



**SAWTOOTH FISH HATCHERY
and
EAST FORK SATELLITE**

**2001 Spring Chinook Brood Year Report
2002 Steelhead Brood Year Report**

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2001 SPRING CHINOOK SALMON

ABSTRACT

The Sawtooth Fish Hatchery trap and weir were put into operation on May 24, 2001 and operated through September 14, 2001. A total of 2,103 spring chinook salmon *Oncorhynchus tshawytscha* (1,000 males, 876 females, and 227 jacks) were trapped. Released above the weir were 1,231 fish, (317 unmarked males, and 244 marked males; 255 unmarked and 202 marked females, and 47 unmarked and 166 marked jacks) to spawn naturally. There were 66 pre-spawning mortalities. An additional 42 fish were killed but not used (7 jacks, 34 males and 1 female).

Spawning began on August 9, and continued through September 14, with twelve spawning days. We spawned 382 females, 375 males, and 7 jacks that produced 1,890,845 green eggs (4,950 eggs per female), which yielded 1,732,927 eyed eggs for an eye-up rate of 91.6%. After receiving ELISA based BKD results from Eagle Fish Health Lab, 85 females eggs (361,794) were culled due to having ELISA based BKD of 0.40 or greater. This leaves 1,177,611 reserve eyed eggs, and 193,522 supplementation eyed eggs remaining for production (1,371,133). From these eyed eggs, 1,213,215 fry were ponded which resulted in a smolt release of 1,105,169 smolts.

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 East Fork satellite facility were built by the U.S. Army Corp of Engineers (USACE) and is funded through the U.S. Fish & Wildlife Service (USFWS).

Location

Sawtooth Fish Hatchery is located five miles south of Stanley, Idaho. The facility's 71 acres borders the Salmon River to the west, Highway 75 to the east and U.S. Forest Service ground to the south and north. The Sawtooth Fish Hatchery (SFH) 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 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 eighteen 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 then 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 at the Sawtooth Fish Hatchery site and in the headwaters of the Salmon River in the late 1970's and early 1980's as fry and smolt plants.

At both facilities, returning adult fish are released to spawn naturally. Numbers of fish released depends 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 chinook salmon tapping has been discontinued. 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 Appendix A and Appendix 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 by 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 rest-room 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 about 1,360 square feet 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 consists of two 68-ft x 10-ft x 4.5-ft adult holding ponds (3,060 cubic ft) 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 cubic feet and a capacity of 15,000 swim up fry each, 6 inside rearing tanks with an individual volume of 50 cubic feet and a capacity for 30,000 fry each, and 14 inside rearing vats with an individual volume of 391 cubic feet and a capacity for 100,000 fry each. Outside rearing consists of 12 fry raceways each with 750 cubic ft of rearing space and 28 production raceways each with 2,700 cubic ft 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 flow from an upper raceway to a lower one.

The adult facility has three concrete adult fish holding ponds with 4,500 cubic ft 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, installing fence 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 develop 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 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 well water 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°F (4°C) in the winter to 52°F (11°C) in the summer. The Salmon River provides up to 55 cfs of gravity-flow water and ranges in temperature from 32°F (0°C) in the winter to 68°F (20°C) in the summer.

Water Quality

The most recent water quality analysis from the Sawtooth Fish Hatchery collection box at the river, well #1, and well #2 was completed in 2002. 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

SAWTOOTH FISH HEALTH SECTION

Diseases Encountered and Treatments. Diseases were not encountered in BY' 2001 spring chinook reared at this facility. IHNV and *Renibacterium salmoninarum* were detected in routine sampling of brood chinook. *M. cerebralis* was detected in brood steelhead and BY' 2001 juvenile chinook at preliberation. Two prophylactic applications of erythromycin were given to BY 2001 chinook to reduce the risk of an epizootic of bacterial kidney disease (BKD), while a third treatment was applied to a high BKD segregation group in the spring of 2003.

Organosomatic Index. See attachments.

Acute Losses. Neither acute nor chronic losses were experienced at this facility.

Other Assessments. An epizootic of Infectious Hematopoietic Necrosis caused extensive mortality in raceway of BY' 2000 spring chinook at this facility. In an effort to ascertain the prevalence in the feral and wild fish that inhabit the Salmon River, Sawtooth Fish Hatchery, an extensive sampling effort was implemented. One fish was found to be positive for IHNV (out of 63 sampled) from the carcasses sampled near the hatchery. Also 100% of the female brood stock has been sampled for IHNV. To date, only the brood South Fork of the Salmon River summer chinook have found to positive for IHNV. Subsequently, the transport of South Fork of the Salmon River summer chinook brood fish to Sawtooth Fish Hatchery has been discontinued and these fish will be held and spawned at the South Fork Trap. The eggs will be incubated at McCall Hatchery. The elevated sampling for IHNV should continue for several more years.

FISH PRODUCTION

Spring Chinook Adult Collection

The Sawtooth Fish Hatchery chinook-trapping season began on May 24, 2001, and continued through September 14, 2001. The peak of the run occurred the week of June 18, 2001 (Appendix D). A total of 2,103 spring chinook salmon were trapped including 1,000 males, 876 females, and 227 jacks (Appendices E and E.1). Released above the weir were 1,231 salmon (including 317 unmarked males, 244 unmarked and 255 unmarked and 202 marked females, and 47 unmarked and 166 marked jacks) Appendix F. No fish were scanned for PIT tags in 2001, as per Fisheries Bureau instructions. Sawtooth Hatchery had a male:female ratio of 58.4% male and 41.6% female.

The East Fork trap was not in operation in 2001.

A total of 227 three-year-old, 1,664 four-year-old, and 212 five-year-old fish returned to Sawtooth Fish Hatchery.

Adult Treatments

Sawtooth Fish Hatchery female 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 66 prespawning mortalities (30 males and 36 females).

Spawning Operations

Spawning activities at Sawtooth Fish Hatchery began August 9 and concluded September 14, 2001. The twelve egg-takes during this period yielded 1,890,845 green eggs from 382 females for an average fecundity of 4,950 eggs per female. There were 375 male and 7 jack salmon used for fertilization. Each female's eggs were separated into two groups. Each group of eggs was fertilized by the sperm from one male. Spawning crosses were determined by mark and age class to create either a reserve group or a supplementation group (see Appendix G). The two 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 two females per tray.

Incubation

Each eight-tray Heath stack had flows set at 5 gpm of wellwater. Eggs were put away at two females per tray. This averaged 8,000 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°F to 44°F during the incubation period. The eggs eyed up at 500 Fahrenheit Thermal Units (FTU). 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 BY01 Sawtooth eggs, the hatchery incubated 1,043,054 eyed Pahasimeroi summer chinook eggs.

Sawtooth Fish Hatchery green eggs eyed up at a 91.6% rate, yielding 1,732,927 eyed eggs (Appendix H).

Early Rearing

The Sawtooth Fish Hatchery stock swim-up fry were transferred from the Heath trays to vats. 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 well water varied in temperature from 46°F to 40°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 BioOregon erythromycin medicated feed during June, at a rate of 4.5 grams active per 100 lbs of fish. The fish were transferred outside for final rearing in March, April and May.

Final Rearing

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

All outside fish were fed Rangen soft moist grower feed. A second 28-day prophylactic Bio-Oregon erythromycin medicated feed treatment was fed in August and September of 2001. It was administered at a rate of 4.5 grams active per 100 lbs of fish to prevent the onset of BKD.

A third and final 28-day prophylactic Bio-Oregon erythromycin medicated feed treatment was fed in March and April of 2003. This treatment was only given to high BKD fish in two raceways prior to release.

The finish weight of the BY01 Sawtooth chinook smolts was 54,997 lbs. The fish were fed 72,623 lbs of feed for a conversion of 1.32. A synopsis of feeding regimes can be found in Appendix H.1.

Fish Marking

Fish marking occurred September 23 through September 25, 2002. All supplementation fish (145,918) received Coded Wire Tags (CWT), and 965,922 reserve fish received an ad-clip. In addition, 498 reserve and 491 supplementation fish were Passive Integrated Transponder (PIT) tagged in February 2003. The PIT tags were used to evaluate downriver migration (Appendices J and K).

Fish Distribution

Fish releases for Sawtooth stock BY01 smolts occurred on April 18, 2003. A total of 1,105,169 fish were released into the Salmon River at the Sawtooth Fish Hatchery weir. The

fish were released in the evening through the outside raceway tailrace pipe. Production costs for BY01 smolts can be found in Appendix L.1.

SOUTH FORK SUMMER CHINOOK

During 2001, Sawtooth Fish Hatchery received marked adult summer chinook salmon from the South Fork Salmon River trap. These fish were held and spawned at Sawtooth to provide eyed eggs to the Shoshone Bannock Tribe (SBT) streamside incubator program. Spawning began on August 17 and ended on September 7, over a total of seven spawn days. A total of 72 females were spawned. Eggs were kept from 59 females, which produced 263,754 green eggs. Eggs from 13 females were culled (approximately 56,000), due to high ELISA BKD values. The green eggs that were kept eyed up at a 92.3% rate, yielding 243,406 eyed eggs. The eyed eggs were shipped from September 25, to October 9, on six different days, to the SBT.

PAHSIMEROI CHINOOK

Sawtooth Fish Hatchery reared Pahsimeroi Hatchery's BY01 summer chinook due to a lack of space and pathogen free water at Pahsimeroi. Six lots of eyed eggs and two lots of green eggs were brought to SFH between September 24 and October 16, 2001. A total of 1,352,744 eggs were incubated. All of the ISS fry (309,690) were returned to Pahsimeroi due to limited rearing space and wellwater. After dead egg pick off and culling, the number at ponding was 944,385, for a 90.5% survival from eyed egg to ponding.

The Pahsimeroi Fish Hatchery stock swim-up fry were transferred from the Heath trays to vats. 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. Pahsimeroi fish were moved to outside raceways by truck on February 6 and March 6, 2002. The fish averaged 1.74 inches and 500 fpp at time of moving.

All Pahsimeroi fish received a 28-day prophylactic erythromycin medicated feed treatment beginning on June 3 and ending on June 30, 2002. The second treatment took place August 16 through September 12, 2002.

All of the fish were ad-clipped September 16 through September 20.

From September 23 through September 25, 2002, all Pahsimeroi fish were returned to Pahsimeroi Spawn Station rearing ponds. The resulting inventory number was a total of 912,418 fish (ad-clipped reserve). Total lbs of fish shipped were 20,025 for an average of 45.6 fpp. Total feed fed was 26,458 lbs for an overall conversion of 1.32.

SOCKEYE SALMON

Sawtooth Fish Hatchery received a total of 107,445 eyed eggs from Eagle Fish Hatchery (EFH). All eggs received at SFH in 2001 were spawned at EFH. Eggs arrived in four separate shipments between November 14 and November 29, 2001. The eggs arrived with

approximately 427 CTUs. Ponding began January 25, 2002, and ended March 1, 2002 with about 1049 CTUs. We ponded 75,052 fry into ten semi-square 17 cuft rearing tanks. Initial water flows were set at three gpm.

Eggs were hand picked three times weekly from eyed egg to ponding. A total of 32,393 dead eggs were removed before ponding. Total eyed egg to ponding survival was 69.85%.

All fry were started on #1 BioOregon BioDiet starter. Feed size was increased with accordance to Bio-Oregon's recommendation with the exception that 20% of the feed was one size smaller to assure smaller fish would get adequate amounts of feed. As rearing densities reached 4 pounds/gpm, fish were transferred to 5 two-meter fiberglass tanks with water flows set at 10 gpm each. In May and June 2002, fish were moved to cement vats with water flows at 100 gpm pathogen free well water.

Mortality was recorded daily from ponding to release. In total, 10,070 fish were lost to mortality for a 13.4% loss. Almost all mortalities were from genetic malformations.

Ad-clipping and CWT marking started September 30, 2002 and ended October 1, 2002. Pit tagging by Sockeye Research occurred October 1 and 2, 2002. In total, 65,076 fish were Ad-clipped with 10,000 receiving a CWT tag and 3,000 receiving PIT tags. At the time of release, fish averaged 30.02 fpp and had a condition factor of $3,750 \times 10^{-7}$.

All BY01 sockeye were destined as fall presmolt release groups. Fall releases of sockeye occurred on October 7 and 8, 2002. Redfish Lake received 45,001 ad clipped fish at 30 fpp (1,000 PIT tags), and Pettit received 19,981 fish at 31 fpp (9,994 were ad-clipped only, with 2,000 PITs and 9,987 were ad-CWT with no PIT tags). There was one PIT mortality recorded in the Redfish Lake group (3D9.1BF166D24A).

2002 STEELHEAD TROUT

ABSTRACT

The Sawtooth Fish Hatchery trap and weir were put into operation on March 20, 2002 and closed May 2, 2002. A total of 7,104 adult steelhead *Oncorhynchus mykiss* (3,499 males and 3,605 females) were trapped at the Sawtooth Fish Hatchery weir. Surplus hatchery adults were given to charitable organizations, the Shoshone-Bannock and Duck Valley Tribes, released downstream at Torry's Hole and the Yankee Fork, and released upstream of the weir as part of Idaho Supplementation Studies (ISS). A total of 95 natural fish (56 males and 39 females) were released above the weir. There were no pre-spawning mortalities at Sawtooth Fish Hatchery.

Spawning began at Sawtooth Fish Hatchery on April 4, 2002 and continued through May 2, 2002 with 9 spawning days. A total of 542 females were spawned with 542 males, yielding 2,858,525 green eggs for an average fecundity of 5,274 eggs per female. These green eggs yielded 2,526,935 eyed eggs for an eye-up percentage of 88.4%.

The East Fork Salmon River (EFSR) trap and velocity barrier were put into operation March 26, 2002, and ran through May 21, 2002. A total of 38 adult "B-run" steelhead were trapped. This included 19 males and 19 females. Fish released above the weir to spawn naturally included 8 natural males, and 9 natural females. There was no prespawning mortality.

East Fork spawning operations began on April 9, 2002, and continued through May 13, 2002. A total of 10 unmarked EFSR "B-run" females were spawned with 20 males over 5 spawn dates, yielding 48,205 green eggs for an average fecundity of 4,821 eggs per female. These green eggs yielded 32,382 eyed eggs for a 67.2% eye-up rate. These eggs were shipped to Magic Valley Hatchery for rearing.

The Squaw Creek Trap and weir was installed on March 27, 2002, and ran through May 6, 2002. A total of 33 adult "B-run" adults (15 males and 18 females) and 133 "A-run" adults (92 males and 41 females) were trapped. All hatchery adults were transferred to the East Fork trapping facility for pre-spawn holding. All unmarked fish were released upstream of the Squaw Creek weir for volitional spawning.

Squaw Creek Trap spawning operations occurred from April 12 through April 23, 2002 over 4 spawn dates. A total of 98,302 green eggs were taken from 17 marked "B-run" females for a mean fecundity of 5,782 eggs per female. These green eggs yielded 81,206 eyed eggs or an 82.6% eye-up rate. These eggs were shipped to Magic Valley Hatchery for rearing.

There were 329,101 green eggs from Pahsimeroi Hatchery incubated at Sawtooth in 2002. These eggs eyed up at a 72.8% rate, yielding 239,499 eyed eggs.

The Sawtooth and East Fork stock eyed eggs were released as smolts by their respective rearing hatcheries during the spring of 2003. Hagerman National Fish Hatchery (HNFH) stocked direct release smolts (4.5 fpp) at the Sawtooth Fish Hatchery weir. East Fork stock smolts numbering at 4.8 fpp were mixed with Dworshak smolts and released below Squaw Creek Pond.

FISH PRODUCTION

Steelhead Adult Collection

Sawtooth Trap

The Sawtooth Fish Hatchery weir and trap was put into operation on March 20, 2002 and closed May 2, 2002. The peak of the Sawtooth Fish Hatchery steelhead *Oncorhynchus mykiss run* occurred during the third week of April (Appendix M).

A record total of 7,104 adult "A-run" steelhead were trapped in 2002, of which 7,009 (3,443 males and 3,566 females) were hatchery-produced fish and 95 (56 males and 39 females) were unmarked. All fish were scanned for CWTs. Information regarding the CWT fish was not available. Length frequency and age-class gender data for trapped steelhead at the Sawtooth Trap is shown in Appendix N.

Distribution of the 7,009 hatchery-produced adults ranged from spawn-related activities to charitable giveaways and included: 1) 3,180 surplus adults donated to charitable organizations (Idaho Food Bank, Operation Help, Port of Hope, Eastern Idaho Special Services, and Helping Hand Christian Outreach), 2) 1,929 adults ponded for spawn-related activities (eventually given to the public on spawn days), 3) 700 surplus adults given to the Shoshone-Bannock and Duck Valley Tribes, 4) 600 adults (opercle punched) transported downstream and released at Torry's Hole on the Main Salmon River to recycle through the fishery, 5) 400 adults (200 pair m/f) outplanted to the Yankee Fork of the Salmon River for Shoshone-Bannock Tribe natural production, and 6) 200 adults (100 pair m/f) released above the Hatchery weir for Idaho Supplementation Studies (15 pair m/f to Beaver Creek, 15 pair m/f to Frenchman Creek, 70 pair m/f to Vienna pullout).

All returning unmarked adults (95) were released upstream of the Hatchery intake for volitional spawning.

East Fork Salmon River Trap

The velocity barrier on the East Fork of the Salmon River (EFSR) was put into operation on March 26, 2002, with trapping operations initiated on March 28 and continuing through May 21. The peak of the East Fork run occurred during the first week of April (Appendix O). A total of 38 adult "B-run" steelhead were trapped, of which 11 (all males) were hatchery-produced fish and 27 (8 males and 19 females) were unmarked. Length frequency and age-class gender data for fish trapped at the (EFSR) is shown in Appendix P.

Of the 38 adults trapped, 11 marked males were retained for hatchery "production" spawn crosses (crossed with returning Squaw Creek hatchery-produced females), 10 unmarked females contributed to "natural" spawn crosses, and 17 unmarked adults (8 males and 9 females) were released above the weir for volitional spawning. Prior to liberation, the eight natural males released above the weir were partially stripped of milt to fertilize eggs from the 10 females used for natural production.

Squaw Creek Trap

A weir was installed on Squaw Creek and a trap installed at the outlet of the Squaw Creek acclimation pond outflow channel on March 27, 2002. The peak of the Squaw Creek run occurred during the second week of April (Appendix Q). Adult steelhead trapping continued through May 6, at which time weir pickets were pulled and the trap was taken out of operation. A total of 33 adult "B-run" steelhead were trapped (15 males and 18 females), of which 32 were hatchery-produced (15 males and 17 females) and one was unmarked. Length frequency and age-class gender data for fish trapped at Squaw Creek Trap is shown in Appendix R. All hatchery adults were transferred to the East Fork trapping facility for prespawn holding. The single unmarked adult, a female, was released upstream of the Squaw Creek weir for volitional spawning.

In addition to "B-run" adults, 133 "A-run" adults were trapped (92 males and 41 females) throughout the run, of which 126 (87 males and 39 females) were of hatchery-produced origin and seven (five males and 2 females) were unmarked. All hatchery-produced "A-run" fish received an opercle-punch and were released in the Salmon River at Thompson Creek. All unmarked "A-run" adults were released upstream of the Squaw Creek weir for volitional spawning.

Sawtooth Fish Hatchery has a male:female ratio of 49% males and 51% females. The East Fork had a male:female ratio of 50% males and 50% females, and the Squaw Creek trap had a male:female ratio of 69% males and 31% females.

Specific information obtained from CWT fish at Sawtooth Fish Hatchery, the East Fork, and Squaw Creek Pond is not available. However, released steelhead by adult year class and sex are shown in Appendix Q, with length criteria established by IDFG personnel using historical return data (Appendix R).

Spawning Operations

Sawtooth Trap

Sawtooth Fish Hatchery spawning operations occurred from April 4 through May 2 in 2002. A total of 542 females were crossed with 542 males over 9 spawning days to produce 2,858,525 green eggs and a mean fecundity of 5,274 eggs per female. Total green egg take yielded 2,526,935 eyed eggs for a percent survival to the eyed-stage of development average of 88.4% (Table 1).

Eyed egg transfers to Magic Valley Steelhead Hatchery and Hagerman National Fish Hatchery totaled 399,000 and 937,000 eyed eggs, respectively (Table 5). All surplus eggs were made available to biologists from the Shoshone-Bannock Tribe and resulted in an eyed egg transfer total of 472,000 (Table 5). All unwanted or remaining eggs were culled as development progressed beyond the window of transport safety, as determined by temperature-unit accumulation.

Table 1. 2002 Sawtooth Steelhead Spawn Data.

Lot #	Spawn Date	# Females	Total Eyed	Total Dead	Total Eggs	% Eye	Mean Fecundity
SAW 1	04/04	18	95,115	14,671	109,786	87.0	6,099
SAW 2	04/08	96	462,755	61,020	523,775	88.0	5,455
SAW 3	04/11	100	476,500	59,624	536,124	89.0	5,361
SAW 4	04/15	100	449,300	72,611	521,911	86.0	5,219
SAW 5	04/18	100	447,000	57,388	504,388	89.0	5,043
SAW 6	04/22	50	238,665	22,341	261,006	91.0	5,220
SAW 7	04/25	40	186,000	24,138	210,138	86.0	5,253
SAW 8	04/29	20	91,000	14,974	105,974	86.0	5,298
SAW 9	05/02	18	80,600	4,823	85,423	94.0	4,745
TOTAL:		542	2,526,935	331,590	2,858,525	88.4	5,274

East Fork Salmon River Trap

A total of 10 unmarked EFSR “B-run” females were retained for natural-production spawn crosses in 2002, with spawning operations occurring from April 9 through May 13 (5 spawn dates). Spawning activities from the 10 naturally produced females yielded a total of 48,205 green eggs for a mean fecundity of 4,821 eggs per female. A total of 32,382 eyed eggs were obtained from natural-production crosses, for a percent survival to the eyed-stage of development average of 67.2% (Table 2). A shortage of naturally produced returning males resulted in the need to first strip milt, and then release, each of the 8 returning unmarked males. The 11 returning marked males were crossed with marked females returning to Squaw Creek, with resulting eggs destined for hatchery-production rearing (see Squaw Creek spawn data below).

All eyed eggs (32,382) produced from EFSR natural crosses were transferred to the Magic Valley Steelhead Hatchery for final incubation and rearing (Table 5).

Squaw Creek Trap

A total of 17 marked “B-run” females were retained for hatchery-production spawn crosses in 2002, with spawning operations occurring from April 12 through April 23 (4 spawn dates). All spawning was conducted at the East Fork Salmon River trap/spawn facility, with spawn activities from the 17 females yielding a total of 98,302 green eggs for a mean fecundity of 5,782 eggs per female. A total of 81,206 eyed eggs were obtained from hatchery-production crosses, for a percent survival to the eyed-stage of development average of 82.6% (Table 3). Males used in hatchery-production crosses included the 15 returning marked males from the Squaw Creek trap, as well as 11 marked males from the East Fork trap.

All eyed eggs (81,206) produced from East Fork/Squaw Creek “B-run” hatchery crosses were transferred to the Magic Valley Steelhead Hatchery for final incubation and rearing (Table 5).

After fertilization, the eggs were rinsed of blood and sperm with well water. 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.

Pahsimeroi Stock Egg Incubation

As in past years, Sawtooth Fish Hatchery incubates a portion of the Pahsimeroi Fish Hatchery egg take. Incubating eggs at Sawtooth takes advantage of cooler well-water temperatures to slow development of the eggs. All egg shipments are transferred as “green” eggs, with eggs transported in perforated egg-tubes and insulated coolers.

In 2002, a total of 329,101 green eggs were transferred to Sawtooth from a total of 64 females (5,142 mean fecundity). Total egg transfers yielded 239,499 eyed eggs, for a percent survival to the eyed-stage of development average of 72.8% (Table 4). All Pahsimeroi eggs incubated at Sawtooth were destined for Hagerman National Fish Hatchery (HNFH) to satisfy

Table 2. 2002 East Fork Salmon River Steelhead Spawn Data.

Lot #	Spawn Date	# Females	Total Eyed	Total Dead	Total Eggs	% Eye	Mean Fecundity
EF1	04/09	1	2,252	1,176	3,428	65.7	3,428
EF3	04/16	2	6,190	3,167	9,357	66.2	4,679
EF6	05/01	3	6,907	5,027	11,934	57.9	3,978
EF7	05/03	2	8,279	4,644	12,923	64.1	6,462
EF8	05/13	2	8,754	1,809	10,563	82.9	5,282
TOTAL:		10	32,382	15,823	48,205	67.2	4,821

Table 3. 2002 Squaw Creek Steelhead Spawn Data.

Lot #	Spawn Date	# Females	Total Eyed	Total Dead	Total Eggs	% Eye	Mean Fecundity
EF2	04/12	5	29,382	3,254	32,636	90.0	6,527
EF3	04/16	3	13,744	2,380	16,124	85.2	5,375
EF4	04/19	3	11,901	4,118	16,019	74.3	5,340
EF5	04/23	6	26,179	7,344	33,523	78.1	5,587
TOTAL:		17	81,206	17,096	98,302	82.6	5,782

Table 4. 2002 Pahsimeroi Steelhead (@ Sawtooth) Spawn Data.

Lot #	Spawn Date	# Females	Total Eyed	Total Dead	Total Eggs	% Eye	Mean Fecundity
PAH 2	03/28	24	89,135	35,043	124,178	72.0	5,174
PAH 4	04/02	40	150,364	54,559	204,923	73.0	5,123
TOTAL:		64	239,499	89,602	329,101	72.8	5,142

Table 5. Steelhead Eyed Egg Or Fry Shipments From Sawtooth Fish Hatchery In 2002.

HATCHERY or OFF-SITE LOCATION	NUMBER SHIPPED	STOCK
Shoshone-Bannock Streamside Incubators	472,000	Sawtooth
Hagerman National Fish Hatchery	212,000 937,000	Pahsimeroi Sawtooth
Magic Valley Fish Hatchery	399,000 32,382 81,206	Sawtooth East Fork East Fork (Squaw Creek)
Total Eggs Shipped	212,000	Pahsimeroi*
Total Eggs Shipped	1,808,000	Sawtooth**
Total Eggs Shipped	113,588	East Fork
Total Eggs Shipped	2,133,588	All Stocks

* A total of 27,499 surplus Pahsimeroi stock eyed eggs were not shipped.

** A total of 718,935 surplus Sawtooth stock eyed eggs were not shipped.

production requests. A total of 212,000 eyed eggs were transferred to HNFH, with all remaining eggs (27,499) culled after production requests had been met (Table 5).

Table 6 shows the criteria used for aging steelhead at Sawtooth Fish Hatchery.

Adult Treatments

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

Prespawning Mortality

There were two female pre-spawning mortalities at Sawtooth in 2002.

Incubation

After hardening in the Argentine solution, the green eggs were put away at two females eggs 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. 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 three-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 JM4 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 well water. Then the cooler was strapped shut and shipped.

Release Acclimation of BY 02

Due to a large chinook salmon egg-take in 2002, no rearing space was available for acclimation of steelhead smolts. Hagerman NFH direct released BY02 steelhead smolts directly below the Sawtooth FH weir into the Salmon River. The total BY02 smolt release was 748,027 fish at 4.2 fpp. East Fork stock smolts numbering 566,522 at 4.6 fpp were mixed with Dworshak smolts released into Squaw Creek Pond and direct release into Squaw Creek.

Table 6. Sawtooth Fish Hatchery Criteria for Aging Steelhead, from Kent Ball, Idaho Department of Fish and Game.

"A-Run" male-	≤68 cm - 2-year old	1 ocean
	>68 cm - 3 or 4 year old	2
"A-Run" female-	≤65 cm - 2-year old	1
	>65 cm - 3 or 4 year old	2 ocean

Fish Marking

Fish marking was completed in the rearing hatcheries and is available from individual rearing facility reports.

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

Due to limited well water, only the number of green eggs required to meet the eyed egg goal should be collected.

APPENDICES

Appendix A. Sawtooth Fish Hatchery Chinook Smolt Releases and Returns (marked and unmarked).

Brood Year	Release Year	Number Released	Adult Returns ^a				Total %
			3-year	4-year	5-year	Returns	
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	1,185,060	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	212	791	1.83
1997	1999	223,240	376	1,664	730	2,770	1.24
1998	2000	123,425	227	958	(2003)		
1999	2001	57,134	98	(2003)	(2004)		
2000	2002	385,761	(2003)	(2004)	(2005)		
2001	2003	1,105,169	(2004)	(2005)	(2006)		

East Fork Chinook Smolt Releases and Returns (marked and unmarked).

Brood Year	Release Year	Number Released	Adult Returns ^a				Total %
			3-year	4-year	5-year	Returns	
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: ≤ 64 cm, 4-yr. old: 64 to 82 cm 5-yr. old: >82 cm. ND means no data, trap not operated.

Appendix A.1 Sawtooth Fish Hatchery Chinook Smolt Releases and Hatchery Returns (Marked Fish).

Beginning with BY91, all hatchery reserve chinook smolts released were marked.
(See individual brood year reports for specific mark types)

Hatchery Adult Returns

Brood Year	Release Year	Number Released	Adult Returns ^a				Total %
			3-year	4-year	5-year	Returns	
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	32	227	0.53
1997	1999	223,240	279	1,219	327	1,825	0.82
1998	2000	123,425	176	531	(2003)	-	inc
1999	2001	57,134	65	(2003)	(2004)	-	inc
2000	2002	385,761	(2003)	(2004)	(2005)	-	inc
2001	2003	1,105,169	(2004)	(2005)	(2006)	-	inc

East Fork Chinook Smolt Releases and Hatchery Returns (Marked Fish).

Hatchery Adult Returns

Brood Year	Release Year	Number Released	Adult Returns ^a				Total %
			3-year	4-year	5-year	Returns	
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.

	2002	1999	1996	1993	1985
<u>Nutrients (mg/L)</u>					
T. Ammonia as N	<0.01	0.02	0.027	0.043	0.045
T. NO ₂ + NO ₃ as N	NR	NR	0.006	0.073	0.088
T. Kjeldahl Nitrogen as N	<0.10	<0.10	0.20	<.05	0.26
T. Phosphorus as P	0.010	0.005	<.05	<.05	0.02
Ortho Phosphate as P	0.009	<0.005	NR	0.019	<.003
<u>Minerals (mg/L)</u>					
Sp. Conductance (umhos/cm)	168.0	159.0	167.0	157.0	135.0
Hardness as CaCO ₃	78.0	75.7	80.0	68.0	62.0
T. Alkalinity as CaCO ₃	77.5	75.2	79	74	63
Bicarbonate Alk. as CaCO ₃	77.5	75.2	79	74	63
Calcium	27.9	26.8	27.4	24	20.8
Magnesium	1.93	2.1	2.9	1.9	1.8
Sodium	4.69	4.26	5.5	7.0	3.8
Potassium	0.53	0.48	0.7	0.7	<1
Fluoride	0.83	0.60	0.29	0.85	0.58
Sulphate as SO ₄	5.23	5.50	12	5	<6
<u>Total Metals (ug/L)</u>					
Arsenic, Total	<0.003	<0.005	<10	<10	<10
Boron, Total	0.01	NR	<10	<80	1
Cadmium, Total	<0.0005	<0.0005	<1	<1	<1
Chromium, +6	NR	NR	NR	<10	<50
Chromium, Total	<0.002	<0.002	<2	<10	<50
Copper, Total	<0.01	<0.01	<10	<10	<10
Iron, Total	0.03	0.02	20	20	120
Lead, Total	0.004	<0.002	<5	<5	<50
Manganese, Total	<0.01	<0.01	1	<10	10
Mercury, Total	<0.0002	<0.0002	<.5	<.5	<.5
Nickel, Total	<0.003	<0.003	<5	<10	<50
Silver, Total	<0.002	<0.002	<1	<1	<1
Zinc, Total	0.002	<0.001	3	<2	<1
<u>Miscellaneous</u>					
Turbidity (NTU)	0.36	0.98	0.45	<1	1.8
pH (SU)	7.94	7.97	8.04	8.0	8.1
Total Cyanide (mg/L)	<0.005	<0.005	<.005	<.005	<.005
Total Residue	NR	NR	NR	NR	97

Appendix B. Continued

	2002	1999
<u>Nutrients (mg/L)</u>		
Ammonia as N	<0.01	0.02
T. Phosphorus as P	0.012	7.60
<u>Minerals (mg/L)</u>		
Hardness	81.0	81.3
Alkalinity	79.0	85.7
Bicarbonate Alk. as CaCO ₃	79.0	85.7
<u>Total Metals (ug/L)</u>		
Arsenic	0.005	<0.005
Cadmium	<0.0005	<0.0005
Chloride	0.72	0.56
Cobalt	<0.01	<0.01
Copper	<0.01	<0.01
Lead	<0.002	<0.002
Mercury	<0.0002	<0.0002
Selenium	0.013	<0.005
<u>Miscellaneous</u>		
T. Cyanide (mg/L)	<0.005	<0.005

Appendix C. Sawtooth Fish Hatchery Results of Disease Sampling.

BY01 Juvenile Chinook

Case #	Stock	Date	Data
02-193	Saw	05/02/02	No pathogens detected; VIRO 0/60, IHN 0/60, IPN 0/60
02-222	Saw	05/30/02	No pathogens detected; VIRO 0/10, FAT 0/10, BACTE 0/10
02-223	Pah	05/30/02	No pathogens detected; VIRO 0/10, FAT 0/10, BATCE 1/10
02-230	Pah	06/17/02	<i>Flavobacterium psychrophylum</i> 4/10 <i>Pseudomonas flurensdens</i> 6/10
02-231	Saw	06/17/02	CWD, VIRO 0/10, FAT 0/10, <i>Acinetobacter spp.</i> 8/10 <i>Flavobacterium psychrophylum</i> 1/10
02-249	Saw	07/01/02	No pathogens detected; VIRO 0/10, FAT 0/10, BACTE 0/10
02-281	Saw	07/23/02	CWD, COL, MASS; VIRO 0/10, FAT 0/12, <i>Aeromonas hydrophila</i> 8/10, <i>Flavobacterium psychrophylum</i> 3/10, <i>Flavobacterium columnare</i> 2/10
02-439	Saw	11/13/03	No pathogens detected; VIRO 0/10, NAVHS 1/10, FAT 0/10, BACTE 0/10
03-032	Saw	01/22/03	No pathogens detected; VIRO 0/10, FAT 0/9, BACTE 0/10
03-059	Saw	02/21/03	MAS: VIRO 0/20, FAT 0/20, PSEUDOMONAS FLUORESCENS 1/20
03-087	Saw	03/18/03	WHD; VIRO 0/20, FAT 0/20, ELISA 0/20, PTD-WHD 1/4(5)

Return Year 2001 Chinook Broodstock

Case #	Stock	Date	Data
01-307	Saw	08/14/01	BKD; VIRO 0/8, ELISA 8/8 (LOW 3, HIGH 5)
01-308	Saw	08/13/01	BKD; VIRO 0/16, NAVHS 0/3, ELISA 16/16 (LOW 14, HIGH 2)
01-329	Saw	08/16/01	No pathogens detected; VIRO 0/24
01-330	Saw	08/20/01	No pathogens detected; VIRO 0/12
01-348	Saw	08/16/01	RS; ELISA 17/24 (LOW 17)
01-362	Saw	08/20/01	BKD; ELISA 24/38
01-363	Saw	08/23/01	BKD; ELISA 37/53 (LOW 35, HIGH 2)
01-364	Saw	08/27/01	BKD; WHD; ELISA 56/87 (LOW 41, HIGH 15) <i>Myxobolus cerebralis</i> 1/4(X5)
01-395	Saw	08/30/01	BKD; ELISA 80/87 (LOW 52, HIGH 28)
01-396	Saw	09/04/01	BKD; ELISA 46/46 (LOW 27, HIGH 19)
01-404	Saw	09/06/01	BKD; ELISA 14/16 (LOW 11, HIGH 3)
01-415	Saw	09/10/01	BKD; ELISA 5/5 (LOW 3, HIGH 2)
01-420	Saw	09/14/01	RS; ELISA 1/1
01-419	Saw	09/12/01	No pathogens detected; ELISA 0/1

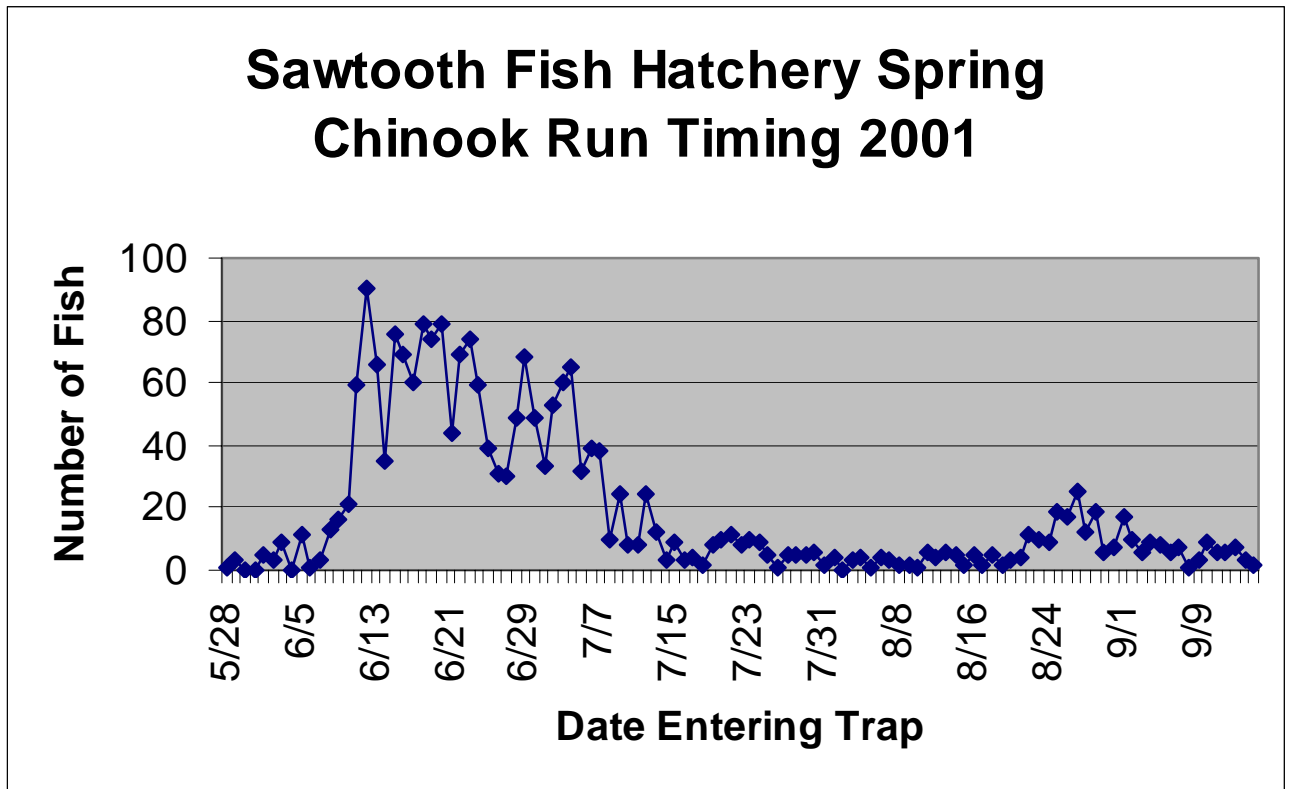
Return year 2002 Steelhead Broodstock

Case #	Stock	Date	Data
02-127	Saw-A	04/04/02	No pathogens detected; VIRO 0/18, NAVHS 0/4
02-136	Saw-A	04/08/02	No pathogens detected; VIRO 0/40, NAVHS 0/4
02-146	Saw-A	04/11/02	No pathogens detected; VIRO 0/50, NAVHS 0/20
02-148	Saw-A	04/04/02	WHD; PTD-WHD 1/20
02-149	Saw-A	04/15/02	No pathogens detected; VIRO 0/50
02-163	Saw-A	04/18/02	No pathogens detected; VIRO 0/50, NAVHS 0/18, FAT 0/60

Appendix C. Continued

Return year 2002 Steelhead Broodstock			
Case #	Stock	Date	Data
02-178	Saw-A	04/22/02	No pathogens detected; VIRO 0/30, NAVHS 0/6
02-184	Saw-A	04/25/02	No pathogens detected; VIRO 0/40, NAVHS 0/4
02-192	Saw-A	05/02/02	No pathogens detected; VIRO 0/18
02-194	Saw-A	05/02/02	No pathogens detected; VIRO 0/20
02-135	EF-B	04/09/02	No pathogens detected; VIRO 0/1
02-145	EF-B	04/12/02	No pathogens detected; VIRO 0/5
02-154	EF-B	04/16/02	No pathogens detected; VIRO 0/5, NAVHS 0/1
02-164	EF-B	04/19/02	No pathogens detected; VIRO 0/3
02-179	EF-B	04/23/02	No pathogens detected; VIRO 0/6, NAVHS 0/2
02-195	EF-B	05/02/02	No pathogens detected; VIRO 0/3
02-200	EF-B	05/03/02	WHD; VIRO 0/2, PTD-WHD 3/7(X3)
02-207	EF-B	05/13/02	No pathogens detected; VIRO 0/2, FAT 0/27

Appendix D. Sawtooth Fish Hatchery Spring Chinook Run Timing – 2001.



Appendix E. Sawtooth Fish Hatchery Age Class Totals from All Trapped Chinook, Return Year 2001.

Sawtooth	Length (Fk)	Year class	Number
Males	≤ 64 cm	3-year old	227
	64-82 cm	4-year old	924
	> 82 cm	5-year old	76
Subtotal			1,227
Females	≤ 64 cm	3-year old	0
	64-82 cm	4-year old	740
	> 82 cm	5-year old	136
Subtotal			876
Total			2,103

Appendix E.1. Sawtooth Fish Hatchery Spring Chinook Salmon Length Frequency Distribution for 2001.

MALES

TOTAL TRAPPED		HATCHERY PONDED		HATCHERY RELEASED		UNMARKED PONDED		UNMARKED RELEASED	
FL(CM)	NUMBER	FL(CM)	NUMBER	FL(CM)	NUMBER	FL(CM)	NUMBER	FL(CM)	NUMBER
39	0	39	0	39	0	39	0	39	0
40	1	40	0	40	1	40	0	40	0
41	1	41	0	41	1	41	0	41	0
42	0	42	0	42	0	42	0	42	0
43	5	43	0	43	4	43	0	43	1
44	9	44	0	44	3	44	1	44	5
45	10	45	0	45	5	45	1	45	4
46	9	46	1	46	6	46	0	46	2
47	8	47	0	47	7	47	0	47	1
48	16	48	0	48	11	48	0	48	5
49	15	49	0	49	13	49	0	49	2
50	18	50	1	50	14	50	1	50	2
51	5	51	1	51	3	51	0	51	1
52	10	52	0	52	10	52	0	52	0
53	9	53	0	53	8	53	0	53	1
54	11	54	0	54	9	54	0	54	2
55	3	55	0	55	3	55	0	55	0
56	15	56	0	56	11	56	0	56	4
57	3	57	0	57	3	57	0	57	0
58	11	58	1	58	10	58	0	58	0
59	10	59	1	59	7	59	0	59	2
60	7	60	0	60	4	60	0	60	3
61	7	61	0	61	5	61	0	61	2
62	12	62	2	62	6	62	0	62	4
63	10	63	1	63	6	63	0	63	3
64	22	64	2	64	16	64	1	64	3
65	14	65	7	65	5	65	0	65	2
66	22	66	9	66	8	66	0	66	5
67	41	67	21	67	10	67	0	67	10
68	44	68	18	68	13	68	1	68	12
69	37	69	21	69	8	69	1	69	7
70	54	70	33	70	9	70	1	70	11
71	49	71	24	71	12	71	1	71	12
72	59	72	32	72	14	72	0	72	13
73	73	73	35	73	21	73	1	73	16
74	71	74	35	74	13	74	0	74	23
75	66	75	29	75	10	75	4	75	23
76	57	76	29	76	12	76	0	76	16

Appendix E.1. Continued

MALES

TOTAL TRAPPED		HATCHERY PONDED		HATCHERY RELEASED		UNMARKED PONDED		UNMARKED RELEASED	
FL(CM)	NUMBER	FL(CM)	NUMBER	FL(CM)	NUMBER	FL(CM)	NUMBER	FL(CM)	NUMBER
77	75	77	34	77	14	77	2	77	25
78	49	78	10	78	18	78	2	78	19
79	45	79	19	79	10	79	1	79	15
80	50	80	18	80	11	80	1	80	20
81	40	81	14	81	6	81	2	81	18
82	78	82	24	82	43	82	2	82	9
83	9	83	0	83	2	83	0	83	7
84	13	84	0	84	1	84	2	84	10
85	5	85	0	85	2	85	1	85	2
86	7	86	1	86	0	86	1	86	5
87	4	87	0	87	1	87	0	87	3
88	3	88	0	88	0	88	0	88	3
89	5	89	0	89	0	89	1	89	4
90	5	90	0	90	0	90	0	90	5
91	4	91	0	91	0	91	0	91	4
92	5	92	0	92	0	92	0	92	5
93	5	93	0	93	1	93	0	93	4
94	1	94	0	94	0	94	0	94	1
95	4	95	0	95	0	95	1	95	3
96	1	96	0	96	0	96	0	96	1
97	1	97	0	97	0	97	0	97	1
98	0	98	0	98	0	98	0	98	0
99	0	99	0	99	0	99	0	99	0
100	0	100	0	100	0	100	0	100	0
101	0	101	0	101	0	101	0	101	0
102	0	102	0	102	0	102	0	102	0
103	1	103	0	103	0	103	0	103	1
104	0	104	0	104	0	104	0	104	0
105	0	105	0	105	0	105	0	105	0
106	1	106	0	106	0	106	1	106	0
107	1	107	0	107	0	107	0	107	1
108	0	108	0	108	0	108	0	108	0
109	1	109	0	109	0	109	0	109	1
TOTALS:	1227		423		410		30		364

Appendix E.1. Continued

AGE 3 HATCHERY MALES RELEASED:	166
AGE 4 HATCHERY MALES RELEASED:	237
AGE 5 HATCHERY MALES RELEASED:	7
TOTAL HATCHERY MALES RELEASED:	410
AGE 3 HATCHERY MALES PONDED:	10
AGE 4 HATCHERY MALES PONDED:	412
AGE 5 HATCHERY MALES PONDED:	1
TOTAL HATCHERY MALES PONDED:	423

AGE 3 NATURAL MALES RELEASED:	47
AGE 4 NATURAL MALES RELEASED:	256
AGE 5 NATURAL MALES RELEASED:	61
TOTAL NATURAL MALES RELEASED:	364
AGE 3 NATURAL MALES PONDED:	4
AGE 4 NATURAL MALES PONDED:	19
AGE 5 NATURAL MALES PONDED:	7
TOTAL NATURAL MALES PONDED:	30

FEMALES

TOTAL TRAPPED		HATCHERY PONDED		HATCHERY RELEASED		UNMARKED PONDED		UNMARKED RELEASED	
FL(CM)	NUMBER	FL(CM)	NUMBER	FL(CM)	NUMBER	FL(CM)	NUMBER	FL(CM)	NUMBER
55	0	55	0	55	0	55	0	55	0
56	0	56	0	56	0	56	0	56	0
57	0	57	0	57	0	57	0	57	0
58	0	58	0	58	0	58	0	58	0
59	0	59	0	59	0	59	0	59	0
60	0	60	0	60	0	60	0	60	0
61	0	61	0	61	0	61	0	61	0
62	0	62	0	62	0	62	0	62	0
63	0	63	0	63	0	63	0	63	0
64	1	64	0	64	1	64	0	64	0
65	2	65	2	65	0	65	0	65	0
66	4	66	1	66	1	66	0	66	2
67	6	67	3	67	0	67	0	67	3
68	9	68	4	68	3	68	0	68	2
69	7	69	4	69	1	69	0	69	2
70	12	70	7	70	3	70	1	70	1
71	13	71	6	71	3	71	2	71	2
72	26	72	12	72	9	72	0	72	5
73	37	73	19	73	6	73	2	73	10
74	33	74	19	74	8	74	0	74	6
75	45	75	18	75	17	75	0	75	10
76	75	76	41	76	18	76	3	76	13
77	66	77	42	77	14	77	1	77	9
78	87	78	48	78	23	78	1	78	15
79	82	79	41	79	20	79	4	79	17
80	84	80	48	80	10	80	2	80	24
81	65	81	43	81	5	81	0	81	17
82	86	82	26	82	44	82	1	82	15
83	22	83	1	83	4	83	0	83	17

Appendix E.1. Continued

84	13	84	0	84	1	84	0	84	12
85	12	85	0	85	0	85	0	85	12
86	7	86	0	86	2	86	2	86	3
87	3	87	0	87	0	87	1	87	2
88	5	88	1	88	0	88	0	88	4
89	3	89	0	89	1	89	0	89	2
90	4	90	0	90	0	90	2	90	2
91	5	91	2	91	0	91	0	91	3
92	9	92	2	92	1	92	1	92	5
93	10	93	1	93	1	93	2	93	6
94	11	94	0	94	1	94	0	94	10
95	9	95	0	95	4	95	0	95	5
96	4	96	0	96	0	96	0	96	4
97	5	97	1	97	0	97	0	97	4
98	5	98	0	98	1	98	0	98	4
99	6	99	0	99	0	99	1	99	5
100	3	100	0	100	0	100	1	100	2
101	0	101	0	101	0	101	0	101	0
102	0	102	0	102	0	102	0	102	0
103	0	103	0	103	0	103	0	103	0
104	0	104	0	104	0	104	0	104	0
105	0	105	0	105	0	105	0	105	0
106	0	106	0	106	0	106	0	106	0
107	0	107	0	107	0	107	0	107	0
108	0	108	0	108	0	108	0	108	0
109	0	109	0	109	0	109	0	109	0
110	0	110	0	110	0	110	0	110	0
TOTALS:	876		392		202		27		255

AGE 4 HATCHERY FEMALES RELEASED:	186
AGE 5 HATCHERY FEMALES RELEASED:	16
TOTAL HATCHERY FEMALES RELEASED:	202
AGE 4 HATCHERY FEMALES PONDED:	384
AGE 5 HATCHERY FEMALES PONDED:	8
TOTAL HATCHERY FEMALES PONDED:	392

AGE 4 NATURAL FEMALES RELEASED:	153
AGE 5 NATURAL FEMALES RELEASED:	102
TOTAL NATURAL FEMALES RELEASED:	255
AGE 4 NATURAL FEMALES PONDED:	17
AGE 5 NATURAL FEMALES PONDED:	10
TOTAL NATURAL FEMALES PONDED:	27

Appendix F. Sawtooth Fish Hatchery Age Class Breakdown by Released Chinook,
Return Year 2001.

Sawtooth	Length (Fk)	Age Class	Number
Males	≤ 64 cm	3-year old	213
	64-82 cm	4-year old	493
	> 82 cm	5-year old	68
Total Males			774
Females	≤ 82 cm	4-year old	339
	> 82 cm	5-year old	118
Total Females			457
Total released			1231

Appendix G. Sawtooth Fish Hatchery Spring Chinook Spawning Matrix, 2001 Return Year.

Group	Markings	Sex	Number in Group
Reserve	ad only or ad/cwt	Male	340
		Female	340
Supplementation	cwt only or unmarked	Male	42
		Female	42

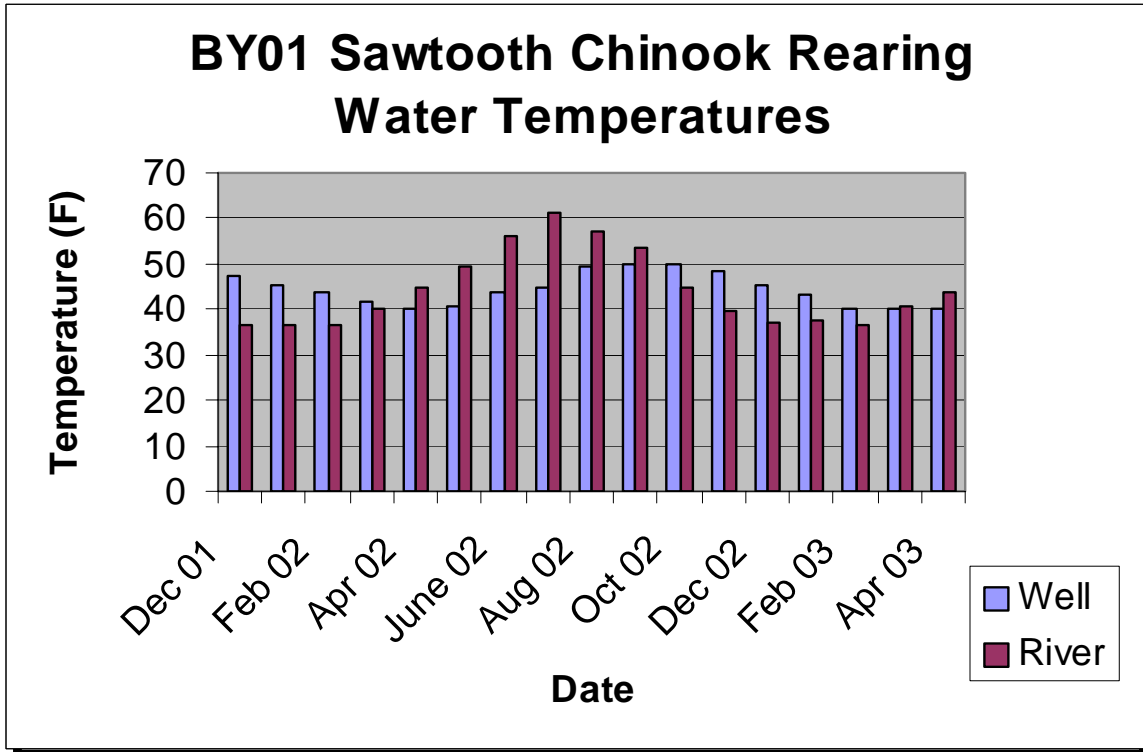
Appendix H. Survival Table for Chinook (BY01) and Steelhead (BY02) from Green Eggs to Released Smolts, at Sawtooth Fish Hatchery and East Fork Sites.

CHINOOK				
Green egg Number	Eyed egg Number	Percent Survival	Released Smolts	Percent Survival From green
<u>Sawtooth Fish Hatchery Fish</u>				
1,529,051	1,371,133	89.7	1,105,169	72.3
STEELHEAD				
Green egg Number	Eyed egg Number	Percent Survival		
<u>Sawtooth Fish Hatchery eggs</u>				
2,858,525	2,526,935	88.4		
distributed as follows: 937,000 Hagerman NFH 472,000 Shoshone-Bannock Streamside incubators 399,000 Magic Valley FH 718,935 culled				
<u>East Fork eggs</u>				
144,730	113,588 to Magic Valley FH	78.5		
<u>Squaw Creek eggs</u>				
98,302	81,206 to Magic Valley FH	82.6		
<u>Pahsimeroi FH eggs</u>				
329,101	212,000 to Hagerman NFH 27,499 culled	72.8		

All steelhead raised at other hatcheries.

Appendix H.1. Feed Schedule for Sawtooth/Pahsimeroi Spring Chinook, BY01.

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



Appendix J. Summary of Marked Spring Chinook Released, Brood Year 2001.

Mark	Sawtooth Fish Hatchery Stock Number Released	Location
Ad Clip	960,193 (Reserve)	SFH Weir (4/18/03)
CWT only	144,976 (Supplementation)	SFH Weir (4/18/03)
Total Release (PIT)	1,105,169 (989)	

Pahsimeroi Stock

Adipose Clip	912,418	Reserve
Transferred to Pahsimeroi FH Sept. 23 – 25, 2002		

Appendix K. Summary of Sawtooth Fish Hatchery Spring Chinook Smolt Releases, Brood Year 2001

Raceway	Number	Tag Code	Fish per Pound	Pounds	Designation
L1	122,214		24.0	5,092	Reserve
L2	155,244		19.5	7,961	Reserve
L3	122,623		22.5	5,450	Reserve
L4	137,733		17.7	7,782	Reserve
L10	82,864		18.7	4,431	Reserve
L11	137,447		22.3	6,164	Reserve
L12	136,546		19.5	7,002	Supplementation
L13	88,090		17.9	4,932	Res&Supp(high BKD)
L14	122,408		19.8	6,182	Res (high BKD)
Total			1,105,169		20.1
				54,997	

Appendix L. Sawtooth Fish Hatchery Summary of Steelhead Smolt Releases and Marks.

Steelhead Sawtooth Fish Hatchery Stock BY02					
Mark Type	CWT Code	#PIT	# Fish Released	Date	Release Purpose
AD	N/A		705,006	04/09/03-04/29/03	Direct Release at SFH weir, contribution
AD/LV	CWT	299**	43,021		
TOTAL		299	748,027		

** Number PIT tagged available from Department marking supervisor

Steelhead East Fork Stock BY01					
Mark Type	CWT Code	#PIT	# Fish Released	Date	Release Purpose
AD	N/A	**	260,816	04/25	E. Fk Salmon River (lower)
None	N/A	**	34,757	04/24	E. Fk Salmon River (above E Fk. Weir)
Squaw Creek Acclimation Pond					
AD/LV	CWT		58,140	04/09	acclimated fish
AD/LV	CWT		70,890	04/09	acclimated fish
AD/LV	CWT	298	215,666	04/23	Direct Release into Squaw Creek
TOTAL		298	566,522		

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

Appendix L.1. Sawtooth Fish Hatchery Production Cost Table (Includes Chinook BY01, Steelhead BY02, and Sockeye BY01).

Chinook BY 01							
Smolt Number	Lbs. Feed	Cost Feed	Lbs of Smolts	C	Total Cost	Cost per 1,000	Cost per lb.
Sawtooth							
1,105,169	72,623	\$69,767	54,997	1.32	\$277,443	\$251	\$5.04
Pahsimeroi							
912,418	26,458	\$0*	20,025**	1.32	\$79,270	\$87	\$3.96

East Fork

No BY01 East Fork spring chinook salmon were reared. Costs were incurred operating the trap.

Steelhead BY 02				
Stock	Green Eggs	Eyed Eggs	Total Cost	Cost per 1,000 eyed eggs
Sawtooth	2,858,525	2,526,935	\$134,078	\$53.06
Squaw Cr/EF	144,730	113,588	\$45,207	\$398.78
Pahsimeroi	329,101	239,499	\$1,812	\$7.57
Totals	2,912,831	2,880,022	\$181,187	

Sockeye BY 01				
Smolt Number	Lbs Smolts	Total Cost	Cost per 1,000	Cost per lb.
64,982	2,161	\$28,310	\$435.66	\$13.10

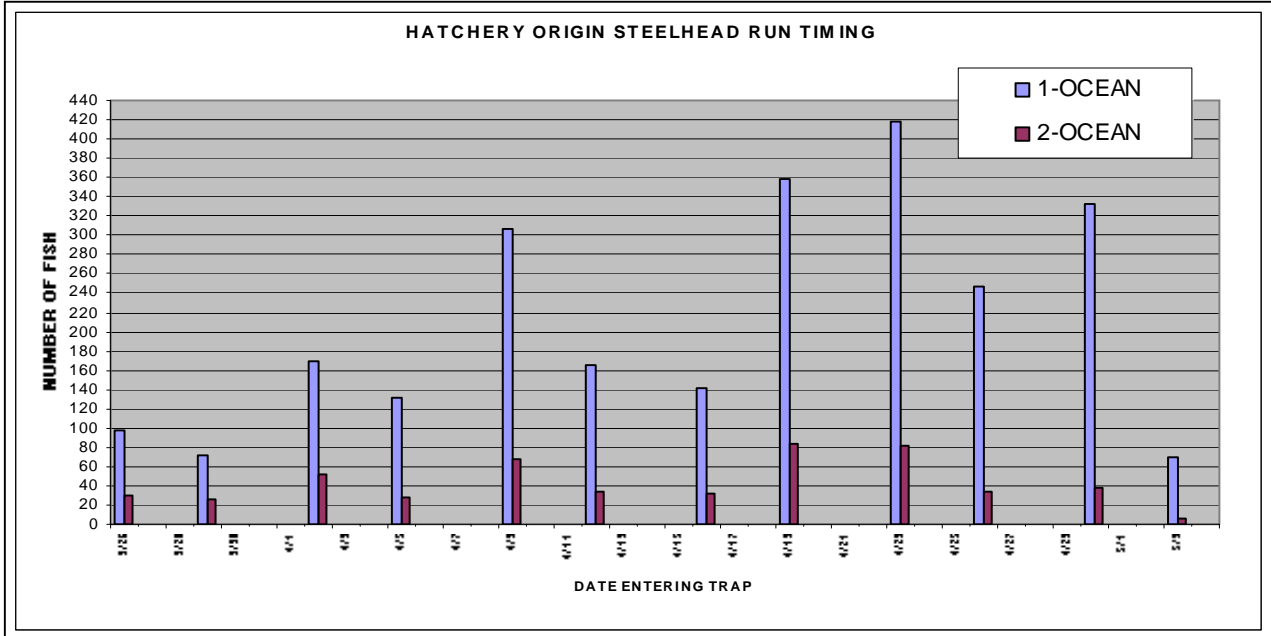
Note: Total costs less capital outlay. Costs include operating East Fork fish trap and running wells for entire rearing period. Costs are proportional species and stock.

* PFH purchased feed

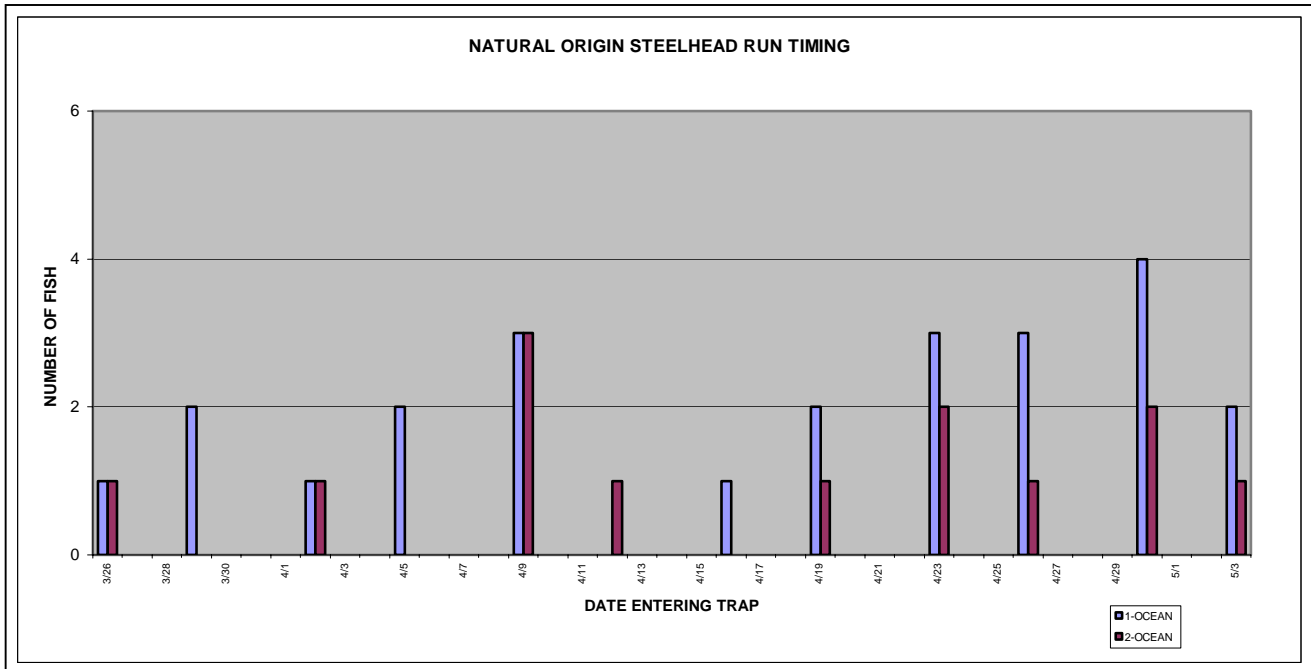
** Presmolts

Appendix M. Run Timing for Steelhead, Return Year 2002, Sawtooth trap.

**2002 SAWTOOTH FISH HATCHERY STEELHEAD RUN TIMING
HATCHERY ORIGIN STEELHEAD**



**2002 SAWTOOTH FISH HATCHERY STEELHEAD RUN TIMING
NATURAL ORIGIN STEELHEAD**



Appendix N. Sawtooth Fish Hatchery Steelhead Length Frequency Distribution, Return Year 2002.

FK.LN (cms)	NATURALS (RELEASED)		HATCHERY (ADIPOSE CLIPS)		HATCHERY (OTHER MARKS)		FK.LN (in)
	Male	Fem	Male	Fem	Male	Fem	
50	1	0	2	1	0	1	19.7
51	0	0	3	0	0	1	20.1
52	1	0	2	4	0	1	20.5
53	0	0	3	4	4	0	20.9
54	1	1	10	10	2	1	21.3
55	0	0	18	22	7	1	21.7
56	0	0	38	51	2	8	22.0
57	1	1	44	64	9	8	22.4
58	3	0	90	108	11	17	22.8
59	3	3	105	150	27	20	23.2
60	4	5	199	200	43	42	23.6
61	6	4	195	143	40	31	24.0
62	9	5	273	173	51	29	24.4
63	2	3	228	99	48	22	24.8
64	4	3	187	92	26	14	25.2
65	3	1	135	55	25	3	25.6
66	2	1	80	26	9	2	26.0
67	1	0	56	40	11	1	26.4
68	0	0	26	29	3	2	26.8
69	0	1	37	50	1	0	27.2
70	0	2	22	54	1	0	27.6
71	0	3	14	24	0	0	28.0
72	2	2	24	35	0	0	28.3
73	2	0	22	23	2	0	28.7
74	2	1	17	20	0	0	29.1
75	0	1	20	13	0	0	29.5
76	0	0	14	4	0	0	29.9
77	1	1	11	3	0	0	30.3
78	0	0	7	0	0	0	30.7
79	0	0	2	3	0	0	31.1
80	0	0	3	0	0	0	31.5
81	0	0	1	0	0	0	31.9
82	0	0	1	0	0	0	32.3
83	0	0	0	0	0	0	32.7
84	0	0	0	0	0	0	33.1
85	0	0	0	0	0	0	33.5
TOTALS	48	38	1889	1500	322	204	

Appendix N. Continued

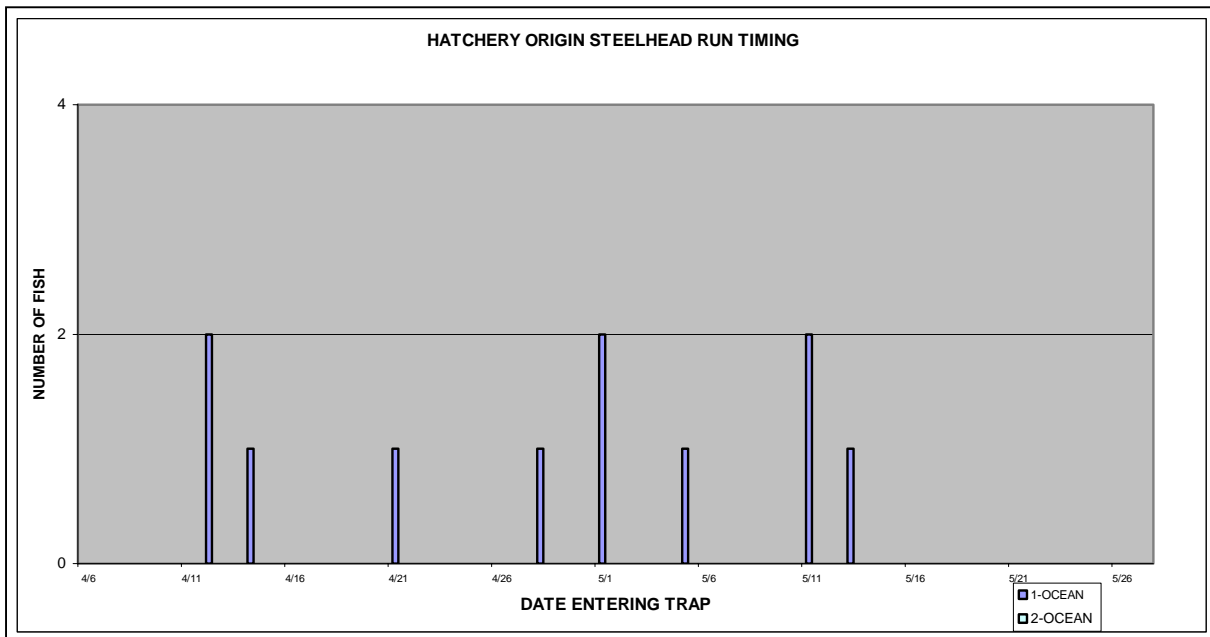
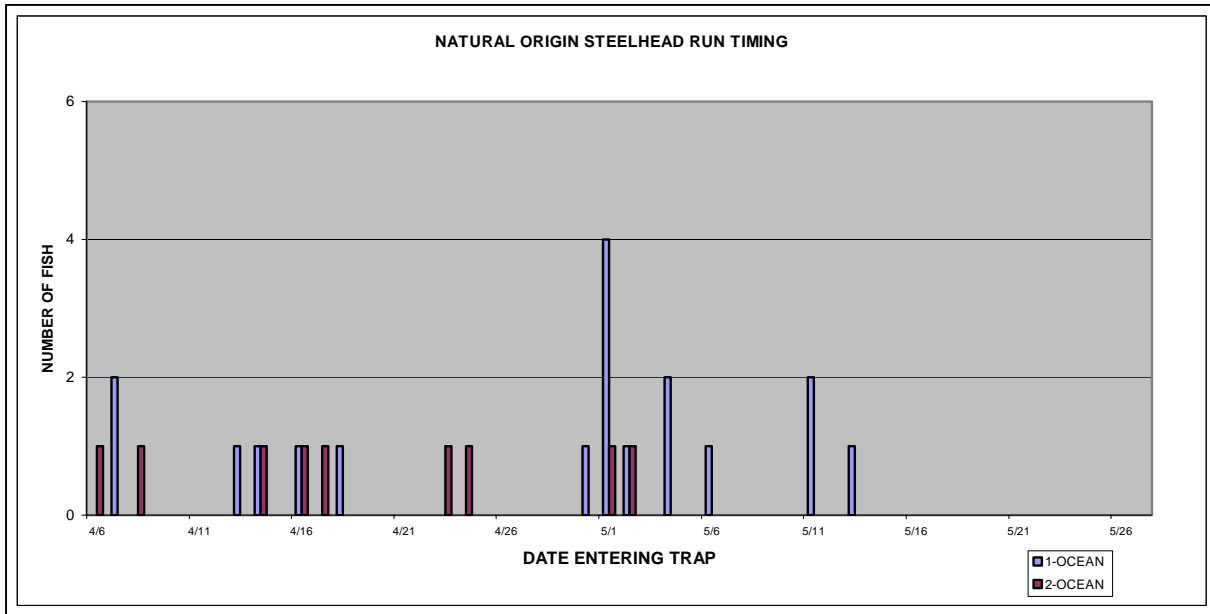
AGE-CLASS OF ADULTS	MALES		FEMALES		TOTAL	
	No.	%	No.	%	No.	%
HATCHERY 1-OCEANS	1983	89.7	1375	80.7	3358	85.8
HATCHERY 2-OCEANS	228	10.3	329	19.3	557	14.2
NATURAL 1-OCEANS	41	85.4	26	68.4	67	77.9
NATURAL 2-OCEANS	7	14.6	12	31.6	19	22.1
TOTAL 1-OCEANS	2024	89.6	1401	80.4	3425	85.6
TOTAL 2-OCEANS	235	10.4	341	19.6	576	14.4

**Of the 7,104 adults trapped, lengths were taken on only 4001 fish. No length data was taken on the remaining 3,103 adult steelhead trapped at Sawtooth.

Appendix O. Run Timing for Steelhead, Return Year 2002, East Fork Trap.

**2002 EAST FORK STEELHEAD RUN TIMING
HATCHERY ORIGIN STEELHEAD**

**2002 EAST FORK STEELHEAD RUN TIMING
NATURAL ORIGIN STEELHEAD**



Appendix P. East Fork Trap Steelhead Length Frequency Distribution, Return Year 2002.

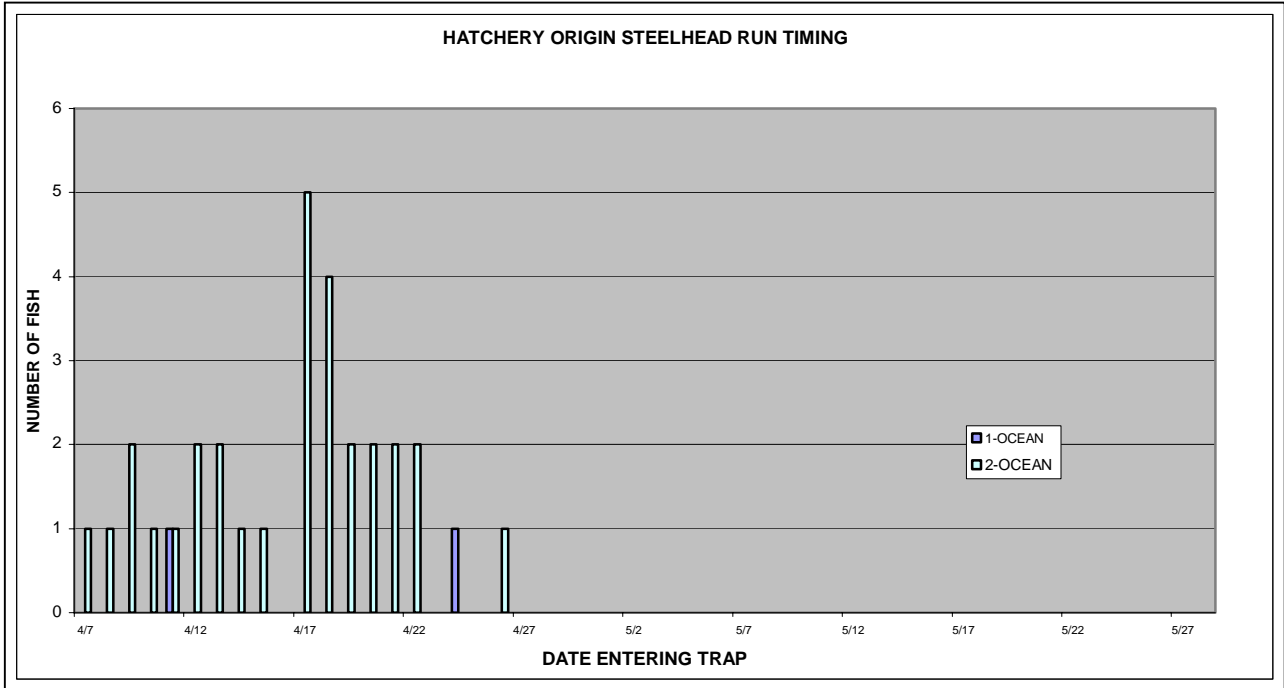
FK.LN (cms)	NATURALS (RELEASED)		HATCHERY (ADIPOSE CLIPS)		HATCHERY (OTHER MARKS)		FK.LN (in)
	Male	Fem	Male	Fem	Male	Fem	
50	0	0	0	0	0	0	19.7
51	0	0	0	0	0	0	20.1
52	0	0	0	0	0	0	20.5
53	1	0	1	0	0	0	20.9
54	0	0	0	0	0	0	21.3
55	1	0	0	0	0	0	21.7
56	0	0	0	0	0	0	22.0
57	0	1	0	0	0	0	22.4
58	0	0	0	0	0	0	22.8
59	0	0	1	0	0	0	23.2
60	0	1	0	0	0	0	23.6
61	1	2	3	0	0	0	24.0
62	1	3	1	0	0	0	24.4
63	1	2	4	0	0	0	24.8
64	0	1	0	0	0	0	25.2
65	0	0	0	0	0	0	25.6
66	0	2	0	0	0	0	26.0
67	0	0	0	0	1	0	26.4
68	1	0	0	0	0	0	26.8
69	0	1	0	0	0	0	27.2
70	0	0	0	0	0	0	27.6
71	0	0	0	0	0	0	28.0
72	0	1	0	0	0	0	28.3
73	0	1	0	0	0	0	28.7
74	0	0	0	0	0	0	29.1
75	0	0	0	0	0	0	29.5
76	1	1	0	0	0	0	29.9
77	0	0	0	0	0	0	30.3
78	0	1	0	0	0	0	30.7
79	0	0	0	0	0	0	31.1
80	0	1	0	0	0	0	31.5
81	0	0	0	0	0	0	31.9
82	0	1	0	0	0	0	32.3
83	0	0	0	0	0	0	32.7
84	1	0	0	0	0	0	33.1
85	0	0	0	0	0	0	33.5
TOTALS	8	19	10	0	1	0	

Appendix P. Continued

AGE-CLASS OF ADULTS	MALES		FEMALES		TOTAL	
	No.	%	No.	%	No.	%
HATCHERY 1-OCEANS	11	100.0	0	0	11	100.0
HATCHERY 2-OCEANS	0	0.0	0	0	0	0.0
NATURAL 1-OCEANS	6	75.0	12	63.2	18	66.7
NATURAL 2-OCEANS	2	25.0	7	36.8	9	33.3
TOTAL 1-OCEANS	17	89.5	12	63.2	29	76.3
TOTAL 2-OCEANS	2	10.5	7	36.8	9	23.7

Appendix Q. Run Timing for Steelhead, Return Year 2002, Squaw Creek Trap.

2002 SQUAW CREEK TRAP RUN TIMING HATCHERY ORIGIN STEELHEAD



Appendix R. Squaw Creek Trap Length Frequency Distribution, Return Year 2002.

FK.LN (cms)	NATURALS (RELEASED)		HATCHERY (ADIPOSE CLIPS)		HATCHERY (OTHER MARKS)		FK.LN (in)
	Male	Fem	Male	Fem	Male	Fem	
50	0	0	0	0	0	0	19.7
51	0	0	0	0	0	0	20.1
52	0	0	0	0	0	0	20.5
53	0	0	0	0	0	0	20.9
54	0	0	0	0	0	0	21.3
55	0	0	0	0	0	0	21.7
56	0	0	0	0	0	0	22.0
57	0	0	0	0	0	0	22.4
58	0	0	0	0	0	0	22.8
59	0	0	0	0	0	0	23.2
60	0	0	0	0	0	0	23.6
61	0	0	0	0	0	0	24.0
62	0	0	0	0	0	0	24.4
63	0	0	0	0	0	0	24.8
64	0	0	0	0	0	0	25.2
65	0	0	0	0	0	0	25.6
66	0	0	0	0	0	0	26.0
67	0	0	0	0	0	0	26.4
68	0	0	0	0	0	0	26.8
69	0	0	0	1	0	0	27.2
70	0	0	2	0	0	1	27.6
71	0	0	0	0	0	0	28.0
72	0	0	0	0	0	0	28.3
73	0	0	0	0	0	0	28.7
74	0	0	1	0	0	1	29.1
75	0	0	0	1	1	0	29.5
76	0	0	0	1	0	2	29.9
77	0	0	1	0	0	0	30.3
78	0	0	0	3	2	1	30.7
79	0	0	0	1	1	0	31.1
80	0	0	0	1	0	0	31.5
81	0	0	1	1	0	0	31.9
82	0	0	1	1	0	0	32.3
83	0	0	2	0	0	1	32.7
84	0	0	1	0	0	0	33.1
85	0	0	1	0	0	1	33.5
86	0	1	0	0	0	0	33.9
87	0	0	0	0	0	0	34.3
88	0	0	1	0	0	0	34.6
TOTALS	0	1	11	10	4	7	

Appendix R. Continued

AGE-CLASS OF ADULTS	MALES		FEMALES		TOTAL	
	No.	%	No.	%	No.	%
HATCHERY 1-OCEANS	2	14.3	0	0.0	2	6.0
HATCHERY 2-OCEANS	13	85.7	17	94.5	29	87.8
NATURAL 1-OCEANS	0	0.0	0	0.0	0	0.0
NATURAL 2-OCEANS	0	0.0	1	5.5	1	3.0
TOTAL 1-OCEANS	2	13.3	0	0.0	2	6.1
TOTAL 2-OCEANS	13	86.6	18	100.0	31	93.9

1-OCEANS	0	0	2	0	0	0
2-OCEANS	0	0	8	10	4	7

Appendix S. Fish Health Autopsy Results

Summary of Fish Autopsy

ACCESSION NO: 03-087
 SPECIES: sc
 STRAIN: saw
 UNIT:
 RIVER FOR AUTOPSY: Prelib.
 INVESTIGATOR(S): Munson
 REMARKS:

LOCATION: Sawtooth
 AUTOPSY DATE: 3/18/03
 AGE: Juvenile
 SAMPLE SIZE: 20

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
LENGTH	0.00	0.00	0.00
WEIGHT	0.00	0.00	0.00
KTL*	0.00	0.00	0.00
CTL*	0.00	0.00	0.00
HEMATOCRIT	45.20	0.23	0.02
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	7.80	0.33	0.12

*EXPRESSED AT KTL TIMES 10 TO THE FIFTH POWER
 **CONVERTED FROM KTL; EXPRESSED AS CTL TIMES 10⁴

EYES		GILLS		PSEUDO-BRANCHS		THYMUS		FAT		MESEN. SPLEEN		GUT		HIND KIDNEY		LIVER		BILE	
N	20	N	20	N	20	0	20	0	0	B	0	0	20	N	20	A	20	0	0
B1	0	F	0	S	0	1	0	1	5	R	20	1	0	S	0	B	0	1	0
B2	0	C	0	L	0	2	0	2	5	G	0	2	0	M	0	C	0	2	0
E1	0	M	0	S&L	0			3	9	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	1	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0	Mean=0.00	
H2	0			O	0			Mean=2.3								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

	20	20	20	20	20	20	20	20	20	0
SEX		M: 0		F: 0		U: 0				

GENERAL REMARKS:

FINS:

GONADS:

SKIN:

OTHER:

Submitted by:

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Fish Hatchery Manager II

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Assistant Hatchery Manager

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Fish Culturist

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Fish Culturist

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