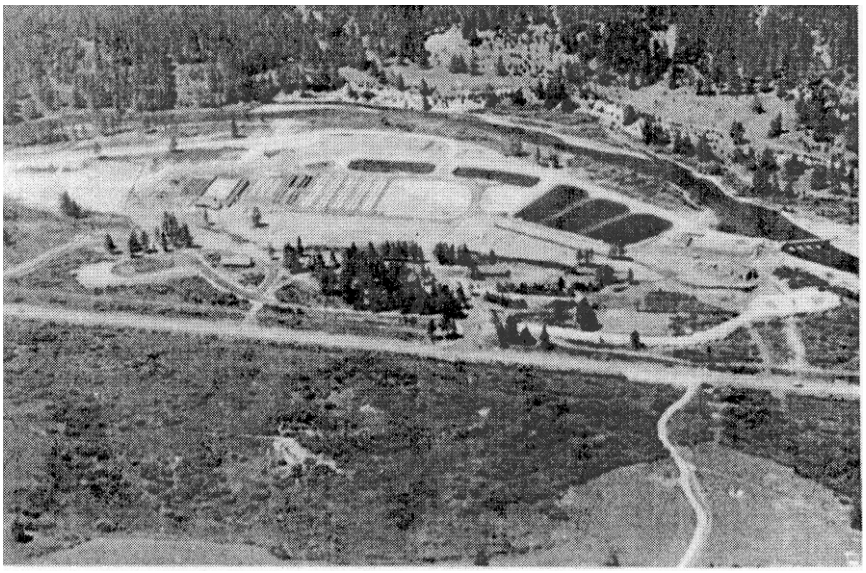
SAWTOOTH FISH HATCHERY
and
EAST FORK SATELLITE

1999 Spring Chinook Brood Year Report
2000 Steelhead Brood Year Report



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IDFG 01-30
August 2001

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1999 SPRING CHINOOK SALMON

ABSTRACT

The Sawtooth Fish Hatchery trap and weir were put into operation on June 28, 1999 and operated through September 7, 1999. A total of 196 spring chinook salmon *Oncorhynchus tshawytscha* (82 males, 35 females, and 79 jacks) were trapped. Released above the weir were 129 fish, (51 unmarked and 3 marked males, 16 unmarked and 6 marked females, and 13 unmarked and 40 marked jacks) to spawn naturally. There were three pre-spawning mortalities.

Spawning began on August 16 and continued through September 1, with five spawning days. We spawned 12 females, 44 males, and 12 jacks that produced 63,642 green eggs (5,303 eggs per female), which yielded 59,373 eyed eggs for an eye-up rate of 93%. From these eyed eggs, 59,111 fry were ponded which resulted in a smolt release of 57,134 smolts.

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INTRODUCTION

Funding Source

Sawtooth Fish Hatchery is part of the Lower Snake River Compensation Plan (LSRCP) and has been in operation since 1985. The hatchery and satellite facility were built by the US Army Corp of Engineers (USACE) and are funded through the US Fish & Wildlife Service (USFWS).

Location

Sawtooth Fish Hatchery is located five miles south of Stanley, Idaho. The facility's 71 acres border the Salmon River to the west, Highway 75 to the east, and US Forest Service (USFS) ground to the south and north. The Sawtooth Fish Hatchery weir is approximately 400 miles from Lower Granite Dam and 950 miles from the mouth of the Columbia River. Chinook salmon *Oncorhynchus tshawytscha* are released directly into the river at the hatchery and above the hatchery in the headwaters of the Salmon. Sawtooth Fish Hatchery steelhead are released at the hatchery, along the lower Salmon, and at various other drainages around the state.

Sawtooth Fish Hatchery has operated a satellite facility on the East Fork of the Salmon River since 1984. The facility is situated 18 miles upstream on the East Fork Salmon River. The mouth of the East Fork Salmon River is located 42 miles downriver from Sawtooth Fish Hatchery. The property was purchased from the Bureau of Land Management (BLM) and is surrounded by private land. An access road easement was purchased from a private landowner who has property surrounding the location. The east side of the property borders the East Fork of the Salmon River. Historically, all East Fork fish have been returned to the East Fork River.

Species Reared

Sawtooth Fish Hatchery is involved in trapping, spawning, and rearing spring chinook salmon to the smolt stage for release. A-run steelhead trout are also trapped and spawned. The steelhead eggs are incubated to eye-up, and then are transferred to other hatcheries for rearing.

The East Fork facility handles spring chinook salmon as well as B-run steelhead trout. The green eggs from fish spawned at the East Fork station are transferred to Sawtooth Fish Hatchery for incubating. The chinook are reared at Sawtooth Fish Hatchery, with the steelhead being transferred as eyed-eggs to other hatcheries for rearing.

Broodstock History

Historically, all of the Sawtooth Fish Hatchery and the East Fork trap broodstock have come from the upper Salmon River and the East Fork River, respectively. There was some introduction of Rapid River stock as fry and smolt plants at the Sawtooth Fish Hatchery site and in the headwaters of the Salmon River in the late 1970s and early 1980s.

At both facilities, returning adult fish are released to spawn naturally. Numbers of fish released depend on marked and unmarked fish returns. The National Marine Fisheries Service (NMFS) under permits # 919 and # 920 prescribes fish handling for chinook salmon. All unmarked steelhead are released, along with enough marked hatchery fish to ensure pairing of adults. At the East Fork, all salmon are released until a total of twenty pairs have been passed above the weir. All unmarked steelhead are released, along with enough marked hatchery fish to ensure equal adult pairings. A historical synopsis of releases and returns is shown in Appendices A and A.1.

OBJECTIVES

Mitigation Goals

As part of the LSRCP, Sawtooth Fish Hatchery's mitigation goals are expressed in adult returns 19,000 adult salmon over Lower Granite Dam.

Idaho Department of Fish and Game Objectives

Idaho Department of Fish and Game (Department) objectives are:

1. To produce 2.4 million smolts for release, of which up to one million of the East Fork-origin smolts will be returned to the East Fork of the Salmon River.

2. Produce quality fish for supplementation programs.

3. Implement research programs at the hatchery to improve returns to the hatchery.

FACILITY DESCRIPTION

Hatchery Description

The hatchery's main building is 134-ft x 166-ft and consists of an office, meeting room, lab, visitor/interpretive center, wood shop, welding/fabrication shop, intake collection box/chemical

room, shop office, incubation and early rearing room, one inside storage room and two outside covered storage areas, generator room, furnace room, and a feed freezer/chemical equipment room. The hatchery has four pump houses (each is 14-ft x 11-ft). One is for domestic water and three are production wells. An intake building (15-ft x 37-ft) is located one-half mile upstream from the hatchery and Salmon River water is collected for outside production rearing. The temporary employee dorm and adult spawning facility are located 300 yards downstream of the hatchery building. The dorm (38-ft x 72-ft) has three bedrooms with a bath in each, attached public restroom facilities, storage and laundry room, living and dining room with an open kitchen. The adult facility consists of three adult ponds and an enclosed spawning shed (35-ft x 52-ft). There are five resident houses at Sawtooth, all approximately 1,360 sq ft with attached single-car garages and separate woodsheds.

The East Fork has a roof structure over a 28-ft travel trailer that is used as a residence while the trap is in operation. The other building is a combination shop, storage, and spawning shed (22-ft x 44-ft).

Production Capabilities

Production capacities at the East Fork trap consist of two 68-ft x 10-ft x 4.5-ft adult holding ponds (3,060 cuft) and a 10-ft x 17-ft fish trap. No fish are reared at this facility. All green eggs are shipped to Sawtooth Fish Hatchery.

Production capacities for Sawtooth Fish Hatchery include 100 stacks of Flex-a-lite Consolidated Inc. (FAL) incubators containing 800 trays, with the potential to incubate five million chinook eggs or seven million steelhead eggs. Inside rearing consists of ten semi-square tanks with an individual volume of 17 cuft and a capacity of 15,000 swim-up fry each, six inside rearing tanks with an individual volume of 50 cuft and a capacity for 30,000 fry each, and 14 inside rearing vats with an individual volume of 391 cuft and a capacity for 100,000 fry each. Outside rearing consists of 12 fry raceways, each with 750 cuft of rearing space; and 28 production raceways each with 2,700 cuft of rearing space. Each production raceway has a capacity to raise 100,000 chinook to smolt stage for a total capacity of 2.8 million fish. These production raceways are serial reuse that flows from an upper raceway to a lower one.

The adult facility has three concrete adult fish holding ponds with 4,500 cuft of holding area. Each pond can hold approximately 1,300 adults.

RECOMMENDATIONS

Recommendations for Sawtooth Fish Hatchery include developing additional wells for disease-free rearing water, modifying the river water intake to reduce winter icing problems, repairing gabions at the river intake, installing fencing around outside raceways for predator control, and seal-coating hatchery roadways.

East Fork recommendations include modifying the intake screen to exclude fish fry, modifying the velocity barrier to prevent injury to migrating fish, and developing a removal system for debris that accumulates on the weir.

WATER SUPPLY

Source

Sawtooth Fish Hatchery receives fish culture water from the Salmon River and from two production wells. Rearing water from the river enters an intake structure located one-half mile upstream from the hatchery building and flows through a 54-inch pipe to a control box located in the hatchery building for final screening. This water is then distributed to the indoor vats, outside raceways, or adult fish facility. Incubation and early-rearing water is provided by two production wells. Excess wellwater is spilled into the control box for use in the outside raceways. A third well provides tempering water introduced at the river intake to reduce winter icing problems.

The East Fork trapping site receives water from the East Fork of the Salmon River via gravity-flow piping throughout the holding ponds. A well provides domestic water and pathogen-free-water for spawning and egg hardening. No fish are reared at the East Fork trap.

Quantity and Temperature

The Sawtooth Fish Hatchery wells provide 3.1 cfs of pumped water and temperatures range from 39^{o}F in the winter to 52^{o}F in the summer. The Salmon River provides up to 55 cfs of gravity-flow water and ranges in temperature from 32°F in the winter to 68^{o}F in the summer.

Water Quality

The most recent water quality analyses from the Sawtooth Fish Hatchery collection box at the river, well #1, and well #2 were completed in October 1999. Results are shown in Appendix B.

STAFFING

Five permanent personnel are stationed at Sawtooth Fish Hatchery: a Hatchery Manager II; an Assistant Hatchery Manager; a Utility Craftsman; and two Fish Culturists.

The temporary employee staffing includes: 8 months of Fishery Technician time, 42 months of Biological Aide time, and 27 months of Laborer time.

FISH HEALTH

Diseases Encountered and Treatment

Sawtooth Fish Hatchery had an exceptional year for fish culture. *Myxobolus cerebralis* is a perennial problem at this facility once the fish are put on raw river water. Other etiologic agents did not cause mortalities and were not found during routine inspections. Two prophylactic treatments of erythromycin-medicated feed were applied under Investigational New Animal Drug (INAD) 6013/4333. No acute or chronic losses were experienced at this facility in BY99 chinook.

The BY99 chinook were considerably larger than in previous years. The 2000-2001 winter was considerably warmer than usual, but the chinook did spend a large amount of time under ice. Pre-liberation examination results showed a light infection of *M. cerebralis*. Viral replicating agents were not detected and Direct Fluorescent Antibody Test (DFAT) technology did not detect *Renibacterium*.

FISH PRODUCTION

Spring Chinook Adult Collection

The Sawtooth Fish Hatchery chinook trapping season began on June 28, 1999 and continued through September 7, 1999. The peak of the run occurred the week of July 19, 1999 (Appendix D). A total of 196 spring chinook salmon were trapped including 82 males, 35 females, and 79 jacks (Appendices E and E.1). Released above the weir were 129 salmon (including 51 unmarked and 3 marked males, 16 unmarked and 6 marked females, and 6 unmarked and 40 marked jacks) (Appendix F). There were no Coded Wire Tag (CWT) fish recoveries (Appendix G). There were no Passive Integrated Transponder (PIT) tagged adult chinook trapped. Sawtooth Fish Hatchery had a male:female ratio of 82.1% male and 17.9% female.

The East Fork trap was not in operation in 1999.

A total of 79 three-year-old, 78 four-year-old, and 39 five-year-old fish returned to Sawtooth Fish Hatchery.

Adult Treatments

Sawtooth Fish Hatchery adult chinook were injected with erythromycin phosphate at a rate of 20 mg active per kg body weight. Injections were given posterior to the pelvic fins in the peritoneal cavity. The Sawtooth Fish Hatchery ponded adults were treated three times per week in a one-hour 170-ppm formalin flush. No adults were ponded at the East Fork.

Prespawning Mortality

Sawtooth Fish Hatchery had three pre-spawning mortalities (two unmarked males and one unmarked female).

Spawning Operations

Spawning activities at Sawtooth Fish Hatchery began August 16 and concluded September 1, 1999. The five egg-takes during this period yielded 63,642 green eggs from 12 females for an average fecundity of 5,303 eggs per female. There were 44 male and 11 jack salmon used for fertilization. Each female's eggs were separated into four groups. Each group was fertilized by sperm from one male (Appendix H). The four groups were then recombined and water-hardened for one hour in a 100-ppm titratable iodine solution. The eggs were then put into Heath incubator trays, with one female per tray for Bacterial Kidney Disease (BKD) segregation.

Incubation

Each eight-tray Heath stack had flows set at 5 gpm of wellwater. Eggs were put away at one female per tray for BKD segregation. This averaged 5,303 eggs per tray. All incubated green eggs were treated with a 1,667 ppm formalin bath for 15 minutes starting three days after fertilization at three times per week for fungal control.

Well temperatures ranged from 50^{o}F to 44^{o}F during the incubation period. The eggs eyed-up at 500 Fahrenheit thermal units (FTUs). At eye-up the eggs were shocked by dropping them from one container to another. They were then picked and enumerated by hand count. The eggs are shocked at 530 FTUs and hatch at 1,300 FTUs.

In addition to the BY99 Sawtooth eggs, the hatchery incubated 371,354 green Pahsimeroi summer chinook eggs from 79 females.

Sawtooth Fish Hatchery green eggs eyed up at a 93% rate, yielding 59,373 eyed eggs (Appendix J).

Pahsimeroi green eggs eyed up at an 81% rate, yielding 300,685 eyed eggs.

Early Rearing

The Sawtooth Fish Hatchery stock swim-up fry were transferred from the Heath trays to vats 15 and 16. The vats contained PVC baffles every four feet. Starting flows for the swim-up fry were set at 20 gpm per vat. As the fish grew, the flows were increased to a maximum of 110 gpm. Early rearing wellwater varied in temperature from 46^{o}F to 40^{o}F (Appendix I).

All fry were started on Rangen soft moist starter and 1/32, and initially fed by hand. Feed amounts and sizes varied according to manufacturer recommendations as the fish grew. Automatic belt feeders were used once the fry exhibited a good feed response. All fish were fed a 28-day prophylactic treatment of Bio-Oregon erythromycin-medicated feed during June at a rate of 4.5 grams active/100 lbs of fish. The fish were transferred outside for final rearing in June and July.

Final Rearing

The Sawtooth spring chinook were placed into the upper sections of two large raceways. Initial densities were 0.03 lbs./cuft and water flows were 660 gpm.

All outside fish were fed Rangen's soft moist grower feed. A second 28-day prophylactic Bio-Oregon erythromycin-medicated feed treatment was fed in August and September of 2000. It was administered at a rate of 4.5 grams active per 100 lbs of fish, to prevent the onset of BKD.

The finish weight of the BY99 Sawtooth chinook smolts was 4,950 lbs. The fish were fed 5,726 lbs of feed for a conversion rate of 1.16. A synopsis of feeding regimens can be found in Appendix I.1.

Fish Marking

Fish marking occurred the week of September 18, 2000. On September 20-22, 2000 all fish received CWTs only. In addition, 500 fish were PIT-tagged in March 2001. The PIT tags were used to evaluate downriver migration (Appendices K and L).

Fish Distribution

Fish release for Sawtooth stock BY99 smolts occurred on April 18,2001. A total of 57,134 fish were released into the Salmon River at the Sawtooth Fish Hatchery weir (Appendix M). The fish were released in the evening through the outside raceway tailrace pipe. Production costs for BY99 smolts can be found in Appendix M.1.

PAHSIMEROI CHINOOK

Sawtooth Fish Hatchery reared Pahsimeroi Fish Hatchery's BY99 summer chinook due to a lack of space and pathogen free water at Pahsimeroi. Eleven lots of fertilized eggs were brought to Sawtooth Fish Hatchery between August 23 and September 23, 1999. A total of 371,354 eggs were incubated. After dead egg pick-off, the number at ponding was 291,884 (205,163 reserve, 16,031 high BKD reserve, 61,685 supplementation, and 9,005 high BKD supplementation) for a 78.6% survival from green eggs to ponding.

On April 12, 2000, the high BKD reserve and supplementation groups were combined and moved to an outside raceway due to demands on wellwater and vat room rearing space. The fish averaged 280 fpp (2.28 inches in length).

On May 16, 2000, the reserve Pahsimeroi group being reared on wellwater was AD-clipped.

Beginning on June 7 and ending on July 4, 2000, all Pahsimeroi fish received a 28-day prophylactic erythromycin-medicated feed treatment.

The supplementation fish were Coded Wire Tagged on September 19, 2000.

On July 6, all remaining fish were moved to the outside raceways. They were 86 fpp and 3.25 inches in length.

On September 25, 26, and 27, 2000, all Pahsimeroi fish were returned to Pahsimeroi Fish Hatchery. The resulting inventory number was a total of 283,602 fish (61,301 CWT supplementation, 24,854 CWT high BKD supplementation, and 197,447 ad-clipped reserve). Total lbs of fish shipped were 13,812 for an average of 20.5 fpp. Total feed fed was 14,626 lbs for an overall conversion of 1.06.

SOCKEYE SALMON

Sawtooth Fish Hatchery received an estimated 81,358-eyed Redfish Lake sockeye eggs from Big Beef (NMFS) and Eagle Fish hatcheries in three shipments between November 23 and December 9, 1999. The eggs arrived with approximately 460 Celsius Temperature Units (CTUs). At 910-950 CTUs fry were ponded into 10 one-meter semi-square rearing tanks. Initial water flows were set at three gpm.

Eyed-egg to ponding survival was 91.7%, yielding 74,661 fry. All fry were started on #1 Bioproducts Biodiet Starter. Feed size was increased in accordance with Bioproducts recommendation with the exception that 20% of the feed was one size smaller to assure smaller fish would get adequate amounts of feed. As densities reached 4 lbs/gpm, fish were transferred to five, two-meter fiberglass tanks with initial flows set at ten gpm.

On July 31, 2000, 6,171 fish were AD-clipped and LV-clipped and released into Pettit and Alturas lakes. Pettit Lake received 3,097 (at 169 fpp) and Alturas Lake received 3,074 (at

167 fpp). A test procedure for grit marking was conducted on 100 of the summer release fish. Of the 100 fish test marked, 62 survived. The survivors were split evenly and were included in the July 31 release totals for Pettit and Alturas lakes.

All of the remaining BY99 sockeye were transferred to inside vats in July and reared there until release in October 2000 as pre-smolts. AD-marking occurred on September 19-20. Fall releases occurred on October 11, 2000. Redfish Lake received 48,051 AD-clipped fish at 42 fpp, Alturas Lake received 6,003 AD-clipped fish at 35.6 fpp, and Pettit Lake received 6,067 AD-clipped fish at 32.5 fpp. Total fall release was 60,121 fish. From egg to release the fish had a survival rate of 89%. One hundred pre-smolts were set aside and placed into a small outside raceway on raw river water. The fish were over-wintered at the hatchery to test exposure and susceptibility to whirling disease.

2000 STEELHEAD TROUT

ABSTRACT

The Sawtooth Fish Hatchery trap and weir were put into operation on March 20, 2000 and closed May 4, 2000. A total of 2,061 adult steelhead *Oncorhynchus mykiss* (1,082 males and 979 females) were trapped at the Sawtooth Fish Hatchery weir. A total of 195 steelhead were released. This included 99 males (9 natural), and 96 females (6 natural). Of these released fish, 15 hatchery males and 15 hatchery females were released into a weired-off section of Beaver Creek, and 15 hatchery males and 15 hatchery females were released into Frenchman Creek for a natural-spawning study conducted by Alan Byrne, Department Research Biologist. In addition, 20 hatchery males and 20 hatchery females were released into Fourth of July and Champion creeks, and into the Salmon River at the Vienna pullout. There were no prespawning mortalities at Sawtooth Fish Hatchery.

Spawning began at Sawtooth Fish Hatchery on March 27, 2000 and continued through May 4, 2000, with 13 spawning days. A total of 870 females were spawned with 870 males, yielding 3,950,103 green eggs for an average fecundity of 4,465 eggs per female. These green eggs yielded 3,516,250 eyed-eggs for an eye-up percentage of 89%. The eggs were shipped as follows: Hagerman National Fish Hatchery received 917,989, Magic Valley Fish Hatchery received 991,665, Hagerman State Fish Hatchery received 248,567, and the Shoshone-Bannock Tribe received 376,429. A total of 981,600 surplus swim-up fry were destined for southern Idaho resident waters, but had to be destroyed due to exposure to raw river water.

The East Fork velocity barrier and trap were put into operation March 29, 2000 and ran through May 3, 2000. A total of 48 adult B-run steelhead were trapped, including 26 males and 22 females. Fish released above the weir to spawn naturally included two natural males and four natural females. There were no prespawning mortalities.

East Fork spawning operations began on April 4, 2000 and continued through April 25, 2000 with 6 spawning days. A total of 15 females were spawned with 15 males, yielding 67,389 green eggs, for an average fecundity of 4,493 eggs per female. These green eggs yielded 51,384 eyed-eggs for a 76.2% eye-up rate. The eggs were shipped to Magic Valley Fish Hatchery for rearing.

A temporary weir was installed on Squaw Creek on March 28, 2000. The trap at Squaw Creek Pond was put into operation and operated until April 25, 2000. One marked hatchery male was trapped. No spawning occurred. The fish was sacrificed to check for a possible CWT.

There were 2,341,653 green eggs from Pahsimeroi Fish Hatchery incubated at Sawtooth. These eggs eyed up at an 85% rate, yielding 1,988,468 eyed-eggs. The eggs were shipped to the following hatcheries: Magic Valley received 946,368 as eyed-eggs, Niagara Springs received 758,658 as eyed-eggs, the Shoshone-Bannock Tribes received 66,084 eyed-eggs for their streamside incubator program, and Hagerman National Fish Hatchery received 217,358 eyed eggs.

The Sawtooth and East Fork stock eyed-eggs were released as smolts during the spring of 2001. A total of 706,735 BY00 Sawtooth stock smolts were released. Sawtooth Fish Hatchery released 565,188 acclimation smolts at the Sawtooth Fish Hatchery weir. Hagerman National Fish Hatchery stocked 141,447 direct release smolts at the Sawtooth Fish Hatchery weir. East Fork stock smolts numbering 38,024 at 3.9 fpp were mixed with Dworshak smolts and released below Squaw Creek Pond.

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FISH PRODUCTION

Steelhead Adult Collection

The Sawtooth Fish Hatchery weir and trap were put into operation on March 20, 2000 and closed May 4, 2000. The East Fork Trap was put into operation March 29, 2000 and ran through May 3, 2000. The Squaw Creek weir and trap were put into operation on March 28, 2000 and ran until April 25, 2000. The peak of the Sawtooth Fish Hatchery steelhead *Oncorhynchus mykiss* run occurred during the first week of April and the peak of the East Fork run occurred during the second week of April. Run timing was not determined for the Squaw Creek trap (Appendix N).

Sawtooth Fish Hatchery trapped a total of 2,061 adult fish, which included 1,082 males and 979 females (Appendix O). All fish were scanned for CWTs and PITs. Information regarding the CWT fish was not available. There were three PIT-tagged adult steelhead trapped at Sawtooth Fish Hatchery. There was a 67-cm marked male (tag #507652144C #10), a 60-cm marked female (tag #512B713632), and a 57-cm marked male (tag #5131322054). A total of 195 steelhead, 99 males (9 natural) and 96 females (6 natural) were released (Appendix O.1). Of the released fish, nine males (all natural), and six females (all natural) were released immediately above the weir. Some adult fish were released as part of supplementation studies conducted by Alan Byrne, Department Research Biologist. These hatchery fish (15 males and 15 females) were placed into Beaver Creek, and (15 males and 15 females) into Frenchman Creek. Twenty pairs of hatchery fish were also released into Fourth of July and Champion creeks, and into the Salmon River at the Vienna pullout.

The East Fork facility trapped 48 B-run adult fish, of which 26 were males and 22 were females (Appendix O). Two males (all natural) and four females (all natural) were released above the velocity barrier to spawn naturally (Appendix O.1). All fish were scanned for CWT and PIT. Information regarding the CWT fish was not available.

The Squaw Creek facility trapped one marked male steelhead (61-cm). It was sacrificed to check for a possible CWT.

Length frequency distributions of trapped steelhead at Sawtooth and the East Fork are shown in Appendices P and Q.

Sawtooth Fish Hatchery had a male:female ratio of 52% males and 48% females. The East Fork's male:female ratio was 54% male and 46% female. No ratio was established for Squaw Creek.

Using Kent Ball's (Department Anadromous Researcher), lengths for one- and two-ocean fish, and steelhead returns by year-class and sex are shown in Appendix R.

Specific information obtained from CWT fish at both Sawtooth Fish Hatchery and the East Fork facility was not available. However, released steelhead by adult year-class and sex are shown in Appendix S.

Adult Treatments

The returning adults at Sawtooth Fish Hatchery, the East Fork Satellite, and Squaw Creek were not treated or injected with any type of drug or chemicals prior to spawning.

Prespawning Mortality

None of the steelhead trapping facilities had any pre-spawning mortalities.

Spawning Operations

Sawtooth Fish Hatchery spawned steelhead on 13 days from March 27 through May 4. Spawning took place at the East Fork on 6 days from April 4 through April 25. The fish trapped at Squaw Creek was not spawned.

At Sawtooth, 1,740 fish were spawned, of which 870 were females. The East Fork facility spawned 30 fish, of which 15 were females. A total of 3,950,103 green eggs were collected from Sawtooth Fish Hatchery fish (4,465 per female) and 67,389 green eggs were taken from East Fork fish (4,493 per female).

After fertilization, the eggs were rinsed of blood and sperm with wellwater. Then the eggs were water-hardened in a minimum 100-ppm solution of Argentine (10% iodine) solution for one hour before being put into Heath trays for incubation. All eggs tested negative for virus.

Incubation

After hardening in the Argentine solution, the green eggs were put away at two females eggs per Heath tray.

There were 2,341,653 green eggs received from 458 females (5,007/female) from Pahsimeroi Fish Hatchery that were incubated at Sawtooth. These eggs were incubated at three females per Heath tray.

All incubated eggs were treated with a 1,667-ppm 15-minute formalin flow-through treatment three times per week for fungal and bacterial control. Sawtooth's eggs eyed up at an 89% rate, yielding 3,516,250 eyed-eggs. East Fork eggs eyed up at a 76.2% rate, yielding 51,384 eyed-eggs. Pahsimeroi eggs incubated at Sawtooth Fish Hatchery eyed up at an 85% rate, resulting in 1,988,468 eyed-eggs.

Well temperatures varied from 40°F at the beginning of incubation to 44°F when the last eyed-eggs were shipped. Ten temperature units (TUs) per day was the average during the incubation period. Eye-up occurred at 360 TUs and the eggs were shocked at 380 TUs.

The eggs were shocked by putting them in a half-full 3-gallon bucket of water, then pouring them into a quarter-full bucket of water from about three feet high. One day after shocking, the eggs were machine-picked using a Jenn-Sorter model JH machine, which picks and enumerates eggs. A day or two after picking, the eyed-eggs are handpicked before transfer to the rearing hatcheries. The eggs were loaded at 50,000 to 100,000 eggs per 48-quart cooler of wellwater; then the cooler was strapped shut and shipped.

The Sawtooth eggs were shipped as follows: 917,989 as eyed-eggs to Hagerman National Fish Hatchery, 991,665 as eyed-eggs to Magic Valley Fish Hatchery, 376,429 as eyed-eggs to the Shoshone-Bannock Tribe, and 248,567 as eyed-eggs to Hagerman State Fish Hatchery. Magic Valley received 51,384 East Fork eyed-eggs.

The Pahsimeroi eggs were shipped as follows: 946,368 as eyed-eggs to Magic Valley Fish Hatchery; 758,658 as eyed-eggs to Niagara Springs Fish Hatchery, and 66,084 as eyed-eggs to the Shoshone-Bannock Tribe.

There were 981,000 surplus Sawtooth swim-up fry held for planting into southern Idaho waters that had to be destroyed due to exposure to raw river water.

Release Acclimation of Brood Year 2000

For the tenth year in a row, steelhead smolts were held and acclimated at Sawtooth Fish Hatchery before final release. A total of 566,386 smolts were hauled from Hagerman National Fish Hatchery and held in 10 separate raceways, starting April 11, 2001 and continuing until April 26, 2001. They were held from 3 to 17 days. The screens were removed on April 27, 2001. The smolts were forced out of the raceways the same day. A total of 565,188 BY00 acclimated smolts were released. An additional 141,447 BY00 smolts were hauled from Hagerman NFH and were released directly below the Sawtooth weir concurrent to the acclimated smolts, bringing the total BY00 smolt release near Sawtooth to 706,635. No fish were released at Torrey's this year. East Fork stock smolts numbering 38,024 at 3.9 were mixed with Dworshak smolts and released below Squaw Creek Pond.

Fish Marking

Fish marking was completed in the rearing hatcheries and is shown in Appendix N.

CONCLUSIONS/RECOMMENDATIONS

East Fork Trap

As stated in last year's brood year report, the East Fork's adult returns are insufficient to meet egg needs or escapement goals. A decision had been made to shift the East Fork program to Squaw Creek Pond.

Sawtooth Fish Hatchery

If the number of returning adults shows that acclimation is a viable program, then we should plan on implementing the program every spring. But, if the numbers of adults show that there is no difference or fewer returning "acclimated" adults, then we need to stop the program. Acclimation requires the hatchery to draw large amounts of water from the river, which also draws in emerging endangered natural chinook fry.

APPENDICES

Appendix A. Sawtooth Fish Hatchery chinook smolt releases and returns (marked and unmarked).

Brood Year	Release Year	Number Released	Adult Returns [a] 3-year	4-year	5-year	Total Returns	Total %
1979	1981	None	-	-	-	291	inc
1980	1982	None	17	66	165	248	inc
1981	1983	185,375	49	1,182	796	2,027	1.08
1982	1984	230,550	292	922	875	2,086	.91
1983	1985	420,060	51	452	1,318	1,821	.43
1984	1986	347,484	17	86	190	293	.08
1985	1987	1,185,06	80	286	164	530	.05
1986	87-88	1,705,500	412	1,212	297	1,921	.11
1987	88-89	2,092,000	112	201	63	376	.02
1988	89-90	1,895,60	68	496	480	1,044	.055
1989	90-91	652,600	45	78	27	150	.023
1990	91-92	1,273,400	29	63	6	98	.008
1991	92-93	774,583	6	15	28	49	.006
1992	93-94	213,830	16	101	96	213	.099
1993	94-95	334,313	27	148	133	308	.092
1994	1996	25,006	10	33	39	82	.032
1995	1997	4,756	4	78	110	192	4.0
1996	1998	43,161	79	500	(2001)	-	inc
1997	1999	223,240	376	(2001)	(2002)		
1998	2000	123,425	(2001)	(2002)	(2003)		
1999	2001	57,134	(2002)	(2003)	(2004)		

East Fork chinook smolt releases and returns (marked and unmarked).

Brood Year	Release Year	Number Released	Adult Returns [a] 3-year	4-year	5-year	Total Returns	Total %
1979	1981	-	-	-	69	69	inc
1980	1982	-	-	26	59	85	inc
1981	1983	-	-	193	102	317	inc
1982	1984	-	-	87	181	268	inc
1983	1985	-	22	90	519	631	inc
1984	1986	108,700	1	23	51	75	.06
1985	1987	195,100	6	55	27	88	.045
1986	1988	249,200	22	106	32	160	.064
1987	1989	305,300	12	23	23	58	.019
1988	1990	514,600	7	27	65	99	.019
1989	1991	98,300	15	18	13	46	.046
1990	1992	79,300	6	2	0	8	.010
1991	1993	35,172	0	0	0	0	.000
1992	1994	12,368	0	7	0	7	.056
1993	1995	48,845	3	7	ND	10	.020

a Age classes based upon the following lengths: 3-yr. old: $\leq$ 64 cm,
4-yr. old: 64 to 82 cm 5-yr. old: >82 cm.
ND means no data; trap not operated.

Appendix A1 Sawtooth Fish Hatchery chinook smolt releases and hatchery returns (marked fish).

Beginning with BY91, all hatchery reserve chinook smolts released were marked.
*all CWT, no AD clip

Hatchery Adult Returns

Brood Year	Release Year	Number Released	Adult Returns [a] 3-year	4-year	5-year	Returns	Total %
1991	92-93	774,583	2	11	7	20	.002
1992	93-94	213,830	8	23	26	57	.026
1993	94-95	334,313	21	72	23	116	.035
1994	1996	25,006	1	3	3	7	.028
1995	1997	4,756	0	12	37	49	1.03
1996	1998	43,161	60	135	(2001)	-	inc
1997	1999	119,442	279	(2001)	(2002)	-	inc
1998	2000	*123,425	(2001)	(2002)	(2003)	-	inc
1999	2001	*57,134	(2002)	(2003)	(2004)	-	inc

East Fork chinook smolt releases and hatchery returns (marked fish).

Hatchery Adult Returns

Brood Year	Release Year	Number Released	Adult Returns [a] 3-year	4-year	5-year	Returns	Total %
1991	1993	35,172	0	0	0	0	.000
1992	1994	12,368	0	0	0	0	.000
1993	1995	48,845	1	1	ND	2	.004

a Age classes based upon the following lengths: 3-yr. old: ≤ 64 cm, 4-yr. old: 64 to 82 cm 5-yr. old: >82 cm.
ND means no data, trap not operated.

Appendix B. Sawtooth Fish Hatchery water quality analysis of the Salmon River.

	1999	1996	1993	1985
Nutrients (mg/L)				
T. Ammonia as N	0.02	0.027	0.043	0.045
T. NO2 + NO3 as N	NR	0.006	0.073	0.088
T. Kjeldahl Nitrogen as N	<0.10	0.20	<.05	0.26
T. Phosphorus as P	0.005	<.05	<.05	0.02
Ortho Phosphate as P	<0.005	NR	0.019	<.003
Minerals (mg/L)				
Sp. Conductance (umhos/cm)	159.0	167	157	135
Hardness as CaCO3	75.7	80	68	62
T. Alkalinity as CaCO3	75.2	79	74	63
Bicarbonate Alk. as CaCO3	75.2	79	74	63
Calcium	26.8	27.4	24	20.8
Magnesium	2.10	2.9	1.9	1.8
Sodium	4.26	5.5	7.0	3.8
Potassium	0.48	0.7	0.7	<1
Fluoride	0.60	0.29	0.85	0.58
Sulphate as SO4	5.50	12	5	<6
Total Metals (ug/L)				
Arsenic, Total	<0.005	<10	<10	<10
Boron, Total	NR	<10	<80	1
Cadmium, Total	<0.0005	<1	<1	<1
Chromium, +6	NR	NR	<10	<50
Chromium, Total	<0.002	<2	<10	<50
Copper, Total	<0.01	<10	<10	<10
Iron, Total	0.02	20	20	120
Lead, Total	<0.002	<5	<5	<50
Manganese, Total	<0.01	1	<10	10
Mercury, Total	<0.0002	<.5	<.5	<.5
Nickel, Total	<0.003	<5	<10	<50
Silver, Total	<0.002	<1	<1	<1
Zinc, Total	<0.001	3	<2	<1
Miscellaneous				
Turbidity (NTU)	0.98	0.45	<1	1.8
pH (SU)	7.97	8.04	8.0	8.1
Total Cyanide (mg/L)	<0.005	<.005	<.005	<.005
Total Residue	NR	NR	NR	97

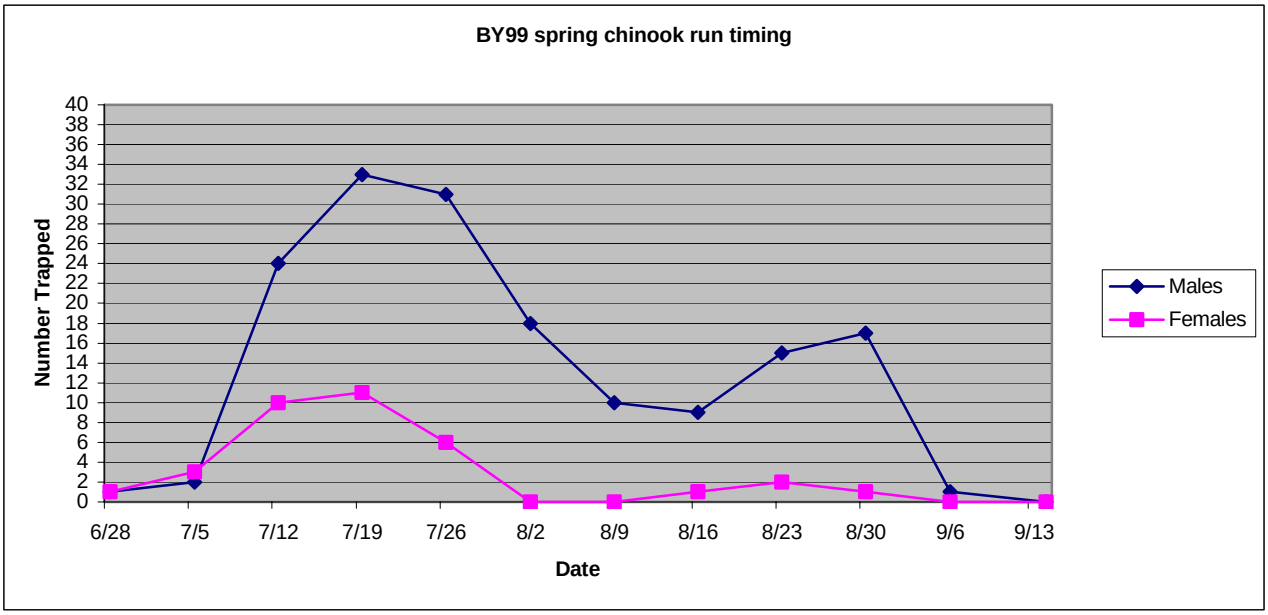
Appendix B1. Sawtooth Fish Hatchery water quality analysis of Well 1&2 mix.

	1999
Nutrients (mg/L)	
Ammonia as N	0.02
T. Phosphorus as P	7.60
Minerals (mg/L)	
Hardness	81.3
Alkalinity	85.7
Bicarbonate Alk. as CaCO3	85.7
Total Metals (ug/L)	
Arsenic	<0.005
Cadmium	<0.0005
Chloride	0.56
Cobalt	<0.01
Copper	<0.01
Lead	<0.002
Mercury	<0.0002
Selenium	<0.005
Miscellaneous	
T. Cyanide (mg/L)	<0.005

Appendix C. Sawtooth Fish Hatchery results of disease sampling.

Case #	Stock	Date	Data
BY99 Juvenile Chinook			
00-160	Pah	06/08/00	BKD, IHN, IPN 0/10, FUR 0/4, ERM 0/4, CWD 0/4
00-159	Saw	06/08/00	IHN 0/10, IPN 0/10, BKD 0/10, FUR 0/4, ERM 0/4, CWD 0/4 BACTE 0/4, Viro 0/10, FAT 0/10
00-402	Saw	11/17/00	IHN 0/10, IPN 0/10, BKD 0/10, FUR 0/4, ERM 0/4, CWD 0/4 BACTE 0/4, Viro 0/10, FAT 0/10
01-060	Saw	03/20/01	IHN, IPN, RS, Viro, 0/20, BKD 2/4 low (ELISA), 5fp WHD 4/4
Return Year 1999 Chinook Broodstock			
99-261	Saw	08/16/99	IHN,IPN, WHD 0/2, BKD 2/2 low ELISA
99-273	Saw	08/20/99	IHN,IPN 0/5
99-275	Saw	08/25/99	IHN, IPN 0/6, BKD 5/6 low ELISA
99-283	Saw	08/27/99	IHN, IPN 0/2
99-293	Saw	09/01/99	IHN, IPN, WHD 0/2, BKD 2/2 low ELISA
99-300	Saw	09/03/99	BKD 2/2 low ELISA, WHD 0/16
Return year 2000 Steelhead Broodstock			
00-056	Saw	03/27/00	IHN, IPN 0/18
00-062	Saw	03/30/00	IHN, IPN 0/26
00-067	Saw	04/03/00	IHN, IPN 0/44
00-084	Saw	04/06/00	IHN, IPN 0/80
00-086	Saw	04/10/00	IHN, IPN 0/60
00-089	Saw	04/11/00	IHN, IPN 0/40
00-094	Saw	04/13/00	IHN, IPN 0/40
00-102	Saw	04/17/00	IHN, IPN 0/40
00-113	Saw	04/20/00	IHN, IPN 0/40
00-121	Saw	04/24/00	IHN, IPN 0/30
00-125	Saw	04/27/00	IHN, IPN 0/16
00-132	Saw	05/01/00	IHN, IPN 0/10
00-133	Saw	05/04/00	IHN, IPN 0/11
00-134	Saw	05/04/00	BKD 0/60, WHD 0/20 5fp
00-069	EF	04/04/00	IHN, IPN 0/2
00-090	EF	04/11/00	IHN, IPN 0/4
00-095	EF	04/14/00	IHN, IPN 0/2
00-103	EF	04/17/00	IHN, IPN 0/3
00-122	EF	04/21/00	IHN, IPN 0/3
00-126	EF	04/25/00	IHN, IPN 0/1
00-135	EF	05/04/00	BKD 0/17, WHD ¼ 5fp

Appendix D. Sawtooth Fish Hatchery spring chinook run timing 1999



Appendix E. Sawtooth Fish Hatchery age-class totals from all trapped chinook, return year 1999.

Sawtooth	Length (Fk)	Year class	Number
Males	≤ 64 cm	3-year old	79
	64-82 cm	4-year old	57
	> 82 cm	5-year old	25
Subtotal			**161**
Females	≤ 64 cm	3-year old	0
	64-82 cm	4-year old	21
	> 82 cm	5-year old	14
Subtotal			**35**
Total			**196**

Appendix E.1. Sawtooth Fish Hatchery spring chinook salmon length frequency distribution for 1999

	MALES					FEMALE					
LENGTH (CM)	Hatchery Ponded	Hatchery Released	Natural Ponded	Natural Released	Total Males	Hatchery Ponded	Hatchery Released	Natural Ponded	Natural Released	Total Females	Total Fish
43		2			2					0	2
44					0					0	0
45		1			1					0	1
46	1	1		1	3					0	3
47		3	1		4					0	4
48		1		2	3					0	3
49		2	1	1	4					0	4
50	5		1	2	8					0	8
51	1	3	1	1	6					0	6
52	2	2			4					0	4
53	3	5			8					0	8
54	1	2			3					0	3
55	1	4	1	1	7					0	7
56	1	1			2					0	2
57	1	3	1	1	6					0	6
58		2		1	3					0	3
59	2	3		1	6					0	6
60	1	1		1	3					0	3
61	1	1			2					0	2
62		2			2					0	2
63		1		1	2					0	2
64					0					0	0
65				1	1					0	1
66		1			1					0	1
67	1			1	2					0	2
68				1	1					0	1
69				2	2					0	2
70				2	2					0	2
71				3	3					0	3
72			2	2	4					0	4
73			1	2	3	1	1	1		3	6
74	1		2		3		1			1	4
75			1	4	5		1		1	2	7
76	1		3	3	7	1			2	3	10
77		1		2	3		1	2	1	4	7
78			2	4	6				2	2	8
79				4	4			1		1	5
80			2	2	4				1	1	5
81			2	1	3	1		2		3	6
82			2	1	3				1	1	4
83			1	1	2		1			1	3
84		1		2	3					0	3
85			1	1	2					0	2
86					0					0	0
87			2	1	3					0	3
88				3	3					0	3
89					0					0	0
90				1	1				1	1	2
91				1	1				4	4	5
92					0			2		2	2
93					0		1		2	3	3
94				1	1					0	1

Appendix E1. continued

LENGTH (CM)	MALES					FEMALE					
	Hatchery Ponded	Hatchery Released	Natural Ponded	Natural Released	Total Males	Hatchery Ponded	Hatchery Released	Natural Ponded	Natural Released	Total Females	Total Fish
95			1		1			2		2	3
96					0					0	0
97					0					0	0
98				2	2					0	2
99			1	1	2				1	1	3
100				1	1					0	1
101					0					0	0
102					0					0	0
103					0					0	0
104			1	1	2					0	2
105					0					0	0
106					0					0	0
107					0					0	0
108			1		1					0	1
Totals	23	43	31	64	161	3	6	10	16	35	196

Appendix F. Sawtooth Fish Hatchery age-class breakdown by released chinook, return year 1999

Sawtooth	Length (Fk)	Age Class	Number
Males	≤ 64 cm	3-year old	53
	64-82 cm	4-year old	37
	> 82 cm	5-year old	17
Total Males			**107**
Females	≤ 82 cm	4-year old	12
	> 82 cm	5-year old	10
Total Females			**22**
Total released			**129**

Appendix G. Sawtooth Fish Hatchery chinook age-class breakdown by CWT recoveries, 1999

Sex	Length (cm)	Code	Purpose

No CWT were recovered from trapped fish in 1999.

Appendix H. Sawtooth Fish Hatchery spring chinook spawning matrix, 1999 return year.

Date Spawned	Female Length	Age Class	Male # 1 Length	Age Class	Male #2 Length	Age Class	Male #3 Length	Age Class	Male #4 Length	Age Class
8/16/99	73	F4H	104	M5N	74	M4N	87	M5N	76	M4N
8/16/99	92	F4N	76	M4H	59	M3H	76	M4N	50	M3H
8/20/99	77	F4N	76	M4H	99	M5N	50	M3H		
8/20/99	81	F4N	50	M3H	108	M5N	60	M3H		
8/20/99	79	F4N	87	M5N	76	M4H	55	M3H		
8/20/99	73	F4N	74	M4H	50	M3H	54	M3H		
8/20/99	92	F5N	59	M3H	56	M3H	74	M4N	53	M3H
8/24/99	95	F5N	53	M3H	74	M4H	55	M3N	75	M4N
8/27/99	81	F4N	87	M5N	74	M4H	53	M3H	108	M5N
8/27/99	76	F4H	99	M5N	104	M5N	73	M4N	85	M4N
9/1/99	95	F5N	74	M4H	67	M4H	61	M3H	80	M4N
9/1/99	81	F4H	85	M5N	80	M4N	74	M4N	104	M5N

F = female, M = male, H = Hatchery fish, N = Natural fish, 3 = 3 yr. old, 4 = 4 yr. old, 5 = 5 yr. old.
length is fork length

Appendix I. Survival table for chinook (BY99) and steelhead (BY00) from green eggs to released smolts, at Sawtooth Fish Hatchery and East Fork sites.

CHINOOK				
Green egg Number	Eyed egg Number	Percent Survival	Released Smolts	Percent Survival From Green
Sawtooth Fish Hatchery Fish				
63,642	59,373	93.3	57,134	89.7

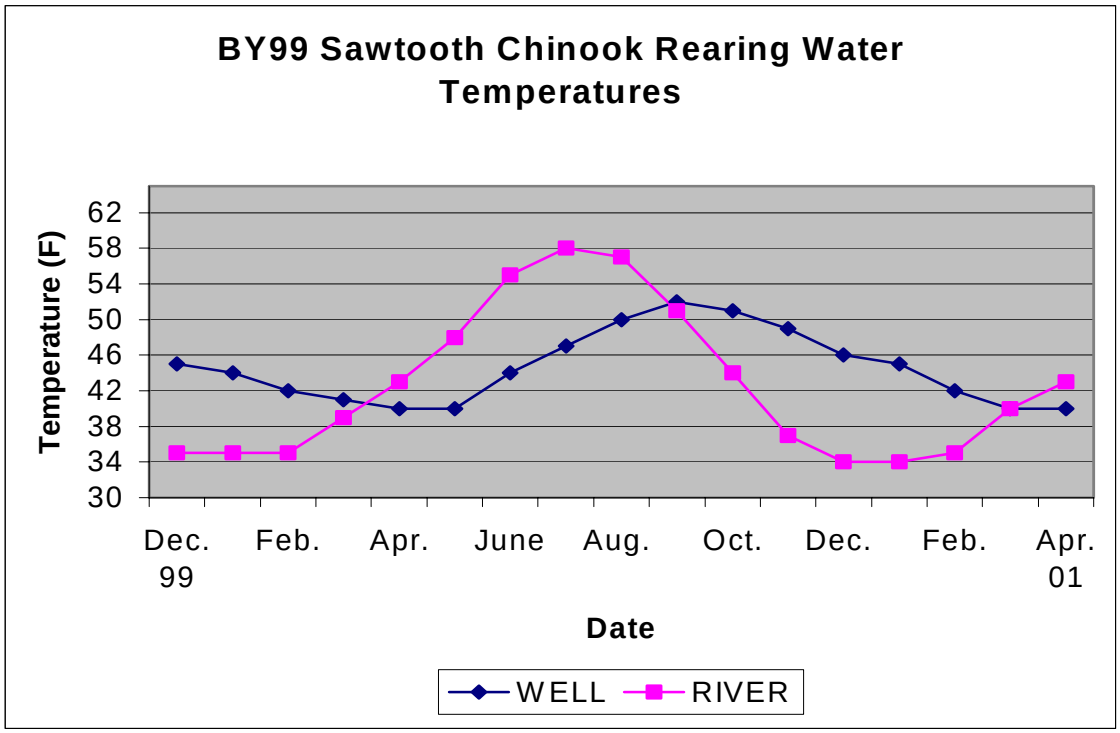
STEELHEAD			
Green egg Number	Eyed egg Number	Percent Survival	
Sawtooth Fish Hatchery Fish			
3,950,103	3,516,250	89.0	distributed as follows
	1,909,654 for smolt production 376,429 for egg boxes 248,567 for resident programs		
East Fork Fish			
67,389	51,384	76.2	

All steelhead raised at other hatcheries.

Appendix I.1. Feed schedule for Sawtooth/Pahsimeroi spring chinook, BY99.

Fpp	% BW Fed	Feed Size	Timing	
su-----800		.035	str., 1/32	11/99 - 01/16/00
800---500		.033	1/32	01/00 - 02/00
500---400		.025	3/64	02/00 - 03/00
400---350		.025	3/64	03/00 - 04/00
350---300		.023	3/64	04/00 - 04/00
300---250		.022	3/64	05/00 - 06/00
250---150		.024	3/64,1/16	06/00 - 06/00
150---110		.024	1/16	06/00 - 07/00
110----90		.025	1/16	07/00 - 08/00
90------50		.022	1/16, 3/32	08/00 - 09/00
50------17		.020	3/32	09/00 - 10/00
< -------17	Maintenance	3/32	10/00 - release 4/18/01	

Appendix J. Rearing water temperatures, BY99 spring chinook at Sawtooth Fish Hatchery.



Appendix K. Summary of marked spring chinook released, return year 1999.

Mark	Number Released	Location
Sawtooth Fish Hatchery Stock		
CWT only	57,134	Sawtooth Fish Hatchery Weir, 04/18/01 (supplementation) non-BKD
Total Release (PIT)	**57,134 (500)**	
Pahsimeroi Stock		
Adipose Clip	197,447	Reserve
CWT only	61,301	Supplementation
CWT only	24,854	Supplementation high BKD
		Transferred to Pahsimeroi FH Sept 25 – 27 2000
	283,602	

Appendix L. Summary of Sawtooth Fish Hatchery spring chinook smolt releases, return year 1999

Raceway	Number	Fish per Pound	Pounds	Designation
1	29,969	11.6	2,588	Supplementation
2	27,165	11.5	2,362	Supplementation
Total	**57,134**			

Appendix M. Sawtooth Fish Hatchery summary of smolt releases and marks.

Steelhead	Sawtooth Fish Hatchery Stock BY00				
Mark Type	CWT Code	#PIT	# Fish Released	Date	Release Purpose
AD	N/A	**	565,188	04/27/01	Acclimated, contribution
AD	N/A	**	141,447	04/27/01	Direct Release at SFH weir, contribution
TOTAL			**706,635**		

**Number PIT-tagged available from Department marking supervisor

Steelhead	East Fork Stock BY00				
Mark Type	CWT Code	#PIT	# Fish Released	Date	Release Purpose
	N/A	**	38,024	04/23/01	contribution

Chinook	Sawtooth Fish Hatchery BY99				
Mark Type	CWT Code	#PIT	# Fish Released	Date	Release Purpose
CWT	N/A	500	57,134	04/18/01	Supplementation, Non-BKD. All released at Sawtooth FH Weir
Total		**500**	**57,134**		

N/A = cwt codes are available at IDFG Lewiston Fish Marking Lab

Appendix M.1. Sawtooth Fish Hatchery production cost table (includes chinook BY99, steelhead BY00, and sockeye BY99).

Chinook BY 99

Smolt Number	Lbs. Feed	Cost Feed	Lbs of Smolts	C	Total Cost	Cost per 1,000	Cost per lb.
Sawtooth 57,134	5,726	$5,808	4,950	1.16	$143,864	$2,518	$29.06
Pahsimeroi 283,602	14,626	$14,826	13,812	1.05	$59,238	$209	$4.28

East Fork
No BY99 East Fork spring chinook salmon were reared. Costs were incurred operating the trap.

Steelhead BY 00

Stock	Green Eggs	Eyed Eggs	Total Cost	Cost per 1,000 eyed eggs
Sawtooth	3,950,103	3,516,250	$44,555	$12.67
East Fork	67,389	51,384	$28,561	$55.67
Pahsimeroi	2,341,653	1,988,468	$41,130	$20.68
Totals	6,359,145	5,556,102	$114,246	

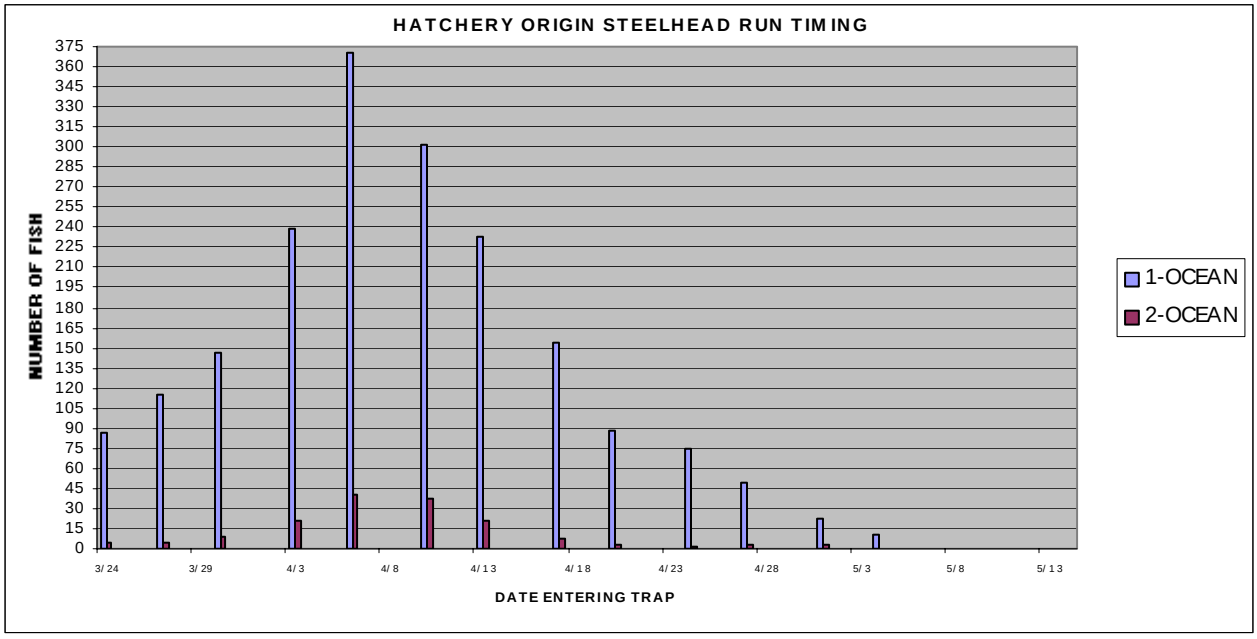
Sockeye BY 99

Smolt Number	Lbs Smolts	Total Cost	Cost per 1,000	Cost per lb.
66,292	1,536	$105,782	$1,595	$68.86

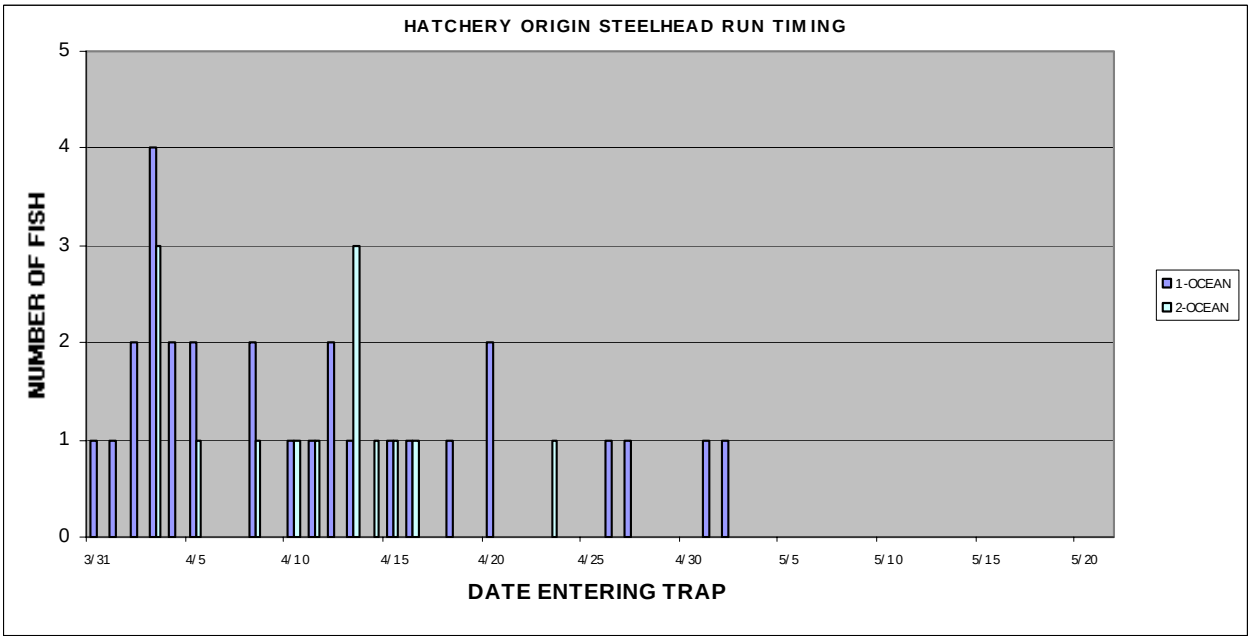
Note: Total costs less capital outlay. Costs include operating East Fork fish trap and running wells for entire rearing period. Costs are proportional species and stock.

Appendix N. Run timing for steelhead; return year 2000, Sawtooth and East Fork traps.

2000 SAWTOOTH FISH HATCHERY STEELHEAD RUN TIMING
HATCHERY ORIGIN STEELHEAD



2000 EAST FORK STEELHEAD RUN TIMING
HATCHERY ORIGIN STEELHEAD



Appendix O. Steelhead returns by year-class[1] and sex, return year 2000.

Sawtooth Fish Hatchery

AGE-CLASS OF ADULTS	MALES		FEMALES		TOTAL	
	No.	%	No.	%	No.	%
HATCHERY 1-OCEANS	1040	96.9	851	87.5	1891	92.4
HATCHERY 2-OCEANS	33	3.1	122	12.5	155	7.6
NATURAL 1-OCEANS	9	100.0	5	83.3	14	93.3
NATURAL 2-OCEANS	0	0.0	1	16.7	1	6.7
TOTAL 1-OCEANS	1049	97.0	856	87.4	1905	92.4
TOTAL 2-OCEANS	33	3.0	123	12.6	156	7.6

East Fork

AGE-CLASS OF ADULTS	MALES		FEMALES		TOTAL	
	No.	%	No.	%	No.	%
HATCHERY 1-OCEANS	20	83.3	8	44.4	28	66.7
HATCHERY 2-OCEANS	4	16.7	10	55.6	14	33.3
NATURAL 1-OCEANS	2	100.0	0	0.0	2	33.3
NATURAL 2-OCEANS	0	0.0	4	100.0	4	66.7
TOTAL 1-OCEANS	22	84.6	8	36.4	30	62.5
TOTAL 2-OCEANS	4	15.4	14	63.6	18	37.5

[1]These figures are based criteria for aging steelhead, as described in Appendix S.

Appendix O.1. Lengths of released steelhead return year 2000, from Sawtooth Fish Hatchery and East Fork traps.

Sawtooth:			**East Fork:**		
Fork Len. (cm)	Male	Female	Fork Len. (cm)	Male	Female
54	3	5(1n)	60		
55	4	4	61		
56	4(1n)	11	62		
57	11(1n)	15(1n)	63		
58	10	14(1n)	64		
59	10	13(1n)	65	1(1n)	
60	13(1n)	13	66	1(1n)	
61	10(1n)	4	73		
62	12(1n)	5(1n)	74		1(1n)
63	8	5	75		1(1n)
65	5(2n)	1	77		
66	3(2n)		78		1(1n)
68	2	3	81		1(1n)
69	1	2			
70			Totals:	2(2n)	4(4n)
72					
73	3				
75		1(1n)			
76					
78					
81					
Totals:	99(9n)	96(6n)			

(#) Indicates number of unmarked fish in each length group.

Appendix P. Sawtooth Fish Hatchery steelhead length frequency distribution, return year 2000.

Sawtooth Hatchery 2000 Adult Steelhead Run

FK.LN	HATCHERY		NATURAL		TOTAL TRAPPED			FK.LN
(CMS)	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES	TOTAL	(in)
50	0	2	0	0	0	2	2	19.7
51	3	2	0	0	3	2	5	20.1
52	1	7	0	0	1	7	8	20.5
53	8	8	0	1	8	9	17	20.9
54	13	13	0	0	13	13	26	21.3
55	25	41	0	0	25	41	66	21.7
56	43	84	1	0	44	84	128	22.0
57	69	98	1	1	70	99	169	22.4
58	128	124	0	1	128	125	253	22.8
59	154	144	0	1	154	145	299	23.2
60	137	110	1	0	138	110	248	23.6
61	127	102	1	0	128	102	230	24.0
62	125	64	1	1	126	65	191	24.4
63	87	25	0	0	87	25	112	24.8
64	61	10	2	0	63	10	73	25.2
65	26	17	0	0	26	17	43	25.6
66	20	13	2	0	22	13	35	26.0
67	13	15	0	0	13	15	28	26.4
68	3	19	0	0	3	19	22	26.8
69	6	22	0	0	6	22	28	27.2
70	2	12	0	0	2	12	14	27.6
71	7	16	0	0	7	16	23	28.0
72	6	7	0	0	6	7	13	28.3
73	4	5	0	0	4	5	9	28.7
74	1	4	0	0	1	4	5	29.1
75	4	6	0	1	4	7	11	29.5
76	0	1	0	0	0	1	1	29.9
77	0	1	0	0	0	1	1	30.3
78	0	1	0	0	0	1	1	30.7
79	0	0	0	0	0	0	0	31.1
80	0	0	0	0	0	0	0	31.5
81	0	0	0	0	0	0	0	31.9
82	0	0	0	0	0	0	0	32.3
83	0	0	0	0	0	0	0	32.7
84	0	0	0	0	0	0	0	33.1
85	0	0	0	0	0	0	0	33.5
TOTALS:	1073	973	9	6	1082	979	2061	

Appendix Q. East Fork steelhead length frequency distribution, return year 2000.

East Fork 2000 Adult Steelhead Run

FK.LN	HATCHERY		NATURAL		TOTAL TRAPPED			FK.LN
(CMS)	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES	TOTAL	(in)
50	0	0	0	0	0	0	0	19.7
51	0	0	0	0	0	0	0	20.1
52	0	0	0	0	0	0	0	20.5
53	0	0	0	0	0	0	0	20.9
54	0	0	0	0	0	0	0	21.3
55	0	0	0	0	0	0	0	21.7
56	0	0	0	0	0	0	0	22.0
57	0	0	0	0	0	0	0	22.4
58	2	0	0	0	2	0	2	22.8
59	1	1	0	0	1	1	2	23.2
60	2	3	0	0	2	3	5	23.6
61	3	1	0	0	3	1	4	24.0
62	3	2	0	0	3	2	5	24.4
63	4	0	0	0	4	0	4	24.8
64	2	1	0	0	2	1	3	25.2
65	1	0	1	0	2	0	2	25.6
66	1	0	1	0	2	0	2	26.0
67	0	0	0	0	0	0	0	26.4
68	1	0	0	0	1	0	1	26.8
69	0	0	0	0	0	0	0	27.2
70	0	1	0	0	0	1	1	27.6
71	0	1	0	0	0	1	1	28.0
72	0	3	0	0	0	3	3	28.3
73	0	0	0	0	0	0	0	28.7
74	1	1	0	1	1	2	3	29.1
75	0	1	0	1	0	2	2	29.5
76	1	0	0	0	1	0	1	29.9
77	0	1	0	0	0	1	1	30.3
78	2	2	0	1	2	3	5	30.7
79	0	0	0	0	0	0	0	31.1
80	0	0	0	0	0	0	0	31.5
81	0	0	0	1	0	1	1	31.9
82	0	0	0	0	0	0	0	32.3
83	0	0	0	0	0	0	0	32.7
84	0	0	0	0	0	0	0	33.1
85	0	0	0	0	0	0	0	33.5
TOTALS:	24	18	2	4	26	22	48	

Appendix R. Released steelhead by year-class and sex, return year 2000.

Sawtooth Fish Hatchery (195; [15n])					
Males -	2-year old -	95 (9n)	**Females** -	2-year old -	90 (5n)
	3 or 4-year old -	4 (0n)		3 or 4-year old -	6 (1n)
	Total -	**99 (9n)**		**Total -**	**96 (6n)**
East Fork (6; [6n])					
Males -	2-year old -	2 (2n)	**Females** -	2-year old -	0
	3 or 4-year old -	0		3 or 4-year old -	4 (4n)
	Total -	**2 (2n)**		**Total -**	**4 (4n)**

n = natural fish

No fish were released at the Slate Creek trap.

Appendix S. Sawtooth Fish Hatchery criteria for aging steelhead.

"A-run" male -	≤ 68 cm - 2-year old
	> 68 cm - 3 or 4-year old
"A-run" female -	≤ 65 cm - 2-year old
	> 65 cm - 3 or 4-year old
"B-run" male -	≤ 73 cm - 2-year old
	> 73 cm - 3 or 4-year old
"B-run" female -	≤ 68 cm - 2-year old
	> 68 cm - 3 or 4-year old

Submitted by:

Brent Snider
Fish Hatchery Manager II

Kurtis Schilling
Assistant Fish Hatchery Manager

Approved by:

_____
Virgil K. Moore, Chief
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_____
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