

Sawtooth Fish Hatchery Operation and Maintenance Annual Report



October 1, 2009 to September 30, 2010

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Cover photo of Melvin Hughes, Assistant Hatchery Manager, overseeing his final spring Chinook salmon smolt release from Sawtooth FH raceways. Mel retired late in 2010.

INTRODUCTION

Sawtooth Fish Hatchery 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 goal was revised in 2009 to 1,700,000 spring Chinook salmon smolts. In addition, Sawtooth collects up to 2,500,000 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. Steelhead from the Upper Salmon River B- program are held and spawned at East Fork Salmon River facility.

CHINOOK SALMON

Sawtooth Fish Hatchery Spring Chinook

BY 10

The fish trap for spring Chinook salmon, *Oncorhynchus tshawytscha*, at Sawtooth Fish Hatchery (SFH) on the Main Salmon River, was installed on June 22, 2010 and remained in operation through September 16, 2010. During operation, the weir diverted all upstream migration of fish through the trap. A total of 1,475 adult Chinook salmon were trapped. Of these adults, 755 were hatchery-produced marked fish (109 jacks, 285 adult males, 361 females) and 720 were unmarked (88 jacks, 455 adult males, 177 females). A trapping summary is provided in Table 1. Hatchery-origin marked fish are defined as fish with either an adipose fin-clip only (AD), adipose fin-clip/Coded Wire Tag (AD/CWT), or Coded Wire Tag only (CWT). Unmarked fish are defined as fish with no external markings or CWT. All unmarked Chinook were released above the hatchery weir for natural spawning. Marked Chinook were ponded at SFH according to broodstock needs or as excess to production needs, with a total of 754 Chinook held for broodstock except for one trap mortality male (109 jack, 284 males, and 361 females). After spawning, all 755 marked carcasses, including spawned fish, pre-spawn mortalities, other mortalities and killed-not-used (KNU) fish were stored frozen for shipment to a rendering facility.

SFH staff spawned a total of 354 females with 355 males. Spawn crosses resulted in 1,736,980 green eggs being collected with an eye-up rate of 89%, producing 1,548,780 eyed eggs, with an average of 4,907 eggs per female. During holding, SFH had 18 fish (8 females, 10 males) die prior to spawning activities, resulting in 2.4% pre-spawn mortality.

BY 09

The BY 09 Sawtooth spring Chinook salmon number 1,746,969 pre-smolts at 25 fpp and 130 mm fork length. This group of fish will over winter in ten large outside raceways. The fish received a 10 day oxytetracycline feeding in January. During mid-June and early-July, a 28 day medicated feeding of erythromycin was administered. Final marking occurred during May 2010. Smolts will be released the first week of April, 2011, below the SFH weir and into the Yankee Fork of the Salmon River. Fish rearing is summarized in Table 2.

BY 08

Brood year 2008 Chinook smolts were released April 9, 2010. Releases totaled 1,854,377 smolts and fish size averaged 22 fish per pound and 5.2 inches fork length at release. The SFH weir release was 1,455,933 fish. The smolts held for SBT Yankee Fork release numbered 398,444 fish. Smolts were trucked to the Yankee Fork April 20 and 21, 2010. Fish marking and smolt releases are summarized in Table 3.

East Fork Fish Facility

The velocity barrier on the East Fork of the Salmon River (EFSR) was put into operation on June 11, 2010, by the Captive Chinook Research Technical Team. Trapping operations continued through September 21. A total of 275 (40 jacks, 162 males, 70 females) were trapped in 2011. All but one female were unmarked natural fish.

All fish trapped at EFSR facility were released above the weir for natural spawning except the marked female that was transported to SFH.

STEELHEAD

Sawtooth Fish Hatchery Returns

The SFH weir was installed on March 18, 2010 for the Upper Salmon River summer steelhead (*Oncorhynchus mykiss*) run. The adult steelhead trap operated from March 23 to May 4, 2010. During that time a total of 6,720 adult "A- run" steelhead were trapped. Of these fish, 6,605 (3,545 males, 3,060 females) were marked hatchery-origin fish and 115 (59 males, 56 females) were unmarked fish of natural origin or unclipped hatchery fish.

The 115 unmarked steelhead trapped were released upstream of the hatchery weir after genetic sample, scale sample, fork length and gender data collection. A total of 1,012 marked steelhead were used for broodstock egg collection in 2010; 506 females were spawn-crossed with 506 males. The spawned carcasses, as well as KNU fish, were distributed to the public on a first-come first-served basis (total of 1,240). A total of 5,152 surplus marked steelhead were provided to tribal ceremonial and subsistence programs and to food banks of several charitable organizations. The remaining 213 steelhead carcasses (either pond mortalities or those that were unfit to be distributed for consumption) were kept frozen on station and were sent to a rendering plant after the 2010 Chinook season. Fish disposition data is provided in Table 4.

Sawtooth Fish Hatchery Spawning

SFH spawning operations for 2010 occurred from March 29 to May 3, 2010. A total of 506 female steelhead were spawn-crossed with 506 male steelhead over 11 spawning days. Each female's eggs were fertilized with one male. The eggs from 14 females were culled before enumeration due to poor egg quality. There were 2,599,841 green eggs that yielded 2,308,593 eyed eggs for an 89 percent survival to the eyed egg stage (Table 7). Mean fecundity was 5,284 eggs per female. Genetic samples were taken from 100 percent of broodstock fish.

Eyed egg transfers to Hagerman National Fish Hatchery (HNFH) totaled 1,290,975 eyed eggs destined for Salmon River smolt releases. Of these eggs, 807,302 are for the Sawtooth weir release and 483,673 eggs for the Shoshone-Bannock Tribes' DNA Parentage Exclusion Analysis Program. These genotyped eggs will be reared to smolts at HNFH and released into the Yankee Fork of the Salmon River. Another total of 571,947 genotyped eyed eggs were provided for the Shoshone-Bannock Tribes' Egg Box Program. These eggs are placed in streamside incubators to mimic natural hatch timing in the Yankee Fork. Magic Valley Fish Hatchery (MVFH) received a total of 140,632 eyed eggs for smolt releases into the Salmon River. A total of 305,039 excess eyed eggs were culled. The Sawtooth stock eyed egg transfer totaled 2,003,554 (Table 8).

East Fork Salmon River Returns

The velocity barrier on the EFSR was in operation from March 25 through May 13, 2010. In continuing with the East Fork Natural Steelhead Program, the program goal for the 2010 season was to proceed in building and maintaining a locally-adapted broodstock in the EFSR. To create this locally-adapted broodstock, production targets were set to collect 228,000 green eggs to produce 170,000 non-adipose-fin-clipped smolts to be released into the system above the weir, while still allowing for natural spawning above the weir. The long term goal is to manage this program in a way that allows local adaptation to determine target production levels. In accordance with this goal, collection targets were set at 45 females and 45 males, taken randomly from across the run, representing the entire range of size, age, and run-timing. Natural-Origin steelhead (designated as N-O by lack of tag present and unmarked or undamaged fins) were to be favored and incorporated over Hatchery-Origin steelhead (designated as H-O by presence of a Coded Wire Tag or obviously frayed fins from hatchery rearing) if given the choice, to achieve the collection target of 45 fish of each sex. Non-East Fork adults (ad-clipped hatchery strays) were not to be spawned or released above the weir.

A total of 579 adult steelhead were trapped for the East Fork Natural Steelhead Program, 518 were H-O (381 males, 137 females) and 61 were N-O steelhead (36 males, 25 females). One adipose fin-clipped male was trapped. This fish was killed, not used for spawning and not included in the trapping totals (Table 5).

East Fork Spawning

A total of 91 East Fork males (63 H-O, 28 N-O) and 45 East Fork females (35 H-O, 10 N-O) were used for natural production spawn crosses in 2010 (Table 5). Each female was spawned with two males. The males were killed after a single use. Seven H-O males and 3 H-O females were killed and not used because they had no CWT detected. Two females (one H-O, one N-O) were killed and not used for spawning because they were still green. Three H-O males were killed and not used because of injuries sustained from deep hook removal in order to detect a CWT. One AD clipped stray male was killed and not used. One H-O male was killed and not used because he was mistakenly identified as a previously used male. Three N-O and four H-O partially spawned-out female steelhead were released above the weir. Spawning operations occurred from April 13 through May 11 in 8 spawn days. The 45 East Fork females yielded a total of 253,724 green eggs for a mean fecundity of 5,638 eggs per female. A total of 178,160 eyed eggs were obtained from natural production crosses for a percent survival to the eyed stage of development average of 70.2 percent. All 178,160 eyed eggs produced from EFSR natural crosses were transferred to HNFH for final incubation and rearing (Table 5).

Upper Salmon River B-Run Returns

A picket weir and trap were installed in Squaw Creek on March 29, 2010, 200 meters upstream of the confluence of the Salmon River to trap adult Upper Salmon River B-Run (USRB) steelhead. The trap was run through May 3, 2010. A total of 61 steelhead were trapped: 9 marked USRB males, 12 marked USRB females, 12 undersized ad-clipped males without CWT, 1 undersized ad-clipped female without CWT, 3 undersized ad-clipped females with CWT, 7 undersized HO-WD males without CWT and finally, 6 undersized HO-WD females without CWT. There were 6 unmarked females and 5 unmarked males released above the picket weir. The 21 USRB broodstock adults were transferred to the East Fork trapping facility for pre-spawn holding. The 12 undersized ad-clipped males and the undersized ad-clipped female that did not have CWT were released back into the Salmon River upstream of the mouth of Squaw Creek.

The Angler Contribution Program was again implemented during 2010. Nampa Research staff, Salmon Regional Office staff and SFH staff cooperated to educate and encourage anglers fishing at the mouth of Squaw Creek to contribute USRB program steelhead caught to the hatchery broodstock program. On March 26, three live boxes were placed in the Salmon River (two near Squaw Creek, one near Sullivan Creek) for anglers to place program fish. Three fish tubes were placed near the live boxes and the mouth of Squaw Creek for anglers to place program fish. IDFG staff monitored the live boxes and fish tubes and removed any fish that did not meet the target criteria for the USRB program as well as transferred angled fish that did meet the criteria to the East Fork spawning facility to be incorporated into the broodstock. Between March 28 and April 20, a total of 16 USRB steelhead were caught and transferred to the East Fork facility (8 males, 8 females) and held for spawning (Table 6). One male and

one female angled fish did not have CWT, but were of USRB program size and were used for spawning.

Upper Salmon River B-Run Spawning

A total of 19 marked USRB females and 15 marked USRB males were used in hatchery production spawn crosses in 2010. Of the 19 females spawned, 11 were trapped fish and 8 were angled. Of the 15 males spawned, 7 were trapped fish and 8 were angled. Spawning operations occurred from April 16 through April 30 (four spawn days). All spawning was conducted at the EFSR facility. The 19 females produced 117,057 green eggs for a mean fecundity of 6,161 eggs per female. The eggs were incubated at Pahsimeroi Fish Hatchery. A total of 97,068 eyed eggs resulted for an eye-up percentage of 82.9% (Table 7). Three undersized trapped males and three undersized trapped females were spawned after real time CWT reading determined that they were B-run target fish. All other fish spawned met target size. To achieve spawn crosses of two males per female, multiple males were spawned up to two times. Five males were used once and 10 males were used twice. Because ripe males were lacking at the time of spawning, 13 females were spawn-crossed with a single male. All 97,068 eyed eggs produced from USRB spawning were transferred to the MVFH for final incubation and rearing (Table 8).

Sawtooth Fish Hatchery Egg Shipments

In 2010, a total of 2,278,782 eyed steelhead eggs were shipped from SFH to various hatcheries or off-site locations for continued rearing. A summary of egg shipments, by stock, is provided in Table 8.

SOCKEYE SALMON

BY 2010

SFH personnel removed and assessed adult sockeye from the SFH trap through the summer until September 16, 2010, when the trap was closed. Total sockeye trapped was 648 fish (Table 10). These fish were either transferred to Eagle Hatchery to be artificially spawned or released into Redfish Lake for natural spawning.

BY 2009

Eagle Fish Hatchery (IDFG) and Burley Fish Hatchery (NOAA) shipped a total of 218,844 eyed eggs to SFH in four egg shipments beginning on November 24 and ended on December 17, 2009. A total of 6,633 dead eggs were hand picked off before ponding. Ponding began March 3 and ended April 16, 2010. They were ponded into four rectangular fiberglass vats and three circular tanks. All lots ponded totaled 212,211 fry.

The sockeye fry were marked October 5 and 6 (Table 11). Pre-smolt releases, numbering about 50,000 fish, will occur in October, 2010. The BY 09 sockeye, numbering around 140,000 fish, will be kept in the small raceways at SFH through the winter and released into Redfish Lake Creek in May of 2011 (Table 11).

BY 2008

The fall release group of fish was AD-clipped in September, 2009. They were released October 7, 2009. A total of 59,530 pre-smolts were released into Alturas, Pettit and Redfish Lakes. Another group of 100,000 fish were CWT only. They were put into four small raceways and kept through the winter. The fish were released May 4, 2010, into Redfish Lake Creek and the Salmon River (Table 12).

RAINBOW TROUT

SFH personnel stock the local area with triploid catchable rainbow trout *O. mykiss* that are reared at Nampa Fish Hatchery and transferred to SFH for redistribution. This project is fully funded by IDFG license program with cooperation from the United States Fish and Wildlife Service Lower Snake River Compensation Plan. SFH stocked 48,689 catchable-sized rainbow trout into ten local area waters (Table 9). Over 100 people, including 62 children, participated in Free Fishing Day, at SFH Kids Fishing Pond, June 12, 2010. Prizes were awarded to all the children.

HIGH MOUNTAIN LAKE STOCKING

SFH planted 38,160 westslope cutthroat fingerling into Yellowbelly Lake. The fish were reared at and transferred from Cabinet Gorge Hatchery. The fish were 424 fpp and 1.9 in. long.

HATCHERY IMPROVEMENTS

There were many modifications, updates and new construction accomplished around the hatchery, all with the intent to improve the hatchery's infrastructure or fish health. Well 1A, designed for more fish production water, was drilled and test pumped. Wells 3, 4, 6 and 7 were pumped for efficiency testing. Drilling started on Well 5. It will also be used for fish production. Redesigned fish and people barriers were installed at the adult trap. A viewing platform was also built at the adult trap. The adult ponds acquired a new electrical supply system and walkways along length of the ponds. A PIT detection array was installed in the adult trap ladder. Jump screens for the large raceways were fabricated and installed. They will keep the fingerlings from jumping out of the head of the raceway. A fish pump was purchased to aid moving fingerling from the vat room to the large raceways. A new fish marking trailer electrical outlet was installed. The vat room lighting control was redone. A new heat pump was installed and later replaced in the dormitory. A French drain, servicing the furnace, was dug into the dormitory lawn. Fine mesh screens for sockeye rearing in several vats were purchased. Chemical spill kits were placed about the hatchery and East Fork facility. The visitor center received new lighting. A new pick-up mounted snow plow was bought. Hazard and diseased trees about the

hatchery were felled. The resulting wood was cut to length, split and delivered to several local elderly residents. Verbonone packets, meant for beetle resistance, were placed in the mature healthy trees around the hatchery. Safety inspections that occurred during the year included the buildings, pressure tanks and domestic water system.

PERSONNEL

Hatchery personnel were involved in several projects during the 2009-2010 reporting period and include: helping IDFG Fisheries Research personnel with Idaho Supplementation Studies, 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 numerous group tours. Mel Hughes performed the Assistant Hatchery Manager duties. Chris Jeszke and Danielle Dorsch performed the Fish Culturists duties. Phil Stone is the Utility Craftsman. Seasonal staff returning for multiple years' appointments included Audra Serrian, Sylvia Hamilton, Chris Klingler, Julie Markham, Shawna Johansen and Laura Rose. Numerous volunteers assisted with hatchery programs and projects.

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Table 1. 2010 Sawtooth Fish Hatchery Spring Chinook salmon trapped, spawned and disposition.

Total Fish Trapped: 1,475 Run Timing: June 23-September 16, 2010
Peak of Return: July 7-26, 2010

Jacks	109 Marked Jacks	88 Unmarked Jacks	197 Total
Males	285 Marked Males	455 Unmarked Males	740 Total
Females	<u>361</u> Marked Females	<u>177</u> Unmarked Females	<u>538</u> Total
	755 Marked Chinook	720 Unmarked Chinook	1,475 Total

Fish Disposition	Jacks	Jills	Males	Females	Total
Trap Mortality	-	-	1	-	1
Pond Mortality	-	-	57	-	57
Pre-Spawning Mortality	2	-	8	8	18
Spawned and Killed	43	1	198	353	595
Spawned Released Above	-	-	49	-	49
Killed Not Used	64	-	21	-	85
Released Above Weir	88	-	406	176	670

Males Spawned	Females Spawned	Ave. Eggs Per Female	Number of Green Eggs	Number of Eyed Eggs	Percent Eye-up
290	347	4,907	1,736,980	1,5548,780	89
43 jacks 247 males	7 other females culled for high ELISA		Culled eggs not included		

Table 2. Sawtooth Fish Hatchery BY 08 Spring Chinook rearing record.

Starting green inventory	2,894,444
Resulting eyed eggs	2,701,418*
Survival to eye-up	93.3%
Eggs culled-High ELISA values	51,855
Fry ponded	1,948,907
Smolts released	1,854,377
Survival from ponding to release	95.1%
Survival from green to release	86.1%
Weight of smolts produced	84,385 lbs.
Number fish per pound (smolts)	22
Pounds of feed fed	77,551 lbs.
Conversion rate	0.93
Feed cost/1000 smolts	\$ 229

* 752,511 excess eyed eggs were destroyed.

Table 3. Sawtooth Fish Hatchery BY 08 Spring Chinook smolt distribution, 1,854,377 total fish.

<u>Mark</u>	<u>Number Released</u>	<u>Location</u>
AD/CWT	122,398	SFH Weir
AD	1,333,535	SFH Weir
PIT-tagged*	21,281	SFH Weir, Yankee Fk.
CWTonly	196,730	Yankee Fk.
AD only	<u>201,714</u>	Yankee Fk.
Total Release		1,854,377

*these PIT-tagged fish numbers are included in the other tagged-groups' numbers.

Table 4. 2010 Sawtooth Fish Hatchery Steelhead Trapped, Spawnd and Disposition.

Total Fish Trapped: 6,720 Run Timing: March 23-May 4, 2010
Peak of Return: April 19-22, 2010

3545 Hatchery Males	59 Unmarked Males	3,604 Total Males
<u>3,060</u> Hatchery Females	<u>56</u> Unmarked Females	<u>3,116</u> Total Females
6,605 Hatchery Steelhead	115 Unmarked Steelhead	6,720 Total Steelhead

Fish Disposition	Males	Females
Spawnd	506	506
KNU* fish	3,039	2,554
Released Above Weir	59	56
Totals	3,604	3,116

*These fish were not used in spawning, but were killed and either distributed to the Shoshone-Bannock and Shoshone-Paiute Tribes, charitable food banks or kept frozen on station to be rendered.

Table 5. 2010 East Fork Steelhead Trapped, Spawmed, and Disposition.

Total Fish Trapped: 579 Run Timing: March 29-May 10, 2010
 Peak of Return: April 18-22, 2010

Total Fish Trapped

381 Hatchery Males <u>137</u> Hatchery Females	36 Natural Males <u>25</u> Natural Females	417 Total Males <u>162</u> Total Females
518 Hatchery Steelhead	61 Natural Steelhead	579 Total Steelhead

Fish Disposition	Males	Females
Spawmed	91*	45*
KNU	12	5
Released Above Weir	314**	112**
Total	417	162

*Of the 91 males used for spawning, 28 were N-O and 63 were H-O. Ten of the 45 females spawned were N-O and 35 were H-O.

**Seven of the 112 females released were partially spawned out.

Table 6. 2010 Upper Salmon River B Steelhead Trapped, Angled, Spawned and Disposition.

Total Fish Collected: 77 Run Timing: 4/2 to 5/2/ Peak of Return: 4/18-4/21

<u>Males</u>	<u>Females</u>
9 USRB Marked	12 USRB Marked
5 Natural	6 Natural
19 Under-sized *	10 Undersized *
<u>8 Angled USRB</u>	<u>8 Angled USRB</u>
41 Total Males	36 Total Females

*these fish did not meet USR-B criteria and had no CWT. They were released back into the main Salmon River. The CWT females were killed.

Fish Disposition	Males	Females
Pre-Spawning Mortality	0	0
Spawned (10 males used two times)	15	19
Killed: Not Used	2	4
Released into Squaw Cr. Pond (Undersized of Hatchery Origin)	12	1
Released into Salmon River (Undersized of Hatchery Origin)	7	6
Released Above Weir (Unmarked)	5	6
Totals:	41	36

Table 7. 2010 Steelhead Spawning Summary.

Spawning Station	Males Spawned	Females Spawned	Green Eggs	Eyed Eggs	% Eye-up
Sawtooth					
East Fork	91	45	253,724	178,160	70.2
USRB	15	19	117,057	97,068	82.9

Table 8. 2010 Sawtooth Fish Hatchery Steelhead Egg Shipments.

HATCHERY or OFF-SITE LOCATION	NUMBER SHIPPED	STOCK
Shoshone-Bannock Egg Boxes	571,047	Sawtooth
Hagerman National Fish Hatchery/SBT YFK smolts	483,673	Sawtooth
Hagerman National Fish Hatchery	807,3025	Sawtooth
Hagerman National Fish Hatchery	178,160	East Fork
Magic Valley Fish Hatchery	140,632	Sawtooth
Magic Valley Fish Hatchery	97,068	USRB*
Total Sawtooth Eggs Shipped	2,003,554	Sawtooth
Total East Fork Eggs Shipped	178,160	East Fork
Total USRB Eggs Shipped	97,068	USRB*
Total Eggs Shipped	2,278,782	All Stocks

*These eggs were shipped from Pahsimeroi Fish Hatchery.

Table 9. 2010 Sawtooth Fish Hatchery Catchable Triploid Rainbow Trout Stocked.

Site	Number
Sawtooth Kids Pond	2,190
Little Bayhorse Lake	2,000
Kelly Creek Pond	1,140
Salmon River (4 sections)	29,700
Squaw Creek Pond	800
Yankee Fork Dredge Ponds	4,000
Valley Creek	4,500
Blue Mountain Meadow Pond	1,200
Stanley Lake	3,059
Grouse Creek Lake	100
Totals	48,689

Table 10. 2010 Sawtooth Fish Hatchery Sockeye Return at Sawtooth Weir.

Natural Adults		Hatchery Adults		Total Fish Trapped		Total Return
Male	Female	Male	Female	Male	Female	
15	13	375	245	390	258	648

Table 11. Sawtooth Fish Hatchery BY 2009 Sockeye Marking.

Clipping Operations, October 5-6, 2010; 81,608 CWT only.

November 2010, 500 were transferred to Eagle Hatchery to raise them larger for later radio tagging.

Table 12. Sawtooth Fish Hatchery BY 2008 Sockeye Marking/Releases.

September, 2009 - 59,650 fish AD only.
100,150 fish CWT only.

Fall Release October 7, 2009. Total- 59,530; all AD; 2,994 AD/PIT.

Redfish Lake-	34,561	(33,566 AD, 995 AD/PIT)
Alturas Lake-	9,982	(8,983 AD, 999 AD/PIT)
Pettit Lake-	<u>4,987</u>	(13,987 AD, 1,000 AD/PIT)

Total 59,530 pre-smolts released

Spring Release May 4, 2010. Total-99,347; all CWT; 51,633 CWT/PIT.

Salmon River-	73,513	(just below hatchery intake)
Redfish Lake Cr.-	<u>25,834</u>	(just below smolt trap)

Total 99,347 smolts released