Sport	Wash.: Sport	Wash.: Treaty Troll	Wash./Idaho: Hatchery/Trap/ Spawn Ground	Alaska Ocean Comm.
074507	93								
	94								
074508	93		2						
	94								
074509	93								
	94								
074510	93				2				
	94								
635661	93	1	16	6	14	24		11	
	94				2			13	
075826	93			3					
	94			2	17				
075827	93			3	1				
	94			1	11				
075828	93			1	1				
	94			4	17				
075829	93								
	94			1	11				
075830	93			1					
	94			4	8				
075831	93			1					
	94			2	8				
075835	93				1				
	94		2		3				

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Appendix C (cont)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries Number	Estimated Recoveries %	Year Recov.	Age at Recov.	Oregon Hatchery/Trap/ Spawn Ground	Oregon Col. R Sport	Oregon Col. R Gillnet
90	075836	26426	36154	0	0.000	93	3			
				5	0.019	94	4			
			Totals	5	0.019					
90	075837	26750	36596	0	0.000	93	3			
				6	0.022	94	4			
			Totals	6	0.022					
90	075832	25503	32994	0	0.000	93	3			
				4	0.016	94	4			
			Totals	4	0.016					
90	075833	25472	32953	1	0.004	93	3			
				9	0.035	94	4		5	
			Totals	10	0.039					
90	075834	25493	32982	2	0.008	93	3			
				1	0.004	94	4			
			Totals	3	0.012					
90	633962	31851	96254	0	0.000	94	4			
91	071443	50611	97013	0	0.000	94	3			
91	071444	48051	63585	0	0.000	94	3			
91	071445	49498	63305	0	0.000	94	3			
91	071446	50045	95456	0	0.000	94	3			
91	071447	50047	104670	0	0.000	94	3			
91	071448	51707	104929	0	0.000	94	3			
91	071449	51518	109528	0	0.000	94	3			
91	071450	51271	109997	0	0.000	94	3			
91	071451	52128	98617	0	0.000	94	3			
91	071452	51659	108652	0	0.000	94	3			
91	076042	25104	25104	0	0.000	94	3			
91	076043	24992	25075	1	0.004	94	3			
91	076044	15423	15730	0	0.000	94	3			
91	076045	24638	24638	1	0.004	94	3			
91	076046	24221	24715	1	0.004	94	3			
91	076047	17269	17667	0	0.000	94	3			
91	071542	26135	50736	0	0.000	94	3			
91	071543	25633	50680	0	0.000	94	3			

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Appendix C (cont)

CWT Code	Year Recov	Oregon Test Net Fishery /1	Oregon Indian Ceremonial /1	Oregon Umatilla R. Fish Trap	Oregon Uma. R. Spawn Surveys/Sport	Wash. Sport	Wash. Treaty Troll	Wash./Idaho Hatchery/Trap/ Spawn Ground	Alaska Ocean Comm.
075836	93								
	94			2	3				
075837	93								
	94				6				
075832	93								
	94	1			3				
075833	93			1					
	94			1	3				
075834	93			2					
	94			1					
633962	94								
071443	94								
071444	94								
071445	94								
071446	94								
071447	94								
071448	94								
071449	94								
071450	94								
071451	94								
071452	94								
076042	94								
076043	94			1					
076044	94								
076045	94			1					
076046	94			1					
076047	94								
071542	94								
071543	94								

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Appendix C (cont)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries Number	Estimated Recoveries %	Year Recov.	Age at Recov.	Oregon Hatchery/Trap/ Spawn Ground	Oregon Cd. R Sport	Oregon Cd. R Gillnet
91	071455	19951	92720	1	0.005	94	3			
91	071456	20022	94220	0	0.000	94	3			
91	075739	21499	50310	0	0.000	94	3			
91	075740	20880	50109	0	0.000	94	3			
91	075741	21157	54347	0	0.000	94	3			
91	075742	20307	54016	0	0.000	94	3			
91	635950	31421	96086	0	0.000	94	3			

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/1 Columbia River.

Appendix C (cont)

CWT Code	Year Recov	Oregon				Wash.		Wash./Idaho	Alaska
		Test Net Fishery /1	Indian Ceremonial /1	Umatilla R. Fish Trap	Uma. R. Spawn Surveys/Sport	Sport	Treaty Troll	Hatchery/Trap/ Spawn Ground	Ocean Comm.
071455	94			1					
071456	94								
075739	94								
075740	94								
075741	94								
075742	94								
635950	94								

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Appendix D. Liberation and survival information for coho salmon released in the Umatilla River. /a

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries No.	Estimated Recoveries %	Year Recov	Age	Oregon Ocean Comm	Oregon Ocean Sport	Oregon Freshwater Col. R Gillnet	Oregon Freshwater Test Net Fishery	Oregon Freshwater Sport	Oregon Freshwater Hatch.	Oregon Freshwater Uma. R.
85	073617	13440	212266	1	0.01	87	2						1 Coor	
				260	1.93	88	3	83	20	78	1	14	2 Coor	15
			Total	261	1.94									
85	073624	19879	313961	0	0.00	87	2							
				333	1.68	88	3	96	52	82		27	6 Coor	10
			Total	333	1.68									
85	073625	26740	422322	0	0.00	87	2							
				415	1.55	88	3	160	49	100		17	5 4 Coor 1 Boon	12
			Total	415	1.55									
86	074356	20592	334038	44	0.21	88	2			16				28
				900	4.37	89	3	204	126	171			8 7 Coor 1 Trout	147
			Total	944	4.58									
86	074357	18963	360689	32	0.17	88	2							32
				804	4.24	89	3	206	116	128		3	4 2 Coor 1 Rock Cr 1 Salmon R SGS	170
			Total	836	4.41									
86	074358	18513	301706	28	0.15	88	2							28
				801	4.33	89	3	191	129	117	1	6	8 7 Coor 1 Boon	188
			Total	829	4.48									
87	074609	27062	829607	10	0.04	89	2							10
				143	0.53	90	3	32	24	1		32	4 Coor	9
			Total	153	0.57									
87	074610	26418	72627	18	0.07	89	2							18
				257	0.97	90	3	24	68	24	1		8 7 Coor 1 Boon	19
			Total	275	1.04									
87	074611	26739	84672	22	0.08	89	2		2					20
				268	1.00	90	3	57	35	16			12 11 Coor 1 Boon	18
			Total	290	1.08									
88	074814	28033	67309	36	0.13	90	2		3	5			6 Coor	16
				826	2.95	91	3	130	85	238	2	37	42 36 Coor [illegible] Boon [illegible]	65
			Total	862	3.07									
88	074813	26881	858524	49	0.18	90	2			18			5 Coor	25
				786	2.92	91	3	104	130	192		48	31 [illegible] Coor [illegible] Boon	47
			Total	835	3.11									
88	074815	27226	65095	43	0.16	90	2			3			8 Coor	28
				1056	3.88	91	3	163	148	216	3	99	69 49 Coor 20 Boon	68
			Total	1099	4.04									
89	075535	24584	152974	4	0.02	91	2							4
				45	0.18	92	3		15	6				2
			Total	49	0.20									
89	075534	25338	449678	7	0.03	91	2						1 Coor	6
				35	0.14	92	3		13	10		4	2 Coor	2
			Total	42	0.17									

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Appendix D (cont.)

CWT Code	Year Recov	Washington Ocean Comm	Washington Ocean Spt	Washington Ocean Net & Seine	Washington Ocean Treaty Troll	Washington FW Buoy 10	Washington FW Hatch.	Washington FW Spt.	California Ocean Comm	California Ocean Spt.	Canada Ocean Comm.	Canada Ocean Spt.	Canada Ocean Net & Seine	FWS Hatch.
073617	87													
	88		6			27			4	7	5			
073624	87													
	88		5			15			13	17	10			
073625	87													
	88					27	1	10	10	7	16			1 LWS
074356	88													
	89	11	52	4	18	58	1		20	30	38	5	9	
074357	88													
	89	6	44		16	57			8	12	31	3		
074358	88													
	89	19	52		22	42		1	11	17	11		8	
074609	89													
	90		4			6			19	12				
074610	89													
	90	2	33		3	11			35	21	8			
074611	89													
	90	37	29		5	6			28	18	7			
074814	90					3							3	
	91	28	33			103			14	48				1 Kalama R Spawn
074813	90					1								
	91	10	24			116			32	34	18			
074815	90		2										2	
	91	18	43			127			49	49	7			1 LWS
075535	91													
	92	2	13			7								
075534	91													
	92		4											

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Appendix D (Cont.)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries No.	%	Year Recov.	Age	Oregon Ocean Comm.	Ocean Sport	Freshwater Col. R. Gillnet	Test Net Fishery	Sport	Hatch.	Uma.R.
89	075533	25407	352977	2	0.01	91	2							2
				38	0.15	92	3	3	8	4	1			10
			Total	40	0.16									
90	075620	27908	472221	2	0.01	92	2							2
				197	0.71	93	3	2	d 29	48		20	14	43
			Total	199	0.71									
90	075621	27705	244615	1	0.00	92	2							1
				296	1.07	93	3	1	d 40	71	4	10	19	72
			Total	297	1.07									
90	075622	27458	244550	3	0.01	92	2							3
				203	0.74	93	3	1	d 9	65		8	16	43
			Total	206	0.75									
91	071521	28273	454794	2	0.01	93	2			2				
				51	0.16	94	3			8		5		36
			Total	53	0.19									
91	071522	27821	218618	2	0.01	93	2							2
				61	0.22	94	3			13		5		43
			Total	63	0.23									
91	071523	27984	219266	0	0.00	93	2							
				42	0.15	94	3			3		3		31
			Total	42	0.15									
92	070337	27166	418222	4	0.01	94	2							4
92	070338	27452	233105	4	0.01	94	2							4
92	070339	27010	232778	3	0.01	94	2							3

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/a Survival data for the 1992 brood includes age-2 fish only (1994 returns)
/b Includes one fish recovered on spawn ground survey in Big White Salmon River
/c Includes one fish recovered on spawn ground survey in Rogue River
/d Unknown test fishery

Appendix D (cont.)

CWT Code	Year Recov	Washington Ocean Comm	Washington Ocean Spt.	Washington Ocean Net & Seine	Washington Ocean Treaty Troll	Washington FW Buoy 10	Washington FW Hatch.	Washington FW Spt.	California Ocean Comm.	California Ocean Spt.	Canada Ocean Comm.	Canada Ocean Spt.	Canada Ocean Net & Seine	FWS Hatch.
075533	91													
	92		12											
075620	92													
	93		11		6	10				11	3			
075621	92													
	93		36		8	17				18				
075622	92													
	93		18		4	17				18	4			
071521	93													
	94					2								
071522	93													
	94													
071523	93													
	94		1								4			
070337	94													
070338	94													
070339	94													

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Appendix E. Umatilla River summer steelhead broodstock collection in 1993–94. /a

Date Collected	Opercle Mark /b	Ad LV Male	Ad LV Female	Total Ad LV	Unmarked Male	Unmarked Female	Total Unmarked	Total Male	Total Female	Total
10/1	1LOP&1ROP			0		2	2	0	2	2
10/6	1LOP&1ROP			0	1		1	1	0	1
10/8	1LOP&1ROP		1	1	1		1	1	1	2
10/11	1LOP&1ROP		1	1			0	0	1	1
10/14	1LOP&1ROP			0		1	1	0	1	1
10/15	1LOP&1ROP			0	1		1	1	0	1
10/18	1LOP&1ROP	2		2			0	2	0	2
10/26	1LOP&1ROP			0	1	1	2	1	1	2
11/9	3ROP			0	1	1	2	1	1	2
1/7	3LOP	1		1	1	1	2	2	1	3
1/10	3LOP	1	6	7	10	10	20	11	16	27
1/11	3LOP	2		2	1	1	2	3	1	4
1/13	3LOP	1	1	2	4	4	8	5	5	10
1/14	3LOP		1	1			0	0	1	1
1/18	3LOP	2	1	3	2	2	4	4	3	7
1/24	3LOP	1		1			0	1	0	1
2/14	2ROP		1	1	1	1	2	1	2	3
2/15	2ROP	1		1			0	1	0	1
3/1	2LOP		1	1	1	1	2	1	2	3
3/9	2LOP	3	1	4	1	1	2	4	2	6
3/10	2LOP	1	1	2	3	3	6	4	4	8
3/11	2LOP	2	3	5	7	7	14	9	10	19
3/15	2LOP	1		1			0	1	0	1
3/28	2LOP		1	1	1	1	2	1	2	3
3/31	2LOP			0		1	1	0	1	1
4/4	1ROP		1	1	3	2	5	3	3	6
4/7	1ROP			0	4	4	8	4	4	8
4/15	1ROP	1	1	2			0	1	1	2
4/18	1ROP		1	1	1	1	2	1	2	3
4/25	1ROP			0		1	1	0	1	1
4/27	1ROP			0	1		1	1	0	1
5/2	1LOP		1	1		1	1	0	2	2
TOTALS		19	23	42	46	47	93	65	70	135

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/a Data provided by CTUIR and ODFW Trap and Haul personnel.
Minthorn records, however, totaled 92 unmarked and 134 total brood.

/b 1 LOP = one left opercle hole punch
2 LOP = two left opercle hole punches
3 LOP = three left opercle hole punches
1 ROP = one right opercle hole punch
2 ROP = two right opercle hole punches
3 ROP = three right opercle hole punches

Appendix F. Summer steelhead broodstock spawning at Minthorn Acclimation Facility in 1994.

Date Spawned	Fish No.	Sex	Family No.	Fork Ln mm	MEHP Ln mm	Weight gms	Fin Mark	Opercle Mark /a	Month Collected /b	Green Eggs	Eyed Eggs
4/6/94	1	F	1	--	585	--	None	3LOP	January		
	2	F	1	690	585	--	•	3LOP	January		
	3	F	1	674	565	--	•	3LOP	January		
	4	M	1	669	550	--	•	None	Unknown		
	5	M	1	--	483	--	•	1LOP	May		
	6	M	1	593	490	--	•	2LOP	March		
	7	F	2	711	595	--	•	3LOP	January		
	8	F	2	581	490	--	•	2LOP	March		
	9	F	2	534	453	--	•	None	Unknown		
	10	M	2	715	590	--	•	2LOP	March		
	11	M	2	592	480	--	•	2LOP	March		
	12	M	2	630	530	--	•	2LOP	March		
	13	F	3	665	560	--	AdLV	2LOP	March		
	14	F	3	668	560	--	•	3LOP	January		
	15	F	3	741	610	--	•	1LOP&1ROP	October		
	16	M	3	spawned live for 1st time			None	Unkown	Unkown		
	17	M	3	spawned live for 1st time			•	Unkown	Unkown		
	18	M	3	spawned live for 1st time			•	Unkown	Unkown		
	19	F	4 /c	597	500	--	Ad	None	---		
	20	M	4	spawned live for 1st time			None	Unkown	Unkown		
										45,423	42,253
4/13/94	21	F	5	765	660	3110	None	1ROP	April		
	22	F	5	613	520	1730	•	2ROP	February		
	23	F	5	642	550	1880	•	2LOP	March		
	24	M	5	610	505	1790	•	2ROP	February		
	25	M	5	630	530	1850	•	2LOP	March		
	26	M	5	710	580	3040	•	3LOP	January		
	27	F	6	706	585	2410	AdLV	3LOP	January		
	28	F	6	698	585	2310	•	3LOP	January		
	29	F	6	698	558	2210	•	2LOP	March		
	30	M	6	spawned live for 1st time			None	Unkown	Unkown		
	31	M	6	spawned live for 1st time			•	Unkown	Unkown		
	32	M	6	spawned live for 1st time			•	Unkown	Unkown		
	33	F	7	557	485	1410	•	3LOP	January		
	34	F	7	740	600	2980	AdLV	2LOP	March		
	35	F	7	726	625	2400	•	3LOP	January		
	36	M	7	spawned live for 1st time			None	Unkown	Unkown		
	37	M	7	spawned live for 1st time			•	Unkown	Unkown		
	38	M	7	spawned live for 1st time			•	Unkown	Unkown		
										47,092	40,916
4/20/94	39	F	8	574	490	1390	None	3LOP	January		
	40	F	8	693	580	2490	•	2LOP	March		
	41	M	8	629	520	2040	•	3LOP	January		
	42	M	8	643	540	2160	•	3LOP	January		
	43	F	9	695	574	2210	AdLV	2LOP	March		
	44	F	9	677	560	2010	•	3LOP	January		
	45	M	9	spawned live for 1st time			None	Unkown	Unkown		
	46	M	9	spawned live for 1st time			•	Unkown	Unkown		
										21,525	18,193
4/27/94	47	F	10	670	565	--	None	1ROP	April		
	48	F	10	743	632	--	•	3LOP	January		
	49	F	10	659	590	--	•	2LOP	March		
	50	M	10	602	483	--	•	3LOP	January		
	51	M	10	640	540	--	•	1ROP	April		
	52	M	10	602	490	--	•	3LOP	January		
	53	F	11	656	550	--	•	1ROP	April		
	54	F	11	558	470	--	•	1LOP&1ROP	October		
	55	F	11	580	495	--	•	2LOP	March		
	56	M	11	605	490	--	•	3LOP	January		
	57	M	11	598	495	--	•	3LOP	January		
	58	M	11	spawned live for 1st time			•	Unkown	Unkown		
	59	F	12	677	570	--	•	3LOP	January		
	60	F	12	533	459	--	•	2LOP	March		
	61	M	12	spawned live for 1st time			•	Unkown	Unkown		
	62	M	12	spawned live for 1st time			•	Unkown	Unkown		
	63	F	13	691	575	--	AdLV	1LOP&1ROP	October		
	64	F	13	730	620	--	•	3LOP	January		
	65	F	13	714	608	--	•	1ROP	April		

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Appendix F. (Cont.)

Date Spawned	Fish No	Sex	Family No	Fork Ln mm	MEHP Ln mm	Weight gms		Opercle Mark /1	Month Collected	Green Eggs	Eyed Eggs
4/27/94	66	M	13	spawned live for 1st time			None	Unkown	Unkown		
(cont.)	67	M	13	spawned live for 2nd time			•	Unkown	Unkown		
	68	M	13	spawned live for 2nd time			•	Unkown	Unkown		
	69	M	Green	604	485	--	•	1ROP	April		
	70	M	•	593	500	--	•	1ROP	April		
	71	M	•	623	510	--	•	3LOP	January		
										58,700	50,625
5/4/94	72	F	14	620	550	--	None	2LOP	March		
	73	F	14	675	590	--	•	3LOP	January		
	74	F	14	535	455	--	•	1LOP& 1ROP	October		
	75	M	14	spawned live for 1st time			•	Unkown	Unkown		
	76	M	14	spawned live for 1st time			•	Unkown	Unkown		
	77	M	14	spawned live for 1st time			•	Unkown	Unkown		
	78	F	15	565	505	--	•	2LOP	March		
	79	F	15	600	520	--	•	2LOP	March		
	80	F	15	580	495	--	•	3LOP	January		
	81	M	15	spawned live for 2nd time			•	Unkown	Unkown		
	82	M	15	spawned live for 2nd time			•	Unkown	Unkown		
	83	M	15	spawned live for 2nd time			•	Unkown	Unkown		
	84	F	16	670	565	--	AdLV	3LOP	January		
	85	M	16	spawned live for 2nd time			None	Unkown	Unkown		
										28,607	25175
5/11/94	86	F	17	747	645	2800	None	None	Unkown		
	87	F	17	--	480	1300	•	2LOP	March		
	88	F	17	--	520	1560	•	2LOP	March		
	89	M	17	693	585	2840	•	2LOP	March		
	90	M	17	--	600	3180	•	1ROP	April	Spawned for 2nd time	
	91	M	17	730	615	2960	•	1ROP	April	Spawned for 2nd time	
	92	F	18	712	610	2730	AdLV	1ROP	April		
	93	F	18	690	593	2450	•	2LOP	March		
	94	M	18	543	455	1340	None	1ROP	April	Spawned for 2nd time	
	95	M	18	735	610	3010	•	3LOP	January	Spawned for 2nd time	
	96	F	19	715	610	2580	•	1LOP	May		
	97	F	19	710	620	2780	•	3LOP	January		
	98	M	19	606	510	1930	•	2LOP	March	Spawned for 2nd time	
	99	M	19	585	490	1640	•	None	Unknown		
										35,085	31,755
									TOTAL	234,432	208,917
									FECUNDITY	4,884	

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/a 1LOP = one left opercle hole punch 2LOP = two left opercle hole punches, 3LOP = three left opercle hole punches
1ROP = one right opercle hole punch, 2ROP = two right opercle hole punches, 3ROP = three right opercle hole punches.
/b The opercle marks recorded at Minthorn do not match the marks recorded at Three Mile Dam
/c Minthorn return that was mistakenly removed from the trap and placed in with the brood

Appendix G. Liberation Information for summer steelhead coded-wire tagged and released in the Umatilla River Basin.

Brood	Number Released la	Release Date	No./lb.	Number tagged	CWT code	Release location
87	10.187	April88	7.4	9.829	073859	Minthorn
87	10.075	April88	7.4	9,721	073860	Minthorn
87	10.287	April 68	7.4	9,925	073661	Minthorn
	30.549			29,475		
87	10.423	April 88	6.5	9,669	073056	Nr. Minthorn
87	10,171	April 88	6.5	9,455	073857	Nr. Minthorn
87	10,183	April 86	6.5	9.448	073858	Nr. Minthorn
	30,757			28.592		
88	9,949	May 69	6.6	a.704	074720	Minthorn
88	9.954	May 89	6.6	8.789	074723	Minthorn
88	9.949	May 69	6.6	6.764	074724	Minthorn
	29,852			26,357		
88	9,873	May 89	5.6	8.600	074715	Nr. Minthorn
88	9,864	May 69	5.6	8,791	074717	Nr. Minthorn
88	9,849	May 69	5.6	8,778	074710	Nr. Minthorn
	29,568			26.369		
89	10.239	May 90	5.9	9,331	075212	Bonifer
89	10.022	May 90	5.9	9.133	075213	Bonifer
89	9.964	May 90	5.9	9.080	075214	Bonifer
	30.225			27.544		
89	9.830	May 90	5.5	9.511	075215	Nr. Bonifer
89	9,645	May 90	5.5	9,525	075216	Nr. Bonifer
89	9.771	May 90	5.5	9.454	075217	Nr. Bonifer
	29,446			20.490		
90	10.086	May 91	6.2	9.635	075340	Bonifer
90	10.070	May 91	6.2	9.819	07534 1	Bonifer
90	10,065	May 91	6.2	9.614	075342	Bonifer
	30.221			29.468		
90	9.754	May 91	8.7	9.432	075343	Nr. Bonifer
90	9.790	May 91	8.7	9,467	075344	Nr. Bonifer
90	9,781	May 91	6.7	9,450	075345	Nr. Bonifer
	29,325			20,357		
91	22.474	March 92	5.8	10.394	073759	Bonifer/Minthorn
91	22902	March 92	5.8	10.594	073662	Bonifer/Minthorn
91	22,059	March 92	5.8	10.203	074127	Bonifer/Minthorn
	67.435			31.191		

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Appendix G. (Cont.)

Brood	Number Released	Release Date	No./lb.	Number tagged	CWT code	Release location
91	22,262	April 92	5.0	10,108	075841	Meacham Creek
91	21,365	April 92	5.0	9,498	075842	Meacham Creek
91	20,923	April 92	5.0	9,747	075843	Meacham Creek
	64,550			29,353		
91	22,469	April/May 92	5.5	10,562	075838	Meacham Creek
91	22,662	April/May 92	5.5	10,275	075839	Meacham Creek
91	22,288	April/May 92	5.5	10,105	075840	Meacham Creek
	67,419			30,942		
92	15,115	April 93	4.5	10,194	076058	Bonifer
92	14,922	April 93	4.5	9,792	076059	Bonifer
92	14,787	April 93	4.5	9,440	076060	Bonifer
	44,824			29,426		
92	16,016	April 93	5.6	10,031	076055	Minthorn
92	15,940	April 93	5.6	9,418	076056	Minthorn
92	16,023	April 93	5.6	9,643	076057	Minthorn
	47,979			29,092		
92	23,862	May 93	6.1	13,117	076052	Bonifer
92	21,644	May 93	6.1	11,410	076053	Bonifer
92	19,959	May 93	6.1	9,907	076054	Bonifer
	65,465			34,434		
93	26,347	May 94	5.2	8,595	070139	Bonifer
93	25,750	May 94	5.2	8,400	070140	Bonifer
	52,097			16,995		
93	24,783	April 94	5.1	9,952	070141	Minthorn
93	24,815	April 94	5.1	9,965	070142	Minthorn
	49,598			19,917		
93	26,749	April 94	4.9	10,471	070143	Bonifer
93	24,654	April 94	4.9	9,651	070144	Bonifer
	51,403			20,122		

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/a The following releases are not included in the table:

33,984 adipose clipped fish at 10.3/lb were released at Umatilla RM 23 in May, 1988
10,033 adipose clipped fish at 57.5/lb were released at Umatilla RM 89 in December, 1988
22,274 adipose clipped fish at 5.5/lb. were acclimated and released from Bonifer in May, 1989
29,522 adipose clipped fish at 7.7/lb. were acclimated and released with the coded-wire tagged fish at Bonifer in May, 1990
12,389 adipose clipped fish at 7.5/lb. were acclimated and released with the coded-wire tagged fish at Bonifer in May, 1991
3,998 adipose clipped fish at 12.5/lb. were released at Umatilla RM 3 in April, 1991
5,443 adipose clipped fish at 5.8/lb. were released at Umatilla RM 3 in April, 1992
1,732 adipose clipped fish at 5.7/lb. were released at Umatilla RM 27.3 in April, 1994

Appendix H Liberation information for spring chinook salmon coded-wire tagged and released in the Umatilla River Basin.

Brood	Number Released /a	Release Date	No./lb.	Number Tagged	CWT Code	Release Location
86	35,946	Mar-Apr 88	10.1	26,640	074325	Bonifer
86	35,148	Mar-Apr 88	10.1	25,863	074326	Bonifer
86	35,137	Mar-Apr 88	10.1	25,853	074327	Bonifer
	106,231			78,356		
86	34,187	April 88	8.6	26,319	074328	Uma RM 23-81
86	33,573	April 88	8.6	25,722	074329	Uma RM 23-81
86	34,118	April 88	8.6	26,252	074330	Uma RM 23-81
	101,878			78,293		
87	416	Nov 88	21.4	410	074420	Bonifer
87	399	Nov 88	21.4	393	074423	Bonifer
87	381	Nov 88	21.4	376	074424	Bonifer
	1,196			1,179		
87	26,109	Nov 88	11.1	25,987	074427	Uma RM 89
87	24,183	Nov 88	11.1	24,070	074429	Uma RM 89
87	25,475	Nov 88	11.1	25,356	074430	Uma RM 89
	75,767			75,413		
87	26,135	Mar-May 89	10.6	25,427	074433	Bonifer
87	27,756	Mar-May 89	10.6	27,004	074434	Bonifer
87	26,093	Mar-May 89	10.6	25,386	074436	Bonifer
	79,984			77,817		
87	28,153	March 89	10.6	27,585	074439	Nr. Bonifer
87	28,116	March 89	10.6	27,550	074440	Nr. Bonifer
87	24,663	March 89	10.6	24,165	074443	Nr. Bonifer
	80,932			79,300		
88	24,968	Oct 89	12.0	24,801	075063	Bonifer
88	28,299	Oct 89	12.0	28,109	075101	Bonifer
88	27,483	Oct 89	12.0	27,299	075102	Bonifer
	80,750			80,209		
88	27,287	Oct 89	12.0	27,137	075103	Nr. Bonifer
88	28,718	Oct 89	12.0	28,560	075104	Nr. Bonifer
88	27,848	Oct 89	12.0	27,695	075105	Nr. Bonifer
	83,853			83,392		
88	38,224	March 90	9.0	26,638	075106	Bonifer
88	37,538	March 90	9.0	26,160	075107	Bonifer
88	38,583	March 90	9.0	26,888	075108	Bonifer
	114,345			79,686		
88	39,012	March 90	9.6	25,611	075109	Nr. Bonifer
88	40,072	March 90	9.6	26,307	075110	Nr. Bonifer
88	38,343	March 90	9.6	25,172	075111	Nr. Bonifer
	117,427			77,090		
89	26,757	Oct 90	11.5	26,670	074505	Bonifer
89	26,805	Oct 90	11.5	26,717	074506	Bonifer
89	26,876	Oct 90	11.5	26,788	074507	Bonifer
	80,438			80,175		
89	26,050	Oct 90	13.4	25,876	074508	Nr. Bonifer
89	26,279	Oct 90	13.4	26,104	074509	Nr. Bonifer
89	25,669	Oct 90	13.4	25,497	074510	Nr. Bonifer
	77,998			77,477		

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Brood	Number Released	Release Date	No./lb.	Number Tagged	CWT Code	Release Location
89	33,473	March 91	10.1	25,947	075114	Bonifer
89	33,440	March 91	10.1	25,921	075115	Bonifer
89	33,593	March 91	10.1	26,039	075116	Bonifer
	100,506			77,907		
89	31,902	March 91	11.8	24,366	075440	Nr. Bonifer
89	32,187	March 91	11.8	24,559	075441	Nr. Bonifer
89	32,032	March 91	11.8	24,441	075442	Nr. Bonifer
	96,152			73,366		
89	90,796	April 91	20.6	22,336	635661	Uma RM 89
89	5,937	Apr - May 91	16.9	1,461	635661	Uma RM 3
	96,733			23,797		
90	27,040	Nov 91	16.5	26,769	075826	Bonifer
90	27,007	Nov 91	16.5	26,737	075827	Bonifer
90	27,098	Nov 91	16.5	26,827	075828	Bonifer
	81,144			80,333		
90	26,019	Nov 91	16.8	25,499	075829	Nr. Bonifer
90	25,900	Nov 91	16.8	25,382	075830	Nr. Bonifer
90	26,561	Nov 91	16.8	26,029	075831	Nr. Bonifer
	78,480			76,910		
90	90,982	April 92	18.7	30,106	633982	Uma RM 89
90	5,272	April 92	18.7	1,745	633982	Uma RM 3
	96,254			31,851		
90	36,361	April 92	9.2	26,570	075835	Bonifer
90	36,154	April 92	9.2	26,426	075836	Bonifer
90	36,596	April 92	9.2	26,750	075837	Bonifer
	109,101			79,746		
90	32,994	April 92	8.5	25,503	075832	Nr. Bonifer
90	32,963	April 92	8.5	25,472	075833	Nr. Bonifer
90	32,982	April 92	8.5	25,493	075834	Nr. Bonifer
	98,928			76,468		
91	97,013	May 92	32.1	50,611	071443	Uma RM 80
91	63,586	May 92	31.2	48,051	071444	Uma RM 80
91	63,306	May 92	32.2	49,498	071445	Uma RM 80
91	95,456	May 92	32.1	50,045	071446	Uma RM 80
91	104,670	May 92	36.4	50,047	071447	Uma RM 80
91	104,929	May 92	36.3	51,707	071448	Uma RM 80
91	109,528	May 92	38.3	51,518	071449	Uma RM 80
91	109,997	May 92	37.8	51,271	071450	Uma RM 80
91	98,617	May 92	39.2	52,128	071451	Uma RM 80
91	108,662	May 92	36.8	51,659	071452	Uma RM 80
	966,752			506,535		
91	25,104	Nov 92	13.0	25,104	076042	Uma RM 80
91	25,075	Nov 92	13.0	24,992	076043	Uma RM 80
91	15,730	Nov 92	13.1	15,423	076044	Uma RM 80
91	24,638	Nov 92	9.9	24,638	076045	Uma RM 80
91	24,715	Nov 92	10.0	24,221	076046	Uma RM 80
91	17,667	Nov 92	10.1	17,269	076047	Uma RM 80
	132,929			131,647		
91	50,736	Nov 92	19.3	26,135	071542	Uma RM 80
91	50,680	Nov 92	19.5	25,633	071543	Uma RM 80
	101,416			51,768		

Appendix H. (cont.)

Brood	Number Released	Release Date	No./lb.	Number Tagged	CWT Code	Release Location
91	92,728	March 93	14.7	19,961	071455	Uma RM 80
91	94,220	March 93	14.3	20,022	071456	Uma RM 80
	186,948			39,973		
91	60,310	March 93	8.3	21,499	075739	Uma RM 80
91	60,109	March 93	8.3	20,880	075740	Uma RM 80
91	54,347	March 93	8.3	21,157	075741	Uma RM 80
91	54,016	March 93	8.3	20,307	075742	Uma RM 80
	208,782			83,843		
91	86,134	April 93	20.3	27,839	635950	Uma RM 89
91	1,626	April 93	20.0	532	635950	Uma RM 3
91	9,326	April 93	20.5	3,050	635950	Uma RM 27.3
	96,086			31,421		
92	105,290	June 93	27.0	52,588	076136	Uma RM 80
92	109,473	June 93	27.3	51,680	076135	Uma RM 80
92	113,862	June 93	28.5	52,893	076132	Uma RM 80
92	111,103	June 93	27.1	52,172	076137	Uma RM 80
92	111,133	June 93	27.4	51,963	076134	Uma RM 80
92	116,316	June 93	28.1	52,335	076133	Uma RM 80
	667,367			313,631		
92	49,694	Nov 93	20.3	34,541	070159	Uma RM 80
92	52,211	Nov 93	21.5	35,657	070161	Uma RM 80
92	47,867	Nov 93	20.8	36,102	070216	Uma RM 80
92	49,081	Nov 93	20.9	35,408	070160	Uma RM 80
92	48,343	Nov 93	20.2	35,467	070162	Uma RM 80
92	49,318	Nov 93	20.8	36,157	070163	Uma RM 80
92	40,661	Nov 93	18.5	35,710	070155	Uma RM 80
92	39,666	Nov 93	18.0	34,857	070157	Uma RM 80
92	42,734	Nov 93	18.8	33,999	070156	Uma RM 80
92	41,244	Nov 93	19.2	34,130	070158	Uma RM 80
	460,809			352,026		
92	51,938	March 94	8.4	20,982	070220	Uma RM 80
92	52,620	March 94	8.8	20,971	070219	Uma RM 80
92	51,210	March 94	8.5	20,070	070217	Uma RM 80
92	49,375	March 94	8.1	19,920	070218	Uma RM 80
	205,143			81,943		
92	75,835	March 94	11.5	26,305	070251	Uma RM 73.5
92	77,019	March 94	11.5	26,716	070250	Uma RM 73.5
	152,854			53,021		
92	126,468	March 94	12.3	20,219	075945	Uma RM 80
92	125,780	March 94	12.3	20,109	075944	Uma RM 80
	252,248			40,328		
93	140,591	May 94	30.7	49,726	070734	Uma RM 80 /b
93	141,901	May 94	30.7	52,298	070735	Uma RM 80 /b
93	139,717	May 94	30.1	52,636	070736	Uma RM 80 /b
93	142,513	May 94	30.1	53,172	070737	Uma RM 80 /b
93	139,687	May 94	30.5	51,042	070738	Uma RM 80 /b
93	134,968	May 94	30.5	52,317	070739	Uma RM 80 /b
	839,377			311,191		

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Appendix H (cont.)

Brood	Number Released	Release Date	No./lb	Number Tagged	CWT Code	Release Location
93	38,234	Nov 94		34,808	070728	Uma RM 80 /b
93	39,551	Nov 94		35,156	070726	Uma RM 80 /b
93	39,548	Nov 94		34,124	070724	Uma RM 80 /b
93	40,383	Nov 94		35,160	070729	Uma RM 80 /b
93	39,487	Nov 94		34,819	070727	Uma RM 80 /b
93	39,517	Nov 94		34,827	070725	Uma RM 80 /b
93	37,096	Nov 94		35,750	070731	Uma RM 80 /b
93	34,649	Nov 94		34,220	070733	Uma RM 80 /b
93	37,073	Nov 94		34,915	070730	Uma RM 80 /b
93	32,687	Nov 94		32,251	070732	Uma RM 80 /b
	378,225			346,030		

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/a The following releases are not included in the table:

99,836 non-tagged fish at 20.5/lb were released at Umatilla RM 23 in April, 1988

89,268 non-tagged fish at 10.3/lb were released into the upper Umatilla River in April, 1988

99,775 non-tagged fish at 18.6/lb were released at Umatilla RM 23 in April, 1990

294,458 non-tagged fish at 32.5/lb were released at Umatilla RM 80 in May, 1992

8,890 non-tagged fish at 8.1 to 8.3/lb were released at Umatilla RM 3 and 29.2 in March and April, 1994

/b Acclimated at Imeques C-mem-ini-kem prior to release.

Appendix I. Liberation information for fall chinook salmon coded-wire tagged and released in the Umatilla River Basin.

Brood	Number Released /a	Release Date	No./lb.	Number tagged	CWT code	Release location
81	306,279	April 82	79.0	46,707	050851	Uma RM 1.5 & 51.5
81	672,057	April 82	79.0	102,331	051057	Uma RM 1.5 & 51.5
	978,336			149,038		
81	2,828,835	April 82	92.0	102,386	072663	Uma RM 1.5
81	100,564	March 83	5.9	99,570	072741	Bonifer & Mea. CR.
82	228,412	March 84	8.6	96,448	072829	Bonifer & Mea. CR.
83	966,250	June 84	85.1	210,441	073124	Uma RM 1.5
83	198,162	March 85	7.8	88,306	073127	Uma RM 87 & Bonifer
84	3,223,172	June 85	92.3	206,756	073326	Uma RM 1.5
84	51,000	Oct 85	16.2	30,838	073162	Bonifer
84	91,036	March 86	5.0	88,396	073327	Minthorn
85	197,432	June 86	86.0	20,636	073833	Uma RM 1.5
85	198,153	June 86	86.0	21,335	073834	Uma RM 1.5
85	197,488	June 86	86.0	20,690	073835	Uma RM 1.5
85	196,952	June 86	86.0	20,170	073836	Uma RM 1.5
85	197,788	June 86	86.0	20,982	073837	Uma RM 1.5
85	208,103	June 86	86.0	20,815	073838	Uma RM 1.5
85	208,958	June 86	86.0	21,659	073839	Uma RM 1.5
85	207,550	June 86	86.0	20,269	073840	Uma RM 1.5
	208,184	June 86	86.0	20,895	073841	Uma RM 1.5
	208,994	June 86	86.0	21,694	073842	Uma RM 1.5
	2,029,602			209,145		
85	22,216	March 87	8.1	10,103	073823	Minthorn
85	22,523	March 87	8.1	10,243	073824	Minthorn
85	21,807	March 87	8.1	9,917	073825	Minthorn
85	20,881	March 87	8.1	9,496	073826	Minthorn
85	21,716	March 87	8.1	9,876	073827	Minthorn
	109,143			49,635		
85	20,786	March 87	8.6	10,253	073828	Bonifer
85	20,212	March 87	8.6	9,970	073829	Bonifer
85	20,546	March 87	8.6	10,135	073830	Bonifer
85	20,381	March 87	8.6	10,053	073831	Bonifer
85	20,438	March 87	8.6	10,081	073832	Bonifer
	102,363			50,492		
86	497,572	May 87	60.4	40,793	073912	Uma RM 1.5
86	501,266	May 87	60.4	41,096	073913	Uma RM 1.5
86	477,992	May 87	60.4	39,187	073914	Uma RM 1.5
	1,476,830			121,076		

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Appendix I. (cont.)

Brood	Number Released	Release Date	No./lb.	Number tagged	CWT code	Release location
86	670	July 87	20.0	643	073915	Minthorn
86	672	July 87	20.0	645	073916	Minthorn
86	658	July 87	20.0	632	074035	Minthorn
	2,000			1,920		
86	52,317	March 88	8.8	42,068	074038	Minthorn
86	48,474	March 88	8.8	38,978	074039	Minthorn
	100,791			81,046		
86	50,480	March 88	10.2	39,509	074036	Bonifer
86	49,070	March 88	10.2	38,405	074037	Bonifer
	99,550			77,914		
87	1,886,757	May 88	68.3	198,285	075007	Uma RM 23
87	4,823	Nov 88	9.8	4,438	074539	Minthorn
87	4,660	Nov 88	9.8	4,289	074540	Minthorn
87	4,925	Nov 88	9.8	4,533	074541	Minthorn
	14,408			13,260		
87	26,858	Nov 88	8.6	24,656	074536	Nr Minthorn
87	25,493	Nov 88	8.6	23,403	074537	Nr Minthorn
87	27,330	Nov 88	8.6	25,089	074538	Nr Minthorn
	79,681			73,148		
88	797,904	May 89	66.6	52,228	074646	Uma RM 23
88	797,903	May 89	66.6	49,771	074647	Uma RM 23
88	797,903	May 89	66.6	52,244	074648	Uma RM 23
	2,393,710			154,243		
88	26,770	Oct 89	10.9	26,358	074753	Minthorn
88	26,617	Oct 89	10.9	25,028	074754	Minthorn
88	25,438	Oct 89	10.9	25,438	074757	Minthorn
	78,825			76,824		
88	27,071	Oct 89	11.1	26,790	074758	Nr Minthorn
88	25,428	Oct 89	11.1	24,285	074760	Nr Minthorn
88	25,633	Oct 89	11.1	25,350	074763	Nr Minthorn
	78,132			76,425		
89	808,567	May - Jun 90	87.5	52,612	075403	Uma RM 70-79
89	808,560	May - Jun 90	87.5	53,160	075404	Uma RM 70-79
89	808,554	May - Jun 90	87.5	53,248	075405	Uma RM 70-79
	2,425,681			159020		
89	25,311	Oct 90	9.2	23,396	075325	Minthorn
89	23,724	Oct 90	9.2	21,929	075326	Minthorn
89	22,828	Oct 90	9.2	21,101	075327	Minthorn
	71,863			66,426		

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Appendix I. (cont)

Brood	Number Released	Release Date	No./lb.	Number tagged	CWT code	Release location
89	25,472	Oct 90	8.8	23,413	075322	Nr Minthorn
89	25,694	Oct 90	8.8	23,617	075323	Nr Minthorn
89	25,480	Oct 90	8.8	23,420	075324	Nr Minthorn
	76,646			70,450		
90	1,343,311	May 91	82.0	52,252	075225	Uma RM 70-79
90	1,343,042	May 91	82.0	51,728	075226	Uma RM 70-79
90	100,642	May 91	73.0	48,266	075328	Uma RM 70-79
90	99,962	May 91	73.0	48,481	075449	Uma RM 70-79
90	99,225	May 91	73.0	48,301	070016	Uma RM 70-79
90	52,326	May 91	82.0	51,814	075450	Uma RM 70-79
90	52,706	May 91	82.0	52,444	075451	Uma RM 70-79
	3,091,214			353,286		
90	26,481	May 91	80.5	26,173	075563	Minthorn
90	26,585	May 91	80.5	24,762	075601	Minthorn
90	26,606	May 91	80.5	25,476	075602	Minthorn
	79,672			76,411		
90	25,862	May 91	86.0	25,720	075560	Nr Minthorn
90	25,708	May 91	86.0	25,425	075561	Nr Minthorn
90	23,295	May 91	86.0	22,309	075562	Nr Minthorn
	74,865			73,454		
90	122,639	March 92	7.7	26,160	075619	Uma RM 56
90	97,801	March 92	7.6	26,178	075618	Uma RM 70
	220,440			52,338		
91	286,578	May 92	70.6	31,892	071429	Uma RM 42.5
91	281,350	May 92	65.1	32,287	071430	Uma RM 42.5
91	182,931	May 92	56.2	28,951	071431	Uma RM 42.5
91	191,257	May 92	58.3	29,425	071432	Uma RM 42.5
91	303,878	May 92	61.0	29,066	071433	Uma RM 42.5
91	306,802	May 92	65.7	31,224	071434	Uma RM 42.5
91	297,331	May 92	60.9	30,326	071435	Uma RM 42.5
91	302,555	May 92	61.9	30,365	071436	Uma RM 42.5
91	223,830	May 92	55.2	30,508	071437	Uma RM 42.5
91	301,831	May 92	64.5	30,924	071438	Uma RM 42.5
	2,678,343			304,968		
91	66,345	March 93	9.1	23,239	071461	Uma RM 73.5
91	68,492	March 93	9.1	23,863	071460	Uma RM 73.5
	134,837			47,102		

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Appendix I. (cont)

Brood	Number Released	Release Date	No./lb.	Number tagged	CWT code	Release location
92	292,895	May 93	63.0	28,964	076330	Uma RM 73.5
92	269,336	May 93	62.9	27,092	070127	Uma RM 73.5
92	282,175	May 93	68.0	29,958	076334	Uma RM 73.5
92	282,125	May 93	67.3	29,537	076331	Uma RM 73.5
92	273,662	May 93	60.3	29,718	076333	Uma RM 73.5
92	277,931	May 93	61.5	29,451	076332	Uma RM 73.5
92	268,001	May 93	59.3	29,594	070126	Uma RM 73.5
92	203,731	May 93	66.7	30,706	076329	Uma RM 73.5
92	272,496	May 93	60.3	29,360	070125	Uma RM 73.5
92	207,565	May 93	59.4	30,462	076335	Uma RM 73.5
	2,629,917			294,842		
92	233,629	March 94	10.4	23,699	070255	Uma RM 73.5
92	49,824	April 94	8.5	23,470	070252	Uma RM 73.5
93	322,867	May 94	63.0	31,162	070663	Uma RM 73.5
93	327,700	May 94	72.4	31,658	070719	Uma RM 73.5
93	314,518	May 94	65.4	30,528	070720	Uma RM 73.5
93	326,408	May 94	66.2	30,447	070723	Uma RM 73.5
93	303,843	May 94	68.0	30,950	070722	Uma RM 73.5
93	306,105	May 94	68.7	28,474	070721	Uma RM 73.5
93	280,046	May 94	60.1	31,239	070662	Uma RM 73.5
93	279,965	May 94	64.2	31,040	070718	Uma RM 73.5
93	191,321	May 94	59.1	30,502	070716	Uma RM 73.5
93	190,439	May 94	60.0	32,481	070717	Uma RM 73.5
	2,843,212			308,481		

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/a The following releases are not included in the table:

115,779 non-tagged fish at 4.7/lb. were acclimated and released from Bonifer in March, 1986
35,574 non-tagged fish at 11.6/lb. were acclimated and released from Minthorn in October, 1986
1,429,250 non-tagged fish at 93.1/lb were released at Umatilla RM 9 in June, 1988
217,443 non-tagged fish at 8.6/lb. were released at Umatilla RM 63 & 70 in March, 1989
255,614 non-tagged fish at 8.2/lb. were released at Umatilla RM 70 in March, 1990
629,800 non-tagged fish at 82.4/lb. were released at Umatilla RM 70 & 79 in May, 1990
194,847 non-tagged fish at 7.8/lb were released at Umatilla RM 56, 70 and 79 in March, 1991
10,462 non-tagged fish at 80-194/lb were released at Umatilla RM 3 in April and May, 1991
504,369 non-tagged fish at 53.4/lb were released at Umatilla RM 42.5 in May, 1992
7,837 non-tagged fish at 62.8-112/lb were released at Umatilla RM 3 in April and May, 1992
29,681 non-tagged fish at 95.5-142/lb were released between Umatilla RM 0.5 and 27.3 in March through May, 1993
22,174 non-tagged fish at 85 to 171/lb were released between Umatilla RM 27.3 and 32.5 in April and May, 1994

Appendix J. Libration information for coho salmon coded-wire tagged and released in the Umatilla River Basin.

Brood	Number Released la	Release Date	No ./l b.	Number tagged	CWT code	Release location
85	37,245	April 87	13.5	13,440	073617	Minthorn
85	53,754	April87	13.5	19,879	073624	Minthom
85	70,890	April 87	13.5	26,740	073625	Minthorn
	161,889			60,059		
86	334,038	March 88	16.8	20,592	074356	LUmaR
86	360,689	March 88	17.3	18.963	074357	LUmaR
86	301,706	March 88	15.7	18,513	074358	LUmaR
	996.433			58,068		
87	75,970	March 89	17.2	27,062	074609	Nr Minthom
87	72,627	Mach 89	17.3	26,416	074610	Minthorn
87	84,672	March 89	19.1	26,739	074611	Minthom
	233,269			80,217		
88	67.309	March 90	13.5	28.033	074814	Minthom
88	59,682	March 90	13.3	26.881	074813	Nr Minthom
88	65,095	April 90	11.2	27,226	074815	Minthom
	192,086			82.140		
89	152,974	March 91	15.4	24,584	075535	Minthom
89	449,678	March 91	16.5	25,338	075534	Uma RM 56-60
89	352,977	March 91	16.8	25.407	075533	Uma RM 63- 70
	955,629			75,329		
90	472.22 1	March 92	15.5	27,908	075620	Uma RM 56
90	244.615	March 92	15.7	27,705	07562 1	Uma RM 60
90	244.550	March 92	15.7	27,456	075622	Uma RM 60
	961.336			83.071		
91	454.794	April 93	17.6	28,273	071521	Uma RM 60
91	218,618	April 93	17.5	27,821	071522	Uma RM 42.5
91	219,266	April 93	17.5	27,984	071523	Uma RM 42.5
	892,678			84,078		
92	418.222	April 94	18.1	27.166	070337	Uma RM 42.5
92	233,105	April 94	17.0	27,452	070338	Uma RM 60
92	232,778	April 94	17.l	27,010	070339	Uma RM 60
	884,105			81.628		

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/a The fdlowing releases are not included in the table:
786.660 non -tagged fish at 14 0/lb. were released at Umatilla RM 23 in April. 1987
753,637 non-tagged fish at 17.6/lb. were released at Umatilla RM 56 and 70 in March, 1989
594.527 non-tagged fish at 14.8/lb. were released at Umatilla RM 70 in March and April, 1990
202,315 non-tagged fish at 14.5/lb. were released at Umatilla RM 23 in March, 1990

Appendix K. Fish sampled at the Westland Canal fish trapping facility in 1994. /a

		Salmonids										
		Hatchery Production					Natural Production					
Date	No Fish Sampled	Coho (Y)	Fall Chinook (Y)	Spring Chinook (Y)	Spring & Fall Chinook (SY)	STS (Y)	STS (Y)	STS (SY)	Coho (Y)	Coho (SY)	Chinook /b	Non-game & Water Species
5/18	376	313	1		5	35	13				9	
6/1	872				852	1	2				16	1
6/7	360				329	6	4				20	1
6/9	334		1		319	1					9	4
6/15	313				288	1			2 /c		22	
6/17	377				357						19	[illegible]
6/20	283				268	1			1 /d		8	5
6/24	329				285	2					33	9
6/27	226				190						15	2[illegible]
TOTAL	3470	313	2	0	2893	47	19	0	3	0	151	42

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/a Y = yearling; SY = subyearling.
/b Some could be unmarked hatchery fish.
/c One could be a hatchery fish.
/d This fish could be a hatchery fish.

Appendix L Liberation and survival information for summer steelhead released in the Umatilla River.

Brood	Number Released	Date of Release	Size at Release	Number Tagged	CWT Code	Release Location	Estimated Adult Survival %	Total	Idaho & Canada	Oregon Col.R Net	Oregon Col.R Sport	Umatilla River
67	10.187	Apr 88	7 4	9.029	073059	Minthorn	0 57	58	0	12	0	46
87	10.075	Apr 88	7 4	9.721	073860	Minthorn	0 81	82	0	35	0	47
a7	10.287	Apr 88	7 4	9.925	073861	Minthorn	0.70	72	0	21	2	49
Total	30.549			29.475			0.69	212	0	60	2	142
87	21.940	Apr 88	6 5	9.689	073656	Nr Minthorn	0.75	164	5	25	23	111
87	21.409	Apr 88	6.5	9.455	073657	Nr Minthorn	0.51	109	2	16	0	91
07	21.392	Apr 88	6.5	9.448	073858	Nr Minthorn	0.32	68	0	0	5	63
Total	64.741 /a			28.592			053	341	7	41	28	26s
88	10.033	Dec 88	57.5	0		Uma RM 89	NA					
88	17.372	May 89	6 6	6,764	074720	Minthorn	0.06	10	0	0	6	4
88	17.382	May 89	6.6	0.709	074723	Minthorn	0.02	4	0	0	0	4
88	17.372	May 89	6 6	8.784	074724	Minthorn	0.03	6	0	0	0	6
Total	52.126 /b			26.357			0.04	20	0	0	6	14
88	9.073	May 89	5.6	8,800	074715	Nr Minthorn	009	9	0	0	0	9
88	9.864	May 89	5 6	8.791	074717	Nr. Minthorn	0.11	11	0	0	0	11
88	9.849	May 89	5.6	8.778	074718	Nr Minthorn	0.01	1	0	0	0	1
Total	79.586			26,369			0.07	21	0	0	0	21
89	20240	May 90	5.9	9.331	075212	Bonifer	0.87	176	0	22	20	134
89	19.811	May 90	5 9	9.133	075213	Bonifer	0.99	197	0	15	4	170
89	19.696	May 90	5 9	9.080	075214	Bonifer	0.91	180	0	48	13	119
Total	59.747 /c			27,544			0.93	553	0	85	37	431
89	9.030	May 90	5 5	9.511	075215	Nr. Bonifer	099	97	0	19	7	71
89	9.045	May 90	5 5	9.525	075216	Nr Bonifer	1.08	106	0	20	4	82
89	9.771	May 90	5 5	9.454	075217	Nr Bonifer	0.86	84	0	14	26	44
Total	29.446			28.490			097	207	0	53	37	197
90	14.221	May 91	6.2	9.035	075340	Bonifer	0.83	118	0	20	23	75
90	14.196	May 91	6 2	9.819	075341	Bonifer	0 73	104	0	25	10	69
90	14.191	May91	6 2	9.814	075342	Bonifer	0.97	138	0	25	19	94
Total	47.610 /d			29.466			004	360	0	70	52	238
90	11.084	May 91	8 7	9,432	075343	Nr Bonier	0.88	90	0	19	7	72
90	11.125	May 91	8 7	9,467	075344	Nr. Bonifer	0.69	77	0	9	7	61
90	11.114	May 91	8.7	9.458	075345	Nr Bonier	0.89	99	0	25	2	z2
Total	33.323 /e			20.357			0.82	274	0	53	16	205
91	22.474	Ma92	5.8	10.394	073759	Bon. & Mm	0.14	32	0	13	0	19
91	72.902	Mar 92	5 8	10.594	073662	Bon & Mm	0.02	4	0	0	0	4
91	22.059	Ma92	5 8	10.203	074127	Bon. & Mm	0.05	11	0	0	0	11
	67.435			31.191			0.07	47	0	13	0	34
91	22.262	Apr 92	5.0	10.108	075841	Meacham Cr	0.00	0	0	0	0	0
91	21.365	Apr 92	5.0	9.490	075842	Meacham Cr.	0.00	0	0	0	0	0
91	20.923	Apr 92	5 0	9.747	075843	Meacham Cr	0.00	0	0	0	0	0
	64.550			29.353			000	0	0	0	0	0

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Appendix L. (cont.)

Brood	Number Released	Date of Release	Size at Release	Number Tagged	CWT Code	Release Location	Estimated Adult Survival %	Total	Idaho & Canada	Oregon Col.R. Net	Oregon Col.R. Sport	Oregon Umatilla River
91	24,283	Apr/May 92	5.5	10,562	075838	Meacham Cr	0.01	2	0	0	0	2
91	24,492	Apr/May 92	5.5	10,275	075839	Meacham Cr.	0.00	0	0	0	0	0
91	24,087	Apr/May 92	5.5	10,105	075840	Meacham Cr	0.00	0	0	0	0	0
	72,862 /f			30,942			0.00	2	0	0	0	2

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/a The number released includes 33,984 adipose clipped fish at 10.3/lb. released at Umatilla RM 23 in May
/b The number released includes 22,274 adipose clipped fish at 5.5/lb. acclimated and released at Bonifer in May
/c The number released includes 29,522 adipose clipped fish at 7.7/lb. acclimated and released with the coded-wire tagged fish in May
/d The number released includes 12,389 adipose clipped fish at 7.5/lb. acclimated and released with the coded-wire tagged fish in May
/e The number released includes 3,998 adipose clipped fish at 12.5/lb. released at Umatilla RM 3 in April
/f The number released includes 5,443 adipose clipped fish at 5.8/lb. released at Umatilla RM 3 in April

Appendix M. Liberation and survival information for Spring Creek tule stock fall chinook salmon released in the Umatilla River (1982)

Br. Yr	Number Released	Date of Release	Size at Release	Number Tagged	CWT Code	Release Location	Estimated Adult Survival %	Total	Ocean	Col & Snake R.	Uma R.
81	306,279	Apr 82	79.0	46,707	050851	Umatilla R. /1	0.46	1,423	767	656	0
81	672,057	Apr 82	79.0	102,331	051057	Umatilla R. /1	0.56	3,730	2,154	1,576	0
Total	978,336			149,038			0.53	5,153	2,921	2,232	0
81	2,828,835	Apr 82	92.0	102,386	072663	Umatilla R. (RM 1.5)	0.46	12,930	7,515	5,415	0

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/1 Approximately 48.7% of the fish were released at RM 1.5 and 51.3% at RM 51.5.

Appendix N. Liberation and survival information for Bonneville JRB stock yearling fall chinook salmon released in the Umatilla River (1983–1994) /1

Br. Yr	Number Released	Date of Release	Size at Release	Number Tagged	CWT Code	Release Location	Estimated Adult Survival /2 %	Total	Ocean	Col. & Snake R.	Uma R.
81	100,564	Apr 83	5.9	99,570	072741	Bonifer & Meacham Cr.	0.17	169	89	80	0
82	228,412	Apr 84	8.6	96,448	072829	Bonifer & Meacham Cr.	0.08	178	126	52	0
83	198,162	Mar 85	7.8	88,306	073127	Uma R.(RM 87) & Bonifer	0.60	1,593	880	711	2
84	206,815	Mar 86	5.0	88,396	073327	Bonifer & Minthorn	3.17	6,560	3,552	2,716	292
85	22,216	Mar 87	8.1	10,103	073823	Minthorn	2.22	493	231	205	57
85	22,523	Mar 87	8.1	10,243	073824	Minthorn	2.07	466	204	229	33
85	21,807	Mar 87	8.1	9,917	073825	Minthorn	2.22	483	224	200	59
85	20,881	Mar 87	8.1	9,496	073826	Minthorn	2.37	495	165	299	31
85	21,716	Mar 87	8.1	9,876	073827	Minthorn	2.17	471	196	235	40
Total	109,143			49,635			2.21	2,408	1,020	1,168	220
85	20,786	Mar 87	8.6	10,253	073828	Bonifer	2.27	472	227	229	16
85	20,212	Mar 87	8.6	9,970	073829	Bonifer	2.27	458	235	207	16
85	20,546	Mar 87	8.6	10,135	073830	Bonifer	2.73	561	245	294	22
85	20,381	Mar 87	8.6	10,053	073831	Bonifer	2.21	451	201	207	43
85	20,438	Mar 87	8.6	10,081	073832	Bonifer	2.45	500	227	243	30
Total	102,363			50,492			2.39	2,442	1,135	1,180	127
86	52,317	Mar 88	8.8	42,068	074036	Minthorn	3.32	1,738	751	512	475
86	48,474	Mar 88	8.8	38,978	074039	Minthorn	3.13	1,517	680	410	427
Total	100,791			81,046			3.23	3,255	1,431	922	902
86	50,480	Mar 88	10.2	39,509	074036	Bonifer	2.41	1,216	571	318	327
86	49,070	Mar 88	10.2	38,405	074037	Bonifer	2.61	1,279	563	394	322
Total	99,550			77,914			2.51	2,495	1,134	712	649
87	217,443	Mar 89	8.6	0		Uma RM 53–70	NA				
88	255,614	Mar 90	6.2	0		Uma RM 70	NA				
89	194,847	Mar 91	7.8	0		Uma RM 56–79	NA				
90	122,639	Mar 92	7.7	26,160	075619	Uma RM 56	0.00	5	0	0	5
90	97,801	Mar 92	7.6	26,178	075618	Uma RM 70	0.02	19	19	0	0
Total	220,440			52,338			0.01	24	19	0	5
91	66,345	Mar 93	9.1	23,239	071461	Uma RM 73.5	0.05	34	11	3	20
91	68,492	Mar 93	9.1	23,863	071460	Uma RM 73.5	0.02	11	0	0	11
Total	134,837			47,102			0.03	45	11	3	31
92	233,629	Mar 94	10.4	23,699	070255	Uma RM 73.5	0.14	316	0	10	306
92	49,824	Apr 94	8.5	23,470	070252	Uma RM 73.5	0.06	32	0	0	32

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/1 Adult returns from the 1990, 1991 and 1992 broods are incomplete
/2 The data reported in the table are expanded numbers

Appendix O Liberation and survival information for Bonneville URB and Umatilla River stock subyearling fall chinook salmon released in the Umatilla River (1984 - 1993) /1

Hr. Yr Stock /2	Number Released	Date of Release	Size at Release	Number Tagged	CWT Code	Release Location	Estimated Adult Survival /3 %	Total	Ocean	Col. & Snake R.	Uma.R
83 B	966,250	Jun 84	86.1	210.441	073124	Umatilla R (RM 1.5)	0.79	7.594	2.406	5.166	0
84 B	3,223,172	Jun 85	92 3	206,756	073326	Umatilla R (RM 1.5)	0 6 7	26.1 m	11.115	17,008	47
84 B	51,000	Oct as	16.2	30,838	073162	Bonifer	0.67	342	147	192	3
86 B	35.574	Oct 86	11.6	0		Minthorn	NA				
86 B	197.432	Jun 86	86.0	20,636	073833	Umatilla R.(RM 1 5)	0.75	1,473	526	947	0
86 B	196.153	Jun 86 8	6 0	21.535	073834	Umatilla R.(RM 1 5)	0 37	734	362	372	0
86 B	197.438	Jun 86	86 0	20,690	073835	Umatilla R.(RM 1 5)	0.37	735	372	363	0
86 B	196.952	Jun 86 8	6 0	20.170	073836	Umatilla R.(RM 1 5)	0 51	996	254	742	0
86 B	197.788	Jun 86	86 0	20,982	073837	Umatilla R (RM 1.5)	0 51	1,009	255	754	0
86 B	208.103	Jun 86	86.0	20.615	073838	Umatilla R (AM 1 5)	0 39	810	330	480	0
86 B	208.958	Jun 86	86 0	21.658	073839	Umatilla R (RM 1.5)	0 55	1.140	269	059	0
86 B	207.550	Jun 86 8	6 0	20.289	073840	Umatilla R (RM 1.5)	0.56	1.157	625	532	0
86 B	208.184	Jun 86 8	6 0	20,895	073841	Umatilla R (RM 1.5)	0 61	1.265	149	1.116	0
86 B	208.994	Jun 86 8	6 0	21.694	073842	Umatilla R (RM 1 5)	0 44	925	289	636	0
Total	2,029,602			209.145			0 51	10,252	3.451	6,801	0
87 B	1,429,250 /4	Jun 88	93 1	0		Umatilla R (RM 9)	NA				
89 B	1,018,502	May - Jun 90	87 5	52.612	075403	Umatilla R (RM 70 - 79)	0 18	1,800	774	613	213
89 B	1,018,493	May - Jun 90	87 5	53.160	075404	Umatilla R (RM 70 - 79)	0 21	2.145	900	1.130	115
89 B	1,018,486	My - Jun 90	87 5	53.248	075405	Umatilla R (RM 70 - 79)	0.13	1,339	727	421	191
Total	3,055,481 /5			159,020			0 17	5.264	2.401	2.364	519
89 B	25.311	Oct 90	9 2	23.3%	075325	Minthorn	0.03	7	4	2	1
89 B	23,724	Oct 90	9 2	21.929	075326	Minthorn	0 11	26	12	12	2
89 B	22.828	Oct 90	9 2	21.101	075327	Minthorn	0.07	15	2	9	4
Total	71.863			66.426			0.07	46	18	23	7
89 B	25.472	Oct 90	8 8	23.413	075322	Nr Minthorn	0 05	12	3	9	0
89 B	25.694	Oct 90	8 8	23.617	075323	Nr Minthorn	0.00	1	0	1	0
89 B	25.480	Oct 90	8 8	23.420	075324	Nr. Mmmom	0.05	13	10	2	1
Total	76.646			70.450			0.03	26	13	12	1
90 B	1.347.658	May 91	8 2 0	52.252	075225	Umatilla R.(RM 70 - 79)	0.07	902	232	335	335
90 B	1,347.587	May 91	8 7 0	51.726	075226	Umatilla R (RM 70 - 79)	0.08	1.042	625	287	130
90 B	100,983	May 91	7 3 0	48,266	075328	Umatilla R (RM 70 - 79)	0.28	280	77	176	27
90 B	100.500	May91	73 0	46.461	075449	Umatilla R (RM 70 - 79)	0.14	137	52	52	33
90 B	99.561	May 91	7 3 0	48,301	070016	Umatilla R (RM 70 - 79)	0 13	129	47	68	14
90 B	52,503	May 91	8 2 0	51.814	075450	Umatilla R (RM 70 - 79)	0 17	91	42	29	20
90 B	52.884	May 91	82 0	52.444	075451	Umatilla R (RM 70 - 79)	0 18	95	52	31	12
Total	3,101,676 /6			353,286			0.09	2,676	1.127	976	571
90 B	26.481	May 91	80 5	26.173	075563	Minthorn	0 11	28	11	12	5
90 B	76.5%	May 91	8 0 5	24.762	075801	Minthorn	0 16	42	23	17	2
90 B	26.606	May 91	80 5	25.476	075802	Minthorn	0.18	48	24	16	8
Total	79.672			76,411			0.15	116	58	45	15
90 B	25.662	May91	86 0	25,720	075560	Nr Minthorn	0 12	31	11	15	5
90 B	25.708	May 91	8 6 0	25.425	075561	Nr Minthorn	0 13	33	16	14	3
90 B	23.295	May 91	86.0	22.309	075562	Nr Minthorn	0 16	37	15	16	6
Total	74.865			73.454			0 13	101	42	45	14

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Appendix O (cont.)

Br Yr Stock /2	Number Released	Date of Release	Size at Release	Numbs Tagged	CWT Code	Release Location	Estimated Adult Survival /3 %	Total	Ocean	Col. & Snake R.	Uma.R.
91 B	286,864	May 92	70.6	31,892	071429	Umatilla R.(RM 42.5)	0.00	9		0	9
91 B	281,630	May 92	65.1	32,287	071430	Umatilla R.(RM 42.5)	0.00	0	8	0	0
91 B	183,113	May 92	56.2	28.951	071431	Umanim R.(RM 42.5)	0.00	0	0	0	0
91 B	191.448	May92	58.3	29.425	071432	Umatilla R.(RM 42.5)	0.00	0	0	0	0
91 B	304.181	May 92	61.0	29,066	071433	Umatilla R.(RM 42.5)	0.00	0	0	0	0
91 B	307.106	May 92	0.7	31.224	071434	Umatilla R.(RM 42.5)	0.00	0	0	0	0
91 B	397.627	May92	60.9	30,326	0716%	Umatilla R.(RM 42.5)	0.00	0	0	0	0
91 B	302,857	May 92	61.9	30,365	071436	Umanim R.(RM 42.5)	0.00	0	0	0	0
91 B	224,053	May 92	56.2	30,508	07157	Umanim R.(RM 42.5)	0.00	7	0	0	7
91 B	302,132	May 92	64.5	30.924	071438	Umatilla R.(RM a 5)	0.00	0	0	0	0
	2,681,013 /7			304,968			0.00	16	0	0	16
91 U	504,369	May92	53.4	0		Umatilla R.(RM 42.5)	NA				
91 U	5,167	Apr - May 92	62.8	0		Umatilla R.(RM 3)	NA				
92 B&U			63.0	26.964	076330	Umatilla R.(RM 73.5)	0.01	30	0	10	20
92 B&U	272,376	May 93	62.9	27.092	070127	Umanim R.(RM 73.5)	0.00	0	0	0	0
92 B&U	285,360	May 93	68.0	29,958	076334	Umatilla R.(RM 73.5)	0.01	19	0	0	19
92 B&U	285,309	May 93	67.3	29.537	076331	Umanim R.(RM 73.5)	0.01	20	0	10	10
92 B&U	276,750	May 93	60.3	29,718	076333	Umatilla A.(RM 73.5)	0.01	19	0	19	0
92 B&U	281,068	May 93	61.5	29.451	076332	Umanim R.(RM 73.5)	0.01	38	0	0	38
92 B&U	271,026	May 93	59.3	29,594	070126	Umatilla R.(RM 73.5)	0.00	0	0	0	0
92 B&U	206,030	May 93	66.7	30,706	076329	Umatilla R.(RM 73.5)	0.00	7	0	7	0
92 B&U	275,571	May 93	60.3	29,360	070125	Umatilla R.(RM 73.5)	0.02	57	38		19
92 B&U	209,908	May93	59.4	30,462	076335	Umatilla R.(RM 73.5)	0.01	14	0	8	14
	2,659,598 /8			294.642			0.01	204	38	46	120

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/1 Adult returns nom the 1989 - 92 brood years are incomplete.
/2 B = Bonneville URB stock. u = Umanim River stock
/3 The data reported in the table are expanded numbers.
/4 These fish were not coded-wire tagged, but to estimate adult contribution, mey were included in me Priest Rapids URB stock subyearling release in 1988 (075007) Both stocks were reared at hgcn Hatchery.
/5 The number released includes 629,800 non-tagged Priest Rapids URB stock subyearlings released at 82.4/lb. in May at Umatilla RM 70-79
/6 The number released includes 10,482 non-tagged fish at 80-194/lb released at Umatilla RM 3 in April and May
/7 The number released includes 2,670 non-tagged fish at 112/lb released at Umatilla RM 3 in April and May
/8 The number released includes 29,681 non-tagged fish at 95.5-142.0/lb. released between Umatilla RM 0 and RM 27.3 in April through May

Appendix P. Liberation and survival information for Priest Rapids URB stock fall chinook salmon released in the Umatilla River (1987 – 1990) /1

Br. Yr	Number Released	Date of Release	Size at Release	Number Tagged	CWT Code	Release Location	Estimated Adult Survival /2 %	Total	Ocean	CO & Snake R.	Uma R.
86	497,572	May 87	60.4	40.793	073912	Umatilla R (RM 1.5)	0.71	3.549	1.537	1,939	73
86	501,266	May 87	60.4	41.096	073913	Umatilla R (RM 1.5)	0.88	4,391	1.939	2.403	49
86	477,992	May 87	60.4	39,187	073914	Umatilla R (RM 15)	0.86	4,099	2,086	1,891	122
Total	1,476,830			121,076			0.82	12.039	5.562	6.233	244
86	670	July 87	20.0	643	073915	Minthorn	0.00	0	0	0	0
86	672	July 87	20.0	645	073916	Minthorn	0.00	0	0	0	0
86	658	July 87	20.0	632	074036	Minthorn	0.79	5	0	5	0
Total	2,000			1,920			0.25	5	0	5	0
87	3,316,007 /3	May 88	60.3	190.205	075007	Umatilla R (AM 23)	0.07	2.458	1,321	886	251
87	4,023	Nov 88	9.8	4,438	074539	Minthorn	0.43	21	11	9	1
87	4,660	Nov 88	9.8	4,209	074540	Minthorn	0.23	10	4	5	1
87	4,925	Nov 88	9.8	4,533	074541	Minthorn	0.62	31	21	10	0
Total	14,408			13,260			0.43	62	36	24	2
87	x.050	Nov 88	8.6	24,656	074536	Nr Minthorn	0.39	105	41	50	14
87	x.433	Nov 88	8.6	23,403	074537	Nr Minthorn	0.62	1 %	98	41	17
87	27,330	Nov 88	8.6	25,089	074538	Nr Minthorn	0.53	144	62	60	22
Total	79,681			73,148			0.51	405	201	151	53
88	797,904	May 89	66.6	52,220	074646	Umatilla R (RM 23)	0.12	978	443	428	107
88	797,903	May 89	66.6	49,771	074647	Umatilla R (RM 23)	0.12	962	433	465	64
88	797,903	May 89	66.6	52,244	074648	Umatilla R (RM 23)	0.10	886	428	443	15
Total	2,393,710			154,243			0.12	2,626	1,304	1,336	186
88	x.110	Oct 89	10.9	26,358	074753	Minthorn	0.13	33	15	16	2
88	X.617	Oct 89	10.9	25,028	074754	Minthorn	0.10	27	6	14	7
88	25,438	Oct 89	10.9	25,438	074757	Minthorn	0.07	19	4	8	7
Total	78,825			76,824			0.10	79	25	38	16
88	71,071	oct 89	11.1	26,790	074758	Nr Minthorn	0.10	27	11	12	4
88	25,428	Oct 89	11.1	24,285	074760	Nr Minthorn	0.09	24	16	7	1
88	25,633	Oct 89	11.1	25,350	074763	Nr Minthorn	0.06	16	7	5	4
Total	78,137			76,425			0.09	67	34	24	9
89	629,800 /4	May 90	02.4	0		Umatilla A (RM 70 -79)	NA				

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/1 Adult return are incomplete

/2 The data reported in the table are expanded numbers

/3 The number released includes 1,429,250 Bonneville URB stock subyearlings released at 93 fish in June 3: Umatilla RM 9.

/4 These fish wore not coded wire tagged. but to estimate adult contribution, they were included in the Bonneville URB stock subyearling release in 1990. Both stocks were reared at Irrigon Hatchery

Appendix Q Liberation and survival information for spring chinook salmon released in the Umatilla River (1988 – 1993)

Brood	Number Released	Date of Release	Size at Release	Number Tagged	CWT Code	Release Location	Estimated Adult Survival /a %	Total	Columbia & Snake Rivers	Umatilla River
86	99,895	April 88	20 5	0		Uma A (RM 23)	NA			
86	35,946	Mar Apr 88	10 1	26.640	074325	Bonifer	0 %	342	34	308
06	35.140	Mar – Apr 88	10 1	25,063	074326	Bonifer	0.94	332	90	234
86	35,137	Mar - Apr 88	10 1	25,853	074327	Bonifer	0 94	332	53	279
Total	106,231			70.356			0 %	1006	105	021
06	64.142	April 88	0 6	26.319	074328	Uma R (AM 23-01)	0.65	419	53	366
86	67.991	April 88	0.6	25,722	074329	Uma.R. (RM 23-81)	0.40	304	86	210
86	64,013	April 88	0 6	26,252	074330	Uma R (RM 23-01)	0 92	588	95	493
Total	191,146 /b			78.293			0.69	1311	234	1077
87	416	Nov 88	2 1 4	410	074420	Bonifer	0.00	0	0	0
R I	399	Nov 88	21 4	393	074423	Bonifer	0.25	1	0	1
87	381	Nov 88	21 4	376	074424	Bonifer	!?-a	1	0	1
Total	1,196			1.179			0 17	2	0	2
87	26.101)	Nov 88	11 1	25.987	074427	Uma R (RM 09)	0.06	15	0	15
87	24.103	Nov 88	11 1	24.070	074429	u ma.R (RM 89)	0.12	20	3	25
R7	a.425	Nov 00	11.1	25,356	074430	Uma R. (RM 09)	0 09	22	0	22
Total	75.767			75.413			0.09	65	3	62
87	76.135	Mar – May 89	10 6	25.427	074433	Bonifer	0.35	92	11	81
87	27,756	Mar -May 89	10 6	27.004	074434	Bonifer	0.25	69	9	Go
87	26,093	Mar -May 09	106	25,386	074436	Bonifer	0 25	66	14	52
Total	79,984			77.017			0.20	227	34	193
87	70,153	March 09	106	27.505	074439	Nr Bonifer	0.32	90	24	66
87	28,116	March 09	106	27.550	074440	Nr Bonifer	0 33	94	16	78
87	24,603	March 09	106	24,165	074443	Nr Bonifer	Q - s	86	15	71
Total	80,972			79.300			0.33	270	55	215
88	24,968	Oct 09	12 0	24.00 1	075063	Bonifer	0.07	17	11	6
88	28,299	Oct 09	120	28,109	075101	Bonifer	0 12	35	4	31
88	27,483	Oct 89	12.0	27,299	075102	Bonifer	0 09	25	5	20
Total	80,750			00.209			0 10	77	20	57
88	21.707	Oct 89	120	27.137	075103	Nr Bonifer	0.07	10	2	16
88	28,718	Oct 09	120	28,560	075104	Nr. Bonifer	0.11	32	16	16
88	27,848	Oct 89	12 0	27,695	075105	N r Bonifer	0 05	13	0	13
Total	83,853			03.392			000	63	10	45
88	99,775	April 90	18 6	0		Uma.R (RM 23)	NA			
88	38,224	March 90	90	26,630	075106	Bonifer	0 49	106	37	149
88	37,538	March 90	90	26,160	075107	Bonifer	0.65	244	59	185
88	38,583	March 90	90	26,888	075108	Bonifer	0.47	183	48	135
Total	114,345			79.606			054	613	144	469
AH	39.0 12	March 90	96	25.611	075109	N r Bonifer	0.73	203	61	222
RR	40.072	March 90	96	26.307	075110	Nr Bonifer	0.77	308	s o	218
88	38,343	March 90	96	25,172	075111	Nr Bonifer	0.54	208	60	148
Total	117,427			7 7,090			0 68	799	211	580

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Appendix 0 (Cont.)

Brood	Number Released	Date of Release	Size at Release	Number Tagged	CWT Code	Release Location	Estimated Adult Survival /a %	Total	Columbia & Snake Rivers	Umatilla River
89	76.757	Oct 90	115	26.670	074505	Bonifer	0 01	3	0	3
A9	26,805	Oct 90	115	26.7 17	074506	Bonifer	0.01	2	0	2
89	26,876	Oct 90	115	26,788	074507	Bonifer	0.00	0	0	0
Total	80.438			80.175			0.01	5	0	5
89	26,050	Oct 90	13 4	25.876	074508	Nr Bonifer	0.01	2	2	0
89	76.279	Oct 90	13 4	26.104	074509	Nr. Bonifer	0.00	0	0	0
89	25,669	Oct 90	13 4	25,497	074510	Nr Bonifer	0.01	2	0	2
Total	77,998			77.477			0.01	4	2	2
89	33.473	Mar 91	10.1	25.947	075114	Bonifer	0.24	82	19	63
89	33.440	Mar 91	10.1	25.92 1	075115	Bonifer	0.22	72	6	66
US	33,593	Mar 91	to 1	26,039	075116	Bonifer	0.25	83	6	77
Total	100,506			77.907			0.24	237	31	206
89	31,932	Mar 91	118	24.365	075440	Nr. Bonifer	0.13	43	0	43
89	37.187	Mar 91	118	24.559	075401	Nr Bonifer	0 21	66	11 /c	55
89	32,032	Mar 91	118	24,441	075442	Nr Bonifer	0.18	58	7	51
Total	96,151			73.365			0 17	167	18	149
89	96,733	Apr - May 91	20 3	23.797	635661	Uma R (RM 3 6 89)	id			
'HI	27,040	Nov 91	16 5	26.769	075826	Bonifer	0.08	22	0	22
90	27,007	Nov 91	165	26.737	075827	Bonifer	0.06	16		16
90	2 1.090	Nov 91	16 5	26.827	075828	Bonifer	0.08	23	8	23
Total	81,145			80,333			0.08	61	0	61
90	76.0 19	Nov 91	16.8	25.499	075829	Nr. Bonifer	0.05	12	0	12
90	25,900	Nov 91	168	25.382	075830	Nr Bonifer	0.05	13	0	13
90	26,561	Nov 91	16 8	26.029	07583 1	Nr Bonifer	0.04	11	0	11
Total	78,480			76.910			0.05	36	0	36
'HI	96,254	April 92	18 7	31.851	633962	Uma.R (RM 3 & 89)	0.00	0	0	0
90	36,351	April 92	9 2	26.570	075035	Bonifer	0.02	8	3	5
90	36,154	April 92	9 2	26.426	075836	Bonifer	0.02	7	0	7
90	36,596	April 92	9 2	26.750	075837	Bonifer	0.02	8	0	8
Total	109,101			79.746			0.02	23	3	20
90	37.994	April 92	8.5	25.503	075832	Nr Bonifer	0.02	5	1	4
90	32,953	April 92	8 5	25.472	075833	Nr Bonif.6	0.04	12	6	6
90	32,982	April 92	8 5	25,493	075834	Nr Bonifer	0.01	4	0	4
Total	WI.979			76.468			0 0 2	21	7	14
91	97,013	May 92	32 1	50.61 1	071443	Uma R. (RM 80)	0.00	0	0	0
31	63,585	May 92	31 2	48.051	071444	Uma R (RM 80)	0 0 0	0	0	0
91	63,305	May 92	32 2	49.498	071 445	Uma R (RM 80)	0 0 0	0	0	0
91	95,456	May 92	32 1	50.045	071446	Uma R (RM 80)	0 00	0	0	0
91	104,670	May 92	36 4	50.04 7	071447	Uma R (RM 80)	0 00	0	0	0
91	104,929	May 92	36 3	51.707	071448	Uma R (RM 80)	0 0 0	0	0	0
91	109,528	May 92	38 3	51.518	071449	Uma R (RM 80)	0 00	0	0	0
91	109,997	May 92	37 8	51.271	07 1450	Uma A (AM 80)	0 00	0	0	0
91	98,617	May 92	39 2	52,128	071451	Uma R (RM 80)	0.00	0	0	0
91	108,652	May 92	36 8	51,659	071452	Uma R. (RM 80)	0.00	0	0	0
	955,752			506,535			0.00	0	0	0

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Appendix Q (Cont)

Brood	Number Released	Dale d Release	sue at Release	Number Tagged	CWT Cooe	Release Location	Estimated Adult Survival /a %	Total	Columbia & Snake Rivers	Umatilla River
91	25,104	Nov 92	1 3 0	25.104	076042	Uma.R (RM 80)	0 00	1	0	1
91	75.075	Nov 92	1 3 0	24 992	076043	Uma R (RM 80)	0.00	1	0	1
91	15.130	Nov 92	13 1	15,423	076044	Uma R (RM 80)	0 0 1	1	0	1
91	24.638	Nov 92	9 9	24.638	076045	Uma.R (RM 80)	0 0 1	2	0	2
91	24.115	Nov 92	1 0 0	24.22 1	076046	Uma R. (RM 80)	0.00	1	0	1
91	17,667	Nov 92	10 1	17.269	076047	Uma R (RM 80)	0.00	0	0	0
	132,929			131.647			0 0 0	6	0	6
91	50.136	Nov 92	19 3	26,136	071542	Uma A (RM 80)	0.00	0	0	0
91	50,680	Nov 92	19 5	25,633	071543	Uma R (RM 80)	0.00	0	0	0
	101.416			51.769			0.00	0	0	0
91	92.720	Mar 93	14.5	19.95 1	071455	Uma R (RM 80)	9.01	5	0	5
91	94.770	Mar 93	14 5	20,022	071456	Uma R (RM 80)	0.00	0	0	0
	186,948			39,973			0.00	5	0	5
91	50,3 10	Mar 93	8 3	21.499	075739	Uma R (RM 80)	0.00	0	0	0
91	50, 109	Mar 93	8 3	20.880	075740	Uma R (RM 80)	0 00	0	0	0
91	54.347	Mar 93	8 3	21.157	07574 1	Uma.R (RM 80)	0.00	0	0	0
91	54.016	Mar 93	8 3	20.307	075742	Uma R (RM 80)	0.00	0	0	0
	208,782			83,843			0 00	0	0	0
91	96,086	April 93		31.421	636950	Uma R (RM 3-89)	0 00	0	0	0

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/a The data reported in the table are expanded numbers
/b The number released includes 89.268 non-tagged fish at 10 3/lb. released in the upper Umatilla River in April, 1988
/c Includes 4 from Alaskan commercial fishery
/d The same coded - wire tag code was released both in the Wind River (Washington) and Umatilla River This eliminates any possible evaluation of survival from the Umatilla River

Appendix R. Liberation and survival information for coho salmon released in the Umatilla River 1987 - 1994 a

Brood	Number Released	Date of Release	Size at Release	Number Tagged	CWT Code	Release Location	Estimated Adult Survival /b %	Total	Ocean	Col R	Uma R
85	212,266	Apr 87	13.5	13.440	073617	Minthorn	1.94	4122	1974	1911	237
85	313,961	Apr 87	13.5	19.879	073624	Minthorn	1.68	5259	3048	2053	158
85	422,322	Apr 87	13.5	26.740	073625	Minthorn	1.55	6555	3822	2543	190
Total	948,549 /c			60.059			1.68	15936	8844	6507	585
86	334,038	Mar - Apr 88	16.8	20.592	074356	Lower Umatilla R	4.58	15314	8387	4088	2839
86	360,689	Mar - Apr 88	17.3	18.963	074357	Lower Umatilla R.	4.41	15901	8407	3652	3842
86	301,706	Mar - Apr 88	15.7	18.513	074358	Lower Umatilla R.	4.48	13510	7464	2852	3194
Total	996,433			58.068			4.49	44725	24258	10592	9675
87	829,607	Mar 89	17.2	27.062	074609	Nr. Minthorn	0.57	4690	2790	1318	562
87	72,627	Mar 89	17.3	26.416	074610	Minthorn	1.04	756	533	121	102
87	84,672	Mar 89	19.1	26.739	074611	Minthorn	1.08	918	690	108	120
Total	157,299			53.155			1.06	1674	1223	229	222
88	67,309	Mar 90	13.5	28.033	074814	Minthorn	3.07	2069	826	1049	194
88	896,524 /d	Mar 90	13.3	26.881	074813	Uma Fin 63 - 70	3.11	26606	11216	13096	2294
88	65,005	Apr 90	11.2	27.226	074815	Minthorn	4.04	2628	1145	1258	225
89	152,974	Mar 91	15.4	74.584	075535	Minthorn	0.20	305	187	81	37
89	449,678	Mar 91	16.5	25.338	075534	Uma Rm 56 - 60	0.17	746	302	302	142
89	352,977	Mar 91	16.8	25.407	075533	Uma Rm 63 - 70	0.16	556	320	69	167
Total	802,655			50.745			0.16	1302	622	371	309
90	472,221	Mar 92	15.5	27.908	075620	Uma Rm 56	0.71	3367	1049	1557	761
90	244,615	Mar 92	15.1	27.705	075621	Uma Rm 60	1.07	2622	909	1068	645
90	244,550	Mar 92	15.7	27.458	075622	Uma Rm 60	0.75	1835	481	944	410
Total	961,386			83.071			0.61	7824	2439	3569	1816
91	454,794	Apr 93	17.6	20.273	071521	Uma Rm 60	0.19	852	0	273	579
91	718,618	Apr 93	17.5	27.821	071522	Uma Rm 42	0.23	495	0	141	354
91	219,266	Apr 93	17.5	27.964	071523	Uma Rm 42	0.15	329	39	47	45
Total	892,678			84.078			0.19	1676	39	461	1176
92	411,772	Apr 94	18.1	27.166	070337	Uma Rm 42	0.01	62	0	0	62
92	233,105	Apr 94	17.0	27.457	070338	Uma Rm 60	0.01	34	0	0	34
92	239,778	Apr 94	17.1	27.010	070339	Uma am 60	0.01	26	0	0	26
	884,105			131.620			0.01	122	0	0	122

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a) Survival data for the 1992 brood includes age - 2 (spring 1994 returns)
b) The data reported in the table are expanded numbers
c) The number released includes 786,660 non - tagged fish at 14.6/lb released at Umatilla RM 23 in April
d) The number released includes 594,527 non - tagged fish at 14.8/lb released at Umatilla RM 70 in March and April, and 202,315 non - tagged fish at 14.5/lb released at Umatilla RM 23 in March