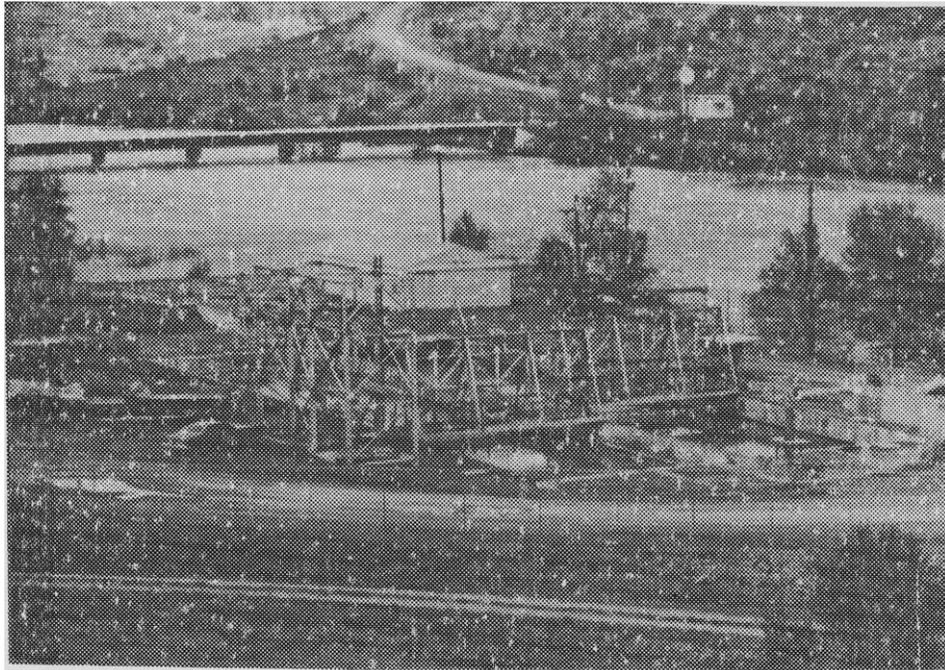




OXBOW FISH HATCHERY

**1999 Steelhead Brood Year Report
1998 Spring Chinook Brood Year Report**



Kent Hills, Hatchery Assistant Manager

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ABSTRACT

The Steelhead Trout *Oncorhynchus mykiss* run totaled 2,042 fish entering the Hells Canyon Dam fish trap. Fall trapping consisted of 15 trapping days between October 26, 1998 and December 1, 1998. The trap was shut down on December 1st due to freezing conditions. 1,974 (97%) Steelhead were trapped during this period. The trap was put back into operation on March 2, 1999 to the 9, 1999 then shut down because of high water and was started again on April 5th and April 6, 1999. The trap was operated for 5 days during the spring period. There were 68 (3%) steelhead trapped during the spring operating period, bringing the total to 2,042 for the season. Of these fish, 885 (43%) were males and 1,157 (57%) were females. The Idaho Fish and Game Fisheries Department discontinued trapping because of the large number of females on station.

Age class breakdown of the run was 1,373 (67%) one-ocean fish, consisting of 690 (50%) hatchery males; 31 (2%) wild males; 623 (46%) hatchery females and 29 (2%) wild females. Two ocean fish accounted for 669 (33%) of the steelhead trapped and consisted of 145 (22%) hatchery males; 19 (3%) wild males; 485 (72%) hatchery females and 20 (3%) wild females. There were 142 steelhead trapped that were tagged (marked) in the following manner 137 coded wire tags (CWT) and 5 floy tags.

A total of 685 adult steelhead were considered surplus and were out-planted into surrounding waters for additional sport fisheries and supplemental propagation. During the fall, 202 fish were released into the Boise River, 200 into Hells Canyon Reservoir and on December 8, 1998, the Idaho Fish and Game transported and released 266 Steelhead into the Salmon River at Hammer Creek Campground for the Nez Perce Tribe. The Steelhead were marked with an opercle punch. An additional 17 were released into Hells Canyon Reservoir during the spring.

Sixteen fall Chinook salmon *O. tshawytscha* were incidentally trapped. These fish were measured, checked for marks and injuries and were returned to the Snake River below Hells Canyon Dam.

Pre-spawning mortality totaled 42 adult steelhead; 17 males and 25 females.

Spawning consisted of 15 egg takes from March 15, 1999 until May 7, 1999. A total of 641 females were spawned with an average fecundity of 4,779. These fish produced 3,063,596 green eggs. The percent eye-up was 58.04%, leaving a total of 1,778,024-eyed eggs. Niagara Springs Hatchery received 538,544-eyed eggs during May 1999 and 600,582 swim-up fry in July 1999. Magic Valley received 146,752-eyed eggs and Hagerman National Fish Hatchery received 492,146 eyed eggs.

The function of Oxbow Fish Hatchery is to trap chinook salmon and hold them until they are shipped to Rapid River Fish Hatchery (RRFH). When the Chinook arrived at OFH, they were measured and checked for marks and injuries. This data was recorded for future use. The adult hatchery fish were injected with antibiotics, and placed in the northeast holding pond. Hatchery Jack salmon were not injected and were put into the southeast holding pond. Wild salmon were treated like hatchery salmon except they were not injected and were released back into the Snake River below Hells Canyon Dam. Periodically, the Jacks were given to the Nez Perce Tribe for personal and ceremonial use. The adult chinook salmon were transported to RRFH weekly when

the holding pond water was cold and as often as daily when the holding pond water reached temperatures in the 60-degree plus range. The chinook salmon were spawned at RRFH, therefore little information is included in this report. Refer to the RRFH Brood Year report for information not included in this report.

Oxbow Hatchery trap operated for 17 days between May 5 and July 15, 1998. A total of 74 adult spring chinook *Oncorhynchus tshawytscha* were trapped during this period and consisted of 66 hatchery fish and 8 wild fish. There were seven holding pond mortalities consisting of six hatchery fish and one wild fish. The remaining wild or natural salmon were peduncle fin punched and released below Hells Canyon Dam and did not return to the trap again. Idaho Power personnel transported the hatchery adults to Rapid River Hatchery where they were held for spawning. A total of 19 females were spawned, producing 95,474 green eggs. Eye-up was 80.8%, resulting in 77,194 eyed eggs.

HATCHERY OVERVIEW

Introduction

Oxbow Fish Hatchery (OFH) is part of the Idaho Power Company's (IPC) hatchery system and has been in operation since 1962. The OFH facility is owned and funded by IPC and operated by the Idaho Department of Fish and Game (Department). The OFH was constructed to mitigate for losses of anadromous fish resulting from the construction of Hells Canyon Dam on the Snake River. The OFH is a steelhead trout *Oncorhynchus mykiss* adult holding, spawning and egg rearing station. Spring chinook salmon *O. tshawytscha* are collected and held for transport RRFH.

Location

The OFH is located in Eastern Oregon and is adjacent to the confluence of Pine Creek and the Snake River (Oregon and Idaho border) at the Idaho Power village known as Oxbow, Oregon. Located at the easternmost end of Oregon State Highway 86, it is approximately 67 highway miles east of Baker City, Oregon and approximately 150 highway miles northwest of Boise, Idaho.

Objectives

The primary objective of OFH is to trap and spawn enough returning adult steelhead and to trap sufficient numbers of spring chinook, which are transported to RRFH for spawning, to meet the Hells Canyon mitigation requirements for adult anadromous fish returns on the upper Snake River. The mitigation objective for Steelhead is to produce 1.3 million eyed eggs and ultimately produce 400,000 pounds of steelhead trout smolts annually. The mitigation objective for spring chinook is to produce 1,000,000 smolts annually.

FACILITY DESCRIPTION

The OFH consists of the following: A hatchery building which houses the office, shop, overnight sleeping quarters, and an incubation room; four adult holding ponds including fish loading and off-loading facilities; an incubation water chilling unit; a spawning building; bio-aide dorm; assistant hatchery managers' residence; and an off-site fish trap. In addition, the facility has six cinder block raceways that are in need of renovation.

The hatchery building is a 28 ft x 60 ft, single-story metal structure partitioned into two main rooms. Half of the building consists of shop space, office space, and sleeping quarters, while the other half is for egg incubation. The incubation room has 384 incubation trays (Heath trays) in 24 stacks, giving it the capacity to incubate 3.4 million eggs. Two 8-ft square sheds attached to the main building for storage.

Adult holding and production facilities include four holding ponds, a fish trap, and a fish transport truck. The four holding ponds are actually two large ponds separated into four. The two larger divisions each measure 105-ft x 30-ft x 5-ft, providing 31,500 cubic feet (cu ft) of holding area. The two smaller divisions measure 55-ft x 30-ft x 5-ft, providing 16,500 cu ft of holding space. Two electric crowding racks provide the ability to consolidate the fish for handling. Six outside raceways (3-ft x 6-ft x 100-ft) could provide 10,800 cubic feet of rearing space if renovated. The adult fish trap consists of an attraction channel, the fish trap, and a loading hopper. The fish are removed from the trap after the loading hopper is hoisted 80 feet up to the fish transport truck.

The well water chiller refrigeration unit is enclosed in a 12-ft x 17-ft metal building to the west side of the hatchery building. The chiller has the capacity to chill 120 gallons of water per minute (gpm) to 40° F.

The spawning building is approximately 13-ft x 18-ft and is located adjacent to two of the holding ponds and consists of a small building, part of which is recessed into the ground to provide holding areas for the fish that are to be spawned. The remaining portion is at ground level where the females are spawned and the eggs processed. The walls are made of fiberglass panel doors and are capable of being opened so that most of the inside area is exposed to the outside.

WATER SUPPLY

Adult Operation Water Source

Water for adult hatchery operations is pumped from the Snake River. There is a pumping platform adjacent to the hatchery that holds two 100-hp production pumps. Each pump produces 17 cubic feet of water per second (cfs). One pump is powered from the Pine Creek substation, and the second is powered from the Oxbow power plant substation. Only one pump operates at a time. The other pump acts as an emergency backup. Water from the production pumps passes over two aeration pump platforms before entering the four adult holding ponds. Water temperatures range from a winter low of 34°F to a late summer high of 72°F.

Incubation Water Source

Two wells provide the water for steelhead egg incubation. One well serves as a primary water source, while the other is an emergency backup with a separate power source. The primary wellwater is a constant 52° F, while the backup is a constant 54°F. Each well is equipped with a 3-hp pump, making each well capable of producing approximately 125 gpm of water. Incubation water enters an elevated surge tank in the hatchery building before distribution through two 4-in PVC water lines to the 24 incubator stacks. By using the chillers, wellwater can be chilled to 40°F before it enters the hatchery building.

STAFFING

One permanent Fish Hatchery Assistant Manager staffs the OFH. Two four-month temporary Bio-aide positions and one eight-month Bio-aide position share the 2,400 hours budgeted for hatchery maintenance and operation.

HATCHERY IMPROVEMENTS

Accomplished

Over the last few years, Idaho Power's Oxbow maintenance personnel have been responsible for work related to several hatchery improvements. Although the following projects may or may not have been completed, they have been included for information purposes.

- 1) New variable speed controls were installed on the crowders.
- 2) The hatchery building was remodeled with the installation of new windows and florescent lights.
- 3) Construction of a mezzanine for the pumps at the trap which makes the trap usable in times of higher flow and eliminates disassembling of the trap during most high water.
- 4) A septic holding tank and electrical hookups were installed for a dormitory trailer.
- 5) Walkways in the east holding ponds were improved for employee safety.
- 6) Vinyl coated chain link fence was installed on the large adult pond crowder in the west pond.

Recommended

In addition to the projects completed by Idaho Power crews as identified in the preceding section, there are several other items that should be addressed in the future. These include:

The spawning building needs to be enlarged and lowered four feet into the ground to reduce potential employee injuries and falls from climbing ladders. An enlarged space would also make the collection of samples more efficient. Lowering the spawning portion of the building would enable unripe fish to be returned into the holding ponds without dropping them over the fence, which would decrease fish stress.

A priority should be to increase hatchery office space. Presently, the south half of the hatchery building serves as office space, a workshop, freezer space, and a small conference area. The assistant hatchery managers' office space is a small cubicle that is partitioned from the rest of the work area. It has a doorway with no door, and a window with no glass that opens into the work area. This allows air circulation. The cubicle is insufficient in size to accommodate current needs. The following are examples of why the office should be expanded. There is insufficient filing space and the bio aide's desk is in the open work/conference area. The office dorm needs renovation as well. Current facilities are not appropriate for overnight occupancy. With the installation of a shower facility and a 220-volt receptacle for a range, the dorm would be suitable for overnight use. The 220-volt receptacle could also be used to power a welder, which could be used to help accomplish hatchery maintenance.

The holding ponds need to be modified to create a better holding environment and to reduce fish stress and injuries during routine handling. Efforts should also be made to improve the quality of the water entering the holding ponds.

The hatchery alarm system should be modified to directly sense the holding pond water level and to be able to register more than one alarm signal at any given times.

Replacement of all underground pipelines that feed the hatchery and to install isolation valves so that water cannot siphon out of the ponds back to the river. (In progress at the writing of this report.)

Both aeration towers need to be sand blasted and repainted.

The hatchery needs to have more gravel hauled in and spread on the driveways, as well as an application of an oil/dust abatement.

A cement slab (approximately 15-ft x 40-ft) is needed in front of the hatchery building for doing truck maintenance and other hatchery projects.

A shop needs to be constructed and shop items removed from the office and conference area.

FISH PRODUCTION

ADULT COLLECTION

Steelhead Returns to Hells Canyon Trap

The OFH trap, located at the base of Hells Canyon Dam, was put into operation on October 26, 1998 and was shut down for the season on December 1, 1998 due to icing conditions. The trap was closed from the November 11 through November 15, 1998. The trap was operated for three days the following week and then the next two consecutive Mondays before being shut down for the season due to freezing temperatures, having operated for 15 days during the fall period. A total of 1,974 (steelhead trout, were trapped during the fall trapping period. Operation of the trap resumed on March 2, 1999 and shut down again on March 9, 1999 due to high water flows. The trap reopened April 5 and 6, 1999 and was then shut down for the season by the Department because of the large number of females on station. The trap operated five days during the spring trapping period. There were 68 steelhead trapped during the spring, bringing the total to 2,042 for the season. Of the 2,042 steelhead captured, 99 were wild or natural fish. Wild or natural steelhead are identified by having an adipose fin and the remaining fins not eroded. All wild fish were returned to the Snake River below Hells Canyon Dam, usually on the same day they were trapped but no later than the following day. During the days of trap operation, IPC personnel removed fish from the trap daily and transported them to the OFH. They were processed upon arrival at the hatchery. Early in the season, all fish were kept until quotas for the hatchery had been met. At that time, fish without tags, or fish being held for spawning were placed into a separate pond for outplanting. The 1999 brood year steelhead run of 2,042 fish was comprised of 885 (43%) males and 1,157 (57%) females. The broodstock strategy of collecting one-fourth of the needed eggs from spring-run fish was met this year. Refer to Figure 1 and Appendix 1.

Length Frequencies

Fork lengths were taken on all trapped steelhead. One-ocean females are 64 cm and less, and one-ocean males are 67 cm and less. Two-ocean females are greater than 64 cm, and two-ocean males were greater than 67 cm. Age-class breakdown of the run was: 1,373 (67%) one-ocean fish, consisting of 690 (50%) hatchery males; 31 (2%) wild males; 623 (46%) hatchery females and 29 (2%) wild females. Two-ocean fish accounted for 669 (33%) of the steelhead trapped and consisted of 145 (22%) hatchery males; 19 (3%) wild males; 485 (72%) hatchery females and 20 (3%) wild females. Refer to Figure 2 and Appendix 2.

Out-planting

A total of 685 adult steelhead were surplus to the spawning requirements and were outplanted into surrounding waters for additional sport fisheries and supplementation programs. During the fall

Figure 1. Steelhead Run Timing (Oxbow BY 99)

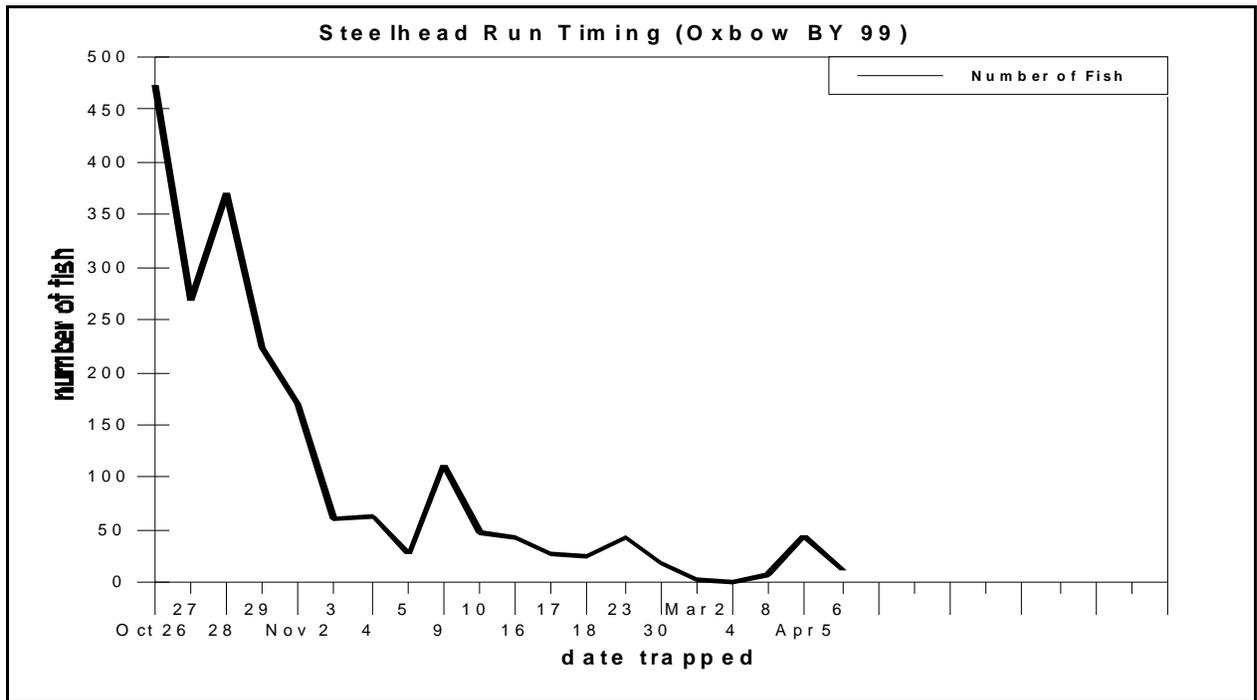
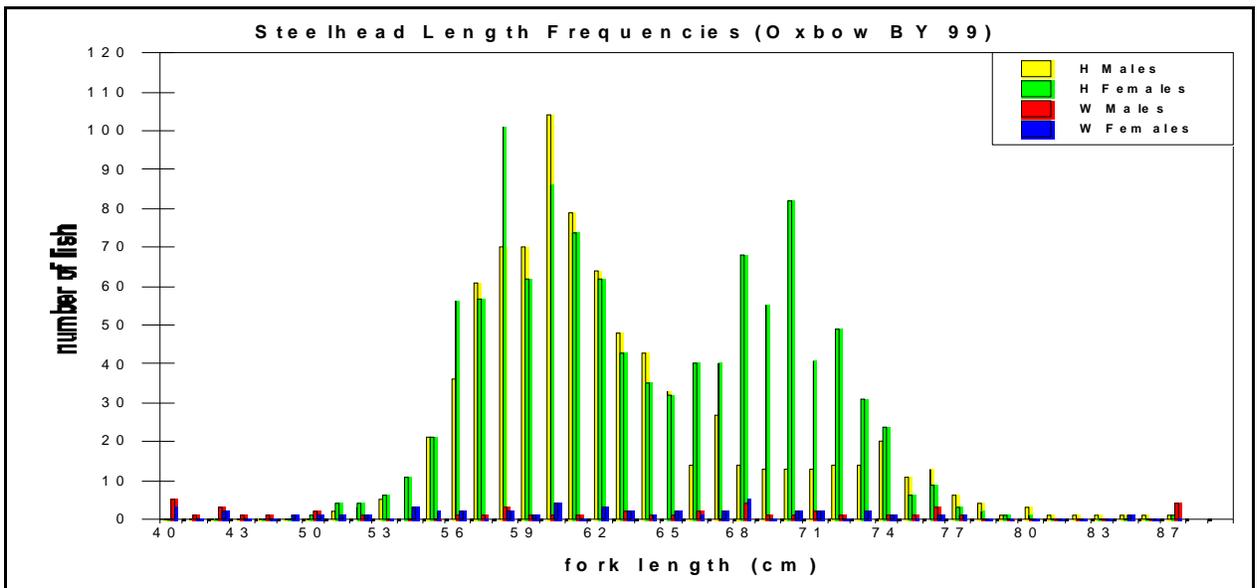


Figure 2. Steelhead Length Frequencies (Oxbow BY 99)



of 1998, 202 steelhead were released into the Boise River, and 200 were released into Hells Canyon Reservoir. On December 8, 1998, the Department transported and released 266 steelhead into the Salmon River at Hammer Creek Campground for the Nez Perce Tribe. The Steelhead were marked with an opercle punch. An additional 17 steelhead were released into Hells Canyon Reservoir during the spring. Steelhead disposition is listed on Appendix 3. Male to female dispositions are seen in Appendix 4.

Incidental Capture

Sixteen fall chinook salmon *O. tshawytscha* were incidentally trapped. These fish were measured, checked for marks and tags and were returned to the Snake River below Hells Canyon Dam. They were comprised of 13 hatchery fish and 3 wild fish. Refer to Appendix 5. Several rainbow trout were trapped during the operation and transported to OFH. They were all released into Hells Canyon Reservoir in a timely manner.

MARKS, FIN CLIPS, INJURIES

All trapped steelhead were checked for marks, consisting of fin clips, tags, and injuries. Of the 1,943 hatchery steelhead, 1,840 had full adipose fin clips, 62 had adipose fins that were only partially removed, and 41 had full adipose fins but had coded wire tags or other fin damage to reveal its hatchery origin. A total of 137 had coded wire tags (CWT) and 5 had floy tags. The tagging agencies included the National Marine Fisheries Service (NMFS), the University of Idaho, Oregon Department of Fish and Wildlife (ODFW), and the Idaho Department of Fish and Game (Department). Snouts were removed from all coded-wire tagged fish and sent to the lab in Lewiston. Injuries included 52 fish with gill net scars, 5 with nitrogen blisters, 106 with fresh body injuries, 246 with body scars, and 39 with opercle or gill injuries.

HOLDING AND SPAWNING

Pre-spawning Mortality

Pre-spawning mortality consisted of all female steelhead that died prior to spawning and those male steelhead that died through the second week of spawning (March 29, 1999). Prespawning mortality was 42 (2%) adults, comprised of 17 (40%) males and 25 (60%) females. All prespawning and spawned carcasses are frozen then picked up weekly by the local sanitation company and hauled to a Department of Environmental Quality approved landfill.

Spawning Operations

Steelhead were initially sorted on March 1, 1999 and separated into two ponds by sex. A total of 641 females were spawned during 15 egg takes beginning March 15, 1999 and ending May

7, 1999. Refer to Table 1. Females were sorted twice weekly for ripeness. Ripe females were killed with a blow to their head. Females were dry-spawned by incision, and the eggs were collected in a colander to drain the ovarian fluid. Eggs from each female were placed into a spawning bucket and fertilized with sperm from one or more males. One cup of chilled well water was added to the eggs and sperm mixture to promote sperm activity. The fertilized eggs from two females were poured together and were allowed to stand in the egg, sperm, and water mixture for approximately five minutes. The fertilized eggs were then water-hardened in a minimum of 100-ppm buffered Argentyne for approximately a half an hour. After the water-hardening process, the eggs were drained, rinsed and poured into the Heath trays in the incubation room. Thirteen females were killed and rejected during spawning due to the abnormal appearance of eggs or internal organs. Refer to Table 1 and Appendix 4.

Table 1. Steelhead Spawning Summary (Oxbow BY 99)

Lot #	Spawn Date	Number Females	Green Eggs	Eyed Eggs	Percent Eye-up	Eggs/Female
A	3/15/99	50	270,498	162,939	60	5,410
B	3/18/99	34	179,120	118,270	66	5,268
C	3/22/99	57	305,256	137,511	45	5,355
D	3/25/99	57	281,261	116,736	42	4,934
E	3/29/99	69	310,115	225,281	73	4,494
F	4/01/99	78	346,201	195,260	56	4,438
G	4/05/99	65	279,110	142,913	51	4,294
H	4/08/99	55	225,256	140,570	62	4,096
I	4/12/99	49	262,792	140,125	53	5,363
J	4/15/99	35	174,926	128,941	74	4,998
K	4/19/99	36	152,445	114,985	75	4,235
L	4/23/99	28	137,775	82,159	60	4,921
M	4/26/99	19	88,211	49,584	56	4,643
N	4/29/99	7	42,606	15,892	37	6,087
O	5/07/99	2	8,024	6,858	85	4,012
	TOTAL	641	3,063,596	1,778,024	58	4,779

Disease Testing

During the spawning process, representative samples were taken from 157 females for virus testing and from 62 females for Bacterial Kidney Disease (BKD) testing. The eggs were loaded into the incubator trays with two families per tray to maintain the integrity of the disease samples. All females tested were negative for pathogens.

Incubation

Fifteen egg takes produced 3,063,596 green eggs from 641 females for fecundity (eggs per female) of 4,779. Eye-up was 58%, leaving 1,778,024 eyed eggs. Egg numbers were determined by enumeration of eyed eggs with a Jensorter brand Model JH egg sorter with electronic counter. Eggs were incubated with pathogen-free well water that has been chilled to 40°F 42°F for the majority of the rearing cycle. This was to delay the development of eggs and fry to achieve smolt target size. After the first two days of incubation, the eggs were treated three times a week with a 15-minute drip treatment of 1,667-ppm formalin to inhibit fungi invasion caused by Saprolognia. Incubator water flows were 5 gpm. Eggs eyed-up after approximately 350 temperature units (TUs) and hatched after approximately 650 TUs in the chilled wellwater. Eyed eggs were shocked by pouring a heath tray of eggs into a square container containing 1-in of water, from a height of approximately 2 ft. The eggs were then poured back into the Heath trays. This process caused the damaged, undeveloped or infected eggs to turn white. They were removed at the time of egg enumeration. Refer to Table 1 and 2.

EGG AND FRY DISPOSITION

Egg Shipments

Eyed eggs were shipped from the end of May through the end of June 1999. Prior to shipping to Niagara Springs Fish Hatchery (NSFH), the eggs were placed in coolers and disinfected for 15 minutes in a water and Argentyne solution. Upon completion of the disinfecting period, the eggs were drained and chilled water and ice were added. The coolers were transported in the Oxbow Hatchery Fish and Game truck. The NSFH received 538,544-eyed eggs; Magic Valley Fish Hatchery (MVFH) received 146,752-eyed eggs and Hagerman National Fish Hatchery (HNFH) received 492,146-eyed eggs. Refer to Table 2.

Fry Shipments

A total of 602,384 swim-up fry were produced at OFH. Fry pick off was 1,802 resulting in a percent swim-up of 99%, leaving 600,582 fry. After reaching 950 TUs in July 1999 the fry were transferred from two or three of their incubation trays into a stainless steel tube for transport. These tubes, containing 600,582 fry were then placed in the bottom of a 2-ton fish truck filled with chilled water, and were transported to NSFH. Refer to Table 2.

Table 2. Steelhead Eggs and Fry Disposition (Oxbow BY99)

3,063,596	Green eggs
1,169,171	Initial pick off
116,401	Secondary pick off includes 1,802 from fry pick off (97% swim up)
1,778,024	Eyed eggs
146,752	Eyed eggs shipped to Magic Valley
492,146	Eyed eggs shipped to Hagerman National
538,544	Eyed eggs shipped to Niagara Springs
600,582	Fry shipped to Niagara Springs
0	Culled eyed eggs

CARCASS DISPOSITION

All carcasses were checked for tags and hatchery employees checked females for signs of internal diseases. All carcasses were frozen and picked up weekly by the local sanitation company and hauled to a Department of Environmental Quality approved landfill.

SMOLT RELEASES

Steelhead trout smolts were reared at Niagara Springs Hatchery, Magic Valley Hatchery and Hagerman National Hatchery. In the spring of 2000, Idaho Power contracted smolt transportation from Niagara Springs Hatchery to below Hells Canyon Dam where 601,220 smolts (143,220 lbs.) were released into the Snake River. Smolts from Magic Valley Hatchery and Hagerman National Hatchery were released into other drainages. Data for steelhead smolt numbers and lbs of smolts released can be found in the annual reports for each of the rearing hatcheries. (Appendix 11).

FISH PRODUCTION

ADULT COLLECTION

Salmon Returns to Hells Canyon Trap

Spring Chinook salmon returning to the Hells Canyon trap in 1998 were from smolt releases in 1995, 1996, and 1997. Trapping began May 5, 1998 and ended July 15, 1998 (Figure 3). Due to high water flows, the trap was shut down on the May 13, 1998, restarted June 24 and ran through July 15, 1998. The trap operated for 17 days during that period. A total of 74 chinook salmon were trapped and included 66 (89%) hatchery fish and 8 (11%) wild or natural fish, all of which were adults (Figure 3 and Appendix 6, 6A, and 9).

Length Frequencies and Age Class

Length frequencies were taken on all fish trapped. The age class breakdown by fork length was as follows: one-ocean (3 yr old \leq 53 cm.), two-ocean (4 yr olds 54 - 80 cm.), and three-ocean (4 yr olds \geq 81 cm.). Age class breakdown of the run is 0 (0%) one-ocean fish. Two-ocean fish accounted for 13 (18%) of the salmon trapped and consisted of 13 (100%) hatchery fish and 0 (0%) wild fish. Three-ocean fish accounted for 61 (82%) of the salmon trapped and consisted of 53 (72%) hatchery fish and 8 (28%) wild fish (Figure 4 and Appendix 7 and 8).

Figure 3. Spring Chinook Run Timing (Oxbow BY 98)

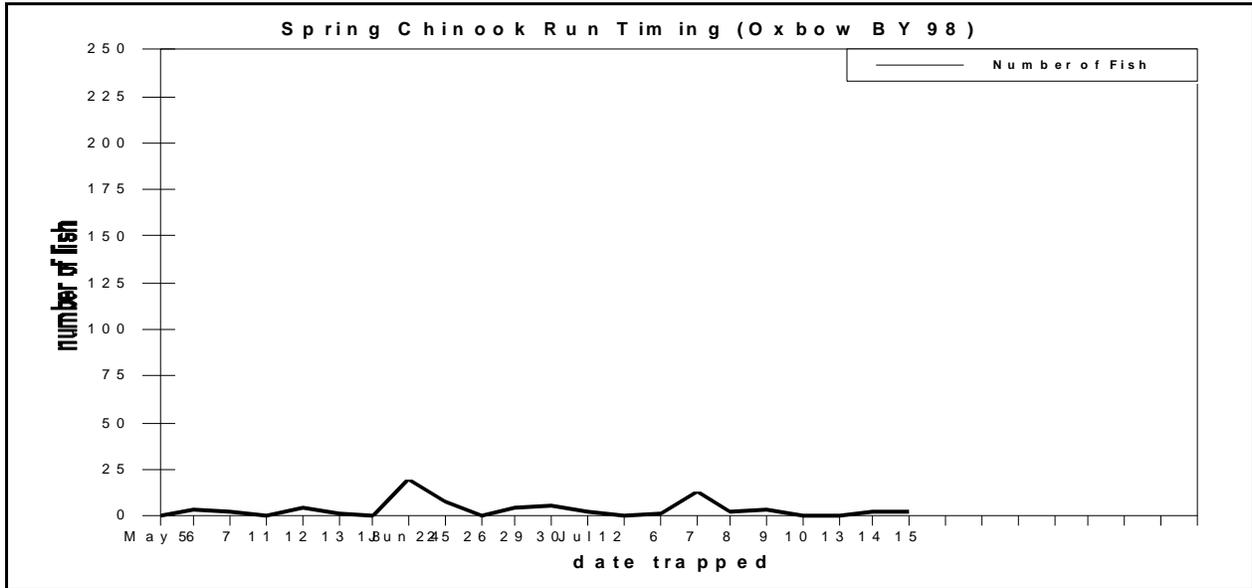
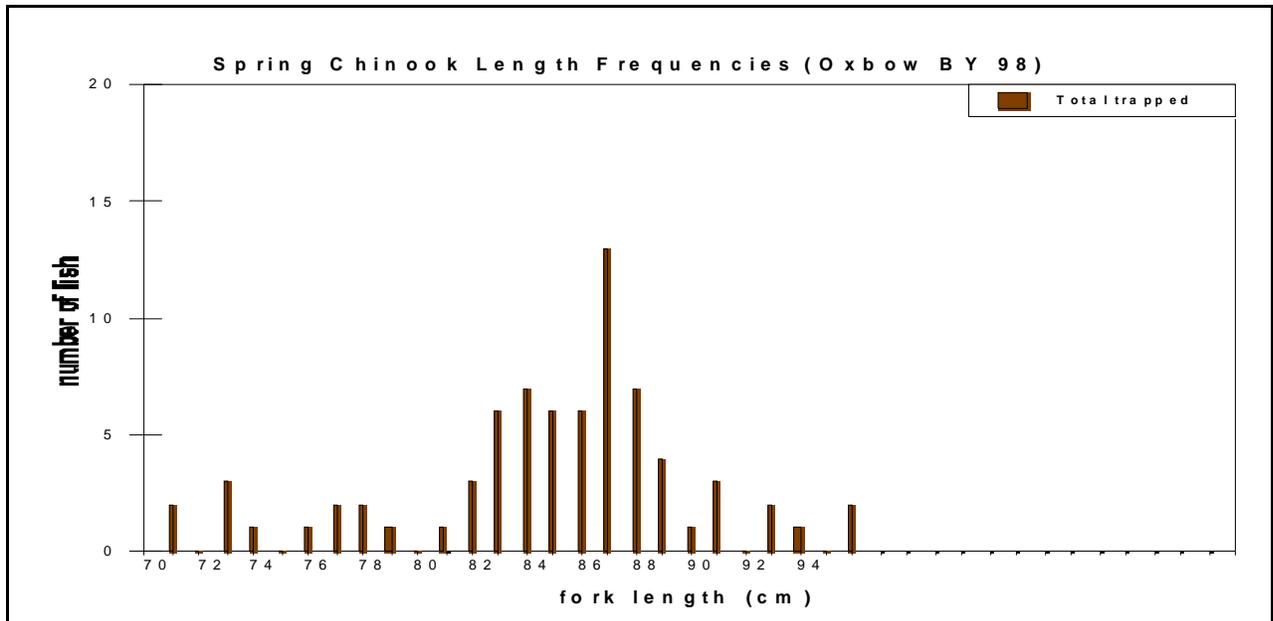


Figure 4. Spring Chinook Length Frequencies (Oxbow BY 98)



Sex Ratio

Due to the lack of distinguishing characteristics, the sex ratio was not determined at the time of trapping, however it was later determined that the seven pond morts were five males and two females (six hatchery; one wild) and the 60 hatchery fish that were transported to Rapid River were 29 males and 31 females. The sex ratio was not determined on the remaining seven wild fish that were released. Refer to RRFH Brood Year report for additional information.

HOLDING AND SPAWNING

Adult Treatments

All hatchery fish were given an intraperitoneal injection of Erythromycin 200 at 20 mg/kg of body weight as determined using a length to weight ratio. Wild fish were differentially caudal marked and returned to the Snake River below the trap. In the event a wild/natural fish returned to the trap three times, it would be kept and treated as hatchery fish. The wild fish that were released did not return to the trap.

Transport

Idaho Power personnel transported chinook salmon from the trap to the hatchery daily. They were processed immediately upon arrival. Wild or natural chinook salmon were returned and released below Hells Canyon Dam the morning after having been trapped. The hatchery fish were loaded into a fish truck and transported to Rapid River Fish Hatchery at least weekly. The hauling water was chilled with incubation wellwater and up to 700 lbs of chlorine-free ice; two Clinoptilolite pillows were also placed in the tank to absorb ammonia. Holding pond water temperatures ranged from 59°F to 73°F during the trapping season.

Pre-spawning Mortality

Prespawning mortality consisted of 5 males and 12 females while at Rapid River Fish Hatchery and 7 pond morts at Oxbow Hatchery. Of the seven pond morts, five were fish that entered the trap with severe wounds and nitrogen blistering, combined with the stress of extremely warm water during July (68°F to 73°F). The other two morts were due to mechanical "jumping" injuries. The sex breakdown on the morts were five males (1 one tow-ocean fish; four three-ocean fish) and 2 females (two three-ocean fish).

Spawning Operations

A total of 19 females were spawned at RRFH, producing 95,474 green eggs resulting in a fecundity of 5,025. Eye-up was 80.8%, resulting in 77,194 eyed eggs. Refer to RRFH brood year report for additional spawning information.

ACKNOWLEDGEMENTS

The staff at Oxbow Fish Hatchery would like to thank the Idaho Power employees and the Idaho Fish and Game employees that have contributed to the successful operation of the hatchery.

APPENDICES

Appendix 1. Steelhead Run Timing (Oxbow BY99).

MONTH / DATE TRAPPED	NUMBER OF FISH	MONTH / DATE TRAPPED	NUMBER OF FISH
OCTOBER 26	474	MARCH 2	2
OCTOBER 27	269	MARCH 4	1
OCTOBER 28	371	MARCH 8	7
OCTOBER 29	223	APRIL 5	46
NOVEMBER 2	171	APRIL 6	12
NOVEMBER 3	60		
NOVEMBER 4	62		
NOVEMBER 5	27		
NOVEMBER 9	113		
NOVEMBER 10	48		
NOVEMBER 16	42		
NOVEMBER 17	28		
NOVEMBER 18	24		
NOVEMBER 23	43		
NOVEMBER 30	19		
TOTAL	1,974	TOTAL	68

Appendix 2. Steelhead Length Frequencies (Oxbow BY99)

Cm	Totals	H Males	H Females	W Males	W Females
40	8			5	3
41	1			1	
42	5			3	2
43	1			1	
46	1			1	
48	1				1
50	4		1	2	1
51	8	2	4	1	1
52	9	3	4	1	1
53	11	5	6		
54	24	10	11		3
55	44	21	21		2
56	95	36	56	1	2
57	119	61	57	1	
58	176	70	101	3	2
59	134	70	62	1	1
60	195	104	86	1	4
61	154	79	74	1	
62	131	64	62	2	3
63	95	48	43	2	2
64	80	43	<u>35</u>	1	<u>1</u>
65	68	33	32	1	<u>2</u>
66	57	14	40	2	1
67	69	<u>27</u>	40		2
68	91	14	68	4	5
69	69	13	55	1	
70	98	13	82	1	2
71	58	13	41	2	2
72	64	14	49	1	
73	47	14	31		2
74	46	20	24	1	1
75	18	11	6	1	
76	26	13	9	3	1
77	11	6	3	1	1
78	6	4	2		
79	2	1	1		
80	4	3	1		
81	1	1			
82	1	1			
83	1	1			
85	2	1			1
86	1	1			
87	6	1	1	4	
Total	2042	835	1108	50	49
AGE class	MALE	FEMALE	TOTAL	AVG LENGTH	
ONE-ocean	721	652	1373	59.47 cm	
TWO-ocean	164	505	669	70.62 cm	
TOTAL	885	1157	2042	63.12 cm	

Age Class Breakdown: One-Ocean (males ≤ 67 cm, females ≤ 64 cm)

Two Ocean (males > 67 cm, females > 64 cm)

H = Hatchery and W = Wild

Appendix 3. Steelhead Disposition (Oxbow BY99)

2,042	Trapped (1,974 – fall: 68 – spring)
685	Released (217 – HC Res., 202 – Boise R., 266 – Salmon R.)
1,258	Ponded
99	Wild / natural released

Appendix 4. Steelhead Male to Female Disposition (Oxbow BY99)

MALES		FEMALES	
318	Spawned	641	Spawned
0	Killed and rejected	13	Killed and rejected
218	Mortalities	68	Mortalities
50	Wild released	29	Wild released
299	Out-planted	386	Out-planted
885	Total males	1,157	Total females

Appendix 5. Fall Chinook Incidental Capture (Oxbow BY99)

Trap date	Fork length	Fin clips	Elastomer side/color	CWT (Y/N)	Release date
10/26/98	54	ad	R green	Y	10/27/98
10/27/98	48	ad	R green	Y	10/28/98
10/27/98	68	ad	R blue	Y	10/28/98
10/28/98	50	ad	R green	Y	10/29/98
10/28/98	55	ad	R green	Y	10/29/98
10/28/98	49	none	none	N	10/29/98
10/29/98	55	ad	R green	Y	10/30/98
10/29/98	53	ad	R green	Y	10/30/98
10/29/98	54	ad	R green	Y	10/30/98
11/02/98	60	none	none	N	11/03/98
11/02/98	56	ad	R green	Y	11/03/98
11/02/98	58	ad	R green	Y	11/03/98
11/03/98	71	ad	R blue	Y	11/04/98
11/05/98	61	ad	R green	Y	11/06/98
11/09/98	50	none	R green	Y	11/10/98
11/09/98	54	none	none	N	11/10/98

Appendix 6 Spring Chinook Run Timing (Oxbow BY98)

date	total trapped	trapped hatchery	trapped wild	released wild	mortality	hailed
5/5/98	0	0				
5/6	3	3				
5/7	2	2				
5/11						5
5/12	5	5				
5/13	1	1			1	
5/18						5
6/24	19	18	1	1		
6/25	8	6	2	2	1	17
6/26						5
6/29	5	3	2	2		
6/30	6	6				
7/1	2	2				10
7/2						2
7/6	1	1				
7/7	13	11	2	2	1	
7/8	2	2			1	10
7/9	3	3			1	2
7/10						2
7/13	0	0				
7/14	2	1	1		W-1	
7/15	2	2			1	1
7/16						1
Total	74	66	8	7	7	60

* W designates one wild mortality included in total.

Appendix 7. Spring Chinook Length Frequencies (Oxbow BY98)

LENGTH cm	3-Y-Olds		4-Y-Olds		5-Y-Olds		TOTAL
	Hat	Wild	Hat	Wild	Hat	Wild	
70			2				2
71							
72			3				3
73			1				1
74							
75			1				1
76			2				2
77			2				2
78			1				1
79							
80			1				1
81					2	1	3
82					4	2	6
83					7		7
84					4	2	6
85					5	1	6
86					13		13
87					7		7
88					3	1	4
89					1		1
90					3		3
91							
92					2		2
93					1		1
94							
95					1	1	2
TOTAL	0	0	13	0	53	8	74
AGE CLASS	TOTAL			AVG LEN (cm)			
ONE – OCEAN	0			0.0			
TWO - OCEAN	13			74.46			
THREE – OCEAN	61			85.82			
TOTAL	74			83.82			

Age Class Breakdown:

- One Ocean (3-yr-olds, ≤53 cm)
- Two Ocean (4-yr-olds, 54-80cm)
- Three Ocean (5-yr-olds, ≥81cm)

Appendix 8 Spring Chinook Age Class Breakdown (Oxbow BY98)

	Hatchery	Wild/Natural	Total
1-Ocean	0	0	0
2-Ocean	13	0	13
3-Ocean	53	8	61
Total	66	8	74

1-Ocean (3-yr-olds, ≤ 53 cm)
 2-Ocean (4-yr-olds, 54-80 cm)
 3-Ocean (5-yr-olds, ≥ 81 cm)

Appendix 9 Spring Chinook Disposition (Oxbow BY98)

	Hatchery	Wild/Natural
Trapped - Oxbow	66	8
Mortalities - Oxbow	6	1
Released - Oxbow	0	7
Transferred to RR	60	0

Appendix 10. Oxbow Hatchery Fish Trapping Summary and Breakdown.

STEELHEAD BROOD YEAR 1999

<u>Fish Trapped</u>		<u>Age Class Breakdown *</u>	
Males	885	1 Ocean	1,373
Females	1,157	2 Ocean	669
Total	2,042	Total	2,042

<u>Fish Disposition</u>	<u>Males</u>	<u>Females</u>	<u>Total</u>
Pre-spawn Mortality	17	25	42
Trap & Pond Morts	201	43	244
Spawned only *	318	641	959
Released	50	49	99
Out Planted	299	386	685
Killed but not used	<u>0</u>	<u>13</u>	<u>13</u>
Total	885	1,157	2,042

* 1 to 1 spawning ratio, all males were spawned at least once.

<u>Carcass Disposition</u>	<u>Males</u>	<u>Females</u>	<u>Total</u>
Buried	536	722	1,245

* Age Class Breakdown: 1 Ocean: males <68 cm (721), females <65 cm (652)
2 Ocean: males ≥68 cm (164), females ≥65 cm (505)

SPRING CHINOOK SALMON BROOD YEAR 1998

	<u>Fish Trapped</u>			<u>Age Class Breakdown **</u>		
	Total	Hat	Wild	Total	Hat	Wild
Jacks	0	0	0	1-Ocean	0	0
Males	?	33	?	2-Ocean	13	0
Females	?	33	?	3-Ocean	61	8
Total	?	66	?	Total	74	8

? Due to the lack of distinguishing characteristics, the sex was not determined on the wild salmon therefore wild and total numbers are not available.

<u>Fish Disposition</u>	<u>Males</u>	<u>Females</u>	<u>Total</u>
Trap & Pond Mortality			0
Pre-spawn Mortality	10	14	24
Shipped to Rapid River *	29	31	60

** Age Class Breakdown: 1 Ocean (3-yr-olds, ≤53cm)
2 Ocean (4-yr-olds, 54-80cm)
3 Ocean (5-yr-olds, ≥81cm)

Appendix 11. Snake River historic releases and return data.

Year	Chinook Released	Steelhead Spring	Released Fall	Chinook Returns	Steelhead Returns
1966			29,400		
1967		587,513			1,681
1968		342,114			1,609
1969		109,200	757,500	344	1,122
1970		385,900	670,960		136
1971			215,625		279
1972			630,900	3	650
1973				2	435
1974				1	125
1975			40,977	14	34
1976			85,510		224
1977		126,000	301,644		243
1978			344,944		186
1979			548,987	1	36
1980		348,520	191,900		339
1981	1,003,200	614,160			158
1982		354,150			203
1983	250,020	92,750	220,270	16	872
1984	500,850	458,917	630,500	3	1,116
1985	437,360	414,712	387,353	699	1,343
1986	140,000	819,495	39,995	395	2,438
1987	547,700	800,000	672,235	543	3,209
1988	400,600	877,400	75,814	458	2,524
1989	500,000	735,500	603,000	84	2,729
1990	551,200	947,200	351,400	30	2,728
1991	500,500	912,000		22	1,151
1992	500,500	243,900		912	1,714
1993	200,300	660,500		431	1,259
1994	380,504	609,115		29	1,403
1995	499,986	614,560		36	1,597
1996	67,818	630,152		78	1,383
1997	13,470	660,651		944	1,270
1998	304,096	653,276		74	2,407
1999	300,000	657,665		79	2,042
2000	0	601,220		1178	2,250

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