
PAHSIMEROI HATCHERY

**A COMPILATION AND SUMMARY OF
IHOT AUDITS FOR SUMMER
STEELHEAD AND SUMMER CHINOOK**

JULY 1998

**HATCHERY EVALUATION REPORT
SUMMARY FOR**

- Pahsimeroi Hatchery**
- **Summer Steelhead**
- **Summer 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 Summer Chinook and Summer Steelhead at Pahsimeroi 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 on the Pahsimeroi River near Ellis, Idaho and is operated by the Idaho Department of Fish and Game. The hatchery is used for adult collection and spawning of summer steelhead and the adult collection, spawning, incubation, rearing, and release of summer chinook.

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.

- 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.

Pahsimeroi Hatchery - Summer Chinook Results

The Pahsimeroi facility includes three ponds for adult holding, four concrete raceways and incubation facilities. The satellite facility has two earthen rearing ponds. The hatchery is funded by Idaho Power to mitigate fishery losses caused by construction of hydroelectric dams on the Snake River in Hells Canyon.

The Pahsimeroi Hatchery - Summer Chinook program 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 better document its adult contribution. The audit found that the hatchery was not in compliance with the temperature criteria, rearing density (full program), water quality monitoring criteria, alarm facilities, predation control criteria, which are all facilities requirements. In the compliance area for fish health policy, the hatchery was not using foot baths in the incubation area. The hatchery did not have a Genetics Monitoring and Evaluation Program in place.

The specific areas in which the Pahsimeroi Hatchery - Summer 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:

- Conduct fishery contribution studies
- Construct 4 more raceways (needed for full program)
- Construct bird netting and fence for upper pond
- Construct new release pipe that runs directly to the river
- Develop 4 cfs additional groundwater supply for incubation, early rearing, and fry
- Develop annual training schedule
- Develop genetics monitoring and evaluation plan
- Develop smoltification goal and monitoring program
- Develop specific incubation and rearing standards for IHOT Operations Plan
- Document adult contribution
- Fence settling ponds and construct new release pipe
- Follow IHOT alarm protocols when new system is operational
- Follow IHOT protocols for disinfection of exterior and interior of transport vehicles
- Follow IHOT protocols for equipment and rain gear disinfection prior to its use in the hatchery
- Install and use foot baths
- Install flow and security alarm system with logging capability
- Install freezer at hatchery (needed for full program)
- Monitor DO and TGP
- Monitor O₂ concentration during transport

- Perform IHOT QA/QC feed tests
- Reduce temperature in bulk storage facilities
- Review feed protocols with respect to how bags of feed are open
- Review IHOT temperature criteria for transport
- Run analysis for alkalinity and hardness
- Run analysis for contaminants
- Run analysis for missing chemistry parameters
- Run analysis for nitrite
- Run analysis for turbidity

Non-compliance issues resulting from items beyond human control or Performance Measures not relevant to this hatchery (Type 1 in Table 3a, Section 4 of this report) were not listed above.

Pahsimeroi Hatchery - Summer Steelhead Results

The Pahsimeroi facility includes three ponds for adult holding, four concrete raceways and incubation facilities. The satellite facility has two earthen rearing ponds. The hatchery is funded by Idaho Power as mitigation for fishery losses caused by construction of hydroelectric dams on the Snake River in Hells Canyon.

The Pahsimeroi Hatchery - Summer Steelhead program was in compliance with most of the performance measures. The audit found that the hatchery was not in compliance with the water quality monitoring criteria and alarm facilities, which are all facilities requirements. In the compliance area for fish health policy, the hatchery was not using foot baths in the incubation area and was not following IHOT protocols for equipment and rain gear disinfection. The hatchery did not have a Genetics Monitoring and Evaluation Program in place and was not following the IHOT spawning protocols for the female to male ratio.

The specific areas in which the Pahsimeroi 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:

- Conduct fishery contribution studies
- Construct bird netting and fence for upper pond
- Construct new release pipe that runs directly to the river
- Develop annual training schedule
- Develop genetics monitoring and evaluation plan
- Develop specific incubation standards for IHOT Operations Plan
- Disinfect ice chests prior to use for transportation of eggs
- Fence settling ponds and construct new release pipe so fish are not released through the settling pond
- Follow IHOT alarm protocols when new system is operational
- Follow IHOT protocols for equipment and rain gear disinfection prior to its use in the hatchery
- Follow IHOT protocols for wearing protective garments when handling eggs
- Follow IHOT spawning protocols (female to male ratio)
- Install and use foot baths
- Install flow and security alarm system with logging capability
- Monitor DO and TGP

- Provide rearing in the basin
- Review IHOT temperature criteria for transport
- Review release strategy as it relates to overall program
- Run analysis for alkalinity and hardness
- Run analysis for contaminants
- Run analysis for missing chemistry parameters
- Run analysis for nitrite
- Run analysis for turbidity
- Use acclimation ponds for release

Non-compliance issues resulting from items beyond human control or Performance Measures not relevant to this hatchery (Type 1 in Table 3b, Section 4 of this report) were not listed above.

Facility Description

Name:	Pahsimeroi Hatchery
Stock/Species:	Summer Chinook Summer Steelhead
Operating Agency:	Idaho Department of Fish and Game
Funding Agency:	Idaho Power Corporation
Location:	Located on the Pahsimeroi River near Ellis, Idaho. The hatchery is divided into two locations with the lower facility 1 mile upstream and the upper facility 7 miles upstream from the river mouth.
Address:	Idaho Department of Fish and Game Pahsimeroi Hatchery Box 85 Ellis, ID 83235
Hatchery Manager:	Mr. Gary Bertellotti
Phone:	(208) 876-4475
Fax:	
Purpose:	The hatchery began operation in 1969. It is funded by Idaho Power as mitigation for fishery losses caused by construction of hydroelectric dams on the Snake River in Hells Canyon. The goal of the hatchery is to relocate steelhead and chinook salmon runs from the Snake river (which was blocked by Hells Canyon, Oxbow, and Brownlee dams) to the Salmon River drainage.

Production Goal:

Summer Chinook

Produce 1 million smolts for release into Pahsimeroi River and Salmon River drainage

Provide surplus eggs to other hatchery programs in the state.

Summer Steelhead

Provide green and eyed eggs to Niagara, Magic Valley, and Hagerman hatcheries

Water Supply:

The main hatchery receives its water (17,953 gpm) directly from the Pahsimeroi River by both gravity and pumped supplies. It also receives a small flow (225 gpm) from a series of small nearby springs.

Facilities:

The hatchery is divided into two locations with the lower facility 1 mile upstream and the upper facility 7 miles upstream from the river mouth.

Adult Holding:

1 concrete trap pond - 5,000 cf each at the lower facility

3 concrete adult holding ponds - 5,625 cf each at the lower facility

Incubation:

20 double stack vertical tray incubators (320 trays) at the lower facility

Early Rearing:

4 concrete raceways - 1000 cf each at the lower facility

Rearing Ponds:

2 earthen rearing ponds - 55,000 cf each located at the upper facility

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 Pahsimeroi Hatchery - Summer Chinook

This section presents the corrective actions required to bring the Pahsimeroi Hatchery - Summer 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 (Table 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.

Remedial Action Required	Cost	PMs¹
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Monitor DO and TGP	----	5b
Run analysis for missing chemistry parameters	----	5c
Run analysis for turbidity	----	5d
Run analysis for alkalinity and hardness	----	5e
Run analysis for nitrite	----	5f
Run analysis for contaminants		5g
Type 4 - Remedial actions requiring significant capital expenditures		
Install flow and security alarm system with logging capability	\$10,000- \$15,000	6
Construct 4 more raceways (needed for full program)	\$180,000	9, 19
Construct bird netting and fence for upper pond	\$121,000	11
Install freezer at hatchery (needed for full program)	\$40,000- \$60,000	12
Construct new release pipe that runs directly to the river	\$22,000	13
Fence settling ponds and construct new release pipe	\$52,000	14
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Develop 4 cfs additional groundwater supply for incubation, early rearing, and fry	----	5a, 5h
Reduce temperature in bulk storage facilities	----	12

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

Table 3b. Remedial Actions Required at Pahsimeroi Hatchery - Summer Steelhead

Remedial Action Required	Cost	PMS¹
Type 1 - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery none	----	
Type 2 - Remedial actions requiring changes in agency policies or procedures		
Follow IHOT alarm protocols when new system is operational	----	6
Follow IHOT spawning protocols (female:male ratio)	----	17,41,42
Develop specific incubation standards for IHOT Operations Plan	----	18, 19
Install and use foot baths	----	21, 28
Provide rearing in the basin	----	22b
Use acclimation ponds for release	----	22b
Review release strategy as it relates to overall program	----	22c
Follow IHOT protocols for wearing protective garments when handling eggs	----	23
Review IHOT temperature criteria for transport	----	23
Conduct fishery contribution studies	----	24
Develop annual training schedule	----	25
Follow IHOT protocols for equipment and rain gear disinfection prior to its use in the hatchery	----	28
Disinfect ice chests prior to use for transportation of eggs	----	28
Develop genetics monitoring and evaluation plan	----	43

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

Remedial Action Required	Cost	PMs¹
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Monitor DO and TGP	----	5b
Run analysis for missing chemistry parameters	----	5c
Run analysis for turbidity	----	5d
Run analysis for alkalinity and hardness	----	5e
Run analysis for nitrite	----	5f
Run analysis for contaminants		5g
Type 4 - Remedial actions requiring significant capital expenditures		
Install flow and security alarm system with logging capability	\$10,000-15,000	6
Construct bird netting and fence for upper pond	\$121,000	11
Construct new release pipe that runs directly to the river	\$22,000	13
Fence settling ponds and construct new release pipe so fish are not released through the settling pond	\$52,000	
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
None	----	

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

Hatchery Contribution to Fisheries, Spawning Grounds, and Hatcheries

This section presents the audit findings for the Pahsimeroi Hatchery - Summer Chinook and Summer Steelhead 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: Pahsimeroi Hatchery - Summer Chinook¹

Year	Fisheries ² (Broodyear)	Spawning Grounds ² (Broodyear)	Hatchery ² (Broodyear)	Total Combined Contribution ³ (Broodyear)	Smolt to Adult Survival (percent)
1981					
1982					
1983		0	109		0.83
1984		0	37		0.64
1985		0	110		0.56
1986		100	245		0.75
1987		228	245		0.12
1988		260	578		0.10
1989		82	265		0.020
1990		149	321		0.022
1991		76	162		

¹ Contribution within Idaho; no information from ocean catch or from Oregon and Washington.

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.

1992		43	88		
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**Table 4b. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries:
Pahsimeroi Hatchery - Summer Steelhead¹**

Year	Fisheries² (Broodyear)	Spawning Grounds² (Broodyear)	Hatchery² (Broodyear)	Total Combined Contribution³ (Broodyear)	Smolt to Adult Survival (percent)
1983					
1984					
1985					
1986					
1987	See Niagara Spring Hatchery	See Niagara Spring Hatchery	See Niagara Spring Hatchery	See Niagara Spring Hatchery	See Niagara Spring Hatchery
1988	See Niagara Spring Hatchery	See Niagara Spring Hatchery	See Niagara Spring Hatchery	See Niagara Spring Hatchery	See Niagara Spring Hatchery
1989	See Niagara Spring Hatchery	See Niagara Spring Hatchery	See Niagara Spring Hatchery	See Niagara Spring Hatchery	See Niagara Spring Hatchery
1990	See Niagara Spring Hatchery	See Niagara Spring Hatchery	See Niagara Spring Hatchery	See Niagara Spring Hatchery	See Niagara Spring Hatchery
1991					
1992					

¹ Contribution within Idaho; no information from ocean catch or from Oregon and Washington.

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.

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 Pahsimeroi Hatchery are presented in Table 5 by program. The detailed breakdown of the Summer Chinook and Summer Steelhead program expenditures at this hatchery are presented in separate tables (Tables 6a and 6b).

Table 5. Annual Operating Expenses - Pahsimeroi Hatchery

Program	1993	1994	1995
1. Summer Chinook	\$135,425	\$101,881	\$207,730
2. Summer Steelhead	\$90,283	\$237,722	\$89,027
3.			
4.			
5.			
Total Hatchery Costs	\$225,708	\$339,603	\$296,757

Table 6a. Detailed Expenditures at Pahsimeroi Hatchery by Program

Summer Chinook

Component	1993	1994	1995
Personnel Costs	\$94,512	\$91,290	\$101,300
Operational Costs	\$114,523	\$138,640	\$80,521
Capital Costs	0	0	0
Indirect Costs			
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs	\$16,673	\$109,673	\$114,936
Total Hatchery Costs	\$225,708	\$339,603	\$296,757
Source of Funds			
Idaho Power Corporation	100%	100%	100%
Program Production (lb)			
Total Production (lb)			
Program as Percent of Total	60%	30%	70%
Program Costs	\$135,425	\$101,881	\$207,730

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

Table 6b. Detailed Expenditures at Pahsimeroi Hatchery by Program

Summer Steelhead

Component	1993	1994	1995
Personnel Costs	\$94,512	\$91,290	\$101,300
Operational Costs	\$114,523	\$138,640	\$80,521
Capital Costs	0	0	0
Indirect Costs			
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs	\$16,673	\$109,673	\$114,936
Total Hatchery Costs	\$225,708	\$339,603	\$296,757
Source of Funds			
Idaho Power Corporation	100%	100%	100%
Program Production (lb)			
Total Production (lb)			
Program as Percent of Total	30%	70%	30%
Program Costs	\$90,283	\$237,722	\$89,027

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