
ROUND BUTTE HATCHERY

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

JULY 1998

**HATCHERY EVALUATION REPORT
SUMMARY FOR**

Round Butte Hatchery
- **Spring Chinook**
- **Summer Steelhead**

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

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Section 1

Executive Summary

This report compiles a summary of the findings of two separate Hatchery Evaluation Reports for Spring Chinook and Summer Steelhead at Round Butte 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.

Round Butte Hatchery is located on the Deschutes River at the base of Round Butte Dam, 10 miles west of Madras, Oregon and is operated by the Oregon Department of Fish and Wildlife. The Pelton Ladder is operated as a satellite rearing facility. The facility is a former fish passage ladder which has had some sections converted for fish rearing. The hatchery is used for adult collection, egg incubation, and rearing of spring chinook, summer steelhead, and brown trout.

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.

Round Butte Hatchery - Spring Chinook and Summer Steelhead Results

The Round Butte facility includes 2 ponds for adult holding, 10 concrete raceways, 30 circular tanks, 1 rearing pond (at Pelton Ladder), and incubation facilities. Round Butte Hatchery was constructed in 1972 to mitigate for the fisheries losses caused by Pelton/Round Butte Hydroelectric Complex.

SPRING CHINOOK

The Round Butte Hatchery - Spring Chinook 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 and needed to develop green-eyed to eyed-egg and eyed-egg to fry survival goals for the IHOT Operations Plan. The audit found that the hatchery was not in compliance with the water quality monitoring requirements, disease-free water requirement for incubation and early rearing, alarm requirements, and regional oversight of feed production, which are all facilities requirements. The hatchery needed to develop specific incubation and rearing standards for the IHOT Operations Plan. The hatchery was not meeting the loading and flow criteria for incubations. The hatchery was not monitoring smoltification, needed rearing or acclimation in the Hood and Deschutes River subbasins, and was not following the IHOT protocols for transportation. In the compliance area for fish health policy, the hatchery did not have foot baths in the incubation facilities.

The specific areas in which the Round Butte 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:

- Develop alarm log
- Develop green-egg to eyed-egg and eyed-egg to fry survival goals for IHOT Operations Plan
- Develop smoltification goal and monitor
- Develop specific incubation and rearing standards for the IHOT Operations Plan
- Follow IHOT protocols for checking alarms
- Follow IHOT protocols for feed handling
- Follow IHOT recommendations for disinfection of tank interiors
- Follow IHOT recommendations for disinfection of transport equipment before and after use.
- Follow IHOT recommendations for QA/QC for feed preparation
- Follow IHOT protocols for disinfection of the exteriors and interiors of vehicles
- Follow IHOT protocols for equipment disinfection

- Follow IHOT protocols for wearing protective garments when handling fish eggs or cultural water
- Improve pre-spawning survival
- Provide disinfection for incubation and early rearing
- Provide foot baths for incubation facilities
- Review IHOT loading and flow criteria for incubation
- Review IHOT temperature criteria for hauling or change hauling temperature
- Review IHOT temperature criteria for rearing
- Run analysis for missing water chemistry parameters, nitrite, and contaminants

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

Facility Description

Name:	Round Butte Hatchery
Stock/Species:	Summer Steelhead Spring Chinook Brown Trout
Operating Agency:	Oregon Department of Fish & Wildlife
Funding Agency:	Portland General Electric (PGE)
Location:	Round Butte Hatchery is located on the Deschutes River at the base of Round Butte Dam, 10 miles west of Madras, Oregon. The Pelton Ladder is operated as a satellite rearing facility. The facility is a former fish passage ladder which has had some sections converted for fish rearing.
Address:	Round Butte Fish Hatchery Oregon Department of Fish & Wildlife P.O. Box 15 Madras, OR 97741
Hatchery Manager:	Mr. Bill Nyara
Phone:	(541) 475-6393
Fax:	(541) 475-4605
Purpose:	Round Butte Hatchery was constructed in 1972 to mitigate for the fisheries losses caused by Pelton/Round Butte Hydroelectric Complex.
Production Goal:	Summer Steelhead Produce 162,000 smolts (40,5000 lb) for release into the Deschutes River Spring Chinook Produce 454,404 smolts (51,622 lb) for release into the Deschutes and Hood rivers.

Water Supply:

Water is supplied to the hatchery from tunnels in the canyon wall that collects seepage from the upstream reservoir.

Facilities:

Adult Holding:	2 concrete adult holding ponds - 2,720 cf each
Incubation:	32 vertical stack incubators (256 trays)
Early Rearing:	30 circular tanks - 71 cf each
	1 oval raceway - 310 cf
Raceways:	10 Burrows raceways - 3,950 cf each
Rearing Ponds:	None
Satellite Facilities:	Pelton Ladder
	Fish ladder section modified into 6 rearing units (161,250 cf total).

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 Round Butte Hatchery - Spring Chinook and Summer Steelhead

This section presents the corrective actions required to bring the Round Butte 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 are desirable for either operational or safety considerations.

Table 3a. Remedial Actions Required at Round Butte Hatchery - Spring Chinook

Remedial Action Required	Cost	PMs ¹
Type 1 - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery		
Improve adult returns	----	4h, 42
Install security alarms	----	6
Type 2 - Remedial actions requiring changes in agency policies or procedures		
Develop green-egg to eyed-egg and eyed-egg to fry survival goals for IHOT Operations Plan	----	4d, 4e
Review IHOT temperature criteria for rearing	----	5a
Follow IHOT protocols for checking alarms	----	6
Develop alarm log	----	6
Follow IHOT recommendations for QA/QC for feed preparation	----	12
Follow IHOT protocols for feed handling	----	12
Develop specific incubation and rearing standards for the IHOT Operation Plan	----	18-19
Review IHOT loading and flow criteria for incubation	----	18
Develop smoltification goal and monitor	----	22a1
Follow IHOT recommendations for disinfection of transport equipment before and after use.	----	23
Follow IHOT recommendations for disinfection of tank interiors	----	23
Follow IHOT protocols for disinfection of the exteriors and interiors of vehicles	----	23
Follow IHOT protocols for equipment disinfection	----	23
Follow IHOT protocols for wearing protective garments when handling fish eggs or cultural water	----	23

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

Remedial Action Required	Cost	PMS ¹
Type 2 (Continued) - Remedial actions requiring changes in agency policies or procedures		
Review IHOT temperature criteria for hauling or change hauling temperature	----	23
Provide foot baths for incubation facilities	----	28
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Run analysis for missing water chemistry parameters, nitrite, and contaminants	----	5c, 5f, 5g
Type 4 - Remedial actions requiring significant capital expenditures		
Provide disinfection for incubation and early rearing	\$320,000	5h, 28
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Improve pre-spawning survival	----	4b

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

Remedial Action Required	Cost	PMS ²
Type 1 - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery		
Improve adult returns	----	4c, 42
Install security alarms	----	6
Type 2 - Remedial actions requiring changes in agency policies or procedures		
Develop M&E plan for IHOT Operations Plan	----	3
Develop green-egg to eyed-egg, eyed-egg to fry, and fry-to-smolt survival goals for IHOT Operations Plan	----	4d-4f

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
Review IHOT temperature criteria for incubation	----	5a
Follow IHOT protocols for checking alarms	----	6
Develop alarm log	----	6
Follow IHOT recommendations for QA/QC for feed preparation	----	12
Follow IHOT protocols for feed handling	----	12
Develop specific incubation and rearing standards for the IHOT Operations Plan	----	18-19
Review IHOT loading and flow criteria for incubation	----	18
Develop smoltification goal and monitor	----	22a1
Follow IHOT recommendations for disinfection of transport equipment before and after use.	----	23
Follow IHOT recommendations for disinfection of tank interiors	----	23
Follow IHOT protocols for disinfection of the exteriors and interiors of vehicles	----	23

Remedial Action Required	Cost	PMS¹
Type 2 - Remedial actions requiring changes in agency policies or procedures		
Follow IHOT protocols for equipment disinfection	----	23
Follow IHOT protocols for wearing protective garments when handling fish eggs or cultural water	----	23
Review IHOT temperature criteria for hauling or change hauling temperature	----	23
Provide foot baths for incubation facilities	----	28
Follow IHOT protocols for sanitation of rearing vessels	----	28
Develop written genetics M&E plan	----	43
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Run analysis for missing water chemistry parameters, nitrite, and contaminants	----	5c, 5f, 5g
Type 4 - Remedial actions requiring significant capital expenditures		
Provide disinfection for incubation and early rearing	\$128,000	5h,28
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Improve pre-spawning survival	----	4b

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 Round Butte Hatchery - Spring 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:
Round Butte Hatchery - Spring Chinook**

Year	Fisheries ¹ (Broodyear)	Spawning Grounds ¹ (Broodyear)	Hatchery ¹ (Broodyear)	Total Combined Contribution ² (Broodyear)	Smolt to Adult Survival (percent)
1981					
1982					
1983	615	?	1395		0.74
1984	1090	?	1301		0.86
1985	845	?	1789		0.99
1986	1177	?	2627		1.43
1987	1234	?	1751		1.09
1988	1631	?	2126		1.44
1989	604	?	1245		0.68
1990	54	?	547		0.22
1991	30	?	668		0.30
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.

**Table 4b. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries:
Round Butte Hatchery - Summer Steelhead**

Year	Fisheries¹ (Broodyear)	Spawning Grounds¹ (Broodyear)	Hatchery¹ (Broodyear)	Total Combined Contribution² (Broodyear)	Smolt to Adult Survival (percent)
1981					
1982					
1983	1,765	7,553	3121		7.28
1984	2,083	10,630	2345		8.55
1985	994	4,490	1,318		3.10
1986	997	2,615	691		2.70
1987	1,010	1,846	908		2.30
1988	185	685	540		1.04
1989	363	2,435	1,974		2.80
1990	244	1,416	332		1.27
1991	28	166	121		0.18
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 Round Butte Hatchery are presented in Table 5 by program. The detailed breakdown of program expenditures for spring chinook and summer steelhead at this hatchery are presented in separate tables (Tables 6a, 6b, and 6c).

Table 6. Annual Operating Expenses - Round Butte Hatchery

Program	1994	1995	1996
1. Summer Steelhead	\$142,779	\$140,839	\$118,658
2. Spring Chinook	\$102,801	\$107,877	\$159,252
3. Brown Trout	\$39,961	\$50,508	\$33,929
4.			
5.			
Total Hatchery Costs	\$285,558	\$299,658	\$312,259

Table 6a. Detailed Expenditures at Round Butte Hatchery by Program

Summer Steelhead

Component	1994	1995	1996
Personnel Costs	\$157,026	\$153,034	\$148,234
Operational Costs	\$85,447	\$100,778	\$120,591
Capital Costs	\$0	\$0	\$0
Indirect Costs	\$43,085	\$45,846	\$43,434
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs			
Total Hatchery Costs	\$285,558	\$299,658	\$312,259
Source of Funds			
Program Production (lb)	39,800	38,995	38,035
Total Production (lb)	78,891	82,864	101,245
Program as Percent of Total	50%	47%	38%
Program Costs	\$142,779	\$140,839	\$118,658

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 Round Butte Hatchery by Program

Spring Chinook

Component	1994	1995	1996
Personnel Costs	\$157,026	\$153,034	\$148,234
Operational Costs	\$85,447	\$100,778	\$120,591
Capital Costs	\$0	\$0	\$0
Indirect Costs	\$43,085	\$45,846	\$43,434
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs			
Total Hatchery Costs	\$285,558	\$299,658	\$312,259
Source of Funds			
Program Production (lb)	28,051	29,902	51,352
Total Production (lb)	78,891	82,864	101,245
Program as Percent of Total	36%	36%	51%
Program Costs	\$102,801	\$107,877	\$159,252

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 6c. Detailed Expenditures at Round Butte Hatchery by Program

Brown Trout

Component	1994	1995	1996
Personnel Costs	\$157,026	\$153,034	\$148,234
Operational Costs	\$85,447	\$100,778	\$120,591
Capital Costs	\$0	\$0	\$0
Indirect Costs	\$43,085	\$45,846	\$43,434
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs			
Total Hatchery Costs	\$285,558	\$299,658	\$312,259
Source of Funds			
Program Production (lb)	11,040	13,967	11,001
Total Production (lb)	78,891	82,864	101,245
Program as Percent of Total	14%	17%	11%
Program Costs	\$39,961	\$50,508	\$33,929

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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.