SAWTOOTH FISH HATCHERY
And
EAST FORK SATELLITE

2006 Spring Chinook Brood Year Report
2007 Steelhead Brood Year Report

By

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TABLE OF CONTENTS

Table of Contents, continued.

Page

LIST OF TABLES

Page

LIST OF APPENDICES

Page

List of Appendices, continued.

Page

2006 SAWTOOTH REARED SALMON

ABSTRACT

2006 SAWTOOTH SPRING CHINOOK SALMON

In 2006, the Sawtooth Fish Hatchery adult spring chinook salmon *Oncorhynchus tshawytscha* weir on the Main Salmon River was installed on June 19 and operated through September 15. A total of 761 adult chinook were trapped in 2006, of which 465 (40 jacks / 192 adult males / 233 females) were hatchery-produced (marked) fish and 296 (56 jacks / 152 adult males / 88 females) were unmarked. Of the total fish trapped, 394 (98 marked, 296 unmarked) were released above the hatchery weir for volitional spawning and included: 12 ISS marked jacks, 45 ISS marked adult males, 41 ISS marked females, 56 unmarked jacks, 152 unmarked adult males, and 88 unmarked females. The remaining 367 chinook salmon were retained for 2006 hatchery spawn crosses. A total of 34 fish were killed and not used (KNU) for spawning. Of the 34 KNU, there were 21 males, 11 jacks, and 1 female. Fish used for hatchery spawn crosses included; 3 marked jacks, 82 marked adult males, and 60 marked females. Hatchery reared marked fish are defined as fish with either an adipose clip only, adipose clip/CWT, or CWT only. Trapping and disposition summaries are provided in Tables 1 through 4 and Figures 1 through 5.

Spawning began on August 8, and continued through September 14, with a total of 60 females spawned on 9 separate spawn days (lots). In 2006 spawn crosses were made by 1:1 (f/m) random cross matings. A total of 60 females were spawned and consisted of the following: 9 age-5 hatchery or reserve, 51 age-4 hatchery females, A total of 82 males were used and consisted of the following: 6 age-5, 73 age-4 hatchery males of which 25 were used twice, and 3 age-3 hatchery jacks. 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$0.25) in three fish samples in 2006. As per Fisheries Bureau instructions, these three females eggs were reared separately while at Sawtooth hatchery.

After fertilization, all eggs were rinsed with well water and water-hardened in a 100 part per million (ppm) solution of Argentyne (Providone Iodine). Eggs were incubated at one female per tray in vertical-stack incubators. The green egg take from the spawning of 60 females was 223,758 eggs, yielding 188,742 eyed eggs for a percent survival to the eyed-stage of development average of 84.4% and a mean fecundity of 3,729 eggs per female. From these eyed eggs, 179,573 fry were ponded which resulted in a smolt release of 174,132 smolts from the Sawtooth Fish Hatchery weir.

2006 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 21, 2006 with trapping operations continuing through September 26, 2006. This is the third consecutive year of operation of the East Fork trap since 1998. A total of 81 Chinook salmon were trapped in 2006 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)

2006 PAHSIMEROI SUMMER CHINOOK SALMON

Sawtooth Hatchery reared Pahsimeroi Hatchery's BY06 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 17, 2006. A total of 1,155,647 eggs were incubated with 14,483 dead eggs and fry picked off resulting in a 98.8% survival to swim up fry.

All of the fish were marked from May 17 to May 21, 2007 at SFH. On September 11 and 12, Pahsimeroi fish totaling 1,042,638 were transferred back to PFH. An Idaho Power Co. tanker hauled the fish in eight trips. Total pounds of fish shipped were 37,855 at an average of 28 fpp. Total feed fed was 33,608 pounds for an overall conversion of .89.

2006 REDFISH LAKE SOCKEYE SALMON

Eagle Fish Hatchery (IDFG) and Burley Fish Hatchery (NOAA) shipped an estimated total of 181,221 eyed eggs to Sawtooth Fish Hatchery. A total of 157,195 fish were marked September 18 through September 21, 2007. Pit tagging by Sockeye Research occurred September 25 and 26, 2007. At the time of pre-smolt release, the fish averaged 65.6 fish per pound and 3.78 inches in total length.

The BY 06 Sockeye October 2 and 3 pre-smolt releases are as follows:

	Ad-clip	Ad-PIT	Total
Redfish Lake	60,995	1,020	62,015
Alturas Lake	8,957	1,020	9,977
Pettit Lake	9,093	1,020	10,113
Totals	79,045	3,060	82,105

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

The remaining 74,009 AD/CWT were moved outside to small raceways 1 and 2, on October 9, 2007 and over-wintered at the hatchery on river water. A total of 73,808 fish were released on May 7, 2008 averaging 25.8 f/lb. and 5.18 inches in length. Fish were transferred into Eagle FH distribution tanks and trucked to Red Fish Lake Creek and released below the trap.

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.

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 19,445 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 four rectangular fiberglass tanks with an individual volume of 92 ft^3 and a capacity of 50,000 swim up fry each, 3 semi-square rearing tanks with an individual volume of 17 cubic feet and a capacity for 15,000 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. Improve seasonal housing, modify shop drain to septic system not to river.

WATER SUPPLY

Source

Sawtooth Fish Hatchery receives fish culture water from the Salmon River and three 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. Another 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°F (0°C) in the winter to 68°F (20°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 #6, and well #7 was completed in 2008. 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 2008

Diseases Encountered and Treatments

Adult steelhead (collected 2007): *M. cerebralis* was not detected in brood steelhead at Sawtooth Hatchery (0/20), 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%) and reported to the APHIS veterinarian-in-charge.

Adult Chinook salmon (collected 2006): Adult Chinook salmon were given intra-peritoneal injection of erythromycin at a rate 20 mg/kg. Pre-spawning mortality was at 2.85%. *Renibacterium salmoninarum* was detected in routine sampling of brood Chinook salmon. The eggs from 3/59 (5.1%) females were culled because ELISA optical densities were above 0.25. *Myxobolus cerebralis* and IHNV were not detected.

Brood year 2006 Chinook salmon: *Ichthyophthirius multifilis* was detected in BY'06 Chinook salmon (both SAW SC and PAH SU) and was treated with 170 mg/l formalin for one hour, three times per week until signs of infection diminished. Two metaphylactic applications of erythromycin were given to BY'06 Chinook salmon to reduce the risk of an epizootic of bacterial kidney disease (BKD). Target dose was 100 mg/kg/day for 28 days.

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 has been vigilant during high water temperatures of the summer months. Veterinary extra-label use of formalin (40mg/l for 6 hrs) in addition to the daily formalin treatment (170 mg/l for one hour) was most helpful in controlling mortality in adult Chinook salmon due to ichthyophthiriasis.

Organosomatic Index. See Appendix C.

FISH PRODUCTION

Spring Chinook Adult Collection-Sawtooth

The Sawtooth Fish Hatchery chinook-trapping season began on June 19, 2006 and continued through September 15, 2006. The peak of the run occurred the week of July 1, 2006 (Appendix D). A total of 761 spring chinook salmon were trapped including 192 males, 233 females, and 40 jacks (Appendix E, Appendix E.1). Released above the weir were 394 salmon (including 152 unmarked males, 88 unmarked females, 45 marked males and 41 marked females, and 56 unmarked jacks and 12 marked jacks) Appendix F. No fish were scanned for PIT tags in 2006, as per Fisheries Bureau instructions. Sawtooth Hatchery had a male: female ratio of 58% male and 42% female. Fish health sampling results are available in Appendix C.

A total of 97 three-year old, 551 four-year old, and 113 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 10, 2006 with trapping operations continuing through September 9, 2006. This is the third consecutive year of operation of the East Fork trap since 1998. A total of 81 natural or unmarked Chinook salmon were trapped in 2006 fish. Jacks totaled 21, and 60 adults of which 21 were females and 39 males trapped. 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)

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

Of the 367 Chinook retained for BY 06 hatchery spawn crosses, 188 (14 jacks / 44 males / 130 females) fish died prior to spawning activities (51.2% overall pre-spawn mortality). Pre-spawning mortalities were marked and unmarked fish.

Spawning Operations

Spawning activities at Sawtooth Fish Hatchery began August 14 and concluded September 14, 2006. The 10 egg takes during this period yielded 223,758 green eggs from 60 females for an average fecundity of 3,729 eggs per female. There were 82 males used for spawning and consisted of 6 age-5 hatchery males, 73 age-4 hatchery males of which 25 were used twice, and 3 age-3 hatchery jacks of which 7 were used once for fertilization. Each female's eggs were fertilized using 1 male and combined with another female' eggs fertilized with a different male, then water hardened for one hour in a 100 ppm titrate able iodine solution. The eggs were then put into Heath incubator trays, with one female 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 one female per tray. This averaged 3,729 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° F to 44° 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. Dead eggs were then hand picked and counted until hatch at 1,300 FTU.

Sawtooth Fish Hatchery green eggs eyed up at a 84.4% rate, yielding 188,742 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 Michigan baffles installed every four feet. Starting flows for the 179,573 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 Bio Oregon starter #2, and initially fed by hand. Feed amounts and sizes followed 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 4.5 grams active/100 lbs. of fish starting on June 8 and ending on July 5, 2007. Erythromycin medicated feed is fed as a prophylactic for BKD. The BKD fish in the display vat (9,269) were moved outside April 20, 2007 to small raceway 3 at 120 fish per pound and 3.03 inches in length. The remaining fish (168,064) were transferred outside for final rearing on July 9. These fish transferred averaged 76 fish per pound (fpp) and 5.3 inches in length when moved to the outside raceways.

Final Rearing

The Sawtooth spring chinook were placed into the "A" section of two large raceways and the BKD fish in to the "A" section of a small raceway. Initial densities were 0.13 lbs./cuft., and water flows were 360 gpm.

All outside fish were fed Bio Oregon grower feed. A ten day Oxytetracycline (OTC) feed treatment was administered to small raceway 3 in July and another ten day OTC treatment given to large raceways 1 & 2 in August. A second 28 day preemptive Bio Oregon erythromycin medicated feed treatment was fed in August and September of 2007 at a rate of 2.25 grams active per 100 pounds of fish, to prevent the onset of BKD. A third 28 day preemptive Bio Oregon erythromycin feed treatment was not given to the BKD fish in the small raceway 3.

The finish weight of the BY06 Sawtooth chinook smolts was 9,111 pounds. The fish were fed 11,060 pounds of feed for a conversion of 1.23 A synopsis of feeding regimes can be found in Appendix I.1.

FISH MARKING

Fish marking occurred May 15 & 16, 2007 and returned to the inside vats.. All fish were classified as listed reserve and were given a coded wire tag. A total of 14,961 fish were pit tagged from raceways #1 & 2 on February 19, 2008; 14,922 PIT tagged fish were released. (Appendix J, Appendix K).

FISH DISTRIBUTION

Fish releases for Sawtooth stock BY06 smolts occurred on April 23, 2008. A total of 174,132 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 48F at time of release. Production costs for BY06 smolts can be found in Appendix L.1.

PAHSIMEROI CHINOOK

Sawtooth Hatchery reared Pahsimeroi Hatchery's BY06 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 17, 2006. A total of 1,155,647 eggs were incubated with 14,483 dead eggs and fry picked off resulting in a 98.8% 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 1,124,731 Pahsimeroi fish were moved into two outside raceways by buckets from February 2 through March 19, 2007. On May 17 through May 21, 2007, the two raceways were split during marking 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 1.2 mm Aquamycin 2.25% starting on May 28, 2007. Due to water temperature reaching into the 70's F, all Pahsimeroi fingerlings were diagnosed with an outbreak of "ICH" and were treated with formalin by SFH staff. The treatments consisted of a 1 hour flow through treatment at 170ppm. The fingerlings were treated with formalin at the same dosage for three consecutive days prior to shipment. A total of 14 barrels of formalin were used for 21 treatments of brood year 2006 Pahsimeroi summer Chinook for "ICH".

All of the fish were marked from May 17 to May 21, 2007 at SFH. A total of 166,372 reserve fish received an AD/CWT-tag, codes 10-31-80, 10-32-80, and 10-35-80. A total of 876,266 fish received AD only. Inventory after marking was 1,042,638 fish.

September 11 and 12 brood year 2006 Pahsimeroi summer Chinook were transferred to PFH by Neil Ring and a contract driver. Two Idaho Power tankers hauled 1,042,638 fish (37,855 lbs) making eight trips. Of these fish, 166,372 were marked

AD/CWT, all of which came from raceway 8. All fish averaged 28 fish per pound and were fed a total of 33,608 lbs of food for a conversion of .89. There were five bags of surplus food transferred to PFH.

BY 2006 SOCKEYE SALMON

Eagle Fish Hatchery (IDFG) and Burley Fish Hatchery (NOAA) shipped an estimated total of 181,221 eyed eggs to Sawtooth Fish Hatchery. A total of 157,195 fish were marked September 18-21, 2006. This is a difference of 24,026 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 four separate shipments between November 15 and December 6, 2006. The eggs arrived with 649 to 833 FTU's. Ponding began February 12, 2007 and ended March 14, 2007 with an average of 2,025 FTU's at ponding.

Eggs were hand picked once per week from eyed egg to ponding. A total of 3,369 dead eggs were removed before ponding. Total eyed egg to ponding survival was 98.1 %. A total of 177,852 swim-up fry were ponded. Lots one through nine of the swim-up fry were ponded into five 17 ft^3 fiberglass tanks and lots 10 and 11 were ponded into one of three 92 ft^3 green fiberglass tanks. By the end of March, all fry were moved into the three 92 ft^3 green tanks. Initial water flows were set between 20 and 25 gallons per minute in the three green tanks.

All fry were started on Bio-Oregon's BioVita Mash starter feed. Feed size was increased in accordance to Bio-Oregon's recommendation. Feed size was increased gradually through three phases of mixing of larger/smaller feed: mixing proportions ranged from 20% larger feed to 80% smaller feed initially, then to 50% / 50%, and then to 80% / 20% larger to smaller. This technique was utilized to assure smaller fish would get adequate amounts of feed, and that fish would adapt to larger feed sizes gradually to prevent feed waste. In April 2006, there was a feed recall on Bio-Oregon's Mash and Starter feeds due to the product containing the chemical melamine. All Bio-Oregon Mash and Starter feed was discarded, and replaced with Rangen Starter feed numbered one through three. Feed size was then increased in the same method described above and in accordance with Rangen's recommendation. In August 2007, when the fry averaged 130 fish-per-pound, and there were no further feed recalls on Bio-Oregon, the fish were put back on Bio-Oregon's Bio Vita Fry 1.2mm feed. The total feed amount fed at Sawtooth for the October release BY '06 sockeye was 2,067 pounds with a 0.92 conversion.

As target rearing densities were approached, the fry were transferred from the three 92 ft^3 green tanks into three cement vats with water flows near 50 gpm specific pathogen free well water. These transfers occurred on two dates, March 30 and April 15, 2007. By August 16, 2007, the fish were thinned into eight vats, with water flows at 100gpm. When the supply of specific pathogen free well water available was diminished by the loss of Well #1, four vats totaling 82,955 fish were transferred to two outside rearing raceways. These fish would comprise the Redfish, Alturas, and Pettit Lakes fall pre-smolt release groups. These two raceways (small raceways 1 and 2) were filled with

1123 ft^3 Salmon River water with flows set at around 250 gpm. The fish remaining in vats inside the hatchery building would comprise the Sawtooth Hatchery Overwinter Group (approximately 74,000 smolts).

Ad-clipping and Coded Wire Tagging (CWT) marking began September 18, 2007. The Mass Automated Tagging System, (MATS) with its automated marking machines marked most of the fish with no significant mortality due to marking. The Sawtooth Over winter Group was ad-clipped and CWT tagged, while the outside pre-smolt release groups were ad-clipped only. Passive Integrated Transponders (PIT) was injected by Sockeye Research into 1,000 fish from each of the three pre-smolt release groups (Redfish, Alturas, and Pettit Lakes) on September 25 and 26, 2007. At the time of pre-smolt release on October 2, 2007 the fish averaged 65.6 fish-per-pound and 3.78 inches in total length. Mortality was recorded daily from ponding to release. A total of 21,738 fish were lost to mortality for an 8.78 % loss.

BY 06 Sockeye October 2 and 3, 2007 Pre-smolt Releases

	Ad-clip	Ad-PIT	Total
Redfish Lake	60,995	1020	62,015
Alturas Lake	8957	1020	9,977
Pettit Lake	9,093	1020	10,113
Totals	**79,045**	**3060**	**82,105**

Sockeye released into Redfish Lake were placed into a barge and released into the pelagic zone of the lake. Sockeye released into Alturas and Pettit Lakes were loaded into two 300 gal tank trucks and transported to each lake, Alturas fish were released directly from the boat dock and Pettit fish were loaded in coolers onto a boat and released into the pelagic zone of the lake.

The remaining 74,009 Ad/ CWT marked fish were moved outside in buckets to small raceways 1 and 2 on October 9, 2006. The fish were 51 fish-per-pound and a condition factor of 2,715 X10-7. The river was 43.6 F. and turbid, vat water was 48.1 F.

Fin clip checks, and CWT retention checks were also 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 %.

Eagle Fish Hatchery personnel also did a CWT retention and a AD Clip check April 30, 2008 of the 50 fish collected April 30, 2007. One fish was a mis-clip and two fish had no CWT reads for a retention rate of 96%.

Doug Munson, IDFG anadromous fish pathologist, collected 10 fish from each raceway for pre-liberation on April 8, 2008. The results were negative for all tests.

Passive Integrated Transponders were injected into 1,000 fish April 10, 2008. There were 16 PIT mortalities detected.

A total of 73,808 fish were released on May 7, 2008 averaging 25.8 f/lb. and

5.18 inches in length. All of the fish were AD/CWT including 984 PIT. The fish were fed a total of 2,285 pounds of food with a 1.25 conversion.

Fish were transferred into two Eagle FH distribution tanks and one Sawtooth Fish Hatchery tank. Fish were trucked to Red Fish Lake Creek and released below the trap. River water temperature on May 7, 2008 was 42 degrees F. at the time of release.

2007 STEELHEAD

ABSTRACT

SAWTOOTH

The Sawtooth Fish Hatchery weir on the Main Salmon River was installed on March 15 in 2007, with the adult steelhead (*Oncorhynchus mykiss*) trap operating from March 26 through May 1. A total of 4,049 adult "A-run" steelhead were trapped during the 2007 season; 4,028 (2,131 males / 1,897 females) of which were marked fish (hatchery produced) and 21 (4 males / 17 females) were unmarked fish of natural origin.

Distribution of the 4,028 marked adults ranged from spawn-related activities to charitable giveaways. The 1,052 steelhead used for spawning were either given to the public on a first come, first served basis on spawn days or distributed to charitable organizations. A total of 2,250 adult steelhead were donated to the following tribes and/or organizations in the following numbers:

Idaho City Food Bank (SMRIST Essentials Food Bank)	400
Shoshone-Bannock Tribe	300
Shoshone-Paiute Tribe	550
Idaho Food Bank	1000

The remaining 726 fish were kept frozen on station and will be processed and used in a stream nutrient enhancement program. Fish disposition data is provided in Table 2.

A genetic sample was taken from all returning unmarked adults (21), which were then released upstream of the hatchery weir to spawn naturally; also sampled and released upstream were 10 marked males to supplement natural spawning (Table 2.) Additional genetic samples were taken randomly from 100 pair of marked adult steelhead that were included in the broodstock.

EAST FORK AND SQUAW CREEK STEELHEAD

EAST FORK

In 2007, the velocity barrier on the East Fork of the Salmon River (EFSR) was operated from March 27 through May 7. Continuing with the Natural Steelhead Program (N-O) that began in 2001, the plan for trapping and spawning returning steelhead in 2007 was to retain enough eggs taken from Hatchery-Origin steelhead (designated as H-O by presence of a Coded Wire Tag or frayed fins from hatchery rearing) enhanced

with a component of steelhead eggs taken from Natural-Origin steelhead (designated as N-O by lack of tag present and unmarked or undamaged fins) to produce 50,000 smolts for the East Fork Weir Release Group (EFWRG) of non-adipose fin-clipped smolts. Anticipating a lower egg-to-smolt survival conversion of natural steelhead reared in a hatchery than that of hatchery steelhead, the target egg take was increased to 70,000 steelhead eggs to achieve the target of 50,000 smolts. In order to incorporate natural steelhead genetics into the hatchery broodstock, one of every three N-O females trapped at the EFSR weir in 2007 was to be crossed with a H-O male. A total of 166 adult steelhead were trapped for the Natural Steelhead Program: 150 H-O steelhead (72 males/78 females) and 16 N-O steelhead (3 males/13 females). Six adipose fin-clipped steelhead were trapped (4 males/2 females) One of these males was inadvertently used for spawning and then killed, and the remaining 3 males and 2 females were killed and not used for spawning.

Squaw Creek Spawning

A total of 21 marked "B-run" females and 17 marked "B-run" males were retained for hatchery-production spawn crosses in 2007, with spawning operations occurring from April 6 through April 20 (5 spawn dates). All spawning was conducted at the East Fork Salmon River trap/spawn facility, with spawn activities from the 21 females yielding a total of 143,521 green eggs for a mean fecundity of 6,834 eggs per female. A total of 80,939 eyed eggs were obtained from hatchery-production crosses, for a percent survival to the eyed-stage of development of 56.4 percent. Males used in hatchery-production crosses from Squaw Creek trap included undersized marked males that by real-time CWT reading were determined to be "B-run" origin fish. Of the 17 males used for spawning, 8 males were used twice, 1 male was used three times, and 3 males were used four times. Nine undersized males and 4 undersized females were released above the Squaw Creek trap. One undersized female was killed and not used for spawning. All eyed eggs (80,939) produced from Squaw Creek "B-run" hatchery crosses were transferred to the Magic Valley Steelhead Hatchery for final incubation and rearing.

STEELHEAD PRODUCTION

Spawning Operations

Sawtooth Trap

Sawtooth Fish Hatchery spawning operations occurred from March 29 through May 3 in 2007. A total of 526 females were crossed with 526 males over 12 spawning days to produce 2,472,200 green eggs with a mean fecundity of 4,810 eggs per female. Total green egg take yielded 2,104,531 eyed eggs for a percent survival to the eyed-stage of development average of 83.20 percent.

Eyed egg transfers to Magic Valley Steelhead Hatchery and Hagerman National Fish Hatchery totaled 428,050 and 1,179,101-eyed eggs, respectively. The Sawtooth-stock eyed-egg transfer totaled 2,104,531.

Eggs were made available to biologists from the Shoshone-Bannock Tribe (SBT) to support two programs that are currently underway. A total of 257,575 eyed-eggs were provided for the SBT DNA Parentage Exclusion Analysis Program, an experimental study on supplementation using genotyped steelhead released as smolts into the

Yankee Fork; these eggs are to be reared to smolts at Hagerman National Fish Hatchery. A total of 572,380 eyed-eggs [from Sawtooth and Pahsimeroi stocks (Table 4)] were provided for the SBT Egg Box Program, in which eggs are placed in streamside incubators (upwellers) on river water to mimic natural hatch timing in five systems: Yankee Fork, Basin Creek, Morgan Creek, Indian Creek, and Panther Creek. All supplementation fish produced from these two programs are genotyped so that they can be differentiated as F1 juveniles and F1 adults from all other fish produced naturally in these systems (AOP for Fish Production Programs in the Salmon River Basin, 2007, Table 4)

East Fork Salmon River Trap

A total of 57 East Fork H-O males (designated as H-O by presence of a Coded Wire Tag or frayed fins from hatchery rearing) and 46 East Fork females, including 1 N-O female Natural-Origin steelhead (designated as N-O by lack of tag present and unmarked or undamaged fins) and 45 H-O females, were retained for natural-production spawn crosses in 2007 (Table 2.) Five females were killed and not used for spawning (two were ad-clipped, two females were partially spawned, and one female was green). Spawning operations occurred from April 3 through April 20 (6 spawn dates). The egg take from those 6 spawn dates exceeded available rearing space and spawning operations ended at the EFSR weir on April 20. Spawning activities from the 46 East Fork female steelhead yielded a total of 251,181 green eggs for a mean fecundity of 5,460 eggs per female. A total of 192,777 eyed eggs were obtained from natural-production crosses, for a percent survival to the eyed-stage of development average of 76.7 percent (Table 2). All 192,777-eyed eggs produced from EFSR natural crosses were transferred to the Magic Valley Steelhead Hatchery for final incubation and rearing (Table 4).

Table 1. 2007 Sawtooth Steelhead Spawn Data.

Fish Disposition	Males	Females
Pre-Spawning Mortality	0	0
Spawned	526	526
Killed Not Used	121	33
Released Above Weir	14**	17
Other*	1484	1338
Total	2135	1914

*These fish were not used in spawning, but were killed and either distributed to the Shoshone-Bannock and Shoshone-Paiute Tribes, food banks, or kept frozen on station for processing to be used in a stream nutrient enhancement program.**Ten of these males were marked males, released to supplement natural spawning.

Table 1. Continued. Spawn summary of steelhead spawned at Sawtooth in 2007.

Males spawned	Females spawned	Eggs per female	Number of green eggs	Number of eyed eggs	Percent eye-up
526	526	4810	2,472,200	2,104,531	83.20%

Age class breakdown for steelhead trapped at Sawtooth in 2007.

Age Class of Adults	MALES		FEMALES		TOTAL	
	No.	%	No.	%	No.	%
Hatchery 1-Ocean	1995	93.62	1531	80.71	3526	87.54
Hatchery 2-Ocean	136	6.38	366	19.29	502	12.46
Natural 1-Ocean	3	0.10	10	0.52	13	0.32
Natural 2-Ocean	1	0.05	7	0.37	8	0.20
Total 1-Ocean	1998	93.58	1541	80.51	3539	87.4
Total 2-Ocean	137	6.42	373	19049	510	12.60

Table 2. Disposition of Steelhead trapped at the East Fork for 2007.

Fish Disposition	Males	Females
Pre-Spawning Mortality	0	0
Spawned	57	46
Killed Not Used	3	5
Released Above Weir	38	40
Total	75*	91

*Of these 75 males, 23 males were used for spawning and then released, 15 males were not used for spawning and were released, for a total of 38 males released above the weir. Twenty-two males were spawned twice, with 14 of these 22 males being released above the weir, and 8 of these males being killed after spawning. Five males were spawned three times and released above the weir.

Spawn class breakdown for Steelhead trapped at the East Fork for 2007.

Males spawned	Females spawned	Number of green eggs	Number of eyed eggs	Percent eye-up
57	46	251,181	192,777	76.70%

Table 3: Steelhead eyed-egg shipments from Sawtooth Fish Hatchery in 2007.

HATCHERY or OFF-SITE LOCATION	NUMBER SHIPPED	STOCK
Shoshone-Bannock Egg Boxes	497,380	Sawtooth
Shoshone-Bannock Egg Boxes	75,000	Pahsimeroi
Hagerman National FH/SBT YFK smolts	257,575	Sawtooth
Hagerman National Fish Hatchery	850,226	Sawtooth
Hagerman National Fish Hatchery	71,300*	Sawtooth
Hagerman National Fish Hatchery	220,000	Pahsimeroi
Hagerman State Fish Hatchery	200,000	Pahsimeroi
Magic Valley Fish Hatchery	428,050	Sawtooth
Magic Valley Fish Hatchery	192,777 / 80,939	East Fork/Squaw Creek
Total Eggs Shipped	2,104,531	Sawtooth
Total Eggs Shipped	192,777	East Fork
Total Eggs Shipped	80,939	Squaw Creek
Total Eggs Shipped	495,000	Pahsimeroi
Total Eggs Shipped	2,873,247	All Stocks

*This shipment of 71,300 eggs was culled at HNFH as a result of hatching during shipment.

Table 4. Squaw Creek Steelhead trapped for 2007.

Total Fish Trapped:	52				
26	Hatchery Males	0	Natural Males	26	Total Males
26	Hatchery Females	0	Natural Females	26	Total Females
52	Hatchery Fish	0	Natural Fish	52	Total Fish

Table 4. Continued.

Spawn class breakdown for Steelhead trapped at Squaw Creek for 2007.

Males Spawned	Females Spawned	Eggs Per Female	Number of Green Eggs	Number of Eyed Eggs	Percent Eye-up
17	21	6,834	143,521	80,939	56.4%

Disposition of Steelhead trapped at Squaw Creek for 2007.

Fish Disposition	**Males**	**Females**
Pre-Spawning Mortality	0	0
Spawned (12 used 2+ times)	17	21
Killed: Not Used (Undersized or Green)	0	1
Released Above Weir (Undersized or Green)	9	4
Other	0	0
Totals:	26	26

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 weir and trap were installed on Squaw Creek, 200 meters upstream of the confluence of the Salmon River on March 27, 2007 to trap adult "B-run"steelhead. The last fish of the season was trapped on April 21, and on April 27, fifty percent of the pickets were pulled from the weir to allow downstream smolt outmigration. Trapping continued through April 30, at which time weir pickets were pulled and the trap was taken out of operation A total of 52 marked adult "B-run" steelhead were trapped (26 males / 26 females), no unmarked fish were trapped. Broodstock adults were transferred to the East Fork trapping facility for pre-spawn holding. Fish that were not to be included in the broodstock were released above the weir at Squaw Creek. Gender, length, marks and disposition data are displayed in Table 4.

Pahsimeroi Stock Egg Incubation

As in past years, Sawtooth Fish Hatchery incubated a portion of the Pahsimeroi Fish Hatchery egg take for LSRCP Steelhead Programs. All received egg shipments are transferred as "green" eggs in insulated coolers.

In 2007, an estimated 538,115 green eggs were transferred to Sawtooth from a total of 104 females (4,735 mean fecundity). Total egg transfers yielded 495,000 eyed-eggs, for a percent survival to the eyed stage of development average of 92.0 percent (Table 8). Eyed egg transfers to Hagerman State Fish Hatchery (HSFH) and Hagerman National Fish Hatchery (HNFH) totaled 200,000 and 220,000-eyed eggs, respectively. All females spawned for HNFH were viral tested. A total of 75,000 Pahsimeroi eggs were made available to the SBT Egg Box Program described above (Table 3). Due to lack of demand, an estimated 558,730 eggs were culled before enumeration (59 females from Lot 3 and 59 females from Lot 4 at a mean fecundity of 4,735 eggs).

Adult Treatments

The returning steelhead 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 2007.

Incubation

After hardening in the Argentine solution, green eggs from all spawning stations reared at SFH 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. The cooler was screwed shut and shipped by staff using hatchery vehicles.

Release of BY 07

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 and 86,931 fish into the East Fork Salmon River. HNFH released 205,546 Pahsimeroi stock at PineHurst Bridge at 4.26 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 186,192 fish at 4.2 fpp. Also, MVFH released Sawtooth stock smolts into Valley Creek (62,485 @ 4.25 fpp) and Yankee Fork (92,126 @ 4.4 fpp).

Magic Valley released East Fork Natural stock above the East Fork weir totaling 63,020 @ 4.15 fpp and 226,648 fish into the lower portion of the East Fork Salmon River. Upper Salmon River 'B' stock totaling 62,910 into the Squaw Creek Pond for acclimation and 183,586 @ 4.42 fpp were released directly into Squaw Creek. MVFH released 62,315 USB stock 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	Total Returns	Total %
1979	1981	None	-	-	-	291	inc
1980	1982	None	17	66	165	248	inc
1981	1983	185,375	49	1,182	796	2,027	1.08
1982	1984	230,550	292	922	875	2,086	.91
1983	1985	420,060	51	452	1,318	1,821	.43
1984	1986	347,484	17	86	190	293	.08
1985	1987	1,185,060	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	521	1,706	1.38
1999	2001	57,134	98	193	83	374	.65
2000	2002	385,761	522	1,281	175	1,978	.50
2001	2003	1,105,169	654	1,182	113	1,949	.176
2002	2004	821,415	204	552	230	1,588	.193
2003	2005	134,769	96	73	(2008)		
2004	2006	1,552,544*	1,236	(2008)	(2009)		
2005	2007	995,262	(2008)	(2009)	(2010)		
2006	2008	174,132					

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

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 a			Total Returns	%
			3-year	4-year	5-year		
1991	92-93	774,583	2	11	7	20	0.002
1992	93-94	213,830	8	23	26	57	0.026
1993	94-95	334,313	21	72	23	116	0.035
1994	1996	25,006	1	3	3	7	0.028
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	131	838	0.68
1999	2001	57,134	65	91	73	229	0.40
2000	2002	385,761	476	926	175	1,577	0.41
2001	2003	1,105,169	407	1,182	67	1,656	.149
2002	2004	821,415	205	358	140	703	.086

2003	2005	134,769	40	26	(2008)
2004	2006	1,552,544 *	1,236	(2008)	(2009)
2005	2007	995,262	(2008)	(2009)	(2010)
2006	2008	174,132			
2007	2009				

*This number includes 135,934 fish released into the Yankee Fork Salmon River 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	Total 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.

	2008	2005	2002	1999	1996
Nutrients (mg/L)					
T. Ammonia as N	<0.01	<0.01	0.01	0.02	0.027
T. NO2 + NO3 as N	NR	NR	NR	NR	0.006
T. Kjeldahl Nitrogen as N	0.17	<0.17	<0.10	<0.1	<.20
T. Phosphorus as P	0.016	0.017	<.05	<.05	<0.05
Ortho Phosphate as P	0.007	0.005	<0.009	<0.005	NR
Minerals (mg/L)					
Sp. Conductance (umhos/cm)	164.0	159.0	168.0	159.0	167.0
Hardness as CaCO3	78.3	78.3	78.0	75.7	80.0
T. Alkalinity as CaCO3	76.1	79.8	777.5	75.2	74
Bicarbonate Alk. as CaCO3	76.1	79.8	77.5	75.2	79
Calcium	27.9	26.3	27.9	26.4	27.4
Magnesium	2.29	2.11	1.932	2.9	1.9
Sodium	4.81	4.70	4.69	4.26	5.5
Potassium	<0.05	0.75	0.53	0.48	0.7
Fluoride	0.67	0.82	0.83	0.60	0.29
Sulphate as SO4	6.31	6.73	5.23	5.5	12
Total Metals (ug/L)					
Arsenic, Total	0.0023	<0.003	<0.003	<0.005	<10
Boron, Total	<0.05	0.05	0.01	NR	<10
Cadmium, Total	<0.0005	<0.0005	<0.0005	<0.0005	<1

Chromium, +6	<0.05	<0.05	NR	NR	NR
Chromium, Total	<0.002	NR	<0.002	<0.002	<2
Copper, Total	<0.01	<0.01	<0.01	<0.01	<10
Iron, Total	<0.01	0.02	0.03	0.02	20
Lead, Total	<0.0001	0.002	<0.004	<0.002	<5
Manganese, Total	<0.01	<0.01	<0.01	<0.01	1
Mercury, Total	<0.0002	<0.0002	<0.0002	<.0.0002	<.5
Nickel, Total	<0.003	<0.007	<0.003	<0.003	<5
Silver, Total	<0.002	<0.002	<0.002	<0.002	<1
Zinc, Total	<0.001	0.004	<0.002	3	<3
Miscellaneous					
Turbidity (NTU)	0.33	0.29	0.36	0.98	0.45
pH (SU)	7.87	7.87	7.94	7.978	.04
Total Cyanide (mg/L)	<0.005	<0.005	<0.005	<.005	<.005
Total Residue	NR	NR	NR	NR	NR

Appendix B1. Sawtooth Fish Hatchery Water Quality Analysis of Well 1, 2, 6 & 7 Mix

	2008	2005	2002	1999
Well Number	**6&7**	**1&2**	**1&2**	**1&2**
Nutrients (mg/L)				
Ammonia as N	<0.04	<0.01	<0.01	0.02
T. Phosphorus as P	<0.05	0.017	0.012	7.60
Minerals (mg/L)				
Hardness	78.3	78.3	81.0	81.3
Alkalinity	70.4	79.8	79.0	85.7
Bicarbonate Alk. as CaCO3	70.4	79.8	79.0	85.7
Total Metals (ug/L)				
Arsenic	<0.005	0.003	0.005	<0.005
Cadmium	<0.0005	<0.0005	.0005	<0.0005
Chloride	<1.0	0.93	0.72	0.56
Cobalt	<0.02	<0.NR	<0.01	<0.01
Copper	<0.01	<0.01	<0.01	<0.01
Lead	<0.005	<0.002	<0.002	<0.002
Mercury	<0.0002	<0.0002	<0.0002	<0.0002
Selenium	<0.005	0.005	0.013	<0.005
Miscellaneous				
T. Cyanide (mg/L)	<0.005	<0.005	0.005	<0.005

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

BY06 Juvenile Chinook

Accession #	Stock	Date	Data
07-198	Saw	06/20/07	Aeromonas hydrophila 3/4, P. fluorescens 1/4
07-232	Saw	08/02/07	Aeromonas sobria 6/10
07-233	Saw	08/02/07	Flavobacterium spp. 3/10
07-281	Saw	08/01/07	Renibacterium salmoninarium PCR 2/60
07-313	Saw	09/05/07	Aeromonas sobria 3/5

Return Year 2006 Chinook Broodstock

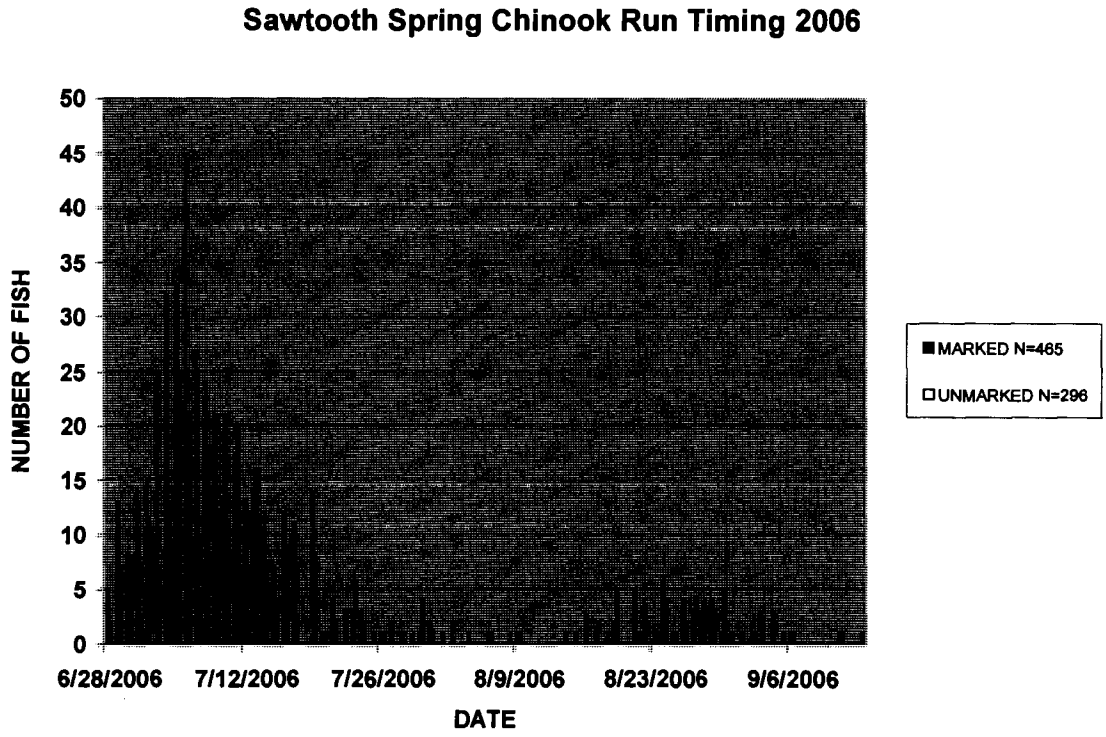
Accession #	Stock	Date	Data
06-255	Saw	08/04/06	P. spp.8/10, ICH multifilis 5/5, ELISA 7/10 (7 lows)
06-256	Saw	08/07/06	BKD; ELISA 13/20 (12 lows, 1 high), PCR 0/20
06-283	Saw	08/14/06	RS; ELISA 4/5 (4 lows)
06-306	Saw	08/21/06	BKD, ELISA 13/14 (10 low, 3 high)
06-328	Saw	08/28/06	RS, IHNV; 2/39, ELISA 10/12 (10 low)
06-384	Saw	08/31/06	ELISA 9/12 (9 low), IHNV 5/35
06-345	Saw	09/05/06	RS, IHNV; ELISA 1/8 (1 low). IHN 1/25
06-353	Saw	09/11/06	IHNV; IHN 2/2
06-360	Saw	09/14/06	RS, IHNV; ELISA 3/4 (3 low), IHN 5/12
06-368	Saw	09/10/06	BKD; ELISA 25/29 (24 low, 1 high)
06-369	Saw	09/16/06	RS; ELISA 3/4 (3 low)
06-370	Saw	09/12/06	RS; ELISA 2/3 (2 low)
06-371	Saw	09/13/06	RS; ELISA 12/17 (12 low)
06-372	Saw	09/07/06	RS; ELISA 18/19 (18 low)
06-373	Saw	09/06/06	RS; ELISA 6/10 (6 low)

Return year 2007 Steelhead Broodstock

Accession #	Stock	Date	Data

No positives were found in 2007.

Appendix D. Sawtooth Fish Hatchery Spring Chinook Run Timing. All Fish N = 761



Appendix E. Sawtooth Fish Hatchery Age Class Totals from All Trapped Chinook, Return Year 2006.

Sawtooth	Length (Fk)	Year class	Number
Males	≤ 64 cm	3-year old	96
	64-82 cm	4-year old	312
	> 82 cm	5-year old	32
Subtotal			**440**
Females	≤ 64 cm	3-year old	1
	64-82 cm	4-year old	239
	> 82 cm	5-year old	81
Subtotal			**321**
Total			**761**

Appendix E. 1. Length Frequency Distribution – Marked & Unmarked Chinook Males.

Tables 3 and 4 are incomplete due to software modifications:

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
36	1	36	0	36	0	36	0	36	1
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	1	41	1	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	1	46	0	46	0	46	0	46	1
47	0	47	0	47	0	47	0	47	0
48	2	48	1	48	0	48	0	48	1
49	1	49	1	49	0	49	0	49	0
50	2	50	1	50	0	50	0	50	1
51	1	51	1	51	0	51	0	51	0
52	2	52	0	52	0	52	0	52	2
53	2	53	0	53	1	53	0	53	1
54	5	54	3	54	1	54	0	54	1
55	2	55	0	55	1	55	0	55	1
56	2	56	1	56	1	56	0	56	0
57	5	57	2	57	0	57	0	57	3
58	4	58	0	58	0	58	0	58	4
59	3	59	0	59	2	59	0	59	1
60	6	60	1	60	0	60	0	60	5
61	7	61	1	61	1	61	0	61	5
62	12	62	3	62	2	62	0	62	7
63	15	63	4	63	3	63	0	63	8
64	22	64	7	64	2	64	0	64	13
65	20	65	8	65	5	65	0	65	7
66	20	66	8	66	1	66	0	66	11
67	24	67	10	67	4	67	0	67	10
68	22	68	9	68	2	68	0	68	11
69	33	69	9	69	4	69	0	69	20
70	32	70	11	70	7	70	0	70	14
71	26	71	10	71	2	71	0	71	14
72	30	72	17	72	2	72	0	72	11
73	26	73	9	73	6	73	0	73	11
74	30	74	16	74	4	74	0	74	10
75	20	75	8	75	2	75	0	75	10
76	17	76	11	76	0	76	0	76	6

77	16	77	8	77	3	77	0	77	5
78	6	78	3	78	0	78	0	78	3
79	6	79	3	79	0	79	0	79	3
80	7	80	2	80	1	80	0	80	4
81	4	81	2	81	1	81	0	81	1
82	2	82	1	82	0	82	0	82	1
83	6	83	5	83	0	83	0	83	1
84	7	84	4	84	1	84	0	84	2
85	2	85	1	85	0	85	0	85	1
86	4	86	0	86	0	86	0	86	4
87	2	87	0	87	0	87	0	87	2
88	1	88	1	88	0	88	0	88	0
89	2	89	0	89	0	89	0	89	2
90	1	90	0	90	1	90	0	90	0
91	2	91	2	91	0	91	0	91	0
92	2	92	0	92	0	92	0	92	2
93	1	93	0	93	0	93	0	93	1
94	0	94	0	94	0	94	0	94	0
95	0	95	0	95	0	95	0	95	0
96	0	96	0	96	0	96	0	96	0
97	1	97	0	97	0	97	0	97	1
98	2	98	0	98	0	98	0	98	2
99	0	99	0	99	0	99	0	99	0
100	1	100	0	100	1	100	0	100	0
101	1	101	0	101	1	101	0	101	0
102	0	102	0	102	0	102	0	102	0
103	1	103	0	103	0	103	0	103	1
TOTALS:	440		175		62		0		203

Age 3 Hatchery Males Released:	12	Age 3 Natural Males Released:	56
Age 4 Hatchery Males Released:	32	Age 4 Natural Males Released:	129
Age 5 Hatchery Males Released:	18	Age 5 Natural Males Released:	18
Total Hatchery Males Released:	62	Total Natural Males Released:	203

Age 3 Hatchery Males Ponded:	28	Age 3 Natural Males Ponded:	0
Age 4 Hatchery Males Ponded:	116	Age 4 Natural Males Ponded:	0
Age 5 Hatchery Males Ponded:	14	Age 5 Natural Males Ponded:	0
Total Hatchery Males Ponded:	175	Total Natural Males Ponded:	0

4. Length Frequency Distribution – Marked & Unmarked Chinook Females

Tables 3 and 4 are incomplete due to software modifications:

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
36	0	36	0	36	0	36	0	36	0
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	1	64	1	64	0	64	0	64	0
65	0	65	0	65	0	65	0	65	0
66	2	66	2	66	0	66	0	66	0
67	2	67	1	67	0	67	0	67	1
68	5	68	3	68	2	68	0	68	0
69	9	69	8	69	0	69	0	69	1
70	15	70	9	70	1	70	0	70	5
71	11	71	10	71	0	71	0	71	1
72	10	72	6	72	3	72	0	72	1
73	9	73	4	73	3	73	0	73	2
74	20	74	11	74	4	74	0	74	5
75	16	75	7	75	4	75	0	75	5

76	18	76	13	76	2	76	0	76	3
77	12	77	10	77	0	77	0	77	2
78	23	78	13	78	5	78	0	78	5
79	14	79	6	79	3	79	0	79	5
80	18	80	9	80	3	80	0	80	6
81	10	81	3	81	2	81	0	81	5
82	10	82	5	82	0	82	0	82	5
83	9	83	6	83	2	83	0	83	1
84	8	84	4	84	1	84	0	84	3
85	12	85	7	85	1	85	0	85	4
86	6	86	2	86	1	86	0	86	3
87	8	87	7	87	1	87	0	87	0
88	8	88	3	88	0	88	0	88	5
89	8	89	5	89	1	89	0	89	2
90	2	90	1	90	1	90	0	90	0
91	9	91	4	91	1	91	0	91	4
92	1	92	0	92	0	92	0	92	1
93	5	93	2	93	2	93	0	93	1
94	2	94	0	94	0	94	0	94	2
95	3	95	2	95	0	95	0	95	1
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	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	1	103	0	103	0	103	0
TOTALS:	321		191		41		0		88

Age 3 Hatchery Females Released:	0	Age 3 Natural Females Released:	0
Age 4 Hatchery Females Released:	31	Age 4 Natural Females Released:	56
Age 5 Hatchery Females Released:	10	Age 5 Natural Females Released:	32
Total Hatchery Females Released:	41	Total Natural Females Released:	88

Age 3 Hatchery Females Ponded:	1	Age 3 Natural Females Ponded:	0
Age 4 Hatchery Females Ponded:	138	Age 4 Natural Females Ponded:	0
Age 5 Hatchery Females Ponded:	52	Age 5 Natural Females Ponded:	0
Total Hatchery Females Ponded:	191	Total Natural Females Ponded:	0

Appendix F. Sawtooth Fish Hatchery Age Class Breakdown by Released Chinook, Return Year 2006

Sawtooth	Length (Fk)	Age Class	ISS	UNMARKED	TOTAL
Males	≤ 64 cm	3-year old	12	56	68
	64-82 cm	4-year old	32	129	161
	> 82 cm	5-year old	18	18	36
Total Males			**62**	**203**	**265**
Females	≤ 82 cm	4-year old	31	56	87
	> 82 cm	5-year old	10	32	42
Total Females			**41**	**88**	**129**
Total released					**394**

Appendix G. Sawtooth Fish Hatchery Spring Chinook Spawning Matrix, 2006 return year.

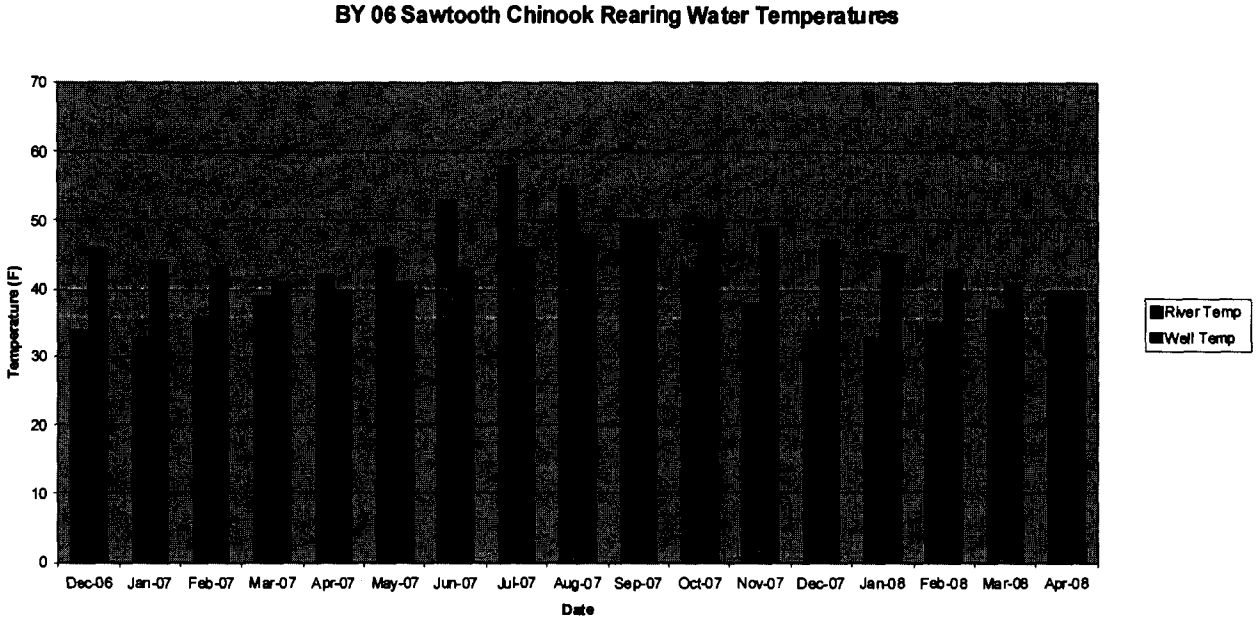
Group	Sex	Number in Group
All Fish Combined	Male	82 (3 jacks)
	Female	60

Appendix H. Survival Table for Chinook (BY06) and Steelhead (BY07) from Green Eggs to Released Smolts, at Sawtooth Fish Hatchery and East Fork Sites.

		Chinook Eggs			
	Green Egg Number	Eyed Egg Number	Percent Survival	Released Smolts	Survival From Green Eggs
Sawtooth Fish Hatchery	223,758	188,742	84.4%	174,132	77.8%
		Steelhead Eggs			
	Green egg Number	Eyed Egg Number	Percent Survival		
Sawtooth Fish Hatchery	2,472,200	2,104,531	83.2%	2,029,156	82%
Distributed as Follows					
1,107,801 Hagerman NFH *					
428,050 Magic Valley FH					
497,380 Shoshone-Bannock					
East Fork eggs					
	251,181	192,777	76.7%	63,020	25.09%
192,777 Magic Valley FH					
Squaw Creek eggs					
	143,521	80,939	56.4%	62,315	43.42%
80,939 Magic Valley FH					
Pahsimeroi FH eggs					
	538,115	495,000	92.0%		
75,000 Shoshone-Bannock					
220,000 Hagerman NFH					
200,000 Hagerman SFH					

* A shipment of 71,300 eggs was culled at Hagerman NFH as a result of hatching during shipment.
All steelhead raised at other hatcheries.

Appendix I. Rearing Water Monthly Average Temperatures, BY06 Spring Chinook at Sawtooth Fish Hatchery.



Appendix I.1. Feed Schedule for Sawtooth/ Pahsimeroi Chinook, BY06.

Skretting_Bio-Oregon

Fpp	% BW Fed	Feed Size	Timing	
1250---570		.023	"0" Bio-Vita	12/06 – 02/07
570---300		.020	str #1 Bio-Vita	02/07 - 03/07
300---150		.014	str #2 Bio-Vita	03/07 - 05/07
150-----90		.012	1.2 mm Semi-Moist	05/07 - 06/07
90-----80		.010	1.5mm Aquamycin	06/07 - 07/07
80-----60		.020	1.5mm Semi-Moist	07/07 - 08/07
60-----25		.020	2.0mm OTC	08/07 - 08/07
50-----45		.020	2.0mm Aquamycin	08/07 - 09/07
45-----20		.020	2.0mm Semi-Moist	09/07 - 12/07
<20		Maintenance	2.5mm Semi-Moist	12/07- release

Appendix J. Summary of Marked Spring Chinook Released, Brood Year 2006.

Sawtooth Fish Hatchery Stock

Mark	Number Released	Location
CWT	174,132 (Reserve)	SFH Weir (4/23/08)
Total Weir Release (PIT)	**174,132 (14,922)**	

Pahsimeroi Stock

Adipose Clip	876,266 (Reserve)
Ad Clip/CWT	166,372 (Reserve)

All 1,042,638 fish transferred to Pahsimeroi FH September 11 and 12, 2007

Appendix K. Summary of Sawtooth Fish Hatchery Spring Chinook Smolt Releases, Brood Year 2006.

Raceway	Number	Tag Code	Fish per Pound	Pounds	Designation//Mark
*L1	91,240 (7,367 PIT)	10-13-80	18.25	4,999	Reserve CWT
*L2	82,892 (7,555 PIT)	10-34-80	20.16	4,112	Reserve CWT
Total 174,132 (14,922)				**9,111**	

*Released 4/23/2008 Sawtooth Fish Hatchery Weir

Appendix L. Sawtooth Fish Hatchery Summary of BY07 Steelhead Smolt Releases and Marks.

Date	Stock	Plant Site	Number Released	Mark	CWT	PIT	Rearing Hatchery
4/16-5/7/2008	Sawtooth A	Sawtooth Weir	687,979	AD		9,917	Hagerman National
4/16-5/7/2008	Sawtooth A	Sawtooth Weir	79,544	AD	CWT		Hagerman National
5/12-5/16/2008	Sawtooth A	Yankee Fork	134,541			1,490	Hagerman National
5/12-5/16/2008	Sawtooth A	Yankee Fork	100,879	AD		983	Hagerman National
	Sawtooth A	Yankee Fork	30,695	No Clip		695	Magic Valley
	Sawtooth A	Yankee Fork	61,431	AD	30,722	896	Magic Valley
	Sawtooth A	Valley Creek	62,485	No Clip		996	Magic Valley
	Sawtooth A	Tunnel Rock	70,669	AD		1,262	Magic Valley
	Sawtooth A	McNabb Point	115,523	AD	30,518	1,391	Magic Valley
		TOTALS	1,343,746		61,240	17,630	

Date	Stock	Plant Site	Number Released	Mark	CWT	PIT	Rearing Hatchery
5/8-5/9/2008	Dworshak B	East Fork Salmon River	86,931	AD	25,913	5,190	Hagerman National
	Dworshak B	Squaw Creek Acclimation Pond	62,910	AD	62,910	1,493	Magic Valley
	Dworshak B	Squaw Creek Direct Release	183,586	AD		4,777	Magic Valley
	Dworshak B	East Fork Salmon River (lower)	226,648	AD	31,678	4,251	Magic Valley
		TOTALS	560,075		120,501	15,711	
	Natural B	East Fork Salmon River (above E.F. weir)	63,020	NO Clip	63,020	1,299	Magic Valley
	USB	Squaw Creek Direct Relase	62,315	AD	62,315	6,150	Magic Valley
		TOTAL STEELHEAD SMOLT RELEASE	**2,029,156**		**307,076**	**42,361**	

** PIT tagged number available from IDFG, marking supervisor

Appendix L.1. Sawtooth Fish Hatchery Production Cost Table (Includes Chinook BY06, Steelhead BY07, and Sockeye BY06).

Chinook BY 06

Smolt Number	Lbs. Feed	Cost Feed	Lbs of Smolts	Total Cost	Cost per 1,000	Cost per lb.
Sawtooth ,174,132	11,060	$26,579.51	9,111	$249,938	$1.44	$27.43
Pahsimeroi 1,042,638	33,608	$0*	37,855**	$62,484	$59.93	$1.65

East Fork

No BY06 East Fork spring chinook salmon were reared.

Steelhead BY 07

Stock	Green Eggs	Eyed Eggs	Total Cost	Cost per 1,000 eyed eggs
Sawtooth	2,472,000	2,104,531	$95,191	$45.23
Squaw Cr/EF	251,181	192,777	$36,612	$189.92
Pahsimeroi	538,115	495,000	$14,645	$29.59
Totals	3,261,296	2,792,308	$	$

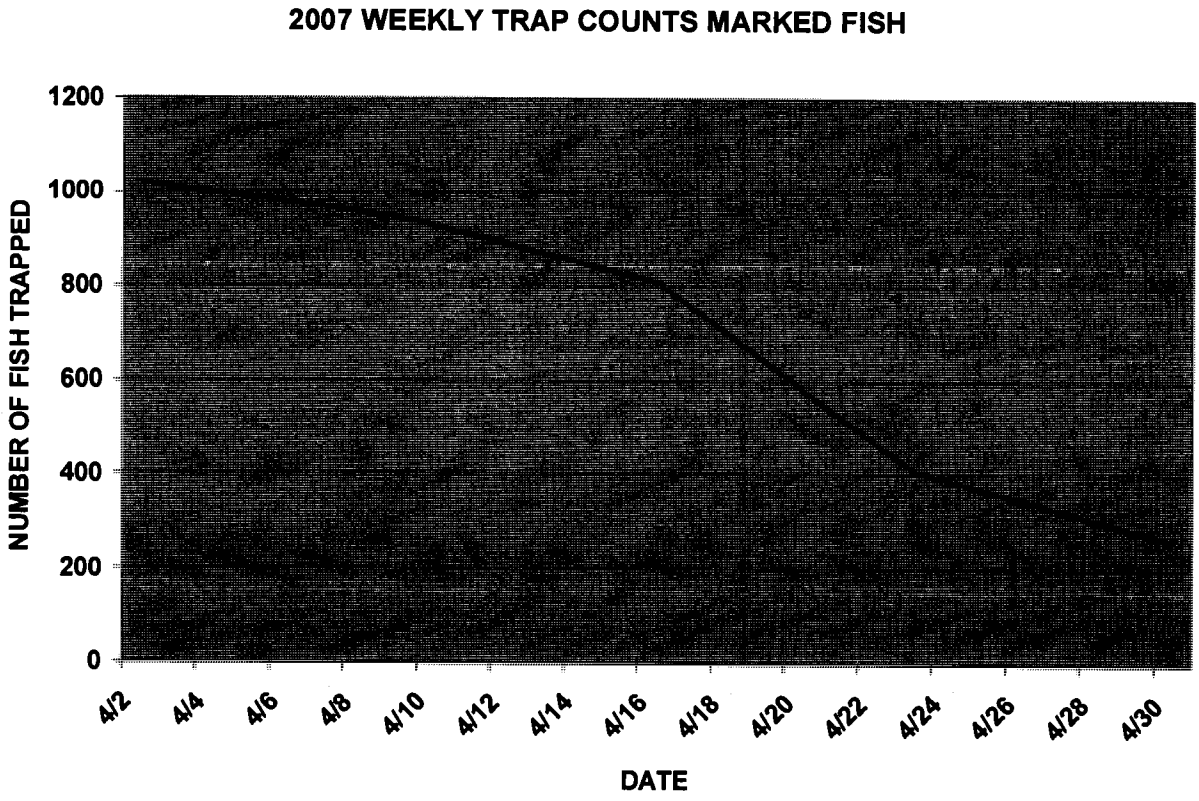
Sockeye BY 06

Smolt Number	Lbs Smolts & PreSmolts	Total Cost	Cost per 1,000	Cost per lb.
155,913	**4,112.37**	**$29,889**	**$191.70**	**$7.27**

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 2007 Steelhead Trapped at Sawtooth.**



This graph does not include unmarked fish trapped. Twenty-one unmarked steelhead (4males/17 females) were trapped at Sawtooth between April 2 and April 30, 2007.

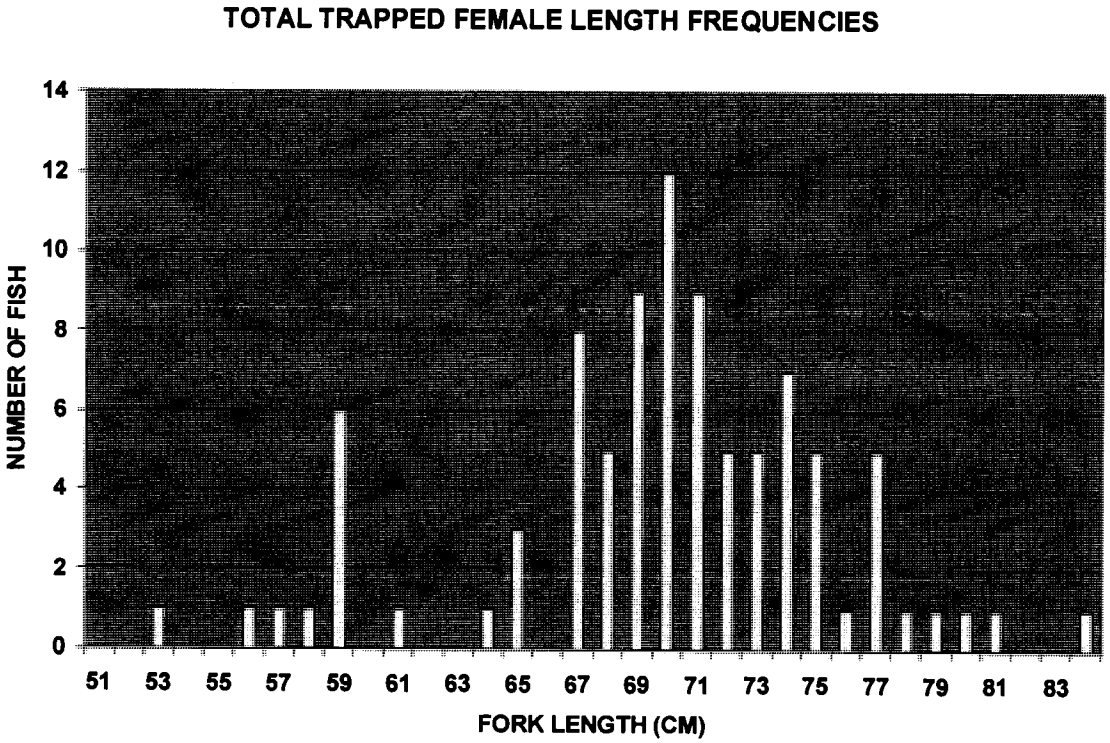
Appendix. N. Sawtooth Fish Hatchery Steelhead Length Frequency Distribution.

F.L.	HATCHERY		NATURAL			TOTAL TRAPPED			F.L.
(cm)	MALES	FEMALES	MALES	FEMALES		MALES	FEMALES	TOTAL	(in.)
50	6	3	0	0		6	3	9	19.7
51	18	13	0	0		18	13	31	20.1
52	15	27	0	1		15	28	43	20.5
53	39	60	0	0		39	60	99	20.9
54	69	95	0	0		69	95	164	21.3
55	115	143	0	0		115	143	258	21.7
56	167	195	2	0		169	195	364	22.0
57	256	245	0	3		256	248	504	22.4
58	310	231	0	1		310	232	542	22.8
59	265	196	0	0		265	196	461	23.2
60	255	132	0	0		255	132	387	23.6
61	180	67	0	2		180	69	249	24.0
62	116	54	1	1		117	55	172	24.4
63	80	34	0	0		80	34	114	24.8
64	50	36	0	2		50	38	88	25.2
65	24	32	0	0		24	32	56	25.6
66	16	36	0	0		16	36	52	26.0
67	14	46	0	0		14	46	60	26.4
68	18	51	0	2		18	53	71	26.8
69	21	46	0	1		21	47	68	27.2
70	17	44	0	0		17	44	61	27.6
71	13	35	0	2		13	37	50	28.0
72	14	33	0	1		14	34	48	28.3
73	9	18	0	0		9	18	27	28.7
74	6	8	0	0		6	8	14	29.1
75	13	8	0	0		13	8	21	29.5
76	10	5	0	0		10	5	15	29.9
77	7	4	0	0		7	4	11	30.3
78	5	0	0	1		5	1	6	30.7
79	1	0	1	0		2	0	2	31.1
80	2	0	0	0		2	0	2	31.5
Totals	2131	1897	4	17		2135	1914	4049	

Total Fish Trapped: 4049

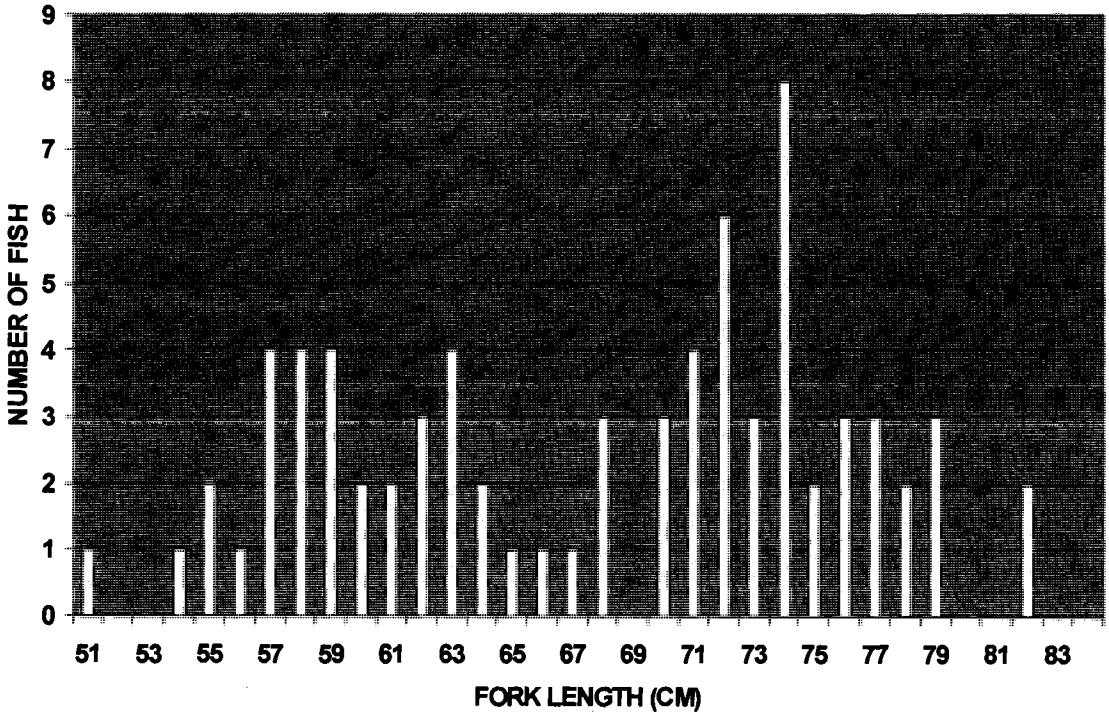
2131	Hatchery Males	4	Natural Males	2135	Total Males
1897	Hatchery Females	17	Natural Females	1914	Total Females
4028	Hatchery Fish	21	Natural Fish	4129	Total Fish

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



East Fork steelhead females released above the trap, 2006.

TOTAL TRAPPED MALE LENGTH FREQUENCIES



Appendix O. Continued.

Age breakdown for Steelhead trapped at the East Fork for 2007. H-O designates hatchery-origin fish; N-O designates natural-origin fish.

Age Class of Adults	MALES		FEMALES		TOTAL	
	No.	%	No.	%	No.	%
H-O 1-Ocean	31	41.33%	9	9.90%	40	24.10%
H-O 2-Ocean	41	54.67%	69	75.82%	110	66.27%
N-O 1-Ocean	2	2.67%	3	3.30%	5	3.01%
N-O 2-Ocean	1	1.33%	10	10.99%	11	6.63%
Total 1-Ocean	33	44.00%	12	13.19%	45	27.11%
Total 2-Ocean	42	56.00%	79	86.81%	121	72.89%

East Fork 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

Appendix P. East Fork Steelhead Length Frequency Distribution, Return Year 2007.

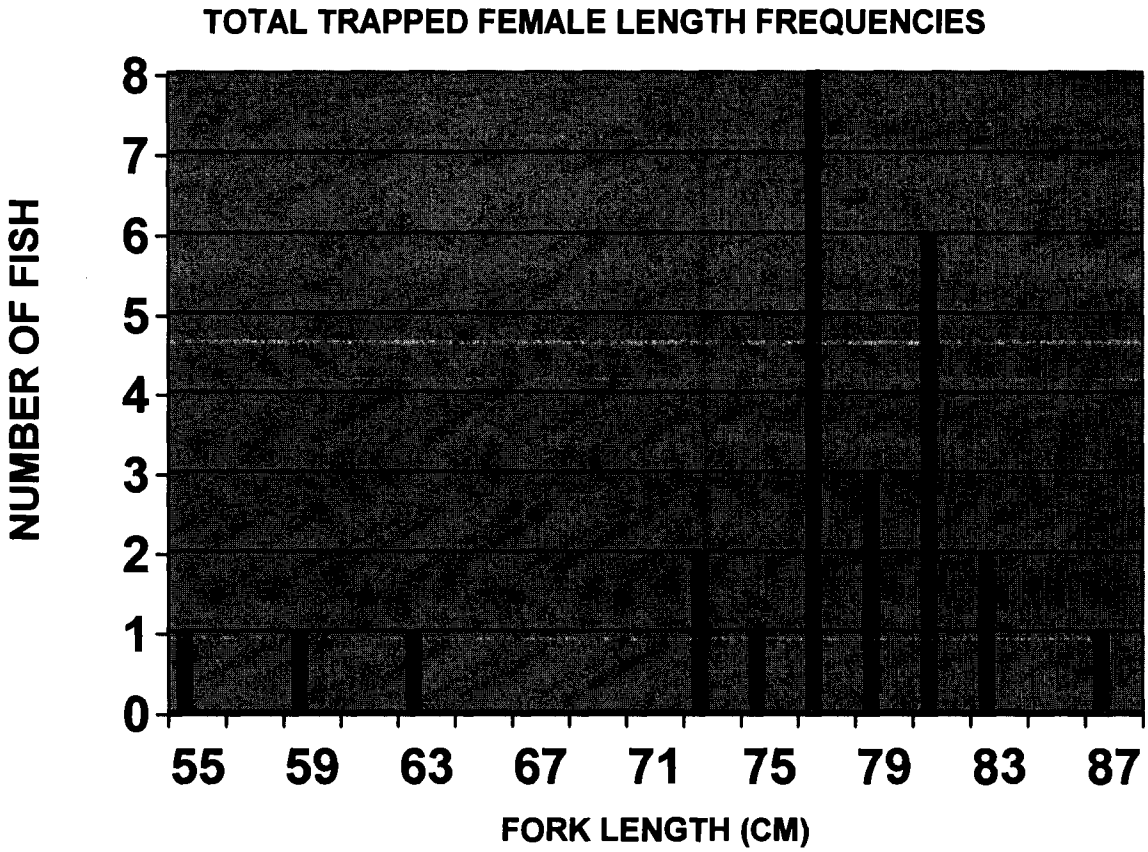
F.L. (cm)	HATCHERY-ORIGIN		NATURAL-ORIGIN			TOTAL TRAPPED			F.L. (in.)
	MALES	FEMALES	MALES	FEMALES		MALES	FEMALES	TOTAL	
51	1	0	0	0		1	0	1	20.1
52	0	0	0	0		0	0	0	20.5
53	0	1	0	0		0	1	1	20.9
54	1	0	0	0		1	0	1	21.3
55	2	0	0	0		2	0	2	21.7
56	1	0	0	1		1	1	2	22.0
57	4	0	0	1		4	1	5	22.4
58	4	1	0	0		4	1	5	22.8
59	4	5	0	1		4	6	10	23.2
60	2	0	0	0		2	0	2	23.6
61	2	1	0	0		2	1	3	24.0
62	2	0	1	0		3	0	3	24.4
63	4	0	0	0		4	0	4	24.8
64	2	1	0	0		2	1	3	25.2

65	1	3	0	0		1	3	4	25.6
66	1	0	0	0		1	0	1	26.0
67	0	7	1	1		1	8	9	26.4
68	3	4	0	1		3	5	8	26.8
69	0	9	0	0		0	9	9	27.2
70	3	11	0	1		3	12	15	27.6
71	3	8	1	1		4	9	13	28.0
72	6	5	0	0		6	5	11	28.3
73	3	5	0	0		3	5	8	28.7
74	8	6	0	1		8	7	15	29.1
75	2	4	0	1		2	5	7	29.5
76	3	1	0	0		3	1	4	29.9
77	3	4	0	1		3	5	8	30.3
78	2	1	0	0		2	1	3	30.7
79	3	1	0	0		3	1	4	31.1
80	0	0	0	1		0	1	1	31.5
81	0	0	0	1		0	1	1	31.9
82	2	0	0	0		2	0	2	32.3
83	0	0	0	0		0	0	0	32.7
84	0	0	0	1		0	1	1	33.1
Totals	72	78	3	13		75	91	166	

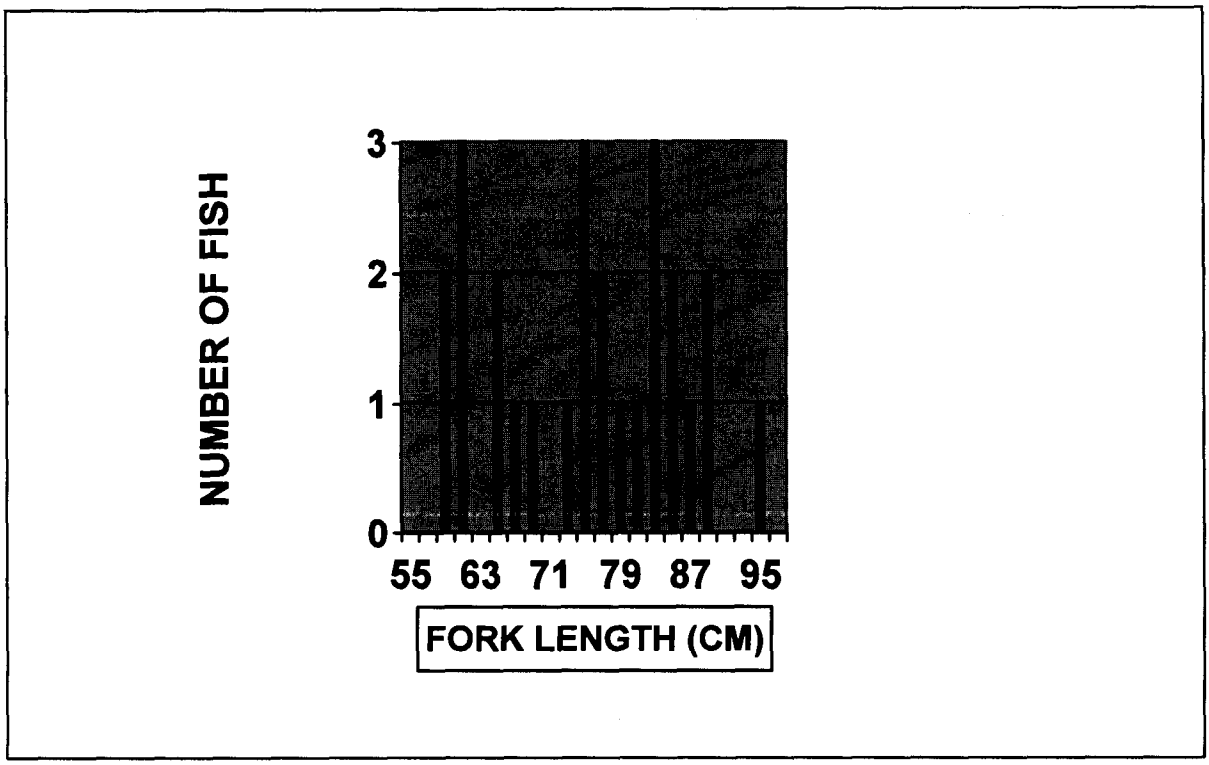
Total Fish Trapped	160		
*72 H-O Males		3 N-O Males	75 Total Males
*78 H-O Females		13 N-O Females	91 Total Females
150 H-O Fish		16 N-O Fish	166 Total Fish

*includes 4 adipose fin-clipped males and 1 adipose fin-clipped female.

Appendix. Q. Length Frequencies for Steelhead, Return Year 2007, Squaw Creek Trap.



TOTAL TRAPPED MALE LENGTH FREQUENCIES



Appendix R. Run Timing for Steelhead, Return Year 2007. Squaw Creek Trap.

Date	Sex		Fork Length (cm)	Marks				Disposition	
	M	F		AD	LV	CWT	NO	*Transferred	Released
3/30/2007		x	58	x					x
4/1/2007		x	86	x				x	
4/1/2007		x	77	x				x	
4/1/2007		x	80	x				x	
4/1/2007	x		75	x	x				x
4/2/2007		x	62	x					x
4/3/2007	x		65	x		x		x	
4/3/2007		x	77	x		x		x	
4/5/2007		x	76	x		x		x	
4/5/2007		x	80	x				x	
4/5/2007	x		66	x		x		x	
4/6/2007		x	81	x		x		x	
4/6/2007	x		84	x		x		x	
4/6/2007	x		64	x					x
4/6/2007	x		68	x		x		x	
4/6/2007		x	77	x		x		x	
4/6/2007	x		58	x					x
4/7/2007	x		60	x					x
4/7/2007		x	77	x		x		x	

4/7/2007	x		74	x		x		x	
4/7/2007	x		84	x					x
4/7/2007		x	79	x		x		x	
4/7/2007		x	79	x		x		x	
4/7/2007		x	78	x		x		x	
4/7/2007	x		82	x		x		x	
4/8/2007		x	77	x		x		x	
4/8/2007		x	80	x		x		x	
4/8/2007		x	82	x				x	
4/8/2007		x	72	x		x			
4/8/2007	x		88	x		x		x	
4/8/2007		x	80	x		x		x	
4/8/2007		x	77	x		x		x	
4/8/2007	x		58	x					x
4/8/2007	x		81	x		x		x	
4/8/2007	x		77	x					x
4/8/2007	x		75	x				x	
4/8/2007	x		61	x					x
4/8/2007		x	80	x		x		x	
4/9/2007	x		95	x		x		x	
4/9/2007	x		83	x		x		x	
4/9/2007		x	72	x					x
4/9/2007	x		76	x		x		x	
4/9/2007	x		86	x				x	
4/9/2007		x	82	x		x		x	
4/9/2007		x	77	x		x		x	
4/9/2007	x		79	x		x		x	
Date	**Sex**		**Fork Length (cm)**	**Marks**				**Disposition**	
	M	F		AD	LV	CWT	NO	*Transferred	Released
4/9/2007		x	74	x		x		x	
4/9/2007	x		73	x		x		x	
4/9/2007	x		61	x					x
4/13/2007	x		82	x		x		x	
4/14/2007	x		88	x		x		x	
4/21/2007		x	54	x					x

*Designates that fish was transferred from the Squaw Creek trap to the spawning facility at the East Fork
of the Salmon River trap.

Total Fish Trapped:	**52**				
26	Hatchery Males	0	Natural Males	26	Total Males
26	Hatchery Females	0	Natural Females	26	Total Females
52	Hatchery Fish	0	Natural Fish	52	Total Fish

Appendix. S. Fish Health Autopsy Results, Chinook BY 2006

ACCESSION NO:	08-026	LOCATION:	Sawtooth
SPECIES:	sc	AUTOPSY DATE:	2/15/2008
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	0.00	0.00	0.00
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	0.00	0.00	0.00

*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	
B1	0	F	0	S	0	1	0	1	6	R	2	1	0	S	0	B	20	1	
B2	0	C	0	L	0	2	0	2	8	G	0	2	0	M	0	C	0	2	
E1	0	M	0	S&L	0			3	5	NO	0			G	0	D	0	3	
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.(	
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
		M:		F:					
SEX		0		0		U: 0			

GENERAL REMARKS:

FINS: GONADS:

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