SAWTOOTH FISH HATCHERY
and
EAST FORK SATELLITE

2005 Spring Chinook Brood Year Report
2006 Steelhead Brood Year Report

By

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ABSTRACT

2005 SAWTOOTH SPRING CHINOOK SALMON

In 2005, the Sawtooth Fish Hatchery adult spring chinook salmon *Oncorhynchus tshawytscha* weir on the Main Salmon River was installed on June 5 and operated through September 19. A total of 1,561 adult chinook were trapped in 2005, of which 1,280 (165 jacks / 529 adult males / 586 females) were hatchery-produced (marked) fish and 281 (39 jacks / 117 adult males / 125 females) were unmarked. Of the total fish trapped, 465 (184 marked, 281 unmarked) were released above the hatchery weir for volitional spawning and included: 46 marked jacks, 67 marked adult males, 71 marked females, 39 unmarked jacks, 117 unmarked adult males, and 125 unmarked females. The remaining 1,296 chinook salmon were retained for 2005 hatchery spawn crosses or given to charitable food bank organizations. A total of 550 fish were killed and not used (KNU) for spawning. Of the 550 fish KNU, there were 286 males, 100 jacks, and 164 females. Fish given to charitable organizations were included in the KNU numbers. There were 345 fish given to the Shoshone-Paiute tribe and 24 to the Idaho City Food Bank. Fish used for hatchery spawn crosses included; 14 marked jacks, 142 marked adult males, and 297 marked females. Hatchery reared marked fish are defined as fish with either an adipose clip only, adipose clip/CWT, or CWT only.

Spawning began on August 11, and continued through September 16, with a total of 11 spawning days. In 2005 spawn crosses were made by 1:1 (f/m) random cross matings. A total of 297 females were spawned and consisted of the following: 25 age-5 hatchery or reserve and 272 age 4 hatchery or reserve. A total of 156 males were used and consisted of the following: 3 age-5 hatchery, 139 age-4 hatchery males of which 135 were used twice, and 14 age-3 hatchery jacks of which 7 were used twice. Eagle Fish Health Laboratory sampled all of the females spawned and detected elevated bacterial kidney disease (BKD) levels (Enzyme-Linked Immunosorbent Assay optical density values $\geq$0.2) in 4 fish samples in 2005. As per Fisheries Bureau instructions, these 4 females along with the eggs of four females' eggs incubating with them, were culled (15,100 green eggs).

After fertilization, all eggs were rinsed with well water and water-hardened in a 100 part per million (ppm) solution of Argentyne (Povidone Iodine). Eggs were incubated at two females per tray in vertical-stack incubators. The green egg take from the spawning of 297 females was 1,183,537 eggs, yielding 1,051,935 eyed eggs for a percent survival to the eyed-stage of development average of 88.9% and a mean fecundity of 3,985 eggs per female. From these eyed eggs, 1,014,736 fry were ponded which resulted in a smolt release of 995,262 smolts from the Sawtooth Fish Hatchery weir.

2005 EAST FORK SALMON RIVER SPRING CHINOOK SALMON

The velocity barrier on the East Fork of the Salmon River (EFSR) was put into operation on June 6, 2005 with trapping operations continuing through August 30, 2005. This is the second consecutive year of operation of the East Fork trap since 1998. A total of 63 Chinook salmon were trapped in 2005 and all were natural (unmarked) fish. All fish trapped at the facility were released above the weir for volitional spawning. (See Captive Rearing Program for Salmon River Chinook Salmon, D. Baker et al. 2004, 2005)

2005 PAHSIMEROI SUMMER CHINOOK SALMON

Sawtooth Hatchery reared Pahsimeroi Hatchery's BY05 summer chinook due to a lack of space and pathogen free water at Pahsimeroi Fish Hatchery. Eight lots of eyed eggs were brought to Sawtooth Hatchery between September 29 and October 25, 2005. A total of 1,070,317 eggs were incubated with 30,069 dead eggs and fry picked off resulting in a 97.2% survival to swim up fry.

All of the fish were marked from September 11 to September 19, 2006 at SFH. On October 24, 25, and 26, Pahsimeroi fish totaling 989,127 were transferred back to PFH. An Idaho Power Co. tanker hauled the fish in six trips. Total pounds of fish shipped was 35,838 at an average of 27.6 fpp. Total feed fed was 39,243 pounds for an overall conversion of 1.09.

2005 REDFISH LAKE SOCKEYE SALMON

Eagle Fish Hatchery (IDFG) and Burley Fish Hatchery (NOAA) shipped an estimated total of 177,243 eyed eggs to Sawtooth Fish Hatchery. A total of 154,633 fish were marked September 14 through September 19, 2006. Pit tagging by Sockeye Research occurred September 25 and 26, 2006. At the time of pre-smolt release, the fish averaged 74.9 fish per pound and 3.77 inches in total length.

The BY 05 Sockeye October 2 and 3 pre-smolt releases are as follows:

	Ad-clip	Ad/PIT	Total
Redfish Lake	60,784	1020	61,804
Alturas Lake	25,974	1020	26,994
Pettit Lake	17,474	1020	18,494
Totals	104,232	3060	107,292

All sockeye released were placed into a barge and released into pelagic zone of each lake.

The remaining 47,135 AD/CWT were moved outside to small raceways 5 and 6, November 8, 2006 and over-wintered at the hatchery on river water. A total of 46,765 fish were released on May 8, 2007 averaging 20.92 f/lb. and 5.42 inches in length. Fish were transferred into Eagle FH distribution tanks and trucked ¾ of a mile to a release pipe approximately 50 yards below the Sawtooth Hatchery intake on the Salmon River.

INTRODUCTION

Funding Source

Sawtooth Fish Hatchery is part of the Lower Snake River Compensation Plan and has been in operation since 1985. The hatchery and East Fork satellite facility were built by the U.S. Army Corp of Engineers and is funded through the U.S. Fish & Wildlife Service.

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 weir is approximately 400 river miles from Lower Granite Dam and 950 river 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 and along the upper Salmon River downstream to near Challis, Idaho. 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 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 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 East Fork natural steelhead. 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, some returning adult fish are released to spawn naturally. At Sawtooth, all unmarked chinook are released above the hatchery weir for natural production. Supplementation fish, those fish that are the product of crossing an unmarked fish with a marked fish, are released above the hatchery weir to spawn. The National Oceanic Atmospheric Administration Fisheries (NOAFF) under permits # 1179 and # 1186 prescribes fish handling for chinook salmon. At the East Fork, all chinook salmon trapped were released above the weir for volitional spawning. 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 Lower Snake River Compensation Plan, Sawtooth Fish Hatchery's mitigation goals are expressed in adult returns of 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 1.3 million chinook smolts for release at Sawtooth Fish Hatchery.

2. To trap and spawn steelhead adults and provide approximately 2 million eyed eggs to meet LSRCP goals.

3. Work cooperatively with Eagle Fish Hatchery to incubate, hatch and rear up to 200,000 sockeye pre- smolts and smolts.

4. To re-distribute 50,000 catchable sized rainbow trout into the area rivers, lakes, and ponds for angling purposes.

5. 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 fish food freezer/chemical equipment storage 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 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 office space while the trap is in operation. The other building is a combination shop, storage and spawning shed (22 ft x 44 ft).

Production Capabilities

Holding capacity at the East Fork trap consists of two 68 ft x 10 ft x 4.5 ft adult holding ponds (3,060 ft^3) 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 ft^3 and a capacity of 15,000 swim up fry each, 6 semi-square 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 ft^3 and a capacity for 100,000 fry each. Outside rearing consists of 12 fry raceways each with 750 ft^3 of rearing space and 28 production raceways each with 2,700 ft^3 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 $ft^3$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 and adult holding water, modifying the river water intake to reduce winter icing problems, and make modifications to the weir for resident fish movement.

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 approximately 900 gpm 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 25 cfs of gravity-flow water and ranges in temperature from 32^0 F (0^0 C) in the winter to 68^0 F (20^0 C) in the summer. See Appendix I.

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 2005. 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; 16 months of 2 Fishery Technicians time, 42 months of Biological Aide time, and 27 months of Laborer time.

FISH HEALTH

SAWTOOTH FISH HEALTH SECTION 2007

Diseases Encountered and Treatments.

Adult steelhead (collected 2006): *M. cerebralis* was not detected in brood steelhead at Sawtooth Hatchery (0/20), the adult Chinook salmon (0/20) and steelhead spawned at Squaw Creek ponds (0/20), but was detected in the adult East Fork STB (2/20). IHNV was detected in adult Sawtooth STA 2/150 (1.33%). See Appendix C.

Adult Chinook salmon (collected 2005): Adult Chinook salmon were given intra-peritoneal injection of erythromycin at a rate 20 mg/kg. Pre-spawning mortality was at 8%. *Renibacterium salmoninarum* was detected in routine sampling of brood Chinook salmon. The eggs from 4/297 (1.35%) females were culled because ELISA optical densities were above 0.25. See Appendix C.

Broodyear 2005 Chinook salmon: Ichthyophthirius multifilis was detected in BY'05 Chinook salmon (both SAW SC and PAH SU) and were treated with 170 mg/l formalin for one hour, three times per week until signs of infection diminished. Two prophylactic applications of erythromycin were given to BY'05 Chinook salmon to reduce the risk of an epizootic of bacterial kidney disease (BKD). See Appendix C.

Organosomatic Index. See Appendix S.

Acute Losses. Acute losses were not experienced at this facility during this reporting period.

Other Assessments. *Ichthyophthirius multifilis* is becoming more of problem due to low water flows and high water temperatures. The hatchery staff needs to be vigilant during high water temperatures of the summer months.

FISH PRODUCTION

Spring Chinook Adult Collection-Sawtooth

The Sawtooth Fish Hatchery chinook-trapping season began on June 5, 2005 and continued through September 19, 2005. The peak of the run occurred the week of July 4, 2005 (Appendix D). A total of 1,561 spring chinook salmon were trapped including 646 males, 711 females, and 204 jacks (Appendix E, Appendix E.1). Released above the weir were 465 salmon (including 117 unmarked males, 125 unmarked females, 67 marked males and 71 marked females, and 39 unmarked jacks and 46 marked jacks) Appendix F. No fish were scanned for PIT tags in 2005, as per Fisheries Bureau instructions. Sawtooth Hatchery had a male: female ratio of 54% male and 46% female. Fish health sampling results are available in Appendix C.

A total of 204 three-year old, 1,180 four-year old, and 177 five-year old fish returned to Sawtooth Fish Hatchery.

Spring Chinook Adult Collection-East Fork

The velocity barrier on the East Fork of the Salmon River (EFSR) was put into operation on June 6, 2005 with trapping operations continuing through August 30, 2005. This is the second consecutive year of operation of the East Fork trap since 1998. A total of 63 Chinook salmon were trapped in 2005 and all were natural (unmarked) fish. All fish trapped at the facility were released above the weir for volitional spawning. (See Captive Rearing Program for Salmon River Chinook Salmon, D. Baker et al. 2004, 2005)

The velocity barrier and fish trap on the East Fork of the Salmon River was not operated for spring chinook salmon between 1998 and 2003 because of expected low adult spring chinook returns. In 2004, the trap was put into operation to capture bull trout to comply with ESA listing of 1999 to review bull trout populations five years after listing. Coincidental to bull trout capture, the trap has been operated by IDFG Fisheries Research personnel as a part of IDFG's captive chinook rearing program. The captive rearing program was developed as a way to preserve severely depressed existing populations and increase the number of naturally spawning adults. A total of 152 adult chinook were captured between June 12 and September 9, 2004. Of these 152, 147 were unmarked fish and 5 were marked hatchery produced fish. All fish were released above the weir for volitional spawning.

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 93 pre-spawning mortalities (5 jacks, 34 adult males, and 54 females) or 8.5%. All pre-spawning mortalities were marked fish.

Spawning Operations

Spawning activities at Sawtooth Fish Hatchery began August 11 and concluded September 16, 2005. The 11 egg takes during this period yielded 1,183,537 green eggs from 297 females for an average fecundity of 3,985 eggs per female. There were 156 males used for spawning and consisted of 3 age-5 hatchery males, 139 age-4 hatchery males of which 135 were used twice, and 14 age-3 hatchery jacks of which 7 were used twice for fertilization. Each female's eggs were fertilized using 1 male and combined with another females' eggs fertilized with a different male, then water hardened for one hour in a 100 ppm titrateable iodine solution. The eggs were then put into Heath incubator trays, with two females per tray. Spawning crosses were random cross-matings 1:1 (f/m). (See Appendix G).

Incubation

Each eight-tray Heath stack had flows set at 5 gpm of well water. Eggs were put away at two females per tray. This averaged 7,970 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 fungus and bacterial control until machine picked.

Well temperatures ranged from 50^{o} F to 44^{o} F during the incubation period. The eggs eyed-up at 500 Fahrenheit thermal units (FTU). Just after eye-up, at about 530 FTU the eggs were shocked by dropping them from one container to another. The eggs were then picked and enumerated using a Jensorter Fish Egg Sorter with Counters Model JM4C. Any dead eggs were then hand picked and counted until hatch at 1,300 FTU.

Sawtooth Fish Hatchery green eggs eyed up at a 88.9% rate, yielding 1,051,935 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^{o} F to 40^{o} F (Appendix I).

All fry were started on Bio Oregon starter #2, and initially fed by hand. Feed amounts and sizes varied according to manufacturer recommendations as the fish grew. (Appendix I.1) 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 at a rate of 2.25 grams active/100 lbs. of fish starting on June 6 and ending on July 3, 2006. Erythromycin medicated feed is fed as a prophylactic for BKD. The fish were transferred outside for final rearing starting on April 5 with fish moves completed May 15, 2006. Fish averaged 191 fish per pound (fpp) and 2.6 inches in length when moved to the outside raceways.

Final Rearing

The Sawtooth spring chinook were placed into eight full raceways for final rearing until release. Initial densities were 0.13 lbs/ ft^3 and water flows were 500 gpm.

All outside fish were fed Bio Oregon grower feed. A second 28 day prophylactic Bio Oregon erythromycin medicated feed treatment was fed from August 9 through September 15, 2006 at a rate of 4.5 grams active per 100 pounds of fish, to prevent the onset of BKD.

The finish weight of the BY04 Sawtooth chinook smolts was 57,864 pounds. The fish were fed 73,996 pounds of feed for a conversion of 1.28. A synopsis of feeding regimes can be found in Appendix I.1.

Fish Marking

Fish marking occurred from May 30 through June 5, 2006. All fish were classified as listed reserve and adipose fin clipped and included 122,257 fish in raceway 1 that were also given a coded wire tag. A total of 14,934 fish were pit tagged from raceways #9, 10, 11, and 12 on February 25 and 26th, 2007. 2006. All PIT tagged fish remained in raceway #9 until release. (Appendix J, Appendix K).

Fish Distribution

Fish releases for Sawtooth stock BY05 smolts occurred on April 11, 2007. A total of 995,262 fish were released into the Salmon River at the Sawtooth Fish Hatchery weir. The fish were released in the afternoon through the outside raceway tailrace pipe. River water temperature was in the low 40's at time of release. Production costs for BY05 smolts can be found in Appendix L.1.

PAHSIMEROI CHINOOK

Sawtooth Hatchery reared Pahsimeroi Hatchery's BY05 summer chinook due to a lack of space and pathogen free water at Pahsimeroi Fish Hatchery. Eight lots of eyed eggs were brought to Sawtooth Hatchery between September 29 and October 25, 2005. A total of 1,070,317 eggs were incubated with 30,069 dead eggs and fry picked off resulting in a 97.2% survival to swim up fry.

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. A total of 1,036,660 Pahsimeroi fish were moved into two outside raceways by buckets from January 8 through February 16, 2006. On June 6, 2006, the two raceways were split into 4 additional raceways as density and flow indices dictated.

All Pahsimeroi fingerlings were administered a 28 day prophylactic medicated feed treatment of Bio-Oregon 1.5 mm Aquamycin 2.25% starting on June 18, 2006. A second 21 day medicated feed treatment began on August 21. Fish in raceways 3, 4, and 5 were fed Bio-Oregon 2.0 mm Aquamycin 2.25%. Fish in raceways 6, 7, and 8 were fed their regular Skretting diet. Only half the fish were fed medicated feed due to lack of freezer storage space for the medicated feed.

All of the fish were marked from September 11 to September 19, 2006 at SFH. A total of 55,564 reserve fish received an AD/CWT-tag code 10-30-80. A total of 934,967 fish received AD only. Inventory after marking was 990,531 fish.

On October 24, 25, and 26, Pahsimeroi fish totaling 989,127 were transferred back to PFH. An Idaho Power Co. tanker hauled the fish in six trips. Total pounds of fish shipped was 35,838 at an average of 27.6 fpp. Total feed fed was 39,243 pounds for an overall conversion of 1.09.

BY 2005 SOCKEYE SALMON

Eagle Fish Hatchery (IDFG) and Burley Fish Hatchery (NOAA) shipped an estimated total of 177,243 eyed eggs to Sawtooth Fish Hatchery. A total of 154,633 fish were marked September 14 through September 14, 2006. This is a total difference of 22,610 eggs after pickoff and mortalities while at Sawtooth Fish Hatchery. This summary is based on the marking inventory and mortality records.

The eggs arrived in the three separate shipments between November 17, and December 8, 2005. The eggs arrived with 554 to 824 FTUs. Ponding began February 11, 2006 and ended April 5, 2006 with about 1850 FTUs at ponding.

Eggs were hand picked three times weekly from eyed eggs to ponding. A total 3,596 dead eggs were removed before ponding. Total eyed egg to ponding survival was 97.97%. A total of 173,647 fry were ponded. The swim-up fry were ponded into six 2 meter fiberglass tanks. Initial water flows were set at five gallons per minute.

All fry were started on #1 Bio-Oregon BioDiet starter. Feed size was increased in accordance to Bio-Oregon's recommendation with the exception that 20% of the feed was one size smaller to assure smaller fish would get an adequate amount of feed. The total feed fed at Sawtooth for the October release BY 05 Sockeye was 1,694 pounds with a 1.17 conversion.

As rearing density reached three pounds per gallon per minute, fish were transferred to cement vats with water flows near 50 gpm specific pathogen free well water. Smaller mesh head and tail screens allowed ponding into two cement vats at around 2,000 fish per pound (fpp). This transfer occurred April 28, 2006. By the end of June, these fish were thinned into four vats.

Mortality was recorded daily from ponding to release. A total of 19,220 fish were lost to mortality for a 8.89% loss.

Ad-clipping and CWT marking began September 14, 2006 and continued through September 19, 2006. In past years marking was done by hand. The MATS trailer, with its automated marking machines marked most of the fish this year. Pit tagging by Sockeye Research occurred September 25 and 26, 2006. At the time of pre-smolt release, the fish averaged 74.9 fpp and 3.77 inches in total length.

The BY 05 Sockeye October 2 and 3 pre-smolt releases are as follows:

	Ad-clip	Ad/PIT	Total
Redfish Lake	60,784	1020	61,804
Alturas Lake	25,974	1020	26,994
Pettit Lake	17,474	1020	18,494
Totals	104,232	3060	107,292

All sockeye released were placed into a barge and released into pelagic zone of each lake.

The remaining 47,135 AD/CWT were moved outside to small raceways 5 and 6, November 8, 2006. These fish were 33 fpp with a condition factor of 3,175 X 10^{-7}. when moved to the raceways and over-wintered at the hatchery on river water. River water was 43.6 F, and turbid. Well water was 48.1 F. Fresh mortalities from this group were sent to Eagle Fish Health Lab for viral detection.

Fin clip checks, and CWT retention checks were done by Sawtooth Fish Hatchery personnel. Of the 100 fish checked all adipose fins were clipped and no CWT was detected in seven fish for a retention rate of 93 %.

The Eagle FH crew collected 148 fish from small raceway 6 for germ cell recovery January 3, 2007. The adipose fin was also collected to document individual genetics. Eagle Fish Hatchery personnel did a CWT retention check January 24, 2007 of the 148 fish collected January 3, 2007. Eleven fish were missing tags or no reads for a retention rate of 92.6 %.

Doug Munson, IDFG anadromous fish pathologist, collected 30 fish from each raceway for pre-liberation on April 3, 2007. The results were negative for all tests.

Passive Integrated Transponders were injected into 1,025 fish April 11, 2007. There were no PIT mortalities detected.

Condition factors of both raceways were taken on April 30, 2007. Small raceway 5-C= 3,022 X 10^{-7} and small raceway 6-C=3,035 X10^{-7}.

A total of 46,765 fish were released on May 8, 2007 averaging 20.92 fpp and 5.42 inches in length. All of the fish were AD/CWT including 1,025 PIT. The fish were fed a total of 2,831 pounds of food with a 1.29 conversion.

Fish were transferred into Eagle FH distribution tanks and trucked ¾ of a mile to a release pipe approximately 50 yards below the Sawtooth Hatchery intake on the Salmon River. River water temperature on May 8, 2007 was 42ºF at the time of release.

2006 STEELHEAD

ABSTRACT

In 2006, the Sawtooth Fish Hatchery adult steelhead, *Oncorhynchus mykiss,* weir on the Main Salmon River was installed on March 22, with the adult trap operating from March 27 through May 3. A total of 1,942 adult "A-run" steelhead were trapped in 2006, 1,920 of which (1,103 males / 817 females) were marked (hatchery-produced) fish and 22 (13 males / 9 females) were unmarked (natural origin).

Distribution of the 1,920 marked adults ranged from spawn-related activities to charitable giveaways. The 904 steelhead used for spawning were either given to the public on a first come, first serve basis on spawn days or distributed to charitable organizations. A total of 1,063 steelhead were donated to the following organizations: Idaho City Food Bank, Lemhi Valley Social Services, Middleton Food Bank, SMRIST Essentials Food Bank, and Shoshone Paiute Tribe.

All returning unmarked adults (22) were genetic sampled and released upstream of the Hatchery weir for natural spawning.

Age class, gender, length frequency and run timing data for returning Sawtooth adults (marked and unmarked) is provided in Appendices M and N. Fish health sampling results are available in Appendix C.

The Sawtooth and East Fork stock eyed eggs were released as smolts by their respective rearing hatcheries during the spring of 2006. Hagerman National Fish Hatchery (HNFH) stocked direct release smolts (5.04 fpp) at the Sawtooth Fish Hatchery weir. HNFH stocked Sawtooth stock smolts (5.36 fpp) into the Yankee Fork of the Salmon River. Magic Valley Fish Hatchery (MVFH) stocked East Fork stock smolts at 4.48 fpp were mixed with Dworshak smolts and released into Squaw Creek Pond. MVFH stocked Sawtooth stock smolts into the Yankee Fork and into Valley Creek and Upper Salmon River B or Squaw Pond stock smolts back into Squaw Pond.

EAST FORK AND SQUAW CREEK STEELHEAD

The East Fork Salmon River (EFSR) trap and velocity barrier were put into operation March 23rd and ran through May 18, 2006. A total of 197 adult East Fork steelhead were trapped for the Natural Steelhead Program of which one male was marked and 196 (101 males and 95 females) were unmarked. Fish released above the weir to spawn naturally included 74 unmarked males and 79 unmarked females. There was no prespawning mortality. Age class, gender, and length frequency data is provided in Appendices O and P.

East Fork spawning operations began on April 11 and continued through April 25, 2006. A total of 14 unmarked EFSR females were spawned with 28 males over 4 spawn dates, yielding 87,737 green eggs for an average fecundity of 6,267 eggs per female. These green eggs yielded 78,700 eyed eggs for an 89.7% eye-up rate. A total of 67,000 eyed eggs were shipped to Magic Valley Hatchery for final incubation and rearing. A total of 11,700 eyed eggs were inadvertently mixed with Sawtooth stock eggs and shipped to Hagerman NFH.

The Squaw Creek Trap and weir was installed on March 21 and ran through April 23, 2006. A total of 70 adult "B-run" adults (31 males / 39 females) and 23 "A-run" adults (13 males / 10 females) were trapped. All marked B-run adults were transferred to the East Fork trapping facility for pre-spawn holding. All A-run fish and one A-run unmarked female were released upstream of the Squaw Creek weir for volitional spawning. . Age class, gender, and length frequency data is provided in Appendices Q and R and Table 5.

Squaw Creek Trap spawning operations occurred from April 11 through May 2, 2006 over 7 spawn dates. All spawning was conducted at the East Fork Salmon River trap/spawn facility, with spawn activities from the 33 females yielding a total of 210,516 green eggs for a mean fecundity of 6,379 eggs per female. These green eggs yielded 150,015 eyed eggs or a 71.3% eye-up rate. These eggs were shipped to Magic Valley Hatchery for final incubation and rearing.

STEELHEAD PRODUCTION

Spawning Operations

Sawtooth Trap

Sawtooth Fish Hatchery spawning operations occurred from April 3 through May 1 in 2006. A total of 452 females were crossed with 452 males over 12 spawning days to produce 2,338,443 green eggs and a mean fecundity of 5,174 eggs per female. Total green egg take yielded 2,049,530-eyed eggs for a percent survival to the eyed-stage of development average of 87.6% (Table 1).

Eyed egg transfers to Magic Valley Steelhead Hatchery and Hagerman National Fish Hatchery totaled 444,900 and 1,129,080-eyed eggs, respectively (Table 4). Eggs were made available to biologists from the Shoshone-Bannock Tribe totaling 309,750. Eyed egg transfer totaled 1,883,730 (Table 3). All unwanted or remaining eggs were culled as development progressed beyond the window of transport safety, as determined by temperature-unit accumulation. Eggs were made available on three additional spawning days to the SBT tribe for their experimental study of steelhead in the Yankee Fork. The study includes genetic DNA typing to differentiate steelhead produced from the SBT egg box project from all other steelhead produced naturally or planted artificially in the watershed. Each steelhead used in broodstock crosses at SFH to supply the eyed eggs (test fish) will be genotyped so all progeny will later be identifiable when captured and sampled as F1 juveniles and F1 adults.

East Fork Salmon River Trap

A total of 14 unmarked East Fork Natural females and 28 unmarked East Fork Natural males were retained for natural-production spawn crosses in 2006, with spawning operations occurring from April 11 through April 25 (4 spawn dates). Spawning activities from the 14 unmarked females yielded a total of 87,737 green eggs for a mean fecundity of 6,267 eggs per female. Unmarked fish could be from hatchery or natural origin. A total of 78,700 eyed eggs were obtained from natural-production crosses, for a percent survival to the eyed-stage of development average of 89.7% (Table 2).

All eyed eggs (67,000) produced from EFSR Natural crosses were transferred to the Magic Valley Steelhead Hatchery for final incubation and rearing (Table 3).

Table 1. 2006 Sawtooth Steelhead Spawn Data.

Fish Disposition		**Males**	**Females**
Pre-Spawning Mortality		0	0
Spawned		452	452
Killed: Not Used		0	0
Released Above Weir		13	9
Other		651	365
	Totals:	**1,116**	**826**

Males Spawned	Females Spawned	Eggs Per Female	Number of Green Eggs	Number of Eyed Eggs	Percent Eye-up
452	452	5,174	2,338,443	2,049,530	87.6

Age Class of Adults	MALES		FEMALES		TOTAL	
	No.	%	No.	%	No.	%
Hatchery 1-Oceans	884	67.22	431	32.78	1315	88.02
Hatchery 2-Oceans	44	24.58	135	75.42	179	11.98
Natural 1-Oceans	6	46.15	7	53.85	13	44.83
Natural 2-Oceans	8	50.0	8	50.0	16	55.17
Total 1-Oceans	890	67.02	438	32.98	1328	87.20
Total 2-Oceans	52	26.67	143	73.33	195	12.80

Table 2. East Fork Salmon River Steelhead Spawn Data.

Males Spawned	Females Spawned	Eggs Per Female	Number of Green Eggs	Number of Eyed Eggs	Percent Eye-up
28	14	6,267	87,737	78,700	89.7

Disposition at East Fork.

Fish Disposition		**Males**	**Females**
Pre-Spawning Mortality		0	0
Spawned		28	14
Killed: Not Used		0	2
Released Above Weir		78	79
Other		0	0
	Totals:	102	95

Table 3. BY06 Steelhead Eyed Egg Or Fry Shipments .

HATCHERY or OFF-SITE LOCATION	NUMBER SHIPPED	STOCK
Shoshone-Bannock Tribe	309,750	Sawtooth
Hagerman National Fish Hatchery	1,129,080 212,000	Sawtooth Pahsimeroi
Magic Valley Fish Hatchery	444,900 67,000 150,015 547,500	Sawtooth East Fork Squaw Creek Pahsimeroi
Total Eggs Shipped	**759,500**	**Pahsimeroi**
Total Eggs Shipped	**1,883,730**	**Sawtooth**
Total Eggs Shipped	**67,000** **150,015**	**East Fork** **Squaw Creek**
Total Eggs Shipped	**2,860,245**	**All Stocks**

Table 4. Squaw Creek Steelhead Spawn Data.

Fish Disposition		**Males**	**Females**
Pre-Spawning Mortality		0	0
Spawned		25	33
Killed: Not Used		7	7
Released Above Weir		12	9
Other		0	0
	Totals:	44	49

Males Spawned	Females Spawned	Eggs Per Female	Number of Green Eggs	Number of Eyed Eggs	Percent Eye-up
25	33	6,379	210,516	150,015	71.3

Note: There were 14 males used twice.

Age Class of Adults	MALES		FEMALES		TOTAL	
	No.	%	No.	%	No.	%
Hatchery 1-Oceans	0	0	0	0	0	0
Hatchery 2-Oceans	44	47.8	48	52.2	92	100
Natural 1-Oceans	0	0	0	0	0	0
Natural 2-Oceans	0	0	1	100	1	100
Total 1-Oceans	0	0	0	0	0	0
Total 2-Oceans	44	47.3	49	52.7	93	100

Table 5. Sawtooth Steelhead Aging Criteria.

Males	<=68 cm - 2-year old	1-Ocean
	>68 cm - 3 or 4 year old	2-Ocean
Females	<=65 cm - 2-year old	1-Ocean
	>65 cm - 3 or 4 year old	2-Ocean

All unwanted or remaining eggs were culled as development progressed beyond the window of transport safety, as determined by temperature-unit accumulation.

Squaw Creek Trap

A total of 33 marked "B-run" females and 25 marked "B-run" males were retained for hatchery-production spawn crosses in 2006, with spawning operations occurring from April 11 through May 2 (7 spawn dates). All spawning was conducted at the East Fork Salmon River trap/spawn facility, with spawn activities from the 33 females yielding a total of 210,516 green eggs for a mean fecundity of 6,379 eggs per female. A total of 150,015 eyed eggs were obtained from hatchery-production crosses, for a percent survival to the eyed-stage of development of 71.3% (Table 4). Males used in hatchery-production crosses included under B-sized returning marked males from the Squaw Creek trap that by real-time, CWT reading indicated that the fish were B-origin fish.

All eyed eggs (150,015) produced from East Fork/Squaw Creek "B-run" hatchery crosses were transferred to the Magic Valley Steelhead Hatchery for final incubation and rearing (Table 3).

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 in insulated coolers.

In 2006, an estimated 1,251,522 green eggs were transferred to Sawtooth from a total of 243 females (5,150 mean fecundity). Total egg transfers yielded 759,500-eyed eggs, for a percent survival to the eyed-stage of development average of 60.7% (Table 3). Eyed egg transfers to Magic Valley Steelhead Hatchery (MVSH) and Hagerman National Fish Hatchery (HNFH) totaled 547,500 and 212,000-eyed eggs, respectively. All Pahsimeroi eggs incubated at Sawtooth were destined for MVSH and HNFH to satisfy production requests. A total of 759,500-eyed eggs were transferred to HNFH and MVSH, with all remaining eggs culled after production requests had been met (Table 4). All females spawned for HNFH were viral tested.

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 no female pre-spawning mortalities at Sawtooth in 2006.

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 Jensorter 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 full of well water. Then the cooler was strapped shut and shipped.

Release of BY 06

Hagerman NFH released BY06 Sawtooth stock steelhead smolts directly below the Sawtooth FH weir into the Salmon River. The total BY06 smolt release was 821,364 fish at 4.19 fpp. Direct releases into Yankee Fork totaled 249,269 fish at 4.29 fpp

Magic Valley released BY06 Sawtooth stock steelhead smolts along with Pahsimeroi stock smolts into the Salmon River at Colston Corner, McNabb Point, and Tunnel Rock totaling 345,639 fish at 4.17 fpp. Also, MVFH released Sawtooth stock smolts into Valley Creek (54,640 @ 4.25 fpp) and Yankee Fork (91,234 @ 4.30 fpp).

Magic Valley released East Fork Natural stock above the East Fork weir totaling 50,592 @ 4.15 fpp. Upper Salmon River 'B' stock totaling 63,597 into the Squaw Creek Pond for acclimation and 63,669 @ 4.42 fpp were released directly into Squaw Creek. (See Appendix L).

Fish Marking

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

CONCLUSIONS/RECOMMENDATIONS

Sawtooth Fish Hatchery

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

When chilled water potential is realized at Pahsimeroi Fish Hatchery, then eyed egg shipments should be from Pahsimeroi Fish Hatchery directly to rearing hatcheries.

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	Returns
1979	1981	None	-	-	-	291
1980	1982	None	17	66	165	248
1981	1983	185,375	49	1,182	796	2,027
1982	1984	230,550	292	922	875	2,086
1983	1985	420,060	51	452	1,318	1,821
1984	1986	347,484	17	86	190	293
1985	1987	1,185,060	80	286	164	530
1986	87-88	1,705,500	412	1,212	297	1,921
1987	88-89	2,092,000	112	201	63	376
1988	89-90	1,895,60	68	496	480	1,044
1989	90-91	652,600	45	78	27	150
1990	91-92	1,273,400	29	63	6	98
1991	92-93	774,583	6	15	28	49
1992	93-94	213,830	16	101	96	213
1993	94-95	334,313	27	148	133	308
1994	1996	25,006	10	33	39	82
1995	1997	4,756	4	78	110	192
1996	1998	43,161	79	500	212	791
1997	1999	223,240	376	1,664	730	2,770
1998	2000	123,425	227	958	521	1,706
1999	2001	57,134	98	193	83	374
2000	2002	385,761	522	1,281	175	1,978
2001	2003	1,105,169	654	1182	113	1,949
2002	2004	821,415	204	552	(2007)	
2003	2005	134,812	96	(2007)	(2008)	
2004	2006	1,552,544*	(2007)	(2008)	(2009)	
2005	2007	995,262	(2008)	(2009)	(2010)	

*This number includes 135,934 fish released into the Yankee Fork

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	Returns
1979	1981	-	-	-	69	69
1980	1982	-	-	26	59	85
1981	1983	-	-	193	102	317
1982	1984	-	-	87	181	268
1983	1985	-	22	90	519	631
1984	1986	108,700	1	23	51	75
1985	1987	195,100	6	55	27	88
1986	1988	249,200	22	106	32	160
1987	1989	305,300	12	23	23	58
1988	1990	514,600	7	27	65	99
1989	1991	98,300	15	18	13	46
1990	1992	79,300	6	2	0	8
1991	1993	35,172	0	0	0	0
1992	1994	12,368	0	7	0	7
1993	1995	48,845	3	7	ND	10

No Trapping Operations 1998-2003 for Chinook.

See Captive Rearing Program for Salmon River Chinook Salmon Fishery Research Project Progress Report for years' 2004 and 2005. (Dan Baker et al.)

[a] Age classes based upon the following lengths: 3-yr. old: ≤ 25 in, 4-yr. old: 25 to 32 in 5-yr. old: >33 in.
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)

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

Hatchery Adult Returns

Brood Year	Release Year	Number Released	Adult Returns 3-year	4-year	5-year	Returns
1991	92-93	774,583	2	11	7	20
1992	93-94	213,830	8	23	26	57
1993	94-95	334,313	21	72	23	116
1994	1996	25,006	1	3	3	7
1995	1997	4,756	0	12	37	49
1996	1998	43,161	60	135	32	227
1997	1999	223,240	279	1,219	327	1,825
1998	2000	123,425	176	531	131	838
1999	2001	57,134	65	91	73	229
2000	2002	385,761	476	926	175	1,577
2001	2003	1,105,169	407	1182	67	1,656
2002	2004	821,415	205	358	(2007)	-
2003	2005	134,769	40	(2007)	(2008)	
2004	2006	1,552,544	(2007)	(2008)	(2009)	
2005	2007	995,262	(2008)	(2009)	(2010)	

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

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

[a] Age classes based upon the following lengths: 3-yr. old: ≤ 64 cm,
4-yr. old: 25 to 32 in 5-yr. old: >33 in.
ND means no data, trap not operated.

Appendix B. Sawtooth Fish Hatchery Water Quality Analysis of the Salmon River.

	2005	2002	1999	1996		1993	1985
Nutrients (ppm)							
T. Ammonia as N	<0.01	<0.01	0.02	0.027		0.043	0.045
T. NO2 + NO3 as N	NR	NR	NR	0.006		0.073	0.088
T. Kjeldahl Nitrogen as N	0.17	<0.10	<0.10	0.20	<.05	0.26	
T. Phosphorus as P	0.017	0.0100.005	<.05	<.05		0.02	
Ortho Phosphate as P	<0.005	0.009	<0.005	NR		0.019	<.003
Minerals (ppm)							
Sp. Conductance (umhos/cm)	159.0	168.0	159.0	167.0		157.0	135.0
Hardness as CaCO3	78.3	78.0	75.7	80.0		68.0	62.0
T. Alkalinity as CaCO3	79.8	77.5	75.2	79	74	63	
Bicarbonate Alk. as CaCO3	79.8	77.5	75.2	79	74	63	
Calcium	<26.3	27.9	26.8	27.4	24	20.8	
Magnesium	2.11	1.93	2.12.9		1.9	1.8	
Sodium	4.70	4.69	4.26	5.5	7.0	3.8	
Potassium	0.75	0.53	0.48	0.7	0.7	<1	
Fluoride	0.82	0.83	0.60	0.29	0.85	0.58	
Sulphate as SO4	6.73	5.23	5.50	12	5	<6	
Total Metals (ppb)							
Arsenic, Total	<0.003	<0.003	<0.005	<10	<10	<10	
Boron, Total	<0.05	0.01	NR	<10	<80	1	
Cadmium, Total	<0.0005	<0.0005	<0.0005	<1	<1	<1	
Chromium, +6	<0.05	NR	NR	NR	<10	<50	
Chromium, Total	NR	<0.002	<0.002	<2	<10	<50	
Copper, Total	<0.01	<0.01	<0.01	<10	<10	<10	
Iron, Total	0.02	0.03	0.02	20	20	120	
Lead, Total	<0.002	0.004	<0.002	<5	<5	<50	
Manganese, Total	<0.01	<0.01	<0.01	1	<10	10	
Mercury, Total	<0.0002	<0.0002	<0.0002	<.5	<.5	<.5	
Nickel, Total	0.007	<0.003	<0.003	<5	<10	<50	
Silver, Total	<0.002	<0.002	<0.002	<1	<1	<1	
Zinc, Total	0.004	0.002	<0.001	3	<2	<1	
Miscellaneous							
Turbidity (NTU)	0.29	0.36	0.98	0.45	<1	1.8	
pH (SU)	7.87	7.94	7.97	8.04	8.0	8.1	
Total Cyanide (ppm)	<0.005	<0.005	<0.005	<.005		<.005	<.005
Total Residue	NR	NR	NR	NR	NR	97	

Appendix B1.……Sawtooth Fish Hatchery Water Quality Analysis of Well 1 & 2 Mix

	2005	2002	1999
Nutrients (ppm)			
Ammonia as N	<0.01	<0.01	0.02
T. Phosphorus as P	0.017	0.012	7.60
Minerals (ppm)			
Hardness	78.3	81.0	81.3
Alkalinity	79.8	79.0	85.7
Bicarbonate Alk. as CaCO3	79.8	79.0	85.7
Total Metals (ppb)			
Arsenic	<0.003	0.005	<0.005
Cadmium	<0.0005	<0.0005	<0.0005
Chloride	0.93	0.72	0.56
Cobalt	NR	<0.01	<0.01
Copper	<0.01	<0.01	<0.01
Lead	<0.002	<0.002	<0.002
Mercury	<0.0002	<0.0002	<0.0002
Selenium	<0.005	0.013	<0.005
Miscellaneous			
T. Cyanide (ppm)	<0.005	<0.005	<0.005

Appendix C. Sawtooth Fish Hatchery Results of Disease Sampling.(only positive results are listed)

BY05 Juvenile Chinook

Case #	Stock	Date	Data
06-233	Saw	07/05/06	MAS; DFAT 0/10, AEROMONAS HYDROPHILA 8/10 Waiting for Pre-liberation results

Return Year 2005 Chinook Broodstock

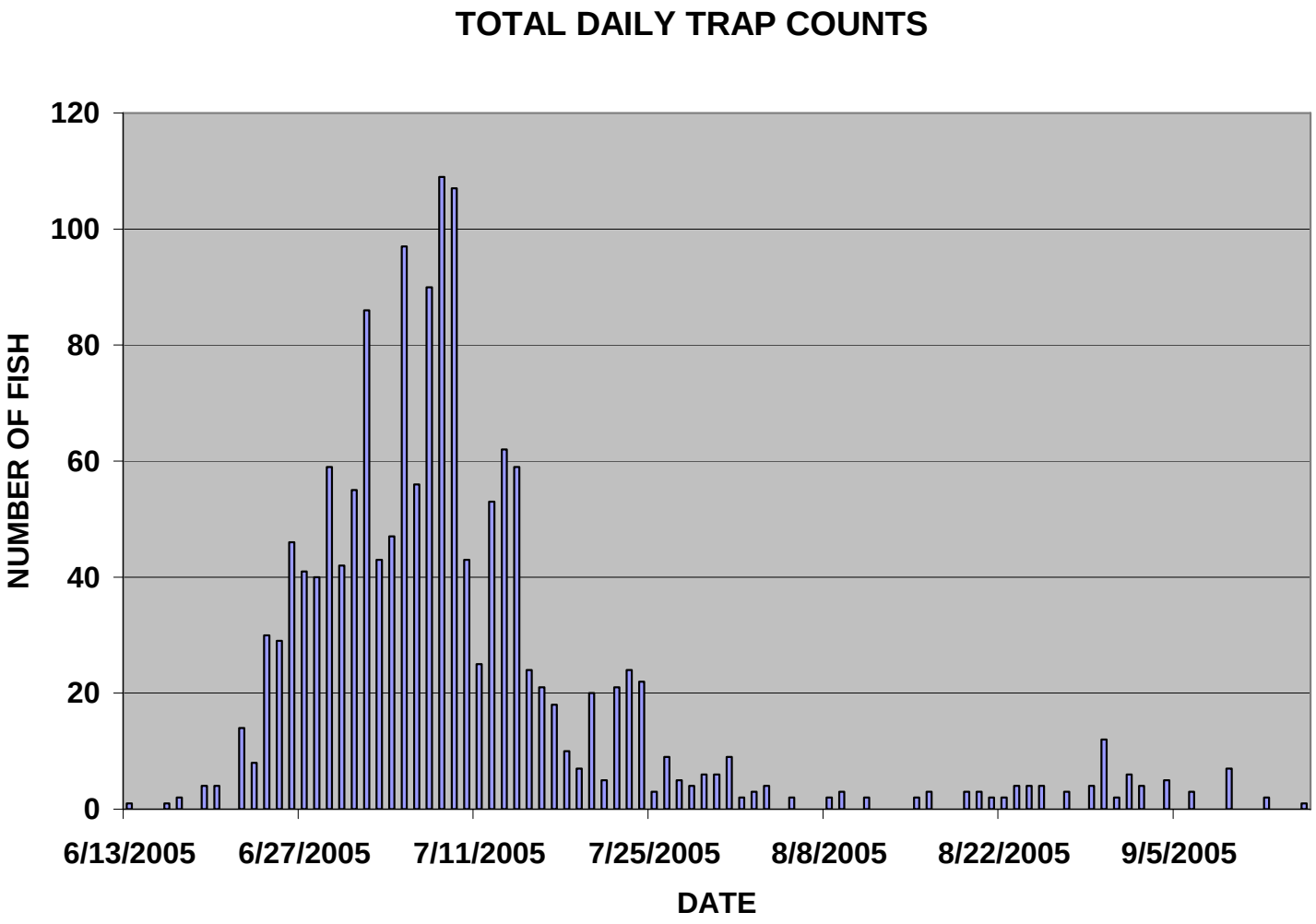
Case #	Stock	Date	Data
05-351	Saw	08/11/05	RS; ELISA 5/8 (5 LOW)
05-352	Saw	08/15/05	RS; ELISA 6/15 (6 LOW),
05-356	Saw	08/18/05	RS; ELISA 2/17 (2 LOW)
05-373	Saw	08/22/05	RS; ELISA 11/28 (10 LOW , 1 HIGH)
05-355	Saw	08/25/05	BKD;VIRO 0/34,NAVHS 0/5,ELISA 17/34 (15 LOW, 2 HIGH
05-354	Saw	08/29/05	RS; ELISA 28/72 (28 LOW), WHD; PTD 1/1 (x5)
05-390	Saw	09/01/05	RS; ELISA 25/73 (25 LOW),PTD-
05-359	Saw	09/06/05	RS; ELISA 13/36 (13 LOW)
05-393	Saw	09/09/05	RS; ELISA 2/8 (1 LOW , 1 HIGH), VIRO 0/6

Return year 2006 Steelhead Broodstock

Case #	Stock	Date	Data
06-112	Saw	04/03/06	IHNV; VIRO 2/10 (x2)
06-188	Saw	04/06/06	RS; ELISA 11/42 (11 LOW), PTD 0/15
06-135	Saw	04/13/06	BKD; VIRO 0/40, ELISA 3/18 (3 LOW), PTD 0/5
06-201	Squaw Creek	04/28/06	RS; ELISA 2/15 (2 LOW)
06-199	Squaw Creek	04/11/06	RS; ELISA 1/7 (1LOW)
06-195	Squaw Creek	04/25/06	RS; ELISA 3/24 (3 LOW)

No Positives found at the East Fork in 2006.

Appendix D. Sawtooth Fish Hatchery Spring Chinook Run Timing – 2005. All Fish N = 1561



Appendix E. Sawtooth Fish Hatchery Age Class Totals from All Trapped Chinook, Return Year 2005.

Sawtooth	Length (Fk)	Year class	Number
Males	≤ 25 in	3-year old	204
	25-32 in	4-year old	594
	> 33 in	5-year old	52
Subtotal			**850**
Females	≤ 25 in	3-year old	0
	25-32 in	4-year old	586
	> 33 in	5-year old	125
Subtotal			**711**
Total			**1561**

Appendix E.1. Sawtooth Fish Hatchery Spring Chinook Salmon Length Frequency Distribution for 2005.

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
37	2	37	1	37	1	37	0	37	0
38	1	38	1	38	0	38	0	38	0
39	0	39	0	39	0	39	0	39	0
40	1	40	0	40	0	40	0	40	1
41	0	41	0	41	0	41	0	41	0
42	2	42	2	42	0	42	0	42	0
43	3	43	1	43	0	43	0	43	2
44	5	44	1	44	2	44	0	44	2
45	5	45	4	45	1	45	0	45	0
46	9	46	6	46	2	46	0	46	1
47	8	47	3	47	4	47	0	47	1
48	6	48	3	48	3	48	0	48	0
49	16	49	9	49	6	49	0	49	1
50	17	50	12	50	3	50	0	50	2
51	13	51	10	51	2	51	0	51	1
52	14	52	10	52	2	52	0	52	2
53	10	53	4	53	5	53	0	53	1
54	8	54	4	54	2	54	0	54	2
55	5	55	4	55	1	55	0	55	0
56	5	56	4	56	1	56	0	56	0
57	5	57	5	57	0	57	0	57	0
58	3	58	2	58	1	58	0	58	0
59	8	59	5	59	2	59	0	59	1
60	11	60	6	60	2	60	0	60	3
61	4	61	2	61	1	61	0	61	1
62	15	62	7	62	3	62	0	62	5
63	20	63	13	63	1	63	0	63	6
64	8	64	0	64	1	64	0	64	7
65	43	65	30	65	3	65	0	65	10
66	30	66	23	66	3	66	0	66	4
67	53	67	35	67	9	67	0	67	9
68	53	68	39	68	6	68	0	68	8
69	54	69	38	69	8	69	0	69	8
70	48	70	39	70	3	70	0	70	6
71	39	71	29	71	3	71	0	71	7
72	53	72	45	72	3	72	0	72	5
73	43	73	31	73	4	73	0	73	8
74	30	74	23	74	1	74	0	74	6
75	33	75	25	75	2	75	0	75	6
76	27	76	22	76	0	76	0	76	5

Appendix E1. Continued.

77	32	77	21	77	6	77	0	77	5
78	16	78	13	78	2	78	0	78	1
79	15	79	11	79	2	79	0	79	2
80	14	80	10	80	4	80	0	80	0
81	3	81	1	81	0	81	0	81	2
82	8	82	6	82	1	82	0	82	1
83	10	83	7	83	2	83	0	83	1
84	6	84	5	84	1	84	0	84	0
85	3	85	3	85	0	85	0	85	0
86	7	86	3	86	1	86	0	86	3
87	3	87	1	87	0	87	0	87	2
88	3	88	1	88	1	88	0	88	1
89	0	89	0	89	0	89	0	89	0
90	0	90	0	90	0	90	0	90	0
91	2	91	0	91	0	91	0	91	2
92	2	92	0	92	0	92	0	92	2
93	6	93	1	93	0	93	0	93	5
94	1	94	0	94	1	94	0	94	0
95	2	95	0	95	0	95	0	95	2
96	0	96	0	96	0	96	0	96	0
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	3	100	0	100	1	100	0	100	2
101	1	101	0	101	0	101	0	101	1
102	0	102	0	102	0	102	0	102	0
103	2	103	0	103	0	103	0	103	2
TOTALS:	**850**		**581**		**113**		**0**		**156**

Age 3 Hatchery Males Released:	46	Age 3 Natural Males Released:	39
Age 4 Hatchery Males Released:	60	Age 4 Natural Males Released:	93
Age 5 Hatchery Males Released:	7	Age 5 Natural Males Released:	24
Total Hatchery Males Released:	113	Total Natural Males Released:	156

Age 3 Hatchery Males Ponded:	119	Age 3 Natural Males Ponded:	0
Age 4 Hatchery Males Ponded:	442	Age 4 Natural Males Ponded:	0
Age 5 Hatchery Males Ponded:	20	Age 5 Natural Males Ponded:	0
Total Hatchery Males Ponded:	581	Total Natural Males Ponded:	0

Appendix E1. continued

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
37	0	37	0	37	0	37	0	37	0
38	0	38	0	38	0	38	0	38	0
39	0	39	0	39	0	39	0	39	0
40	0	40	0	40	0	40	0	40	0
41	0	41	0	41	0	41	0	41	0
42	0	42	0	42	0	42	0	42	0
43	0	43	0	43	0	43	0	43	0
44	0	44	0	44	0	44	0	44	0
45	0	45	0	45	0	45	0	45	0
46	0	46	0	46	0	46	0	46	0
47	0	47	0	47	0	47	0	47	0
48	0	48	0	48	0	48	0	48	0
49	0	49	0	49	0	49	0	49	0
50	0	50	0	50	0	50	0	50	0
51	0	51	0	51	0	51	0	51	0
52	0	52	0	52	0	52	0	52	0
53	0	53	0	53	0	53	0	53	0
54	0	54	0	54	0	54	0	54	0
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	0	64	0	64	0	64	0	64	0
65	3	65	2	65	0	65	0	65	1
66	9	66	6	66	1	66	0	66	2
67	12	67	10	67	1	67	0	67	1
68	25	68	18	68	2	68	0	68	5
69	12	69	8	69	3	69	0	69	1
70	31	70	24	70	2	70	0	70	5
71	33	71	28	71	3	71	0	71	2
72	35	72	30	72	2	72	0	72	3
73	40	73	31	73	4	73	0	73	5
74	62	74	50	74	6	74	0	74	6
75	59	75	51	75	7	75	0	75	1
76	64	76	58	76	4	76	0	76	2

Appendix E1. Continued.

77	60	77	49	77	9	77	0	77	2
78	52	78	35	78	9	78	0	78	8
79	41	79	35	79	2	79	0	79	4
80	28	80	22	80	0	80	0	80	6
81	12	81	9	81	2	81	0	81	1
82	8	82	5	82	1	82	0	82	2
83	18	83	12	83	1	83	0	83	5
84	9	84	2	84	0	84	0	84	7
85	6	85	1	85	1	85	0	85	4
86	7	86	4	86	1	86	0	86	2
87	12	87	4	87	1	87	0	87	7
88	8	88	1	88	2	88	0	88	5
89	10	89	3	89	1	89	0	89	6
90	11	90	3	90	0	90	0	90	8
91	7	91	2	91	0	91	0	91	5
92	8	92	2	92	2	92	0	92	4
93	7	93	3	93	1	93	0	93	3
94	9	94	2	94	1	94	0	94	6
95	3	95	1	95	1	95	0	95	1
96	4	96	2	96	0	96	0	96	2
97	1	97	1	97	0	97	0	97	0
98	3	98	0	98	1	98	0	98	2
99	0	99	0	99	0	99	0	99	0
100	1	100	1	100	0	100	0	100	0
101	1	101	0	101	0	101	0	101	1
102	0	102	0	102	0	102	0	102	0
103	0	103	0	103	0	103	0	103	0
TOTALS:	711		515		71		0		125

Age 3 Hatchery Females Released:	0	Age 3 Natural Females Released:	0
Age 4 Hatchery Females Released:	58	Age 4 Natural Females Released:	57
Age 5 Hatchery Females Released:	13	Age 5 Natural Females Released:	68
Total Hatchery Females Released:	71	Total Natural Females Released:	125

Age 3 Hatchery Females Ponded:	0	Age 3 Natural Females Ponded:	0
Age 4 Hatchery Females Ponded:	471	Age 4 Natural Females Ponded:	0
Age 5 Hatchery Females Ponded:	44	Age 5 Natural Females Ponded:	0
Total Hatchery Females Ponded:	515	Total Natural Females Ponded:	0

Appendix F. Sawtooth Fish Hatchery Age Class Breakdown by Released Chinook, Return Year 2005.

Sawtooth	Length (Fk)	Age Class		Number
Males	≤ 25 in	3-year old		85
	25-32 in	4-year old		153
	> 33 in	5-year old		31
Total Males				269
Females	≤ 33 in	4-year old	115	
	> 33 in	5-year old	81	
Total Females				196
Total released				**465**

Appendix G. Sawtooth Fish Hatchery Spring Chinook Spawning Matrix, 2005 return year.

Group	Sex	Number in Group
All Fish Combined	Male	156 (14 jacks)
	Female	297

Appendix H. Survival Table for Chinook (BY05) and Steelhead (BY06) from Green Eggs to Released Smolts, at Sawtooth Fish Hatchery, East Fork, and Squaw Creek sites Sites.

Chinook Eggs

	Green Egg Number	Eyed Egg Number	Percent Survival	Released Smolts
Sawtooth Fish Hatchery:	1,183,537*	1,051,935	88.9	995,262

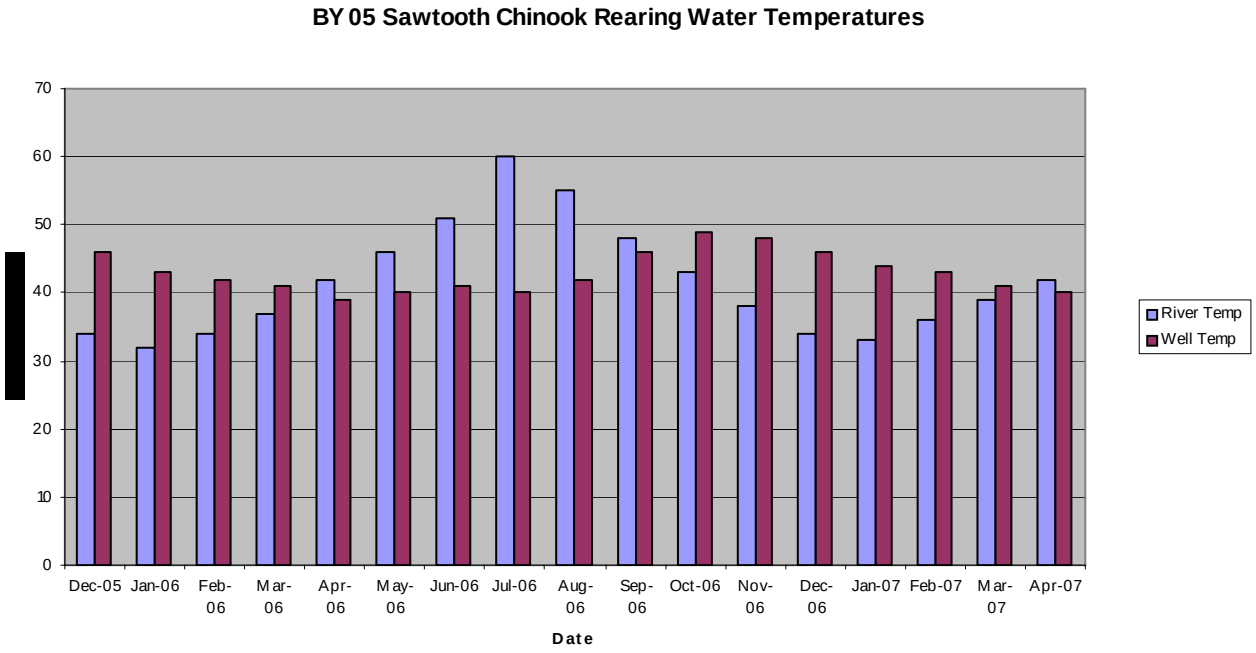
Steelhead Eggs

	Green Egg Number	Eyed Egg Number	Percent Survival
Sawtooth Fish Hatchery:	2,338,443	2,049,530	87.6
Distributed as Follows:			
1,129,080 Hegerman NFH			
309,750 Shoshone-Bannock			
444,900 Magic Valley FH			
East Fork:	87,737	78,700	89.7
Distributed as Follows:			
67,000 Magic Valley FH			
11,700 Hagerman NFH			
Squaw Creek:	210,516	150,015	71.3
Distributed as Follows:			
150,015 Magic Valley FH			
Pahsimeroi FH:	1,251,522	759,500	60.7
Distributed as Follows:			
212,000 Hagerman NFH			
547,500 Magic Valley FH			

All steelhead raised at other hatcheries.

*Numbers do not include 15,100 culled eggs from eight females. Females were paired in incubation trays and culled because of high ELISA results for four females.

Appendix I. Rearing Water Monthly Average Temperatures, BY05 Spring Chinook at Sawtooth Fish Hatchery.



Appendix I.1. Feed Schedule for Sawtooth Chinook, BY05.

Fpp	% BW Fed	Feed Size	Timing	
1816---825		.035	str #2	11/05 – 01/06
1816---825		.035	str #2	01/06- 02/06
825-----189		.035	str #3/1.0/1.3mm	02/06 - 03/06
324-----189		.023	1.3mm	03/06 - 04/06
189-----91		.024	1.5mm	04/06 – 05/06
189-----91		.024	1.5mm	05/06 – 06/06
189-----91		.024	1.5mm	06/06 – 06/06
91-------53		.022	1.5/2.0mm	07/06 – 08/06
53------36		.020	2.0/2.5mm	08/06 – 09/06
36------23		.020	2.5mm	9/056– 10/06
<23		Maintenance	2.5/3.0	10/06- release

Appendix J. Summary of Marked Spring Chinook Released, Brood Year 2005.

Mark	Number Released	Location
Sawtooth Fish Hatchery Stock		
Adipose Clip	858,615 (Reserve)	SFH Weir (4/11/07)
AD/CWT	121,713 (Reserve)	SFH Weir (4/11/07)
AD/PIT	14,934 (Reserve)	SFH Weir (4/11/07)
Total Weir Release	**995,262**	
Pahsimeroi Stock		
Adipose Clip	993,604 (Reserve)	
Ad/CWT	55,523 (Reserve)	
All 989,127 transferred to Pahsimeroi FH October 24, 25, and 26, 2006		

Appendix K. Summary of Sawtooth Fish Hatchery Spring Chinook Smolt Releases, Brood Year 2005

Raceway	Number	Tag Code	Fish per Pound	Pounds	Designation//Mark
*L1	121,713	10-93-77, 10-27-80	16.3	7467	Reserve AD/CWT
*L2	83,410		11.6	7191	Reserve AD
*L9	131,650	14,934 PIT	20.2	6517	Reserve AD/PIT
*L10	131,009		17.5	7486	Reserve AD
*L11	131,876		17.4	7569	Reserve AD
*L12	132,759		18.7	7092	Reserve AD
*L13	130,165		18.1	7181	Reserve AD
*L14	132,680		18.0	7361	Reserve AD
Total	**995,262**		**17.2**	**57,864**	

*Released 4/11/07 Sawtooth Fish Hatchery Weir

Appendix L. Sawtooth Fish Hatchery Summary of BY06 Steelhead Smolt Releases and Marks.

Date	Stock	Plant Site	Number Released	Mark	CWT	PIT	Rearing Hatchery
4/9/07	Sawtooth A	Sawtooth Weir	300	AD	---	300	Hagerman National
4/9-30/07	Sawtooth A	Sawtooth Weir	81,929	AD	81,929	---	Hagerman National
4/9-30/07	Sawtooth A	Sawtooth Weir	739,435	AD	---	---	Hagerman National
5/03-09/07	Sawtooth A	Yankee Fork	142,342	---	---	300	Hagerman National
5/01-09/07	Sawtooth A	Yankee Fork	105,513	AD	---	---	Hagerman National
4/27/07	Sawtooth A	Yankee Fork	91,234	AD and AD/CWT	30,567	298	Magic Valley
4/30/07	Sawtooth A	Valley Creek	54,640	---	---	299	Magic Valley
4/20-23/07	Saw A/Pah A	Tunnel Rock	60,439	AD	---	---	Magic Valley
4/19-20/07	Saw A/Pah A	McNabb Point	119,727	AD and AD/CWT	29,770	298	Magic Valley
4/16-17/07	Saw A/Pah A	Colston Corner	165,473	AD and AD/CWT	31,981	300	Magic Valley
		TOTAL	1,561,032		174,247	1,795	

Date	Stock	Plant Site	Number Released	Mark	CWT	PIT	Rearing Hatchery
5/01-02/07	Dworshak B	East Fork Salmon River	102,551	AD	---	295	Hagerman National
4/9-10/07	Dworshak B	Squaw Creek Acclimation Pond	59,567	AD/CWT	59,567	500	Magic Valley
4/25-27/07	Dworshak B	Squaw Creek Direct Release	132,159	AD	---	481	Magic Valley
4/23-25/07	Dworshak B	East Fork Salmon River (lower)	207,487	AD	---	299	Magic Valley
		TOTAL	501,764		59,567	1,575	
5/01/06	Natural B	East Fork Salmon River (above E.F. weir)	50,592	---	50,592	---	Magic Valley
4/9-10/07	USB	Squaw Creek Acclimation Pond	63,597	AD/CWT	63,597	500	Magic Valley
4/26/07	USB	Squaw Creek	63,669	AD/CWT	63,669	492	Magic Valley
		TOTAL	127,266		127,266	992	
		TOTAL STEELHEAD SMOLT RELEASE	**2,240,654**		**411,672**	**4,362**	

Appendix L.1. Sawtooth Fish Hatchery Production Cost Table (Includes Chinook BY05, Steelhead BY06, and Sockeye BY05).

Chinook BY 05

Smolt Number	Lbs. Feed	Cost Feed	Lbs of Smolts	Total Cost	Cost per 1,000	Cost per lb.
Sawtooth						
995,262	73,996	$100,095.56	57,864	$249,938	$251.13	$4.31
Pahsimeroi						
989,127	38,515	$0*	35,783**	$62,484	$63.17	$1.74
East Fork						

No BY05 East Fork spring chinook salmon were reared.

Steelhead BY 06

Stock	Green Eggs	Eyed Eggs	Total Cost	Cost per 1,000 eyed eggs
Sawtooth	2,338,443	2,049,530	$95,191	$215.30
Squaw Cr/EF	298,253	228,715	$36,612	$624.69
Pahsimeroi	1,251,522	759,500	$14,645	$51.86
Totals	3,888,218	3,037,745	$146,448	

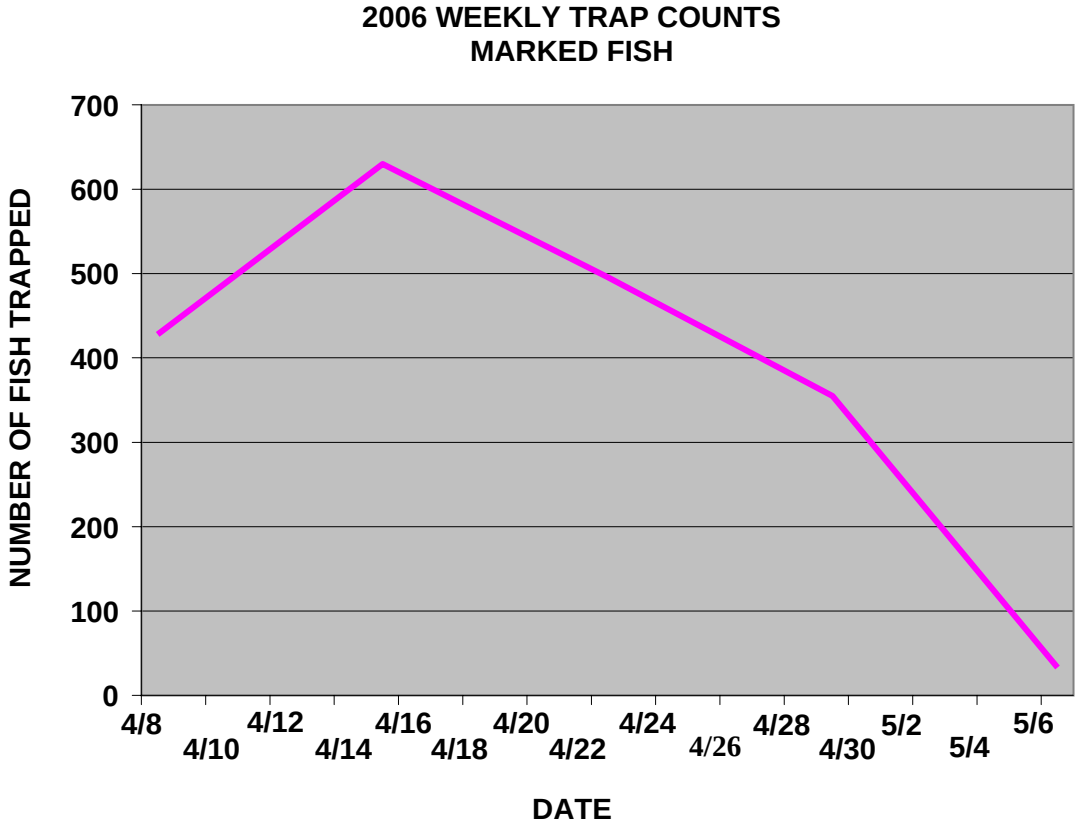
Sockeye BY 05

Pre-Smolt/ Smolt #	Lbs Pre-Smolts/ Lbs Smolts	Total Cost	Cost per 1,000	Cost per lb.
107,292	1,433	$20,210	$188.36	$14.10
46,765	2,235	$9,080	$194.16	$4.06

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 Graph for 2006 Steelhead Trapped at Sawtooth.



*This graph does not include unmarked fish trapped. Twenty-two unmarked steelhead (13 males/ 9 females) were trapped at Sawtooth between April 8 and May 6, 2006.

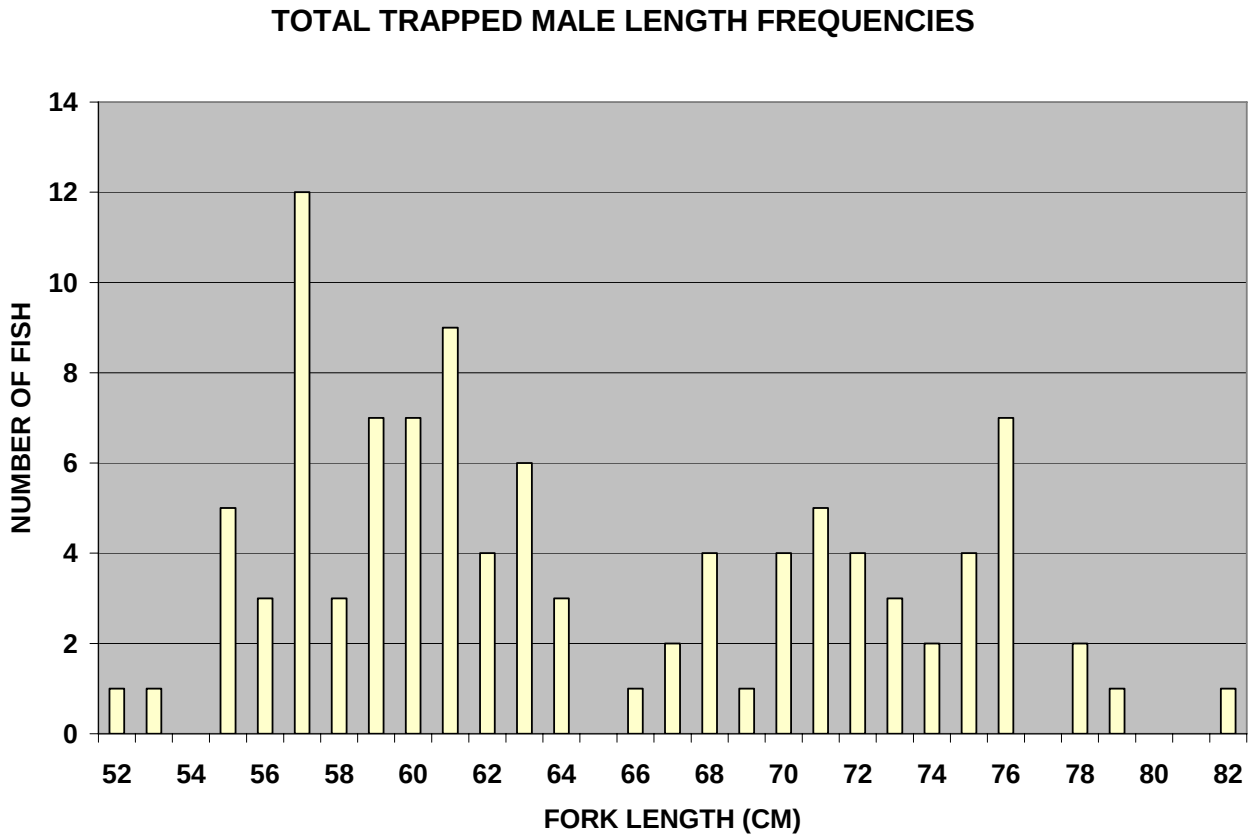
Appendix. N. Sawtooth Fish Hatchery Steelhead Length Frequency Distribution, 2006.

F.L. (cm)	HATCHERY MALES	HATCHERY FEMALES	NATURAL MALES	NATURAL FEMALES		TOTAL TRAPPED MALES	TOTAL TRAPPED FEMALES	TOTAL TRAPPED TOTAL	F.L. (in)
45	0	0	0	0		0	0	0	17.7
46	0	0	0	0		0	0	0	18.1
47	0	0	0	0		0	0	0	18.5
48	0	0	0	0		0	0	0	18.9
49	0	0	0	0		0	0	0	19.3
50	6	3	0	0		6	3	3	19.7
51	9	6	0	0		9	6	15	20.1
52	13	10	0	0		13	10	23	20.5
53	21	15	0	0		21	15	36	20.9
54	48	30	0	0		48	30	78	21.3
55	54	40	0	0		54	40	94	21.7
56	89	55	0	0		89	55	144	22.0
57	94	60	1	0		95	60	155	22.4
58	127	61	0	0		127	61	188	22.8
59	111	52	1	0		112	52	164	23.2
60	114	40	0	0		114	40	154	23.6
61	97	27	1	0		98	27	125	24.0
62	53	18	1	0		54	18	72	24.4
63	35	17	1	0		36	17	53	24.8
64	22	36	1	0		23	36	59	25.2
65	9	48	1	0		10	48	58	25.6
66	13	41	0	2		13	43	56	26.0
67	15	56	0	0		15	56	71	26.4
68	20	49	3	0		23	49	72	26.8
69	26	56	0	0		26	56	82	27.2
70	24	38	0	2		24	40	64	27.6
71	28	26	0	1		28	27	55	28.0
72	18	19	1	2		19	21	40	28.3
73	18	3	0	1		18	4	22	28.7
74	13	5	0	0		13	5	18	29.1
75	7	1	1	0		8	1	9	29.5
76	9	2	0	0		9	2	11	29.9
77	3	2	0	1		3	3	6	30.3
78	3	0	0	0		3	0	3	30.7
79	3	0	0	0		3	0	3	31.1
80	1	0	0	0		1	0	1	31.5
81	0	0	1	0		1	0	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
86	0	0	0	0		0	0	0	33.9
87	0	0	0	0		0	0	0	34.3
88	0	0	0	0		0	0	0	34.6
89	0	1	0	0		0	1	1	35.0
Totals:	**1103**	**817**	**13**	**9**		**1116**	**826**	**1942**	

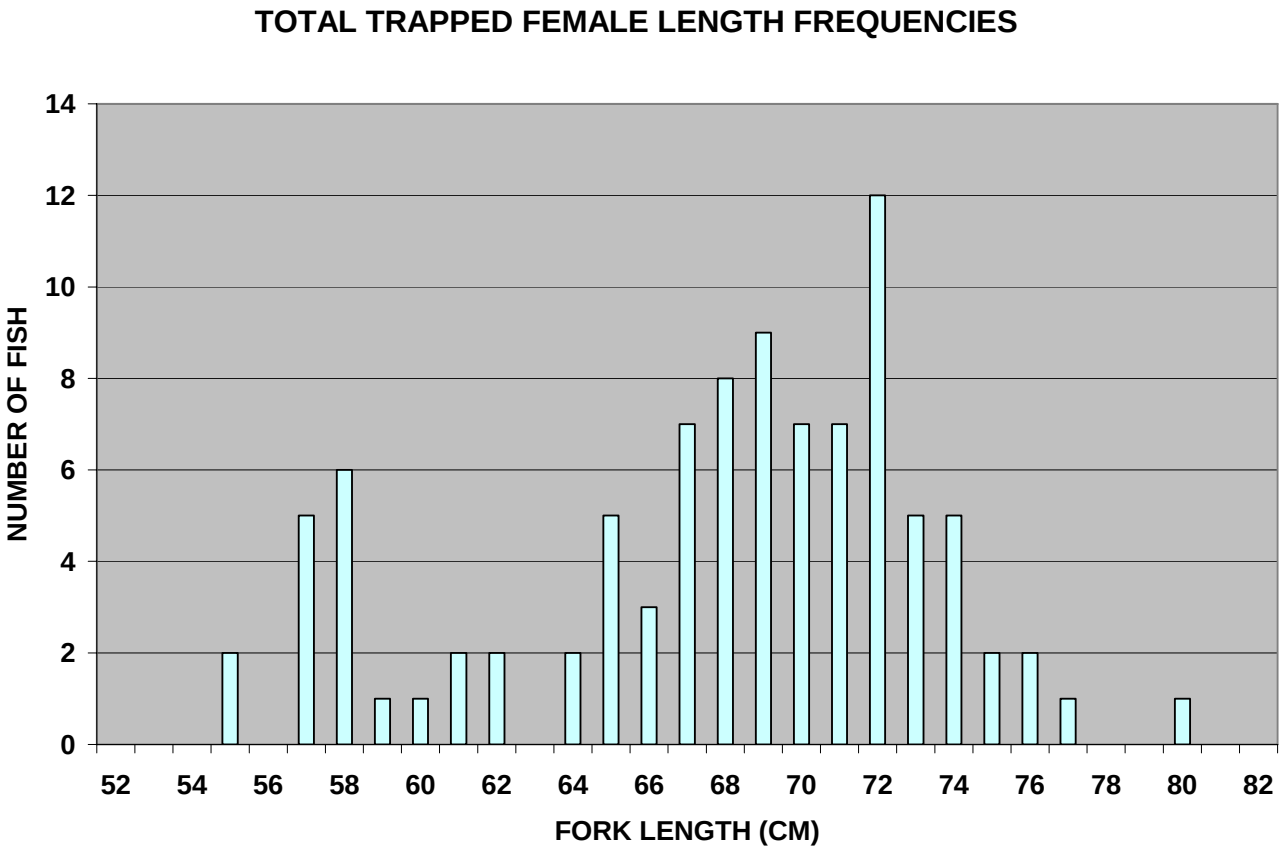
Total Fish Trapped: 1942

1103	Hatchery Males	13	Natural Males	1116	Total Males
817	Hatchery Females	9	Natural Females	826	Total Females
1920	Hatchery Fish	22	Natural Fish	1942	Total Fish

Appendix O. Length Frequency Graphs for Male and Female Steelhead at East Fork Trap.



Appendix O. Continued.



East Fork steelhead females released above the trap, 2006.

Appendix O. Continued. East Fork Steelhead Returns by Age Class and Sex.

Age Class of Adults	MALES		FEMALES		TOTAL	
	No.	%	No.	%	No.	%
Hatchery 1-Oceans	0	0	0	0	0	0
Hatchery 2-Oceans	1	100	0	0	1	100
Natural 1-Oceans	0	0	0	0	0	0
Natural 2-Oceans	101	51.53	95	48.47	196	100
Total 1-Oceans	0	0	0	0	0	0
Total 2-Oceans	102	51.78	95	48.22	197	100

East Fork Steelhead Aging Criteria.

Males	<=79 cm - 2-year old	1-Ocean
	>79 cm - 3 or 4 year old	2-Ocean
Females	<=75 cm - 2-year old	1-Ocean
	>75 cm - 3 or 4 year old	2-Ocean

Appendix P. East Fork Steelhead Length Frequency Distribution, Return Year 2006.

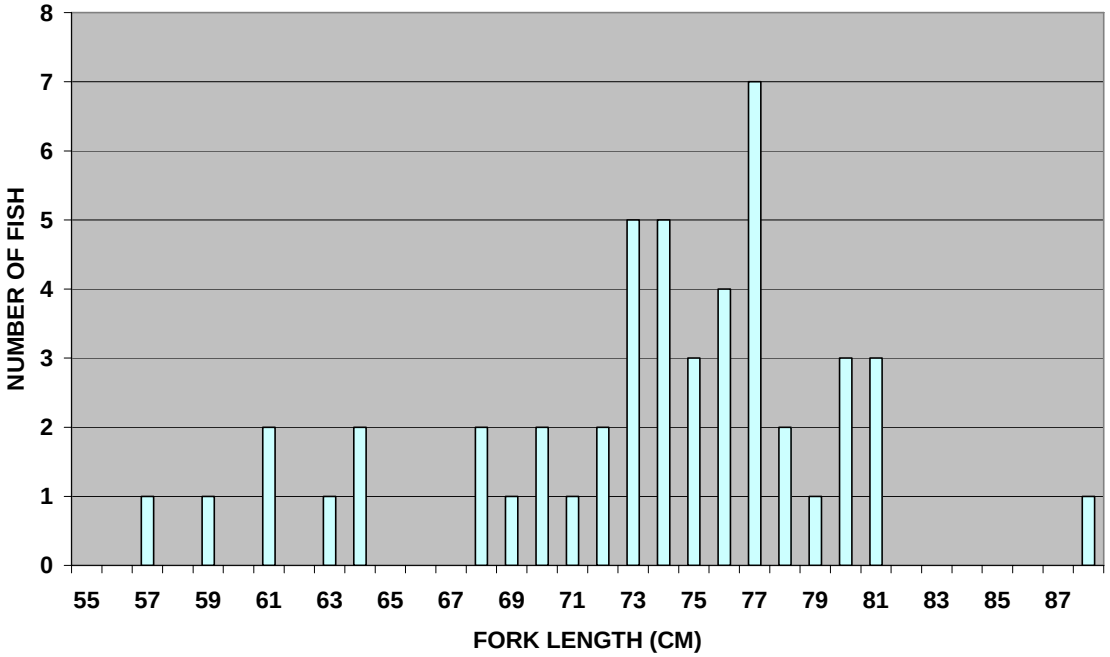
F.L. (cm)	HATCHERY		NATURAL			TOTAL TRAPPED			F.L. (in)
	MALES	FEMALES	MALES	FEMALES		MALES	FEMALES	TOTAL	
52	0	0	1	0		1	0	1	20.5
53	0	0	1	0		1	0	1	20.9
54	0	0	0	0		0	0	0	21.3
55	0	0	5	2		5	2	7	21.7
56	0	0	3	0		3	0	3	22.0
57	0	0	12	5		12	5	17	22.4
58	0	0	3	6		3	6	9	22.8
59	0	0	7	1		7	1	8	23.2
60	1	0	6	1		7	1	8	23.6
61	0	0	9	2		9	2	11	24.0
62	0	0	4	2		4	2	6	24.4
63	0	0	6	0		6	0	6	24.8
64	0	0	3	2		3	2	5	25.2
65	0	0	0	5		0	5	5	25.6
66	0	0	1	3		1	3	4	26.0
67	0	0	2	7		2	7	9	26.4
68	0	0	4	8		4	8	12	26.8
69	0	0	1	9		1	9	10	27.2
70	0	0	4	7		4	7	11	27.6
71	0	0	5	7		5	7	12	28.0
72	0	0	4	12		4	12	16	28.3
73	0	0	3	5		3	5	8	28.7
74	0	0	2	5		2	5	7	29.1
75	0	0	4	2		4	2	6	29.5
76	0	0	7	2		7	2	9	29.9
77	0	0	0	1		0	1	1	30.3
78	0	0	2	0		2	0	2	30.7
79	0	0	1	0		1	0	1	31.1
80	0	0	0	1		0	1	1	31.5
81	0	0	0	0		0	0	0	31.9
82	0	0	1	0		1	0	1	32.3
Totals:	**1**	**0**	**101**	**95**		**102**	**95**	**197**	

Total Fish Trapped: 197

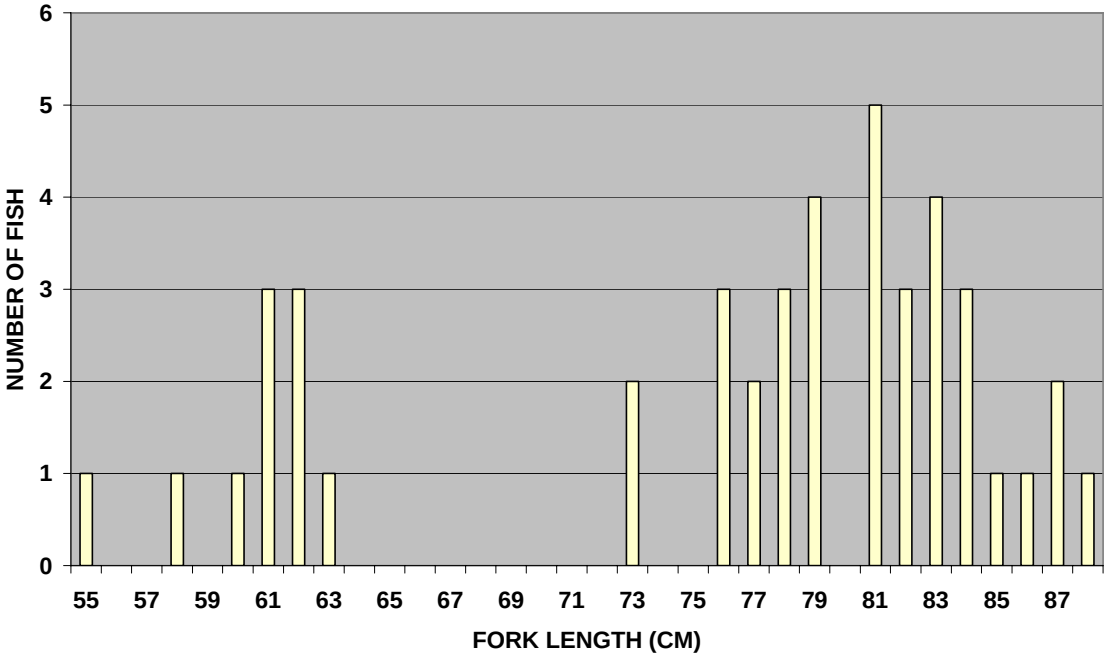
1	Hatchery Males	101	Natural Males	102	Total Males
0	Hatchery Females	95	Natural Females	95	Total Females
1	Hatchery Fish	196	Natural Fish	197	Total Fish

Appendix Q. Length Frequencies for Steelhead, Return Year 2006. Squaw Creek Trap.

TOTAL TRAPPED FEMALE LENGTH FREQUENCIES



TOTAL TRAPPED MALE LENGTH FREQUENCIES



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Appendix. R. Squaw Creek Trap Length Distribution, Return Year 2006.

F.L. (cm)	HATCHERY MALES	HATCHERY FEMALES	NATURAL MALES	NATURAL FEMALES		TOTAL TRAPPED MALES	TOTAL TRAPPED FEMALES	TOTAL TRAPPED TOTAL	F.L. (in)
55	1	0	0	0		1	0	1	21.7
56	0	0	0	0		0	0	0	22.0
57	0	1	0	0		0	1	1	22.4
58	1	0	0	0		1	0	1	22.8
59	0	1	0	0		0	1	1	23.2
60	1	0	0	0		1	0	1	23.6
61	3	1	0	1		3	2	5	24.0
62	3	0	0	0		3	0	3	24.4
63	1	1	0	0		1	1	2	24.8
64	0	2	0	0		0	2	2	25.2
65	0	0	0	0		0	0	0	25.6
66	0	0	0	0		0	0	0	26.0
67	0	0	0	0		0	0	0	26.4
68	0	2	0	0		0	2	2	26.8
69	0	1	0	0		0	1	1	27.2
70	0	2	0	0		0	2	2	27.6
71	0	1	0	0		0	1	1	28.0
72	0	2	0	0		0	2	2	28.3
73	2	5	0	0		2	5	7	28.7
74	0	5	0	0		0	5	5	29.1
75	0	3	0	0		0	3	3	29.5
76	3	4	0	0		3	4	7	29.9
77	2	7	0	0		2	7	9	30.3
78	3	2	0	0		3	2	5	30.7
79	4	1	0	0		4	1	5	31.1
80	0	3	0	0		0	3	3	31.5
81	5	3	0	0		5	3	8	31.9
82	3	0	0	0		3	0	3	32.3
83	4	0	0	0		4	0	4	32.7
84	3	0	0	0		3	0	3	33.1
85	1	0	0	0		1	0	1	33.5
86	1	0	0	0		1	0	1	33.9
87	2	0	0	0		2	0	2	34.3
88	1	1	0	0		1	1	2	34.6
Totals:	**44**	**48**	**0**	**1**		**44**	**49**	**93**	

Total Fish Trapped: 93

44	Hatchery Males	0	Natural Males	44	Total Males
48	Hatchery Females	1	Natural Females	49	Total Females
92	Hatchery Fish	1	Natural Fish	93	Total Fish

Summary of Fish Autopsy

ACCESSION NO:	07-055	LOCATION:	Sawtooth
SPECIES:	sc	AUTOPSY DATE:	3/8/2007
STRAIN:	saw	AGE:	juv
UNIT:		SAMPLE SIZE:	20
RIVER FOR AUTOPSY:	Prelib.		
INVESTIGATOR(S):	Munson		
REMARKS:			

	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	39.89	1.69	0.04
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	6.19	1.33	0.21

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

EYES		GILLS		PSEUDO-BRANCHS		THYMUS		FAT		MESEN. SPLEEN		GUT		HIND KIDNEY		LIVER		BILE	
N	20	N	20	N	20	0	20	0	0	B	18	0	20	N	20	A	0	0	20
B1	0	F	0	S	0	1	0	1	6	R	2	1	0	S	0	B	20	1	0
B2	0	C	0	L	0	2	0	2	8	G	0	2	0	M	0	C	0	2	0
E1	0	M	0	S&L	0			3	5	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=2.45								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

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

GENERAL REMARKS:

FINS: GONADS:

SKIN: OTHER:

Submitted by:

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Roger Elmore
Assistant Hatchery Manager

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Fish Culturist

Holly Smith
Fish Culturist

Lars Alsager
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Approved by:

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