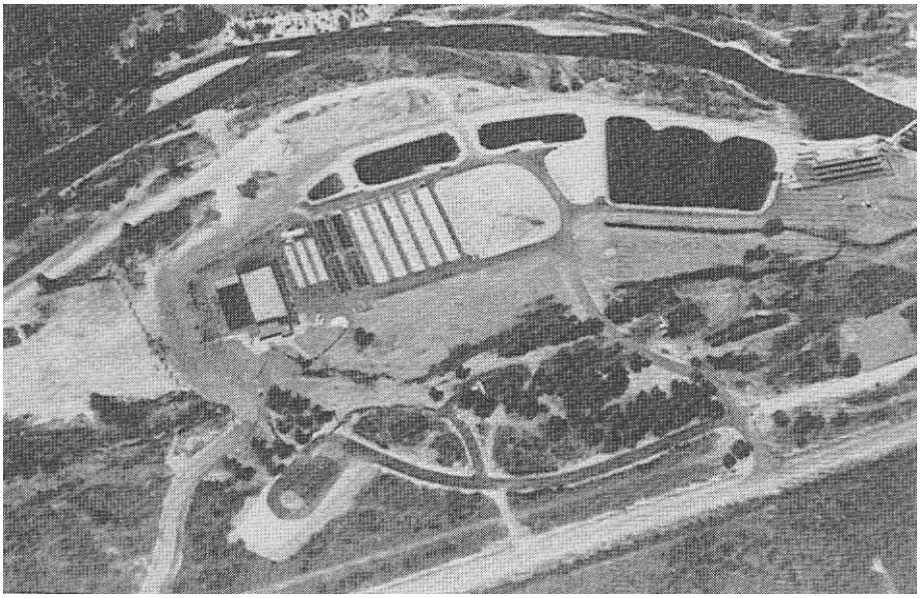
LOWER SNAKE RIVER
COMPENSATION PLAN
Hatchery Program

SAWTOOTH FISH HATCHERY
and
EAST FORK SATELLITE

1995 Spring Chinook Brood Year Report
1996 Steelhead Brood Year Report



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IDFG 98-22
July 1998

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1995 SPRING CHINOOK SALMON

ABSTRACT

The Sawtooth Fish Hatchery trap and weir were put into operation on June 12, 1995, and operated through September 6, 1995. A total of 37 spring chinook salmon *Oncorhynchus tshawytscha* (17 males, 4 females, and 16 jacks) were trapped. Released above the weir were 20 fish, (8 males, 2 females and 10 jacks) to spawn naturally. There was no prespawning mortality.

Spawning began on August 18, and continued through August 22, with two spawning days. We spawned two females that produced 7,377 green eggs (3,688 eggs per female), which yielded 4,997 eyed eggs for an eye-up rate of 68%. From these eyed eggs, 4,914 fry were ponded which, resulted in a smolt release of 4,756 smolts.

The East Fork Satellite fish trap and velocity barrier were put into operation on July 27, 1995, and continued operating through August 31, 1995. No adult spring chinook salmon were trapped.

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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 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 miles from Lower Granite Dam and 950 miles from the mouth of the Columbia River. Chinook salmon *Oncorhynchus tshawytscha* are released directly into the river at the hatchery and above the hatchery in the headwaters of the Salmon. Sawtooth Fish Hatchery steelhead are released at the hatchery, along the lower Salmon, and various other drainages around the state.

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

Species Reared

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

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

Broodstock History

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

At both facilities, returning adult fish are released to spawn naturally. Numbers of fish released depends on marked and unmarked fish returns. The National Marine Fisheries Service under permits # 919 and # 920 prescribes fish handling. Typically at Sawtooth, about

one-third of the salmon are released. All unmarked steelhead are released along with enough marked hatchery fish to ensure pairing of adults. At the East Fork, all salmon are released until a total of twenty pairs have been passed above the weir. All unmarked steelhead are released along with enough marked hatchery fish to ensure equal adult pairings. An historical synopsis of releases and returns is shown in Appendix A.

OBJECTIVES

Mitigation Goals

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

Idaho Department of Fish and Game Objectives

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

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

2. Produce quality fish for supplementation programs.

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

FACILITY DESCRIPTION

Hatchery Description

The hatchery's main building is 134 ft by 166 ft and consists of an office, meeting room, lab, visitor/interpretive center, wood shop, welding/fabrication shop, intake collection box/chemical room, shop office, incubation and early rearing room, one inside storage room and two outside covered storage areas, generator room, furnace room and a feed freezer/chemical equipment room. The hatchery has four pump houses (each is 14 ft x 11 ft). One is for domestic water and three are production wells. An intake building (15 ft x 37 ft) is located one-half mile upstream from the hatchery and Salmon River water is collected for outside production rearing. The temporary employee dorm and adult spawning facility are located 300 yards downstream of the hatchery building. The dorm (38 ft x 72 ft) has three bedrooms with a bath in each, attached public rest-room facilities, storage and laundry room, living and dining room with an open kitchen. The adult facility consists of three adult ponds and an enclosed spawning shed (35 ft x 52 ft). There are five resident houses at Sawtooth, all about 1,360 square ft with attached single car garages and separate woodsheds.

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

Production Capabilities

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

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

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

RECOMMENDATIONS

Recommendations for Sawtooth Fish Hatchery include developing additional wells for disease-free rearing water, modifying the river water intake to reduce winter icing problems, repairing gabions at the weir and intake, covering raceway tail-race openings with grating for added safety, and seal coating hatchery roadways.

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

WATER SUPPLY

Source

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

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

Quantity and Temperature

The Sawtooth Fish Hatchery wells provide 3.1 cfs of pumped water and temperatures range from 39° F (4° C) in the winter to 52° F (11° C) in the summer. The Salmon river provides up to 55 cfs of gravity-flow water and ranges in temperature from 32° F (0° C) in the winter to 68° F (20° C) in the summer (Appendix V).

Water Quality

The most recent water quality analysis from the Sawtooth Fish Hatchery collection box at the river was completed in September 1996. Results include: hardness at 80 mg/L; total alkalinity as CaCO3 at 79; bicarbonate alkalinity as CaCO3 at 79; sp.conductance at 167 (umhos/cm); total ammonia as N at 0.027 (mg/L); total NO2 + NO3 as N at 0.006; total Kjeldahl N as N at 0.20 (mg/L); total phosphorus as P at <0.05 (mg/L); and pH at 8.04. The most noticeable variances from the 1993 tests were; hardness, which was 68 mg/L in 1993 to 80 mg/L in 1996 and Kjeldahl N as N, which was <0.05 mg/L in 1993 to 0.20 mg/L in 1996. Additional information is shown in Appendix B.

STAFFING

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

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

FISH HEALTH

Diseases Encountered and Treatment

No major disease outbreaks were encountered with any of the BY95 spring chinook salmon raised at Sawtooth Fish Hatchery. All fish were given two separate prophylactic 28-day erythromycin feed treatments to control BKD. A minor toxicity reaction occurred during the first medicated feed treatment. The feeding regime was altered to an every other day medicated feed delivery which stopped the toxicity reaction. No mortality resulted from the toxicity.

Important pathogens found at Sawtooth Fish Hatchery are *Renibacterium salmoninarum* (BKD), *Myxobolus cerebralis* (whirling disease), *Diplostomum* spp. (eye fluke), and *Cytophaga psychrophilia* (Cold Water Disease). Both *Myxobolus* and *Diplostomum* have been controlled with concrete raceways. Although *Cytophaga is* ubiquitous in the environment, Cold Water

Disease is not expressed at this hatchery unless stressful conditions predispose the fish to disease (Appendix C).

Both facilities have been relatively disease-free, although Sawtooth Fish Hatchery and East Fork chinook have had incidences of BKD in the past. A BKD segregation program was implemented in 1989, with apparent success in limiting mortalities to high BKD raceways (91-153 & 91-154). In times of either warm-water temperatures or fish handling, some fish will show typical signs of this disease. The focus of the fish health program at Sawtooth Fish Hatchery is to control BKD. This segregation starts at the eye-up stage and continues until the fish are released. Whirling disease exposure is reduced by keeping the fry on pathogen free well water for as long as possible before moving them outside on raw river water.

Several programs have been implemented at Sawtooth Fish Hatchery to help raise a better quality smolt. Outside raceway baffles were tested with two raceways and shade-cover was installed on all the outside raceways. Baffles are used on all inside rearing vats, and light is controlled to mimic outside photoperiod.

FISH PRODUCTION

Spring Chinook Adult Collection

The Sawtooth Fish Hatchery chinook-trapping season began on June 12, 1995, and continued through September 6, 1995. The peak of the run occurred the week of July 29, 1995 (Appendix W). A total of 37 spring chinook salmon were trapped including 17 males (9 marked), 4 females (2 marked), and 16 jacks (8 marked). (Appendix N). Released above the weir were 20 salmon, which included 8 males, 10 jacks, and 2 females (Appendix O). CWT fish recoveries were from 5 three-year old and 6 four-year old adult male salmon (Appendix N.1). Sawtooth Fish Hatchery had a male:female ratio of 89% males and 11% females.

The East Fork trap was in operation from July 27, 1995, to August 31, 1995. No adult spring chinook salmon were trapped. Late trapping was due to delayed spring runoff.

Adult Treatments

Sawtooth Fish Hatchery adult chinook were injected with erythromycin phosphate at a rate of 20 mg active per kg. body weight. Injections were given posterior to the pelvic fins interparietal. The Sawtooth Fish Hatchery ponded adults were treated three times per week in a one-hour 175 ppm formalin flush. No adults were ponded at the East Fork.

Prespawning Mortality

Sawtooth Fish Hatchery had no pre-spawning mortality of ponded fish

Spawning Operations

Spawning activities at Sawtooth Fish Hatchery began August 18, and concluded August 22, 1995. The two egg takes during this period yielded 7,377 green eggs from 2 females for an average fecundity of 3,688 eggs per female. There were 7 male and 1 jack salmon used for fertilization. Each female's eggs were separated into two groups. Two separate male salmon fertilized each group of eggs. The eggs were then recombined and 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 for BKD segregation.

No adults were trapped at the East Fork Facility. No spawning occurred.

PAHSIMEROI CHINOOK

To take advantage of available rearing space and the pathogen free well-rearing water at Sawtooth Fish Hatchery, Pahsimeroi Fish Hatchery transferred eyed summer chinook eggs to Sawtooth Fish Hatchery in 1995. A total of 76,000 BY95 eyed eggs were shipped to Sawtooth Fish Hatchery from September 29, 1995 to November 1, 1995. A total of 72,024 fry were ponded for a 95% swim-up rate. These fry, along with an additional 57,797 BY95 fish that were received from Pahsimeroi Hatchery on June 24, 1996, were reared at Sawtooth Fish Hatchery until the pre-smolt stage and then transferred back to Pahsimeroi Hatchery in October of 1996. A total of 118,520 pre-smolts were transferred. There were 5,268 BY95 Pahsimeroi stock pre-smolts held at Sawtooth Fish Hatchery due to a high BKD designation. In April 1996, these fish were hauled to the Pahsimeroi weir and direct released. In all, a total of 123,788 BY95 Pahsimeroi stock chinook smolts were reared.

Incubation

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

Well temperatures ranged from 50° F to 41° F during the incubation period. The eggs eyed-up at 480 thermal units (TU). At eye-up the eggs are shocked by dropping them from one container to another picked and enumerated by hand count. The eggs are shocked at 530 TU and hatch at 1,300 TU.

Sawtooth Fish Hatchery green eggs eyed up at a 68% rate, yielding 4,977 eyed eggs (Appendix D). One of the two females that were spawned entered the trap in poor condition. She appeared to be injured during migration back to Sawtooth Fish Hatchery. The eggs from this female eyed up at a 41% rate, reducing the overall eye-up percentage.

Early Rearing

The Sawtooth Fish Hatchery stock swim-up fry were transferred from the Heath trays to semi-square tanks measuring 42 inches x 42 inches x 17 inches which were plumbed into

existing vat well water supply. Each female was ponded into a separate tank. The swim-up fry were kept at a high density during feed training (1.2 Ibs/cubic ft) until all the fish were on feed. After all the fish were eating well, they were combined and transferred to an inside vat. The vat contained PVC baffles every four feet. The Pahsimeroi stock swim-up fry were ponded directly into the inside vats and segregated according to BKD designation.

Starting flows for the swim-up fry were set at 3 gpm in each semi square tank and then 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 44° F to 40° F.

All fry were started on Bio-Products Bio-Diet Starter #2 and #3. Feed amounts and sizes varied according to manufacturer recommendations as the fish grew. All fish were fed a 28-day prophylactic treatment of erythromycin medicated feed during May, at a rate of 4.5 grams active/100 lbs of fish.

Final Rearing

The Sawtooth Fish Hatchery chinook were kept inside until November of 1996. They were ad-clipped and PIT tagged in September 1996 and separated into two equal groups in inside vats. On November 20, 1996, the fish were moved outside and placed into two separate small raceways.

In June 1996, 57,797 BY95 Pahsimeroi stock spring chinook were transported from Pahsimeroi Hatchery and placed into a large outside raceway. The Pahsimeroi chinook hatched at Sawtooth Fish Hatchery were moved outside to a separate large raceway on August 20, 1996. All outside Pahsimeroi fish were administered a 28-day erythromycin feed treatment starting August 30, 1996.

A small group (5,300) of high BKD designated BY95 Pahsimeroi stock fish were kept inside until November 20, 1996. They were then moved outside to two small outside raceways.

Initial densities were 0.15 lbs/cu.ft. And flows were 75 gpm in the small raceways and 320 gpm in the large raceways. The small raceways were baffled every seven feet. The small raceways were surrounded with chainlink fencing to prevent otter disturbance. All raceways were covered with shade covers. River water supplies the outside raceways, so daily temperatures fluctuate up to 19° F. Seasonal variances range from lows of 32° F. during winter to 65° F in summer.

All outside fish were fed a diet of Bio Products Grower feed. Prior to moving the fish outside, they were fed a second 28-day prophylactic treatment of erythromycin at a rate of 4.5 grams active per 100 pounds of fish to prevent the onset of BKD.

The finish weight of the BY95 Sawtooth Fish Hatchery spring chinook smolts reared at Sawtooth Fish Hatchery Fish Hatchery was 398 pounds. The fish were fed 750 pounds of feed for a conversion rate of 1.8.

Pahsimeroi stock BY95 smolts were fed a total of 6,225 pounds of feed while being reared at Sawtooth Fish Hatchery. The BKD group of fish was fed 375 pounds of feed and had a finish weight of 260 pounds for a conversion of 1.4. The group of fish that was transferred back to

Pahsimeroi Fish Hatchery received 5,850 pounds of feed and had a transfer weight of 7,901 pounds for a conversion of 0.75.

Fish Marking

Fish marking occurred during September and October 1996. A total of 4,803 Sawtooth Fish Hatchery stock fish were marked in September with an ad-clip, and 1,500 received PIT tags. A total of 20 Sawtooth Fish Hatchery stock fish with PIT tags died prior to release. All Sawtooth Fish Hatchery fish were designated as supplementation stock. A total of 123, 808 Pahsimeroi stock fish received an ad-clip in October, and 33,500 received PIT tags. The PIT-tags are to evaluate downriver migration (Appendix Q, Appendix E).

Fish Distribution

Fish release for Sawtooth Fish Hatchery stock BY95 smolts occurred on April 17, 1997. A total of 4,756 supplementation smolts were released. Of these, 2,380 smolts were released approximately ten miles upriver of the Sawtooth Fish Hatchery at the Blaine/Custer county line bridge into the Salmon River. The remaining 2,376 smolts were released the same day directly at the Sawtooth Fish Hatchery weir (Appendix R).

On October 16, 17, and 18, 1996, 118,520 Pahsimeroi stock BY95 pre-smolts were transferred back to Pahsimeroi Fish Hatchery for over-winter acclimation and spring release. There were 5,206 BY95 high BKD smolts transferred to Pahsimeroi Fish Hatchery on April 15, 1997 for direct release at the Pahsimeroi Hatchery weir.

1995 STEELHEAD TROUT

ABSTRACT

The Sawtooth Fish Hatchery trap and weir were put into operation on March 20, 1996 and closed May 13, 1996. A total of 553 adult steelhead *Oncorhynchus mykiss* (299 males and 254 females) were trapped at the Sawtooth Fish Hatchery weir. A total of 54 steelhead were released above the hatchery to spawn naturally. This included 32 males (2 natural), and 22 females (6 natural). Of these released fish, 20 hatchery males and 13 hatchery females were released into a weired-off section of Beaver Creek for a natural-spawning study, conducted by Alan Byrne, DEPARTMENT Research Biologist. There was no prespawning mortality at Sawtooth Fish Hatchery.

Spawning began on March 28, 1996 and continued through May 2, 1996 with ten spawning days. A total of 226 females were spawned with 228 males, yielding 1,091,543 green eggs for an average fecundity of 4,828 eggs per female. These green eggs resulted in 982,600 eyed eggs for an eye-up percentage of 90%. The eggs were shipped as follows: Hagerman National Fish Hatchery received 849,800, Magic Valley Fish Hatchery received 82,800, and the Shoshone-Bannock Tribes received 50,000.

The East Fork velocity barrier and trap were put into operation March 22, 1996, and ran through May 10, 1996. A total of 54 adult steelhead were trapped. This included 32 males and 22 females. Fish released above the weir to spawn naturally included 5 males (4 natural), and 2 females (2 natural). There was no prespawning mortality

An adult steelhead trap was installed on Slate Creek, a tributary of the Salmon River on March 26, 1996, and operated through April 25, 1996. A total of 38 adult steelhead were trapped. This includes 15 males and 23 females. All A-run steelhead and all unmarked fish were released above the weir to spawn naturally. This included 8 males (one natural), and 8 females (0 natural). The remaining fish were hauled to the East Fork Facility and spawned with East Fork Fish.

Spawning operations began on April 5, 1996, and continued through May 3, 1996 with 8 spawning days. A total of 35 females were spawned with 34 males, yielding 161,632 green eggs, for an average fecundity of 4,618 eggs per female. These green eggs resulted in 143,760 eyed eggs for an 89% eye-up rate. These eggs were shipped to Magic Valley Hatchery for rearing.

There were 5,398,600 green eggs from Pahsimeroi Hatchery incubated at Sawtooth. These eggs eyed up at an 80.7% rate, yielding 4,357,500 eyed eggs. They were shipped to the following hatcheries: Magic Valley received 882,000 as eyed eggs, Niagara Springs received 510,200 as eyed eggs and 787,300 as swim-up fry, Hagerman National received 463,700 as eyed eggs, the Shoshone-Bannock Tribes received 614,000 eyed eggs for their streamside incubator program, and Hagerman State Fish Hatchery received 854,300 as eyed eggs and 213,300 as swim-up fry for resident fishery programs.

The Sawtooth, Pahsimeroi, and East Fork stock eyed eggs were released as smolts during the spring of 1997. Sawtooth Fish Hatchery and Pahsimeroi stock smolts were released at the following locations: acclimated release - 751,249 (this includes: 65,420 acclimated and released at Torrey's Hole, 575,528 acclimated and released at the Sawtooth Fish Hatchery weir, and 110,301 acclimated release study smolts. There were 63,374 smolts direct released for a total BY96 smolt release of 814,613. East Fork stock smolts numbering 131,220 were released in the East Fork Salmon River.

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FISH PRODUCTION

Steelhead Adult Collection

The Sawtooth Fish Hatchery weir and trap was put into operation on March 20, 1996, and closed May 13, 1996. The East Fork trap was put into operation March 22, 1996, and ran through May 10, 1996. The Slate Creek trap was put into operation on March 26, 1996 and ran through April 25, 1996. The peak of the Sawtooth Fish Hatchery steelhead *Oncorhynchus mykiss* run occurred during the week of April 11, the peak of the East Fork run occurred during the week of April 10, and the Slate Creek run peaked during the week of April 11, 1996. (Appendix M).

Sawtooth Fish Hatchery trapped a total of 553 adult fish, which included 299 males and 254 females (Appendix S). All fish were scanned for CWT, with 53 LV-clipped, (54 tagged) fish being recovered. A total of 54 steelhead, 32 males (2 natural) and 22 females (6 natural)) were released. Of the released fish, 12 males (2 natural), and 9 females (6 natural) were released immediately above the weir. The other adult fish were released as part of supplementation studies conducted by Alan Byrne, DEPARTMENT Research Biologist. These hatchery fish (20 males and 13 females) were placed into a weired-off section of Beaver Creek.

The East Fork facility trapped 54 B-run adult fish, of which 32 were males and 22 were females (Appendix S). A total of 5 males (4 natural), and 2 females (2 natural) were released above the velocity barrier to spawn naturally. All fish were scanned for CWT with 17 LV-clipped, (17 tagged) fish being recovered.

The trap at Slate Creek collected a total of 38 adult steelhead, of which 15 were males, and 23 were females. All A-run and natural fish were released. This included 8 males (one natural), and 8 females (0 natural). No CWT tagged fish were recovered at Slate Creek. The length frequency distribution of steelhead from Sawtooth Fish Hatchery, East Fork and Slate Creek is shown in Appendix I, J, and K.

Sawtooth Fish Hatchery had a male:female ratio of 54% males and 46% females. The East Fork's male:female ratio was 59% male and 41% female. Slate Creek had a male:female ratio of 39% male and 61% female.

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

From the 54 Sawtooth Fish Hatchery CWT-fish recovered, the information indicated 29 of the fish were one-ocean and 25 were two-ocean. From the 17 CWT's recovered at the East Fork, measurements indicated that 16 were one-ocean and I was a two-ocean. No CWT tagged fish were recovered at Slate Creek. Released steelhead by adult year class and sex are shown in Appendix T.

Adult Treatments

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

Prespawning Mortality

Sawtooth Fish Hatchery, the East Fork facility, and Slate Creek had no prespawning mortality.

Spawning Operations

Sawtooth Fish Hatchery spawned steelhead on 10 days from March 28, through May 2. Spawning took place at the East Fork on eight days from April 5, through May 3. The Slate Creek fish were transported to the East Fork facility combined with the East Fork fish and spawned together. Both facilities spawned one male with one female and then combined two females together.

At Sawtooth, 454 fish were spawned, of which 226 were females. The East Fork facility spawned 69 fish, of which 35 were females. Using the Von Bayer egg-enumeration method, 1,091,543 green eggs were collected from Sawtooth Fish Hatchery fish (4,828 per female) and 161,632 green eggs were taken from East Fork/Slate Creek fish (4,618 per female).

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

Incubation

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

There were 5,398,600 green eggs received from Pahsimeroi Hatchery and incubated at Sawtooth. These eggs were incubated at two females per Heath tray.

All incubated eggs were treated with a 1,667 ppm 15-minute formalin flow-through treatment five times per week for fungal and bacterial control. Sawtooth's eggs eyed up at a 90% rate, yielding 982,600 eyed eggs. East Fork/Slate Creek eggs eyed up at a 89% rate, yielding 143,760 eyed eggs. Pahsimeroi eggs incubated at Sawtooth Fish Hatchery eyed up at a 80.7% rate, resulting in 4,357,500 eyed eggs (Appendix F).

Well temperatures varied from 40°F at the beginning of incubation to 42°F when the last fry were shipped. Nine temperature units (TU's) per day was the average during the incubation period. Eye-up occurred at 360 TU's and the eggs were shocked at 380 TU's.

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

We shipped 849,800 Sawtooth Fish Hatchery eggs to Hagerman National Hatchery. Magic Valley Hatchery received 82,800 Sawtooth Fish Hatchery eyed eggs, and the Shoshone-

Bannock Tribes received 50,000 Sawtooth Fish Hatchery eyed eggs. Magic Valley Hatchery received all 143,760 East Fork/Slate Creek eggs. The Pahsimeroi eggs were shipped as follows: 882,000 as eyed eggs to Magic Valley Hatchery; 463,700 as eyed eggs to Hagerman National Hatchery, 510,200 as eyed eggs and 787,300 as fry to Niagara Springs Hatchery, 614,000 as eyed eggs to the Shoshone-Bannock Tribe, and 854,300 as eyed eggs, and 213,300 as fry to Hagerman State Hatchery.

Release Acclimation of BY 96

For the sixth year in a row, steelhead smolts were held and acclimated at Sawtooth Fish Hatchery before final release. A total of 825,659 smolts were hauled from Hagerman National Hatchery and held in 12 separate raceways, starting April 1, and continuing until April 11, 1997. They were held from 14 to 46 days. All of the fish were fed a maintenance diet of BioMoist 3.0mm. The screens were removed on April 25, 1997. The smolts were forced out of the raceways the same day.

Fish Marking

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

CONCLUSIONS/RECOMMENDATIONS

East Fork Trap

As stated in last year's brood year report, the East Fork's adult returns are insufficient to meet egg needs or escapement goals. With the involved agency approvals, a lower weir and trap would boost our facility's adult numbers by capturing all the fish that drop out before reaching the trap. Another option would be not to clip the adipose fin off of East Fork stock fish. A ventral fin could be clipped to identify these fish as East Fork stock. With the adipose fin attached, the East Fork stock would not be fished upon, giving us more brood stock potential. This would allow us to plant less Dworshak stock smolts, which are proven to much less successful than East Fork stock fish.

Sawtooth Fish Hatchery

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

APPENDICES

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

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

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

Brood Year	Release Year	Number Released	Adult Returns [a] 3-year	4-year	5-year	Total Returns	%
1979	1981	-	-	-	69	69	inc
1980	1982	-	-	26	59	85	inc
1981	1983-	-	-	193	102	317	inc
1982	1984	-	-	87	181	268	inc
1983	1985	-	22	90	519	631	inc
1984	1986	108,700	1	23	51	75	
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	.046
1990	1992	79,300	6	2	0	8	.010
1991	1993	35,172	0	0	0	0	.000
1992	1994	12,368	0	7	0	7	.056
1993	1995	48,845	3	7	(1998)	-	inc
1994	1996	-	0	(1998)	(1999)	-	inc
1995	1997	-	(1998)	(1999)	(2000)	-	inc

[a] Age classes based upon the following lengths: 3-yr. old: $\leq$ 64 cm, 4-yr. old: 64 to 82 cm 5-yr. old: >82 cm, returns include natural fish.

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

Beginning with BY91, all hatchery smolts released were marked.

Hatchery Adult Returns

Brood Year	Release Year	Number Released	Adult Returns [a] 3-year	4-year	5-year	Total Returns	%
1991	92-93	774,583	2	11	7	20	.002
1992	93-94	213,830	8	23	26	57	.026
1993	94-95	334,313	21	72	(1998)	-	inc
1994	1996	25,006	1	(1998)	(1999)	-	inc
1995	1997	4,756	(1998)	(1999)	(2000)	-	inc

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

Hatchery Adult Returns

Brood Year	Release Year	Number Released	Adult Returns [a] 3-year	4-year	5-year	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	(1998)	-	inc
1994	1996	-	0	(1998)	(1999)	-	inc
1995	1997	-	(1998)	(1999)	(2000)	-	inc

[a] Age classes based upon the following lengths: 3-yr. old: $\leq$ 64 cm, 4-yr. old: 64 to 82 cm 5-yr. old: >82 cm.

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

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

Appendix C. Sawtooth Fish Hatchery Results of Disease Sampling.

By95 Juvenile Chinook

Case #	Stock	Date	Data
96-215	Saw	06/11/96	IHN, IPN, BKD 0/10, FUR, ERM, CWD 0/8
96-418	Saw	10/09/96	IHN, IPN, BKD 0/9, FUR,ERM,CWD 0/8, A.hydrophilla 1/8
96-463	Saw	10/23/96	BKD 3/5 low; 0.117,0.108,0.150,BACTE 0/6 FUR,ERM,CWD 0/6
97-090	Saw	04/08/97	IHN, IPN, 0/20, BKD 4/4 LOW, WHD 0/20, Viro 0/20, FAT 0/20

Return Year 1995 Chinook Broodstock

Case #	Stock	Date	Data
95-374	Saw	08/18/95	IHN, IPN 0/1
95-376	Saw	08/18/95	BKD 1/1 LOW, WHD 0/1
95-377	Saw	08/24/95	IHN, IPN,BKD,WHD 0/1
95-400	Saw	08/31/95	IHN, IPN 0/2
95-443	Saw	09/06/95	BKD 2/3; 12 fish pools, I mod., 1 high, WHD 0/12 All male fish sampled at end of spawning season

Return year 1996 steelhead broodstock

Case #	Stock	Date	Data
96-119	Saw	03/28/96	IHN, IPN 0/18
96-127	Saw	04/01/96	IHN, IPH 0/18
96-135	Saw	04/04/96	IHN, IPN 0/18
96-143	EF	04/05/96	IHN, IPN 0/7
96-144	Saw	04/08/96	IHN, IPN 0/47
96-145	EF	04/09/96	IHN, IPN 0/9
96-152	Saw	04/11/96	IHN, IPN 0/33
96-155	Saw	04/15/96	IHN, IPN 0/38
96-156	EF	04/12/96	IHN, IPN 0/10
96-160	EF	04/16/96	IHN, IPN 0/2
96-161	Saw	04/18/96	IHN, IPN 0/29
96-166	EF	04/22/96	IHN, IPN 0/2
96-173	Saw	04/22/96	IHN, IPN 0/22
96-183	Saw	04/25/96	IHN, IPN 0/12
96-184	EF	04/26/96	IHN, IPN 0/1
96-186	EF	05/02/96	IHN, IPN 0/16
96-188	Saw	05/02/96	IHN, IPN 0/2
96-195	EF	05/08/96	IHN, IPN 0/2
96-196	Saw	04/04/96	BKD 7/11. low ELISA, WHD 1/11
96-197	EF	04/04/96	BKD 19/138, 1 high, 18 low ELISA, WHD 3/4
96-198	SI Cr	04/04/96	BKD 10/18, 1 mod, 9 low ELISA, WHD 0/11

Appendix D. Survival Table for Chinook (By95) and Steelhead (By96) from Green Eggs to Released Smolts, at Sawtooth Fish Hatchery and East Fork Sites.

CHINOOK

Green egg Number	Eyed egg Number	Percent Survival	Released Smolts	Percent Survival From green
Sawtooth Fish Hatchery Fish				
7,377	4,977	68	4,756	64

STEELHEAD

Green egg Number	Eyed egg Number	Percent Survival	Released Smolts	Percent Survival From green
Sawtooth Fish Hatchery Fish				
1,091,543	982,600	90	814,623	75
East Fork/Slate Creek Fish				
161,632	143,760	89	131,220	81

* All steelhead raised at other hatcheries.

Appendix E. Sawtooth Fish Hatchery Summary of Smolt Releases and Marks.

Steelhead Mark Type	Sawtooth Fish Hatchery Stock CWT Code	#PIT	# Fish Released	Date	Release Purpose
AD	None	1,801	110,301	Various	Acclimation study
AD	None		311,049	04/25/97	Acclimated SFH weir Release, Production
AD	None		84,480	04/25/97	Acclimated SFH weir MV FH Production
AD	10-51-46	300	65,420	04/25/97	Torrey's Hole, Suppl. 1x length, feed/fast diet
AD	10-51-47 10-51-48	300	60,946	04/25/97	Acclimated SFH weir Production, 2x length, Feed/fast diet
AD	10-51-51 10-51-52 10-51-53	300 300 300	60,250	04/25/97	Acclimated SFH weir Production, 1x length Feed/fast diet
AD	10-51-57 10-51-58 10-51-59	300 300 300	58,803	04/25/97	Acclimated SFH weir Production 1x length % BW feed diet
AD	10-51-54 10-51-55 10-51-56	300	63,374	04/25/97	Direct release, 1x length Feed/fast diet
Totals		**4,501**	**814,623**		

Steelhead Mark Type	EastFork Stock BY96 CWT Code	#PIT	# Fish Released	Date	Release Purpose
AD,LV	10-52-19	300	22,796	04/24/97	Contribution
AD,LV	10-52-20		16,553	04/24/97	Contribution
AD,LV	10-52-21		21,371	04/24/97	Contribution
AD	None		70,500	04/24/97	Contribution
Total		**300**	**131,220**		

Chinook Mark Type	Sawtooth Fish Hatchery BY95 CWT Code	#PIT	# Fish Released	Date	Release Purpose
AD	None	740	2,380	04/17/97	Supplementation Blaine/Custer County Line Br.
AD	None	740	2,376	04/17/97	Supplementation
Total	**None**	**1,480**	**4,756**		SFH weir

Appendix F. Sawtooth Fish Hatchery Production Cost Table (Includes Chinook By95 and Steelhead By96).

Chinook

Smolt Number	Lbs. Feed	Cost Feed	Lbs of Smolts	C	Total Cost	Cost per 1,000	Cost per lb.
Sawtooth							
4,756	750	830.10	398	1.8	$198,538	$41,744	$498.84

East Fork

No BY95 East Fork spring chinook salmon were reared.

Steelhead

	Green Eggs	Eyed Eggs	Total Cost	Cost per 1,000 eyed eggs
Sawtooth	1,091,543	982,600	$ 39,087	$ 39.77
East Fork	161,632	143,760	$ 27,919	$ 194.37
Pahsimeroi	5,398,600	4,357,500	$ 44,671	$ 10.25
Totals	**6,073,581**	**5,421,647**	**$ 111,677**	**$ 20.60**

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

Appendix G. Sawtooth Fish Hatchery Fish Hatchery Spring Chinook Salmon Length Frequency Distribution for 1995.

Fork Length (cm)	Fish Trapped	Unmarked		Marked	
		Males	Females	Males	Females
44	1	1	1		
46	1			1	
47	1			1	
48	1			1	
49	1			1	
50	1			1	
51	3	2		1	
53	2	1		1	
56	1	1			
57	1			1	
58	1	1			
60	1	1			
61	1	1			
65	1	1			
67	1	1			
69	1	1			
72	1	1			
73	1			1	
75	2	1		1	
77	2			1	1
78	2	1		1	
80	3		1	2	
82	1	1			
83	1			1	
85	1			1	
89	1				
91	1		1	1	
94	1				1
110	1	1			
Totals	37	16	2	17	2

All unmarked chinook salmon, as well as 2, LV-clipped jacks (50 and 53 cm), were released above the weir.

Appendix H. Sawtooth Fish Hatchery Spawning Matrix, 1995 Return Year.

Date Spawned	Female Length	Mark	Males 1&2 Length	Mark	Males 3&4 Length	Mark
8/18/95	94	LV	85	AD	76	AD
			77	AD	46	AD
8/22/95	77	AD	83	AD	91	AD
			80	AD	78	AD

Appendix I. Sawtooth Fish Hatchery Marked Hatchery Steelhead Length Frequency Distribution, Return Year 1996.

Length	Males	Females	Total
50	3	0	3
51	1	0	1
52	3	2	5
53	2	2	4
54	9		11
55	10	5	15
56	11	10	21
57	26	15	41
58	25	20	45
59	44	17	61
60	30	11	41
61	25	6	31
62	17	6	23
63	8	8	16
64	2	4	6
65	4	5	9
66	3	9	12
67	0	19	19
68	5	17	22
69	6	15	21
70	7	20	27
71	11	23	34
72	7	13	20
73	9	6	15
74	6	5	11
75	5	4	9
76	8	2	10
77	5	1	6
78	0	1	1
79	4	0	4
80	0	0	0
81	0	0	0
82	1	0	1
83	0	0	0
84	0	0	0
85	0	0	0
86	0	0	0
87	0	0	0
88	0	0	0
89	0	0	0
90	0	0	00
	297	248	545

Appendix J. East Fork Steelhead Length Frequency Distribution, Return Year 1996.

Length	Males	Females	Total
56	1		1
57			0
58	1		1
59			0
60	2	1	3
61	2	1	3
62	5	1	6
63	3	1	4
64	4	4	8
65	4		4
66	4		4
67	3	1	4
68		1	1
69			0
70	1	2	3
71		1	1
72			0
73	1		1
74		1	1
75		2	2
76		2	2
77		2	2
78		1	1
79	1		1
80		1	1
Total	32	22	54

Appendix K. Slate Creek Steelhead Length Frequency Distribution, Return Year 1996.

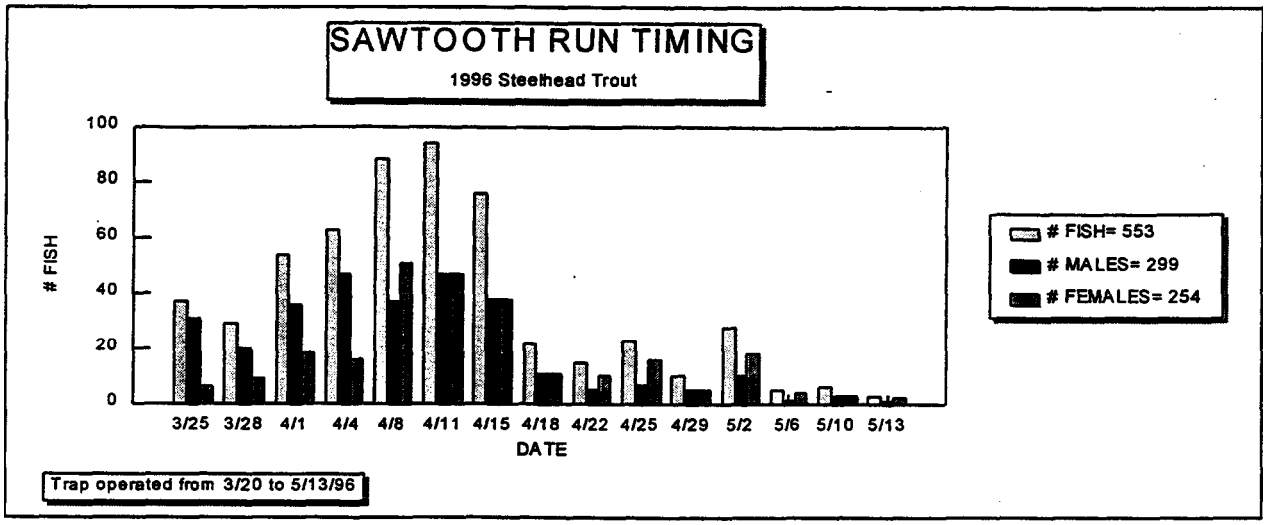
Length	Males	Females	Total
52		1	1
53			0
54		1	1
55		1	1
56	0		0
57	1		1
58			0
59		1	1
60	1		1
61			0
62			0
63			0
64	2		2
65		1	1
66		2	2
67		1	1
68	1		1
69	2	2	4
70		2	2
71		2	2
72		1	1
73			0
74	1	2	3
75	2		2
76	1	2	3
77			0
78		1	1
79	1	2	3
80			0
81	0	1	1
82	0	0	0
83			0
84		1	1
85	2	0	2
TOTAL	14	24	38

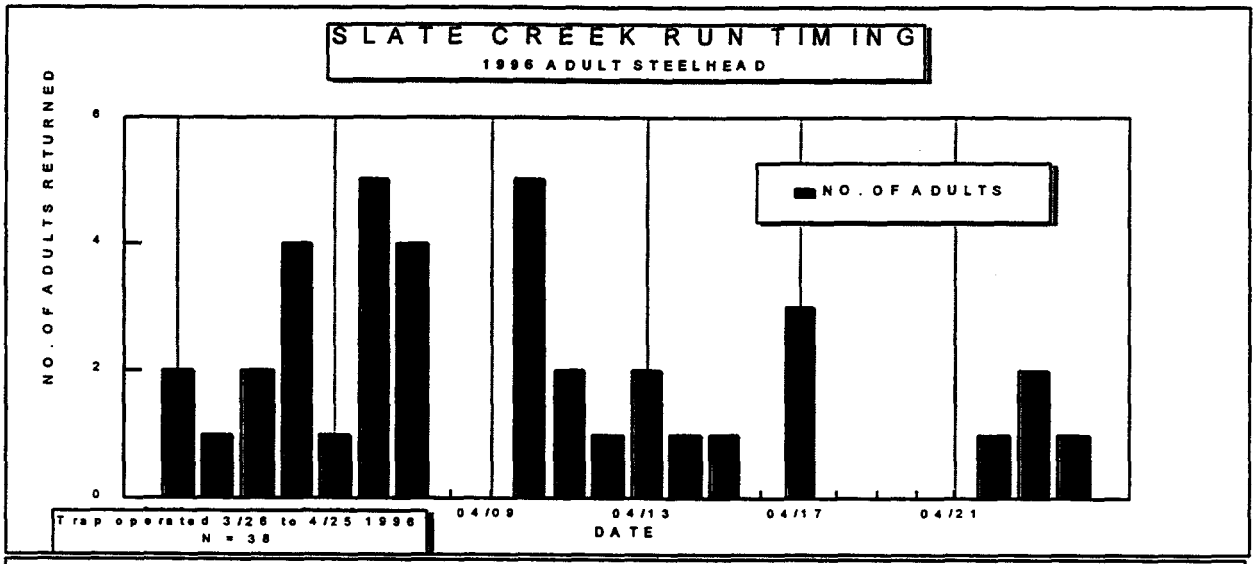
Appendix L. Lengths of Released Steelhead, Return Year 1996, from Sawtooth Fish Hatchery, East Fork, and Slate Creek Traps.

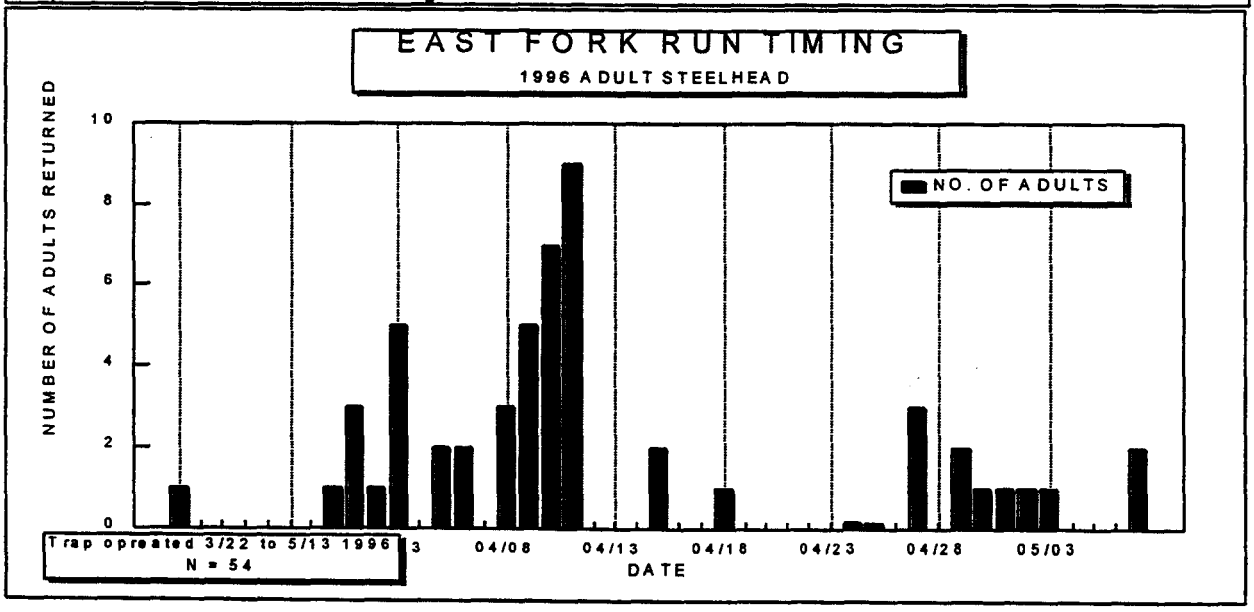
Length	Male	Female	Length	Male	Femal
51	1,0,0	0,0,0	64	0,1n,2	0,1n,0
52	0,0,0	1,0,1	65	0,0,0	0,0,1
54	0,0,0	0,0,1	66	0,0,0	0,0,2
55	1,0,0	1n,0,1	67	0,0,0	1,0,1
56	0,1n,0	1n,0,0	68	2(1n),0,1	0,0,0
57	3,0,2(1n)	3(1n),0,0	69	1,0,2	0,0,0
58	8,0,0	5,0,0	70	1,1n,0	2,0,0
59	4,0,0	3(1n),0,1	71	0,0,0	1,0,0
60	3(1n),0,1	2,0,0	73	0,1n,0	0,0,0
61	2,0,0	0,0,0	74	1,0,0	0,0,0
62	3,1,0	1n,1n,0	78	1,0,0	0,0,0
63	0,0,0	1n,0,0	80	1,0,0	0,0,0

3(1n),0,1 means 3 Sawtooth Fish Hatchery stock with one being unmarked;0 East Fork stock; 1 Slate Creek. N denotes unmarked fish all others are marked fish.

Appendix M. Run Timing Graphs for Steelhead, Return Year 1996, Sawtooth, Slate Creek, and East Fork Traps.







Appendix N. Sawtooth Fish Hatchery Age Class Totals from All Trapped Chinook, Return Year 1995.

Sawtooth	Length (Fk)	Year class	Number
Males -	≤ 64 cm	- 3-year old -	16
	64-82 cm	- 4-year old -	13
	> 82 cm	- 5-year old -	4
Subtotal			**33**
Females	≤ 64 cm	- 3-year old -	0
	64-82 cm	- 4-year old -	2
	> 82 cm	- 5-year old -	2
Subtotal			**4**
Total			**37**

Appendix N.1. Sawtooth Fish Hatchery Fish Hatchery Age Class Breakdown by CWT Recoveries 1995.

Sex	Length(cm)	Code	Purpose
3-year olds: (5)			
m	45	10/46/04	Natural rearing, control 3
m	47	10/46/04	Natural rearing, control 3
m	46	10.49/27	Natural rearing, control 1
m	46	10/49/27	Natural rearing, control 1
m	49	10/49/27	Natural rearing, control 1
4-year olds: (6)			
m	76	10/49/14	HiDens, US/CAN
m	84	10/50/27	HiDens, US/CAN
m	82	10/50/27	HiDens, US/CAN
m	75	10/49/13	Supplementation, LowDens
m	78	10/50/32	+BKD, US/CAN
m	76	10/50/28	MedDens, US/CAN

Appendix O. Sawtooth Fish Hatchery Age Class Breakdown by Released Chinook, Return Year 1995.

Sawtooth	Length (Fk)	Age Class	Number
Males -	< 64 cm	- 3-year old -	10 (2 LV)
	64-82 cm	- 4-year old -	7
	> 82 cm	- 5-year old -	1
Total Males			18
Females -	< 82 cm	- 4-year old -	1
	> 82 cm	- 5-year old -	1
Total Females			**2**
Total released			**20**

Appendix P. Feed Schedule for Sawtooth/Pahsimeroi Spring Chinook, By95.

Fpp	% BW Fed	Feed Size	Timing
su ----800	.030	#2/#3 str	11/95 - 01/96
800---500	.025	#3 str	02/96 - 03/96
500---400	.0225	1.0 mm	04/96 - 06/96
400--350	.0225	1.0/1.3 mm	04/96 - 06/96
350---300	.0225	1.3 mm	04/96 - 06/96
300---250	.0225	1.3 mm	04/96 - 06/96
250---150	.0225	1.5 mm	04/96 - 06/96
150--110	.0225	1.5 mm	04/96 - 06/96
110--90	.0225	1.5 mm	04/96 - 06/96
90------50	.025	2.5 mm	04/96 - 06/96
50 -----25	.025	2.5 mm	07/96 - 11/96
≤ -----25	Maintenance	3.0 mm	12/96 - release

Appendix Q. Summary of Marked Spring Chinook Released, Return Year 1995.

Mark	Number Released	Location
Sawtooth Fish Hatchery Stock (All Supplementation)		
Adipose Clip (PIT)	2,380 (740)	Blaine/Custer County Line Bridge
Adipose Clip (PIT)	2,376 (740)	Sawtooth Fish Hatchery Weir
Total Release	**4,756 (1,480)**	
Pahsimeroi Stock		
Adipose Clip (PIT)	118,520 (33,500)	Transferred to Pahsimeroi FH 10/96
Adipose Clip	5,268	Transferred to Pahsimeroi FH 04/96

Appendix R. Summary of Sawtooth Fish Hatchery Spring Chinook Smolt Releases, Return Year 1995.

	Number	Fish per Pound	Pounds
Raceway 3	2,380	13.1	182
Raceway 4	2,376	11.0	216
Total	**4,756**	**11.95**	**398**

Appendix S. Steelhead Returns by Year Class[1] and Sex, Return Year 1996 .

Sawtooth Fish Hatchery (553)		
2-year old males		231
3 or 4-year old males		68
	males	299
2-year old females		119
3 or 4-year old females		135
	females	254
East Fork (54)		
2-year old males		30
3 or 4-year old males		2
	males	**32**
2-year old females		10
3 or 4-year old females		12
	females	**22**
Slate Creek (38)		
2-year old males		8
3 or 4-year old males		7
	males	**15**
2-year old females		15
3 or 4-year old females		8
	females	**23**

[1]These figures are based on Kent Ball's criteria for aging steelhead, as described in Appendix U.

Appendix T. Released Steelhead by Year Class and Sex, Return Year 1996.

Sawtooth Fish Hatchery (54;(8n))

Males -	2-year old -	25 (1n)	**Females -**	2-year old -	18 (6n)
	3 or 4-year old -	7 (1n)		3 or 4-year old -	4
	Total -	**32 (2n)**		**Total -**	**22 (6n)**

East Fork (7; (6n))

Males -	2-year old -	3 (2n)	**Females -**	2-year old -	2 (2n)
	3 or 4-year old -	2 (2n)		3 or 4-year old -	0
	Total -	**5 (4n)**		**Total -**	
		2 (2n)			

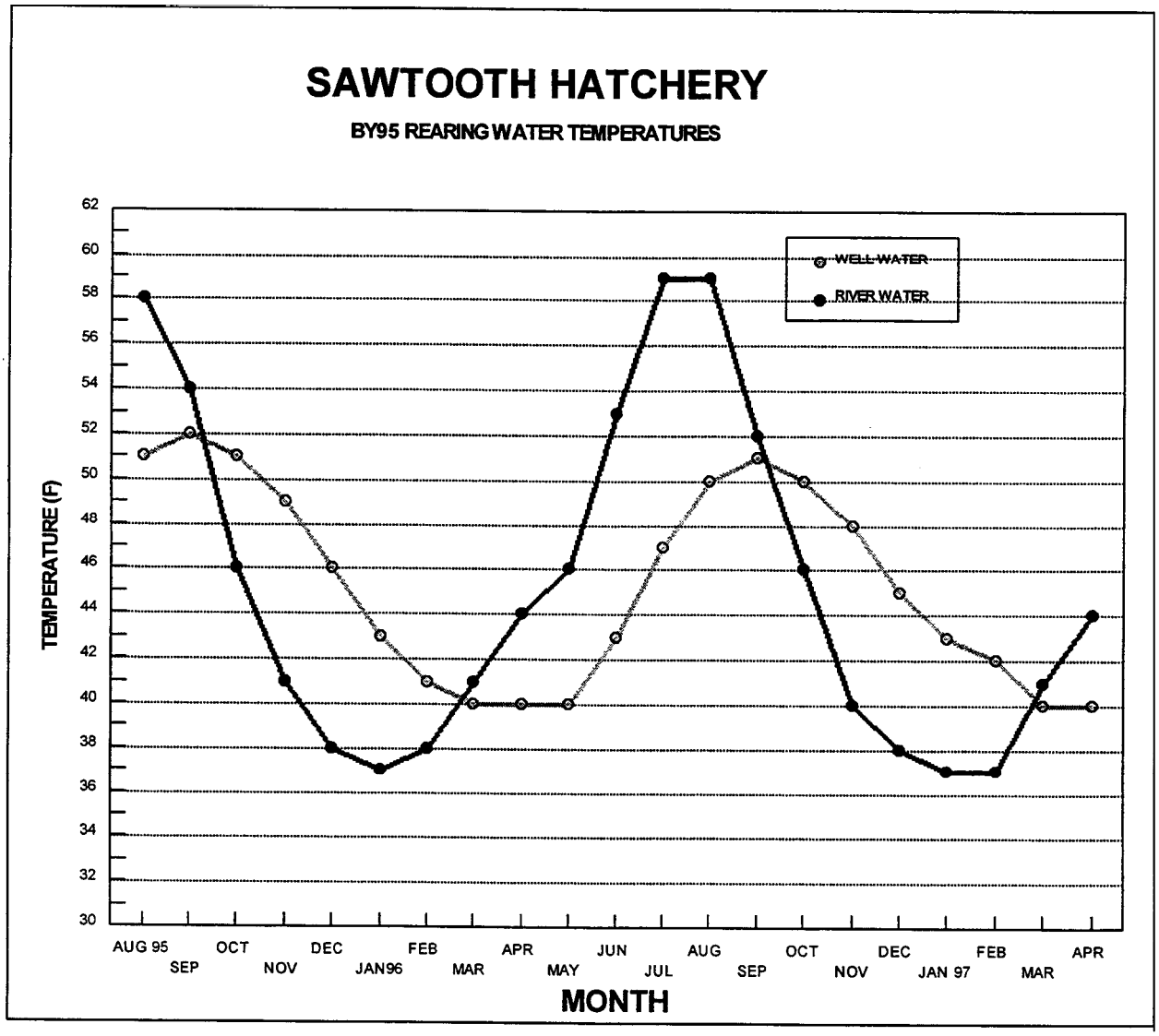
Slate Creek (16; (In))

Males -	2-year old -	8 (1n)	**Females -**	2-year old -	8
	3 or 4-year old-	0		3 or 4-year old	0
	Total -	**8 (1n)**		**Total -**	**8**

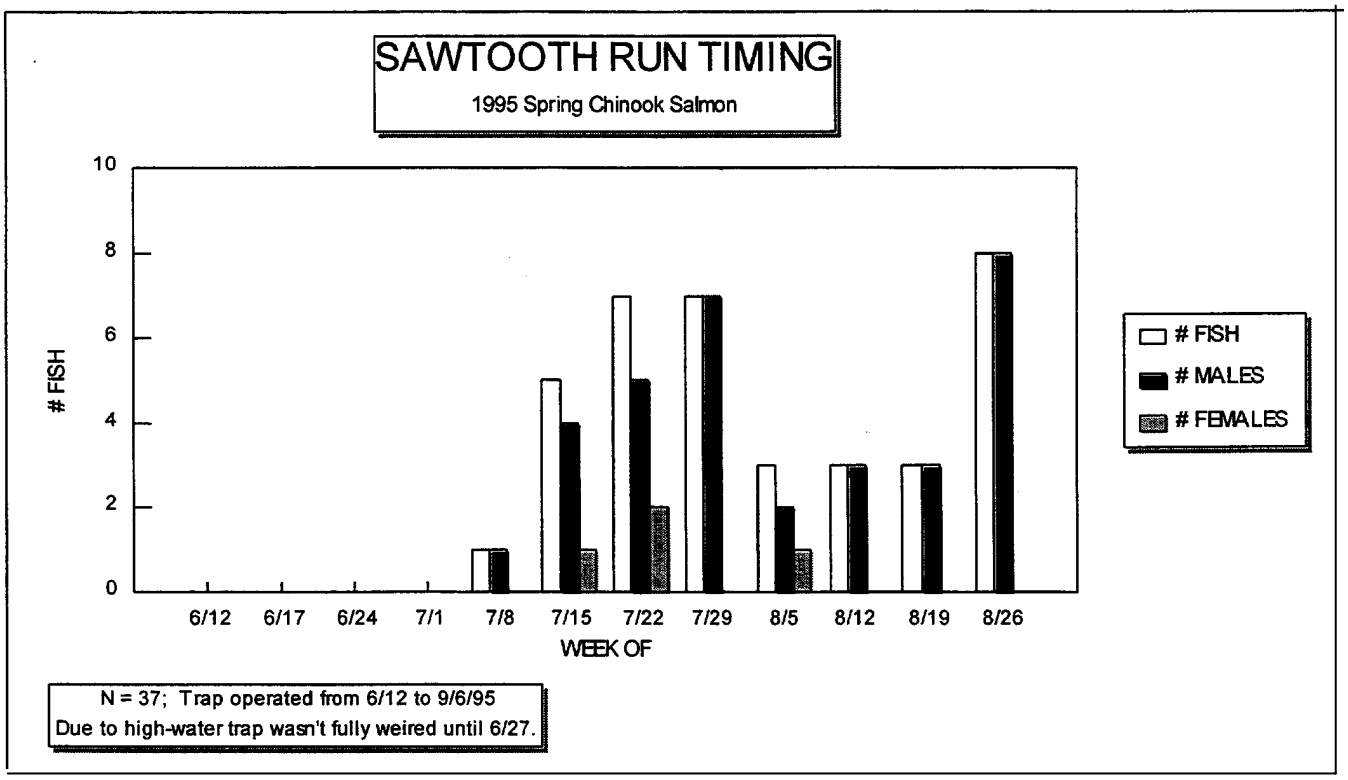
Appendix U. Sawtooth Fish Hatchery Criteria for Aging Steelhead, from Kent Ball, The Department.

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

Appendix V. Rearing Water Temperatures, BY95 Spring Chinook at Sawtooth Fish Hatchery



Appendix W. Sawtooth Fish Hatchery Spring Chinook Run Timing.

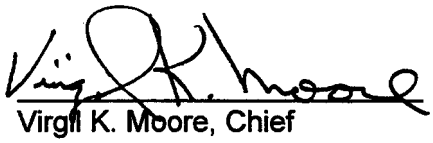


Submitted by:

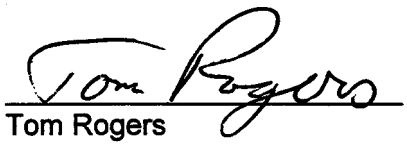
Brent Snider
Fish Hatchery Manager II

Kurtis Schilling
Assistant Fish Hatchery Manager

Approved by:



Virgil K. Moore, Chief
Bureau of Fisheries



Tom Rogers
Fish Hatchery Supervisor