
BONNEVILLE HATCHERY

A COMPILATION AND SUMMARY OF
IHOT AUDITS FOR COHO

JULY 1998

**HATCHERY EVALUATION REPORT
SUMMARY FOR**

**Bonneville Hatchery
- Coho**

**A Summarized Compilation of Independent 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 the hatchery Evaluation Reports for Coho at Bonneville Hatchery. The original Hatchery Evaluation Report, 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 Columbia River just west of Cascade Locks, Oregon. The hatchery is used for adult collection, incubation, and rearing of Tule Fall Chinook and URB Fall Chinook and the adult collection and acclimation of coho. Hatchery audit information for fall chinook and spring chinook are not included in this summary, except for annual operating expenses (Section 5).

Background

The audit is being 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) contracted with Montgomery Watson to act as an independent contractor for the 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.

Bonneville Hatchery - Coho Results

The Bonneville Hatchery facility includes 4 adult holding ponds, 30 converted Burrows ponds, 30 raceways, and incubation facilities. Bonneville Hatchery was constructed in 1909 and was originally funded by the State of Oregon. In 1957 the facility was remodeled and expanded as part of the Columbia River Fisheries Development Program (Mitchell Act) -- a program to enhance declining fish runs in the Columbia River Basin. The hatchery underwent another renovation in 1974 as part of the U.S. Army Corps of Engineer's mitigation of fish losses from the construction of the John Day Dam.

The Bonneville Hatchery - Coho program 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. The audit found that the hatchery was not in compliance with the pathology-free water criteria, water quality monitoring requirements, and IHOT QA/QC protocols for feed, which are all facilities requirements. The hatchery needs to develop specific rearing standards for the IHOT Operations Plan, develop smoltification goals and monitoring program, and follow IHOT transportation and sanitation protocols. The hatchery did not have a Genetics Monitoring and Evaluation Program.

The specific areas in which the Bonneville Hatchery - Coho 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 Genetics M&E program
- Develop smolt-to-adult survival goal for IHOT Operations Plan
- Develop smoltification criteria for IHOT and implement measurement program
- Develop written broodstock collection plan and procedures
- Develop written rearing practices and standards for IHOT Operations Plan
- Follow IHOT recommendations for equipment and rain gear sanitation
- Follow IHOT recommendations for monitoring food production
- Follow IHOT transportation protocols
- Improve conditions in ponds used for acclimation
- Review the need for pathogen-free water for rearing and acclimation
- Review Operations Plan with staff
- Run analysis for alkalinity and hardness for Tanner Creek
- Run analysis for contaminants for Tanner Creek
- Run analysis for dissolved oxygen and dissolved nitrogen
- Run analysis for missing water chemistry parameters for Tanner Creek
- Run analysis for nitrite for Tanner Creek
- Run analysis for turbidity for Tanner Creek

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

Facility Description

Name:	Bonneville Hatchery
Stock/Species:	Tule Fall Chinook, URB Fall Chinook, Spring Chinook, and Coho
Operating Agency:	Oregon Department of Fish and Wildlife
Funding Agency:	Receives funding from both the National Marine Fisheries Service (NMFS) and U.S. Army Corps of Engineers (COE)
Location:	Just west of Cascade Locks, Oregon at Bonneville Dam on the Columbia River
Address:	Bonneville Hatchery Oregon Department of Fish and Wildlife Star Route B, Box 12 Cascade Locks, OR 97014
Hatchery Manager:	Mr. Dan Barrett
Phone	(503) 374-8393
Fax:	(503) 374-8090 (fax)
Purpose:	<p>Bonneville Hatchery was constructed in 1909 and was originally funded by the State of Oregon. In 1957 the facility was remodeled and expanded as part of the Columbia River Fisheries Development Program (Mitchell Act), a program to enhance declining fish runs in the Columbia River Basin. The hatchery underwent another renovation in 1974 as part of the U.S. Army Corps of Engineer's mitigation of fish losses from the construction of the John Day Dam.</p> <p>This hatchery provides fish for the ocean and river fisheries and eggs to other programs.</p>

Production Goal:

URB Fall Chinook

2,900,000 eggs to Umatilla Hatchery
2,830,000 fingerlings (37,875 lb) for release in the Columbia
5,325,000 smolts and fingerlings (112,750 lb) for on-station releases
225,000 smolts (28,125 lb) for release in the Umatilla River

Tule Fall Chinook

9,100,000 fry (34,000 lb) for transfer to Stayton Ponds
7,950,000 fingerlings (123,080 lb) for on-station releases
2,000,000 fingerlings (40,000 lb) for release in Tanner Creek from the Stayton Ponds

Spring Chinook

125,000 Deschutes stock smolts (15,554 lb) for release into the West Fork Hood River

Coho

1,175,00 smolts (90,384 lb) for on-site release

Total Production: 481,769lb

Water Supply:

Gravity supply from Tanner Creek Wells

Facilities:

Incubation:	152 16-tray vertical incubators 60 bulk incubators (space for 10 baskets each)
Adult Holding	Upper Pond (North) - 32,785 cf Upper Pond (South) - 32,785 cf Lower Pond - (Upper Side) - 11,288 cf Lower Pond - (Lower Side) - 14,502 cf
Raceways	Battery A - 22 converted Burrow ponds - 3,188 cf each Battery B - 8 converted Burrow ponds - 3,188 cf each Battery C & D - 30 raceways - 4,000 cf each Adult Holding Ponds - 4 ponds, 91,360 cf total
Satellite Facilities	None

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 types of categories range across a spectrum 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:

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 Bonneville Hatchery - Coho

This section presents the corrective actions required to bring the Bonneville Hatchery - Coho program into compliance with IHOT performance measures. The remedial actions suggested here are just that, suggestions developed by the Montgomery Watson Audit Team. 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 3).

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 are desirable for either operational or safety considerations.

Table 3. Remedial Actions Required at Bonneville Hatchery - Coho

Remedial Action Required	Cost	PMS¹
<p>Type 1 - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery</p> <p>None</p>		
<p>Type 2 - Remedial actions requiring changes in agency policies or procedures</p> <p>Review Operations Plan with staff</p> <p>Develop smolt-to-adult survival goal for IHOT Operations Plan</p> <p>Install security alarms</p> <p>Install telephone pagers</p> <p>Follow IHOT recommendations for monitoring food production</p> <p>Develop written rearing practices and standards for IHOT Operations Plan</p> <p>Develop smoltification criteria for IHOT and implement measurement program</p> <p>Follow IHOT transportation protocols</p> <p>Follow IHOT recommendations for equipment and rain gear sanitation</p> <p>Develop written broodstock collection plan and procedures</p> <p>Develop Genetics M&E program</p>	<p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p>	<p>2</p> <p>4h</p> <p>6</p> <p>6</p> <p>12</p> <p>19</p> <p>22a1</p> <p>23</p> <p>28</p> <p>41</p> <p>43</p>

Remedial Action Required	Cost	PMS²
<p>Type 3 - Remedial actions requiring changes in monitoring coverage or interval</p> <p>Run analysis for dissolved oxygen and dissolved nitrogen</p> <p>Run analysis for missing water chemistry parameters for Tanner Creek</p> <p>Run analysis for turbidity for Tanner Creek</p>	<p>----</p> <p>----</p> <p>----</p>	<p>5b</p> <p>5c</p> <p>5d</p>

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

² PMS are performance measures that were extracted from the IHOT 1995 report.

Remedial Action Required	Cost	PMS²
Run analysis for alkalinity and hardness for Tanner Creek	----	5e
Run analysis for nitrite for Tanner Creek	----	5f
Run analysis for contaminants for Tanner Creek	----	5g
Type 4 - Remedial actions requiring significant capital expenditures None	----	
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time Improve conditions in ponds used for acclimation Review need for pathogen-free water for rearing and acclimation	----	4g 5h, 20, 22a2

Hatchery Contribution to Fisheries, Spawning Grounds, and Hatcheries

This section presents the audit findings for the Bonneville Hatchery - Coho program contribution of adult fish to fisheries, local fisheries, spawning grounds, and hatcheries (Table 4). 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 4. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries:
Bonneville Hatchery - Coho**

Year	Fisheries ¹ (Broodyear)	Spawning Grounds ¹ (Broodyear)	Hatchery ¹ (Broodyear)	Total Combined Contribution ² (Broodyear)	Smolt to Adult Survival (percent)
1981					
1982					
1983					
1984					
1985					
1986					
1987				29,395	1.67
1988				51,980	3.15
1989				35,350	2.05
1990				19,155	0.88
1991				25,126	2.26
1992					

¹ Data obtained from Missing Production Groups Annual Report or from the Regional Mark Information System database.

² 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 Bonneville Hatchery are presented in Table 5 by program. The detailed breakdown of program expenditures for coho and fall chinook at this hatchery are presented in separate tables (Tables 6a, 6b and 6c).

Table 5. Annual Operating Expenses - Bonneville Hatchery

Program	1994	1995	1996
1. Coho	\$81,122	\$70,136	\$78,118
2. URB Fall Chinook	\$689,534	\$596,153	\$664,001
3. Tule Fall Chinook	\$851,777	\$736,424	\$820,236
Total Hatchery Costs	\$1,622,443	\$1,402,713	\$1,562,355

Table 6a. Detailed Expenditures at Bonneville Hatchery by Program

Coho

Component	1994	1995	1996
Personnel Costs	\$630,358	\$546,837	\$615,680
Operational Costs	\$428,665	\$355,640	\$419,886
Capital Costs	\$31,494	\$2,594	\$0
Indirect Costs	\$231,926	\$197,642	\$226,789
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs ²	\$300,000	\$300,000	\$300,000
Total Hatchery Costs	\$1,622,443	\$1,402,713	\$1,562,355
Source of Funds			
Program Production (lb)			
Total Production (lb)			
Program as Percent of Total	5%	5%	5%
Program Costs	\$81,122	\$70,136	\$78,118

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

² 20 million kwh/year @\$0.015 per kwh

Table 6b. Detailed Expenditures at Bonneville Hatchery by Program

URB Fall Chinook

Component	1994	1995	1996
Personnel Costs	\$630,358	\$546,837	\$615,680
Operational Costs	\$428,665	\$355,640	\$419,886
Capital Costs	\$31,494	\$2,594	\$0
Indirect Costs	\$231,926	\$197,642	\$226,789
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs ²	\$300,000	\$300,000	\$300,000
Total Hatchery Costs	\$1,622,443	\$1,402,713	\$1,562,355
Source of Funds			
Program Production (lb)			
Total Production (lb)			
Program as Percent of Total	42.5%	42.5%	42.5%
Program Costs	\$689,534	\$596,153	\$664,001

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

² 20 million kwh/year @\$0.015 per kwh

Table 6c. Detailed Expenditures at Bonneville Hatchery by Program

Tule Fall Chinook

Component	1994	1995	1996
Personnel Costs	\$630,358	\$546,837	\$615,680
Operational Costs	\$428,665	\$355,640	\$419,886
Capital Costs	\$31,494	\$2,594	\$0
Indirect Costs	\$231,926	\$197,642	\$226,789
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs ²	\$300,000	\$300,000	\$300,000
Total Hatchery Costs	\$1,622,443	\$1,402,713	\$1,562,355
Source of Funds			
Program Production (lb)			
Total Production (lb)			
Program as Percent of Total	52.5%	52.5%	52.5%
Program Costs	\$851,777	\$736,424	\$820,236

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

² 20 million kwh/year @\$0.015 per kwh