
SAWTOOTH HATCHERY

A COMPILATION AND SUMMARY OF HOT AUDITS FOR SUMMER STEELHEAD AND SPRING CHINOOK

JULY 1998

**HATCHERY EVALUATION REPORT
SUMMARY FOR**

- Sawtooth Hatchery**
- **Summer Steelhead**
- **Spring Chinook**

**A Summarized Compilation of Independents Audits Based on
Integrated Hatchery Operations Team (IHOT) Performance
Measures**

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Executive Summary

This report compiles a summary of the findings of two separate Hatchery Evaluation Reports for Spring Chinook, and Summer Steelhead at Sawtooth Hatchery. The original Hatchery Evaluation Reports, prepared by Montgomery Watson, presented each species and program separately and include the complete findings. Details on the audit compliance status for each species and program are included in the original reports. The Hatchery Evaluation Reports were based upon audits conducted in 1996-1997 as part of a 2-year effort that will include 67 hatcheries and satellite facilities located on the Columbia and Snake River system in Idaho, Oregon, and Washington. The hatchery operating agencies include the U.S Fish and Wildlife Service, Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, and Washington Department of Fish and Wildlife.

The hatchery is located along the upper Salmon River near Stanley, Idaho and is operated by the Idaho Department of Fish and Wildlife. The hatchery is used for adult collection, incubation, and rearing of spring chinook and adult collection, spawning, and incubation of summer steelhead.

Background

The hatchery audit was conducted as a requirement of the Northwest Power Planning Council (NPPC) “Strategy for Salmon” and the Columbia River Basin Fish and Wildlife Program. Under the audit, the hatcheries are evaluated against policies and related performance measures developed by the Integrated Hatchery Operations Team (IHOT) in January 1995. IHOT is a multi-agency group established by the NPPC to direct the development of new basinwide standards for managing and operating fish hatcheries. The Bonneville Power Administration (BPA) was contracted along with Montgomery Watson to complete the hatchery audit.

IHOT has established five basic policies that cover: (1) hatchery coordination, (2) hatchery performance standards, (3) fish health, (4) ecological interaction, and (5) genetics. The audit focuses on all these policies, with the exception of hatchery coordination. These policies are set forth in *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1995)*, which is the source for the performance measures that are the basis of this audit.

The Audit Process

The audit was based on the facility management’s response to a 109-page questionnaire. This audit form was completed through a five-step process in which:

- Information was obtained from headquarters.

¹ PMs are performance measures that were extracted from the IHOT 1995 report.

- The hatchery manager was asked to fill out and return the audit form.
- A 1-2 day site audit visit was conducted to inspect facilities, review hatchery records, discuss audit form responses, and develop remedial action plans.
- A compliance report was developed to document the compliance status of each performance measure. This report was then shared with the hatchery manager and IHOT representative.
- This hatchery evaluation report was written to document compliance with IHOT performance measures and develop cost estimates for remedial actions when needed.

Sawtooth Hatchery - Summer Steelhead and Spring Chinook Results

The Sawtooth facility includes 3 adult holding pond, 28 concrete raceways, 12 outside early rearing raceways, 16 indoor early rearing vats, and incubation facilities. The Sawtooth Hatchery was constructed in 1984-85 as part of the Lower Snake River Compensation Plan (LSRCP) - a program to mitigate anadromous fishery losses caused by the construction of four hydroelectric dams on the lower Snake River.

Summer Steelhead

The Sawtooth Hatchery was in compliance with most of the performance measures. In the area of program objectives, the hatchery was not meeting its adult return goal and needed to document its adult contribution. The audit found that the hatchery was not in compliance with the water temperature criteria, water quality monitoring requirements, and needed to develop specific incubation standards for the IHOT Operations Plan, all of which are facilities requirements. The hatchery needed to develop an approved Genetics Monitoring and Evaluation Program.

The specific areas in which the Sawtooth Hatchery - Summer Steelhead program requires remedial actions based on the IHOT performance measures are listed below. These remedial actions are listed in alphabetical order without intent of ranking or otherwise assigning priority:

- Develop approved genetics monitoring and evaluation program
- Develop specific incubation standards for IHOT Operations Plan
- Document adult contribution
- Determine quality of smolt produced for on station releases
- Document density and loading during acclimation
- Review IHOT temperature criteria
- Run analysis for contaminants
- Run analysis for missing water chemistry parameters
- Develop smoltification criteria and measure
- Document disease condition prior to release
- Document release number
- Document size at release
- Document release date
- Provide rearing in the subbasin

¹ PMs are performance measures that were extracted from the IHOT 1995 report.

- Review release strategy as it relates to overall program

Non-compliance issues resulting from items beyond human control or Performance Measures not relevant to this hatchery were not listed above.

Spring Chinook

The Sawtooth Hatchery was in general compliance with most of the performance measures. In the area of program objectives, the hatchery was not meeting its adult return goal, needed to improve its green-egg to eyed-egg survival and fry-to-smolt survival, and document its adult contribution. The audit found that the hatchery was not in compliance with the screen approach criteria, screen mesh criteria, acclimation pond requirements, and water quality monitoring criteria, which are all facilities requirements. The hatchery was not monitoring smoltification and needed to develop specific incubation and rearing standards for the IHOT Operations Plan. The hatchery needed to develop an approved Genetics Monitoring and Evaluation Program.

The specific areas in which the Sawtooth Hatchery - Spring Chinook program requires remedial actions based on the IHOT performance measures are listed below. These remedial actions are listed in alphabetical order without intent of ranking or otherwise assigning priority:

- Construct acclimation ponds for off-station releases
- Develop approved genetics monitoring and evaluation program
- Develop smoltification goal and monitoring program
- Develop specific incubation standards for IHOT Operations Plan
- Document adult contribution
- Follow IHOT protocols for exterior and interior disinfection
- Improve fry-to-smolt survival
- Improve green-egg to eyed-egg survival
- Perform IHOT QA/QC feed tests
- Enlarge the headbox screen to meet current approach criteria and screen mesh criteria
- Review release strategy as it relates to overall program
- Run analysis for contaminants
- Run analysis for missing water chemistry parameters

Non-compliance issues resulting from items beyond human control or Performance Measures not relevant to this hatchery were not listed above.

¹ PMs are performance measures that were extracted from the IHOT 1995 report.

Section 2

Facility Description

Name:	Sawtooth Hatchery
Stock/Species:	Spring Chinook Summer Steelhead
Operating Agency:	Idaho Department of Fish and Game
Funding Agency:	Lower Snake River Compensation Program
Location:	Located along the upper Salmon River near Stanley, Idaho. It is approximately 879 river miles from the mouth of the Columbia River at an elevation of 6,480 feet above sea level.
Address:	Idaho Department of Fish and Game Sawtooth Fish Hatchery HC 64, Box 9905 Stanley, ID 83278
Hatchery Manager:	Mr. Brent Snider
Phone:	(208) 774-3684
Fax:	

¹ PMs are performance measures that were extracted from the IHOT 1995 report.

Purpose: The Sawtooth Hatchery was constructed in 1984-85 as part of the Lower Snake River Compensation Plan (LSRCP) - a program to mitigate anadromous fishery losses caused by the construction of four hydroelectric dams on the lower Snake River. The LSRCP mitigation goal is to return 19,445 spring chinook adults above Lower Granite Dam.

Production Goal: Spring Chinook

Produce 1.6 million smolts (80,000 lb) for on-station release

Produce 700,000 smolts (35,000 lb) for release into the East Fork Salmon River.

Summer Steelhead

Trap and spawn adult steelhead to provide eggs to other hatcheries for LSRCP programs

Release 741,000 smolts (from Hagerman NFH) to provide broodstock and sport fisheries.

Water Supply: Water is supplied to the hatchery by gravity flow from the Salmon River and also pumped from three wells. The hatchery uses 15,709 gpm of water from the river and wells produce 4,039 gpm for incubation and early rearing.

Facilities:

Adult Holding:	3 adult holding ponds - 10,200 cf each
Incubation:	100 stacks of vertical tray incubators (800 trays)
Early Rearing:	12 indoor rearing vats -391 cf each 12 outdoor fry raceways - 1395 cf each
Raceways:	28 raceways - 5,400 cf each
Rearing Ponds:	None
Satellite Facilities:	East Fork Salmon River Satellite 3 adult holding ponds and a spawning area.

¹ PMs are performance measures that were extracted from the IHOT 1995 report.

Section 3
Remedial Actions

Based on the compliance status for each performance measure, remedial actions were developed. The required remedial actions are organized into five categories. The categories range from those actions that are beyond human control, to those that require a change in agency policy or procedures, to those that involve a significant capital cost to put in place. The following are the five types of remedial actions identified under phase 1 of the audit:

Table 2. The Five Types of Remedial Actions

Type	Description
1	Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery
2	Remedial actions requiring changes in agency policies or procedures
3	Remedial actions requiring changes in monitoring coverage or interval
4	Remedial actions requiring significant capital expenditures
5	Remedial actions that may require significant capital expenditures but are not clearly definable at this time

Remedial Actions at Sawtooth Hatchery - Summer Steelhead and Spring Chinook

This section presents the corrective actions required to bring the Sawtooth Hatchery - Spring Chinook and Summer Steelhead programs into compliance with IHOT performance measures. The remedial actions described here are suggestions developed by the Montgomery Watson Audit Team. The remedial actions and associated cost estimates have not been analyzed or prioritized by the respective operating agencies, fishery managers, or IHOT. There may be additional remedial actions, not included in this report, proposed by the respective operating agencies. For some non-compliance areas, other remedial actions could be proposed. The required remedial actions are cross-referenced to each IHOT performance measure that was not in compliance. Where appropriate, the costs associated with the remedial actions are also presented (Tables 3a and 3b).

The cost estimates presented in this section are based on professional experience from similar projects. In most cases, only a lump-sum figure is presented, and detailed take-off lists have not been prepared. The cost estimates are essentially order of magnitude estimates ($\pm 40\%$).

The suggested remedial activities may also present several levels of action. Optional actions have been listed for several problems. These optional actions maybe desirable for either operational or safety considerations.

¹ PMs are performance measures that were extracted from the IHOT 1995 report.

3b. Remedial Actions Required at Sawtooth Hatchery - Spring Chinook

Remedial Action Required	Cost	PMS ¹
<p>Type 1 – Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery</p> <p>Improve adult returns; passage conditions from estuary to facility</p>	----	4c, 4g, 4h, 22a4, 41, 42
<p>Type 2 – Remedial actions requiring changes in agency policies or procedures</p> <p>Document adult contribution</p> <p>Perform IHOT QA/QC feed tests</p> <p>Develop specific incubation standards for IHOT Operations Plan</p> <p>Develop smoltification goal and monitoring program</p> <p>Review release strategy as it relates to overall program</p> <p>Follow IHOT protocols for exterior and interior disinfection</p> <p>Develop approved genetics monitoring and evaluation program</p>	----	4a 12 18 22a1 22c 23
<p>Type 3 – Remedial actions requiring changes in monitoring coverage or interval</p> <p>Run analysis for missing water chemistry parameters</p> <p>Run analysis for contaminants</p>	----	5c 5g

¹ PMS are performance measures that were extracted from the IHOT 1995 report.

¹ PMS are performance measures that were extracted from the IHOT 1995 report.

Remedial Action Required	Cost	PMS ¹
Type 4 – Remedial actions requiring significant capital expenditures		
Enlarge the headbox screen to meet current approach criteria and screen mesh criteria	\$50,000-\$100,000	10
Construct acclimation ponds for off-station releases 3 acclimation ponds @\$1,000,000 per pond	\$3,000,000	22b
Type 5 – Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Improve green-egg to eye-egg survival	----	4d
Improve fry-to-smolt survival	----	4f

Section 4

Hatchery Contribution to Fisheries, Spawning Grounds, and Hatcheries

This section presents the audit findings for the Sawtooth Hatchery - Summer Steelhead and Spring Chinook programs contribution of adult fish to fisheries, local fisheries, spawning grounds, and hatcheries (Tables 4a and 4b). Data is reported by broodyear. A broodyear refers to the adult contribution from the eggs produced from a single group of spawning adults. For some species, this may include fish caught as 2-, 3-, 4-, 5-, and 6-year old fish. Because of the return distribution and data processing delays, the complete adult contribution for a given broodyear may not be available until 4 to 5 years after the fish have been released from the hatchery.

Table 4a. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries: Sawtooth Hatchery - Summer Steelhead²

Year	Fisheries ³ (Broodyear)	Spawning Grounds ¹ (Broodyear)	Hatchery ¹ (Broodyear)	Total Combined Contribution ¹ (Broodyear)	Smolt to Adult Survival (percent)

¹ PMS are performance measures that were extracted from the IHOT 1995 report.

² Fisheries contribution from Idaho only; no tribal harvest, or harvest in Oregon or Washington.

³ Data obtained from Missing Production Groups Annual Report or from the Regional Mark Information System database.

¹ PMS are performance measures that were extracted from the IHOT 1995 report.

1981					
1982					
1983					
1984					
1985					
1986					
1987					
1988					
1989					
1990	1849	628	253		---
1991	1618	661	207		---
1992	503	54	125		---

**Table 4b. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries:
Sawtooth Hatchery - Spring Chinook**

Year	Fisheries² (Broodyear)	Spawning Grounds¹ (Broodyear)	Hatchery¹ (Broodyear)	Total Combined Contribution³ (Broodyear)	Smolt to Adult Survival (percent)
1981					
1982					
1983					
1984					
1985					

¹ Total combined adult contribution; presented when it is not possible to subdivide the contribution into fisheries, spawning grounds, and hatchery contributions.

² Data obtained from Missing Production Groups Annual Report or from the Regional Mark Information System database.

³ Total combined adult contribution; presented when it is not possible to subdivide the contribution into fisheries, spawning grounds, and hatchery contributions.

¹ PMs are performance measures that were extracted from the IHOT 1995 report.

1986					
1987					
1988	Unknown	344	700		0.055
1989	Unknown	50	100		0.023
1990	Unknown	33	65		0.008
1991					
1992					

Section 5

Annual Operating Expenditures

The level and detail of annual operating expenditures varies widely depending on hatchery, operating agency, and funding source. When provided, expenditures were presented in terms of personnel costs, operating costs (power, feed, and supplies), capital costs, indirect costs charged to the federal government, third-party costs, and other costs. These cost components were summed to determine a total hatchery annual cost. Based on discussion with the hatchery manager, the percent of total hatchery costs allocated to a given program was estimated. The total hatchery costs and the percent of hatchery costs allocated to a given program were used to compute the cost of a given program. The total expenditures for the Sawtooth Hatchery are presented in Table 5 by program. The detailed breakdown of the Summer Steelhead and Spring Chinook program expenditures at this hatchery are presented in separate tables (Tables 6a and 6b).

Table 5. Annual Operating Expenses - Sawtooth Hatchery

Program	1994	1995	1996
1. Summer Steelhead	\$290,770	\$119,942	\$78,845
2. Spring Chinook	\$385,439	\$379,816	\$249,675
3.			
4.			
5.			
Total Hatchery Costs	\$676,209	\$499,758	\$328,520

Table 6a. Detailed Expenditures at Sawtooth Hatchery by Program

¹ PMs are performance measures that were extracted from the IHOT 1995 report.

Summer Steelhead

Component	1994	1995	1996
Personnel Costs	\$214,873	\$232,218	\$166,108
Operational Costs	\$243,561	\$169,972	\$110,890
Capital Costs	\$133,880	\$27,970	\$18,303
Indirect Costs	\$83,895	\$69,598	\$51,522
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs			
Total Hatchery Costs	\$676,209	\$499,758	\$328,520
Source of Funds	100%	100%	100%
Program Production (lb)	---	---	---
Total Production (lb)	---	---	---
Program as Percent of Total	43%	24%	24%
Program Costs	\$290,770	\$119,942	\$78,845

¹ When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

¹ PMs are performance measures that were extracted from the IHOT 1995 report.

Table 6b. Detailed Expenditures at Sawtooth Hatchery by Program
Spring Chinook

Component	1994	1995	1996
Personnel Costs	\$214,873	\$232,218	\$166,108
Operational Costs	\$243,561	\$169,972	\$110,890
Capital Costs	\$133,880	\$27,970	\$18,303
Indirect Costs	\$83,895	\$69,598	\$51,522
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs			
Total Hatchery Costs	\$676,209	\$499,758	\$328,520
Source of Funds	100%	100%	100%
Program Production (lb)	---	---	---
Total Production (lb)	---	---	---
Program as Percent of Total	57%	76%	76%
Program Costs	\$385,439	\$379,816	\$249,675

¹ When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

¹ PMs are performance measures that were extracted from the IHOT 1995 report.