

# **Sawtooth Fish Hatchery**

## **Operation and Maintenance Annual Report**

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## INTRODUCTION

Sawtooth Fish Hatchery (FH) has been operating since 1985 as part of the Lower Snake River Compensation Plan. The mitigation goal is for 19,445 adult spring chinook salmon *Oncorhynchus tshawytscha* above Lower Granite Dam. The production capability is 2,400,000 spring chinook salmon smolts. In addition, Sawtooth collects up to 4,500,000 steelhead *O. mykiss* eggs that are shipped to Hagerman National Fish Hatchery and Magic Valley Fish Hatchery. A satellite fish station on the East Fork of the Salmon River provides additional trapping, holding, and spawning facilities for adult spring chinook salmon and steelhead.

## CHINOOK SALMON

### Sawtooth Spring Chinook

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. Of the 367 chinook retained for hatchery spawn crosses, 188 (14 jacks/ 44 males/130 females) died prior to spawning. Pre-spawning mortality was 51.2%. 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. (For SFH chinook trapped, spawned, and fish disposition, see table 1) The 60 females used for spawning produced 223,758 green eggs (3,729 eggs per female). Eggs surviving to the eyed stage of development totaled 188,742 for a percent survival of 84.4%. (Table 1)

In 2006, the velocity barrier on the East Fork of the Salmon River (EFRS) was put into operation on June 21, with trapping operations continuing through

September 26. This was the third consecutive year of operation of the East Fork trap since trapping ceased in 1998. A total of 81 chinook were trapped in 2006, all of which were natural (unmarked) fish. All fish trapped at the facility were released above the weir for volitional spawning.

Fish released for brood year 2004 chinook smolts occurred on March 30<sup>th</sup>, April 12, April 19, and April 21. Releases totaled 1,552,544 smolts and fish size averaged 21.7 fish per pound and 5.11 inches in length at release. All fish were released at the SFH weir except for April 21 when smolts were hauled to the Yankee Fork Salmon River and released as part of an agreement with the Shoshone Bannock tribe. Fish rearing is summarized in Table 2 and fish marking and releases are summarized in Table 3.

### **Pahsimeroi Summer Chinook**

Sawtooth Hatchery reared Pahsimeroi Hatchery's Brood Year 2005 Summer chinook due to rebuilding and construction at Pahsimeroi Hatchery. The rebuild will address lack of space and pathogen free water previously unavailable at Pahsimeroi. Summer chinook eggs are incubated, hatched, and reared to either fry or pre-smolt size. Fry destined for return to PFH are returned post-hatch, with pre-smolts transferred back to PFH after fish marking in the spring or fall. A total of eight lots of eyed eggs were brought to Sawtooth between September 29 and October 25, 2005. A total of 1,070,317 eggs were placed into incubation. A total of 30,069 dead eggs and fry were picked off resulting in a 97.2% survival of eyed eggs to fry. Starting in late December 2005 and into early January 2006, swim up fry were ponded into inside vats and started on feed. The fry were being held inside as long as possible to get them to feed and improve their condition. As water and space became limiting, the fry were moved to outside rearing raceways.

All the fish received a 28 day prophylactic treatment of Bio-Oregon Aquamycin 2.25% totaling 5,896 lbs fed during late June and into early July. A second 21 day prophylactic treatment was administered to half the fish beginning on August 21 and ending just before fish marking started on September 11. A total of 8,210 lbs. of Bio-Oregon Aquamycin 2.25% medicated feed was fed. The second treatment was given to half the fish because of lack of freezer storage space for the food. Also, fish pathologists wanted to test the effectiveness of a single medicated treatment on one half of the fish. After marking, the fish were treated with formalin drip treatments at 167 ppm because of external mycosis outbreaks.

Fish marking took place from September 11 through September 19. ponded fry to presmolt transfer was 95.5%. A total of 55,544 presmolts were AD/CWT marked and 934,286 were AD clipped only. By September 30, 2006 PAH fish averaged 30 FPP and had been fed a total of 34,304 pounds of Skretting fish feed.

. A Memorandum of Understanding was agreed to by Lower Snake River Compensation Program and Idaho Power Company to provide for the rearing of Pahsimeroi fish at SFH. Funding provided by Idaho Power pays for personnel costs and basic fish culture supplies used to raise Pahsimeroi fish. Idaho Power Company pays for fish feed fed to Pahsimeroi fish.

In the fall of 2006, Sawtooth is scheduled to receive an estimated 1.1 million BY06 Pahsimeroi summer chinook eggs. All of these eggs will be reared until marking which is scheduled for May 2007. After marking all fish will be returned to Pahsimeroi.

## **STEELHEAD**

### **Sawtooth Hatchery Returns**

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

Distribution of the 1,920 marked adults ranged from spawn-related activities to charitable giveaways and included; 1,063 steelhead given to charitable organizations and 857 given to the public on a first come-first serve basis. Charitable organizations receiving fish included Idaho City Food Bank, Lemhi Valley Social Services, Middleton Food Bank, SMRIST Essentials food Bank, and Shoshone Paiute tribe.

All returning unmarked adults (22) were released upstream of the Hatchery weir for natural spawning. (Table 4)

Sawtooth Fish Hatchery spawning operations occurred from April 3 through May 1 in 2006. A total of 452 females were crossed with 452 males over 12 spawning days to produce 2,338,443 green eggs and a mean fecundity of 5,174 eggs per female. Total green egg take yielded 2,049,530-eyed eggs for a percent survival to the eyed-stage of development, average of 87.6%. (Table 4 and 8) There were 4 females' eggs that were culled due to high ELISA values.

Additional time and effort were expended on three additional spawning days to accommodate the SBT tribe for their experimental study of steelhead in the Yankee Fork. The study includes genetic DNA typing to differentiate steelhead produced from the SBT egg box project from all other steelhead produced naturally or planted artificially in the watershed.

Eyed egg transfers to Magic Valley Steelhead Hatchery and Hagerman National Fish Hatchery totaled 444,900 and 1,129,080-eyed eggs, respectively. Eggs were made available to biologists from the Shoshone-Bannock Tribe totaling 309,750. Eyed egg transfer totaled 1,883,730. All unwanted or remaining eggs were culled as development progressed beyond the window of transport safety, as determined by temperature-unit accumulation. (Table 9)

## **East Fork Salmon River Returns**

In 2006, the velocity barrier on the East Fork of the Salmon River (EFSR) was put into operation on March 23 and continuing through May 18. A total of 197 adult steelhead were trapped for the Natural Steelhead Program, of which 1 male was marked and 196 (101 males / 95 females) were unmarked. (Table 5)

Of the 196 unmarked fish trapped, 28 unmarked males and 14 unmarked females contributed to "natural" spawn crosses, and 153 unmarked adults (74 males / 79 females) were released above the weir for natural spawning. Two females were killed, but not used. The marked male was killed and not used.

A total of 14 unmarked East Fork Natural females and 28 unmarked East Fork Natural males were retained for natural-production spawn crosses in 2006, with spawning operations occurring from April 11 through April 25 (4 spawn dates). Spawning activities from the 14 naturally produced females yielded a total of 87,737 green eggs for a mean fecundity of 6,267 eggs per female. A total of 78,700-eyed eggs were obtained from natural-production crosses, for a percent survival to the eyed-stage of development average of 89.7%. (Table 8)

All eyed eggs (67,000) produced from EFSR natural crosses were transferred to the Magic Valley Steelhead Hatchery for final incubation and rearing (Table 9). A total of 11,700 eyed eggs from Lot 4 were inadvertently mixed with Sawtooth FH stock eggs from Lot 8 and shipped to Hagerman NFH.

## **Squaw Creek Returns**

A weir and trap were installed on Squaw Creek 200 meters upstream of the confluence of the Salmon River on March 21, 2006. Adult steelhead trapping continued through April 23, at which time weir pickets were pulled and the trap was taken out of operation. A total of 70 adult "B-run" steelhead were trapped (31 males / 39 females), of which all but one female were marked. The unmarked female was released above the weir into Squaw Creek. Also, 23 "A-run" fish were trapped (13 males / 10 females) (Table 7). All marked adults were transferred to the East Fork trapping facility for pre-spawn holding.

A total of 33 marked "B-run" females and 25 marked "B-run" males were retained for hatchery-production spawn crosses in 2006, with spawning operations occurring from April 11 through May 2 (7 spawn dates). All spawning was conducted at the East Fork Salmon River trap/spawn facility, with spawn activities from the 33 females yielding a total of 210,516 green eggs for a mean fecundity of 6,379 eggs per female. A total of 150,015-eyed eggs were obtained from hatchery-production crosses, for a percent survival to the eyed-stage of development average of 71.3%. Males used in hatchery-production crosses included under B-sized returning marked males from the Squaw Creek trap that by real time, CWT reading indicated that fish were of "B" origin. (Table 8)

All eyed eggs (150,015) produced from East Fork/Squaw Creek “B-run” hatchery crosses were transferred to the Magic Valley Steelhead Hatchery for final incubation and rearing (Table 9).

### **Pahsimeroi Stock Steelhead Egg Incubation**

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

In 2006, a total of 1,251,522 green eggs were transferred to Sawtooth from a total of 243 females (5,150 mean fecundity). Total egg transfers yielded 759,500-eyed eggs, for a percent survival to the eyed-stage of development average of 60.7% (Table 8). Eyed egg transfers to Magic Valley Steelhead Hatchery (MVSH) and Hagerman National Fish Hatchery (HNFH) totaled 547,500 and 212,000-eyed eggs, respectively. All Pahsimeroi eggs incubated at Sawtooth were destined for MVSH and HNFH to satisfy production requests. All females spawned for HNFH were viral tested (Table 9).

### **Sawtooth Fish Hatchery Egg Shipments**

In 2006, a total of 2,860,245 eyed steelhead eggs were shipped from Sawtooth Fish Hatchery to various hatcheries or off-site locations for continued rearing. A summary of egg shipments, by stock, is provided in Table 9.

### **Steelhead Smolt Acclimation At Sawtooth Hatchery**

Due to increased production levels and a corresponding lack of available raceway space, no steelhead smolts were acclimated at Sawtooth FH in 2006.

## **SOCKEYE SALMON**

The Sawtooth FH crew monitored an adult sockeye salmon *O. nerka* weir on Redfish Lake Creek in the summer and fall of 2006. The Redfish Lake Creek adult trap was in operation from July 7 through October 2. The Sawtooth FH weir and trap were operated for chinook and sockeye as well from June 19 to September 15. A total of 3 fish were trapped, all at the SFH weir. The adult sockeye were immediately transferred to Eagle Fish Hatchery for hatchery spawning purposes.

From November 17 until December 8, 2005, four shipments totaling 177,243 BY 05 sockeye eyed eggs were received from the Idaho Department of Fish and Game's (IDFG) Eagle Fish Hatchery (Eagle, Idaho) and Burley Fish Hatchery (NOAA). A total of 3,596 dead eggs were removed before ponding. The remaining 173,647 fry were ponded into six 2 meter fiber glass tanks. Initial water flows were set at 5 gallons per minute.

The fish were marked on September 14, 2006. A total of 154,633 fish were marked. This is a difference of 22,610 based on mortality records and marking inventory numbers.

On September 25 and 26, sockeye research personnel PIT tagged 1,020 fish from each planned release group for Alturas, Pettit, and Redfish Lakes. On October 2 and 3, sockeye pre-smolts were released as follows: Alturas Lake received 26,994, Pettit Lake received 18,494, and Redfish Lake received 61,804. At the time of release, all fish averaged 74.8 fish per pound and 3.77 inches in length.

BY 04 sockeye that remained overwinter at SFH, were released as smolts into the Salmon River below the SFH intake. A total of 39,622 smolts were released on May 4, 2006. Smolts averaged 23 fpp and 134 mm in length.

An overwinter group of 47,135 will be moved outside into small raceways in mid November 2006. Their release is scheduled for Spring 2007.

All sockeye salmon fish feed, fish marking and personnel costs are covered by Sockeye Recovery Project funds.

## **RAINBOW TROUT**

Sawtooth FH personnel were involved in stocking triploid catchable rainbow trout *O. mykiss* that were reared at Nampa Fish Hatchery and transferred to Sawtooth for redistribution. This project was funded by State IDFG dollars (license-funded) with cooperation from the United States Fish and Wildlife Service (USFWS). Through this program, Sawtooth FH stocked 50,749 catchable-sized rainbow trout in 2006 (Table 10). This is a very popular program among area visitors and businesses.

## **MOUNTAIN LAKE STOCKING**

SFH personnel continued high mountain lake stocking of Westslope cutthroat trout by fixed wing aircraft in the Salmon Region. Forest fires in the region delayed flying until late September. On September 25, 26, and 27, McCall Aviation using a Cessna 185 flew two flights on each day to complete stocking of lakes in rotation "B". A total of 74 lakes were stocked with 29,450 fry. In addition to "B" lakes, 12 lakes that were not stocked last year in rotation "A" due to smoke from forest fires were stocked. A total of 5,450 fry were stocked into these lakes. Another 12 lakes located in Region 4 were stocked with 7,400 fry. A total of 42,300 fry averaging 2,660 fish per pound (5.86 f/g) were stocked by airplane. Excess fry totaling 24,000 were stocked by truck into Yellowbelly Lake.

Approximately 90,000 Westslope cutthroat eggs were received on July 18. A total of 18,000 dead eggs and fry were picked and removed for a survival rate from eggs to fry of 80%. Cost of the flights was \$4,452.50 and estimated cost to stock fish was \$4,721.25. An additional \$90.42 was spent on fish feed. Fish feed expense was paid for out of the IDFG resident fish food budget. SFH would like to thank Region 4 for loaning us needed flight safety gear and equipment.

## **HATCHERY IMPROVEMENTS**

A construction project completed in 2005-06 added office space and a new entryway into the hatchery building. IDFG personnel from the Information Technology Bureau installed the hardware and necessary software to supply wireless internet service to the hatchery offices and residences. New flooring was installed in residence # 5 and the interior was given a fresh coat of paint. Flooring was installed in the kitchen area of residence #2. The hatchery shop was re-organized and given a fresh coat of paint. In 2006, USFS personnel placed more Verbenone pouches on the trees. While not perfect, the pheromone appears to deter pine beetle infestation. Approximately 200 small lodgepole pine and willow trees were planted in various places around the hatchery.

## **PERSONNEL**

Hatchery personnel were involved in several projects during the 2005/2006 reporting period and include: helping IDFG Fisheries Research

personnel with Idaho Supplementation Studies (ISS), redd count monitoring on tributaries to the Salmon River, conducting educational presentations, conducting a Free Fishing Day clinic, providing spawning assistance to other IDFG hatchery programs, assisting in IDFG research projects, and Holly presented a Trout in the Classroom program to Stanley school students. Holly Smith resigned from her Fish Culturist position. Her replacement is Lars Alsager. Jim Nixon resigned from his Utility Craftsman position and his replacement is Phil Stone. Lars and Phil attended a flight safety training workshop. Brent Snider attended the annual anadromous fish meeting and the annual LSRCP meeting.

**Table 1. Sawtooth FH spring chinook salmon trapped, spawned, and fish disposition - 2006.**

**Total Fish Trapped: 761    Run Timing: 6/28/06 to 9/13/06    Peak of Return: 7/06/06**

40 Marked Jacks	56 Unmarked Jacks	96 Total Jacks
192 Marked Males	152 Unmarked Males	344 Total Males
<u>233 Marked Females</u>	<u>88 Unmarked Females</u>	<u>321 Total Females</u>
470 Marked Salmon	291 Unmarked Salmon	761 Total Salmon

<b>Fish Disposition:</b>	<b>Jacks</b>	<b>Males</b>	<b>Females</b>	<b>Jills</b>	<b>Totals</b>
Prespawning Mortality*	14	44	130	0	188
Spawned	3	82	60	0	145
Killed: Not used	15	21	1	1	34
Released above weir	68	197	129	0	394
<b>Total</b>	<b>96</b>	<b>344</b>	<b>320</b>	<b>1</b>	<b>761</b>

\* Note: The Carcasses from spawning and pre-spawning mortalities were sampled for disease information, frozen, and later distributed to a rendering plant along with some fish that were killed and not used.

<b>Males</b>	<b>Females</b>	<b>Green</b>	<b>Eyed</b>	<b>%</b>
<b>Spawned</b>	<b>Spawned</b>	<b>Eggs</b>	<b>Eggs</b>	<b>Eye</b>
82	60	223,758	188,742	84.4

**Table 2. Rearing record for spring chinook salmon at Sawtooth FH, BY04.**

Starting green inventory	1,999,254
Resulting eyed eggs	1,752,395
Survival to eye-up	87.7%
Eggs culled-High ELISA values	93,417
Fry ponded	1,699,355
Survival to ponding	85.0%
Smolts released	1,552,544
Survival from ponding to release	91.3%
Survival from green to release	77.6%
Weight of smolts produced	71,638 lbs.
Number fish per pound (smolts)	21.7
Pounds of feed fed	97,064 lbs.
Conversion rate	1.4
Feed cost/1000 smolts*	\$ 140.36

\*(feed cost *only* - excludes labor & overhead)

**Table 3. Sawtooth spring chinook smolt distribution, March and April 2006.**

<b>Mark</b>	<b>Number Released</b>	<b>Location</b>
AD only	136,849	SFH Weir (3/30/06)
AD/CWT	130,512	SFH Weir (4/12/06)
AD only	501,072	SFH Weir (4/12/06)
AD*	648,177	SFH Weir (4/19/06)
AD**	135,934	Yankee Fork Salmon River (4/21/06)

\* Includes 500 PIT tags.

\*\* Includes 695 PIT tags.

No. / lb Average 21.7

**Table 4. SFH steelhead trapped, spawned and fish disposition, 2006.**

<b>Fish Disposition</b>	<b>Run Timing</b> 3/22/06 to 5/03/06	<b>Peak of Return</b> 4/10/06 to 4/20/06
Fish Trapped	1,942 (942 males, 581 females)	
Fish Released	22 (13 males, 9 females)	
Fish Spawned	904 (452 males, 452 females)	
Pre-spawn Mortality	0	
Killed, Not Used	0	
Charitable/Tribal Distribution	1,063	
Fish Recycled Through Fishery	0	

**1,942 (1,920 marked, 22 unmarked)**

**Table 5. East Fork (EF) steelhead trapped, spawned, and fish disposition, 2006.**

<b>Fish Disposition</b>	<b>Run Timing</b> 3/31/06 to 5/08/06	<b>Peak of Return</b> 4/24/06
Fish Trapped:	197 ( 102 males, 95 females)	
Fish Released:	157 (78 males, 79 females, all unmarked)	
Fish Spawned	42 (28 unmarked males, 14 unmarked females)	
Pre-spawn Mortality	0	
Killed, not used	3 (1 marked males, 2 unmarked female)	

**Table 6. Squaw Creek "B-run" steelhead trapped, spawned and fish disposition, 2006.**

<b>Fish Disposition</b>	<b>Run Timing</b> 4/03/06 to 4/23/06	<b>Peak of Return</b> 4/22/06
Fish Trapped	70 (31 males, 39 females)	
Fish Released	1	
Fish Spawned*	58 (25 males, 33 females)	
Pre-spawn Mortality	0	
Killed, Not Used	14	

\* Includes marked males that were under B-sized, but by real time, CWT reading indicated that fish were of "B" origin.

**Table 7. Squaw Creek "A-run" steelhead trapped, spawned and fish disposition, 2006.**

<b>Fish Disposition</b>	
Fish Trapped	23 (13 males, 10 females)
Fish Released*	23
Fish Spawned	0
Pre-spawn Mortality	0
Killed, Not Used	0

\*(Released above the Squaw Creek weir) 23

**Table 8. Steelhead spawning record, 2006.**

<b>Spawning Station</b>	<b>Males Spawned</b>	<b>Females Spawned</b>	<b>Green Eggs</b>	<b>Eyed Eggs</b>	<b>% Eye</b>
Sawtooth	452	452	2,338,443	2,049,530	87.6
East Fork	28	14	87,737	78,700	89.7
Squaw Cr. "B"	25	33	210,516	150,015	71.3
Pahsimeroi		243	1,251,522	759,500	60.7

**Table 9. 2006 Sawtooth FH Steelhead Egg Shipments.**

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

\* A total of 157,200 surplus Sawtooth stock-eyed eggs were not shipped.

**Table 10. Planting sites and numbers of catchable triploid rainbow trout stocked in the Stanley Basin by Sawtooth FH, 2006.**

Site	Number	Site	Number
Blue Mt. Meadow P	900	Little Bayhorse Lk.	2,000
Squaw Cr. Pond	300	Kelly Cr. Ponds	1,240
Salmon River	33,884	Valley Creek	4,000
Yankee Fk. Ponds	4,000	Sawtooth Kids Pond	925
Stanley Lake	3,500		
	<b>Total</b>		<b>50,749</b>