
CLEARWATER HATCHERY

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

JULY 1998

**HATCHERY EVALUATION REPORT
SUMMARY FOR**

- Clearwater Hatchery**
- **Spring Chinook**
- **Summer Steelhead**

**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 two separate Hatchery Evaluation Reports for Spring Chinook and Summer Steelhead at Clearwater 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, the 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 north bank of the North Fork of the Clearwater River, downstream from the Dworshak Dam in Idaho. The hatchery is operated by the Idaho Department of Fish and Game and used for incubation and rearing of spring chinook and 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) 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.

Clearwater Hatchery - Spring Chinook & Summer Steelhead Results

The Clearwater Rapid River facility includes two ponds for adult holding, 35 concrete raceways, incubation facilities, and three satellite facilities for adult collection, spawning, and acclimation. The Clearwater Hatchery was constructed in 1992 as part of the Lower Snake River Compensation Plan (LSRCP) to compensate for anadromous fishery losses caused by the four federal dams constructed on the lower Snake River.

SPRING CHINOOK

The Clearwater 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. The audit found that the hatchery was not in compliance with the alkalinity and hardness criteria, incubation facilities, alarm monitoring equipment, water quality monitoring, and pathology-free water criteria, which are all facilities requirements. The hatchery needs one more raceway to make up for the raceway used by the captive brood program. In the compliance area for fish health policy, the hatchery did not meet the criteria of routine hatchery visits every month. The hatchery did not have

a final Genetics Monitoring and Evaluation Program in place and needed the plan reviewed by a qualified geneticist.

The specific areas in which the Clearwater 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:

- Build 10 more incubator stacks
- Determine if adult contribution data is available
- Develop disease-free water supply
- Develop smoltification goals and monitoring program
- Double screen chinook raceways
- Finalize genetics monitoring and evaluation plan
- Follow IHOT QA/QC feed tests
- Follow IHOT standards for checking “other” alarms
- Have qualified geneticist review the plan
- Improve eyed-egg to fry survival
- Improve green-egg to eyed-egg survival
- Increase “monthly” fish health monitoring visits to once a month
- Increase alkalinity and hardness
- Reduce weather related stress on fish at acclimation sites
- Run analysis for contaminants
- Run analysis for nitrite
- Run analysis for water chemistry parameters
- Set up and program alarm system

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

SUMMER STEELHEAD

The Clearwater Hatchery was in general compliance with most of the performance measures. The audit found that the hatchery was not in compliance with the alkalinity and hardness criteria, incubation facilities, alarm monitoring equipment, water quality monitoring, and pathology-free water criteria, which are all facilities requirements. In the compliance area for fish health policy, the hatchery did not meet the criteria of routine hatchery visits every month. The hatchery did not have a final Genetics Monitoring and Evaluation Program in place and needed the plan reviewed by a qualified geneticist.

The specific areas in which the Clearwater 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:

- Build 10 more incubator stacks
- Develop acclimation sites
- Develop disease-free water supply
- Develop smoltification goals and monitoring program
- Document adult contribution data
- Document smolt -to-adult survival
- Finalize genetics monitoring and evaluation plan
- Follow IHOT QA/QC feed tests

- Follow IHOT standards for checking “other” alarms
- Have qualified geneticist review the plan
- Improve eyed-egg to fry survival
- Improve fry-to-smolt survival
- Increase “monthly” fish health monitoring visits to once a month
- Increase alkalinity and hardness
- Reduce weather related stress on fish at acclimation and release sites
- Run analysis for contaminants
- Review release strategy as it relates to overall program
- Run analysis for nitrite
- Run analysis for water chemistry parameters
- Setup and program alarm system

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

Facility Description

Name:	Clearwater Hatchery
Stock/Species:	Spring Chinook Summer Steelhead Rainbow Trout
Operating Agency:	Idaho Department of Fish and Game
Funding Agency:	LSRCP
Location:	Located on the north bank of the North Fork of the Clearwater River, downstream from the Dworshak Dam. It 504 miles from the mouth of the Columbia River and the site elevation is 994 feet above sea level.
Address:	Idaho Department of Fish and Game Clearwater Hatchery 4156 Ahsaka Road Ahsaka, ID 83520
Hatchery Manager:	Mr. Jerry McGehee
Phone:	(208) 476-3331
Fax:	
Purpose:	<p>The Clearwater Hatchery was constructed in 1992 as part of the Lower Snake River Compensation Plan to compensate for anadromous fishery losses caused by the four federal dams constructed on the lower Snake River.</p> <p>The LSRCP mitigation goals are to return 11,915 adult spring chinook and 14,000 adult steelhead about Lower Granite, for the Clearwater River.</p>

Production Goal:

Summer Steelhead

2.3 million smolts (350,000 lb) for release in the Clearwater drainage

Spring Chinook

300,000 smolts (15,000 lb) for final rearing and release at the Red River satellite facility

800,000 smolts (40,000 lb) for final rearing and release at the Crooked River satellite facility

300,000 smolts (15,000 lb) for final rearing and release at the Powell satellite facility

Rainbow Trout (catchables)

Variable, depends on egg sources

Total salmon production: 420,000 lb

Water Supply:

Two pipelines from the Dworshak Reservoir (80 cfs total capacity)

Facilities:

Adult Holding: 2 adult holding ponds at hatchery

Incubation: 40 stacks of vertical tray incubators (16 trays)
60 incubation jars

Early Rearing: 60 early rearing tanks - 480 cf each

Raceways: 11 raceways for chinook - 8,000 cf each
24 raceways for steelhead - 12,000 cf each

Rearing Ponds: none

Satellite Facilities: Red River (adult trapping, spawning, and acclimation)
Crooked River (adult trapping, spawning, and acclimation)
Powell (adult trapping, spawning, and acclimation)

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 Clearwater Hatchery - Spring Chinook and Summer Steelhead

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

Table 3a. Remedial Actions Required at Clearwater 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</p>	----	4c, 4g 4h, 17, 22a4, 42
<p>Type 2 - Remedial actions requiring changes in agency policies or procedures</p> <p>Determine if adult contribution data is available</p> <p>Install alarms in quarantine area and security alarms</p> <p>Install telephone pagers</p> <p>Develop smoltification goals and monitoring program</p> <p>Follow IHOT disinfection protocols for transport vehicle cab</p> <p>Finalize genetics monitoring and evaluation plan</p> <p>Have qualified geneticist review the plan</p>	<p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p>	<p>4a</p> <p>6</p> <p>6</p> <p>22a1</p> <p>23</p> <p>43</p> <p>43</p>
<p>Type 3 - Remedial actions requiring changes in monitoring coverage or interval</p> <p>Run analysis for water chemistry parameters</p> <p>Run analysis for nitrite</p> <p>Run analysis for contaminants</p> <p>Follow IHOT standards for checking “other” alarms</p> <p>Follow IHOT QA/QC feed tests</p> <p>Increase “monthly” fish health monitoring visits to once a month</p>	<p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p>	<p>5c</p> <p>5f</p> <p>5g</p> <p>6</p> <p>12</p> <p>21, 26</p>

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

Type 4 - Remedial actions requiring significant capital expenditures		
Set up and program alarm system	\$20,000	6
Build 10 more incubator stacks	\$12,000	8
Double screen chinook raceways	\$3,500	10
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Improve green-egg to eyed-egg survival	----	4d
Improve eyed-egg to fry survival	----	4e
Increase alkalinity and hardness	----	5e
Develop groundwater supply for satellites	----	5a
Reduce turbidity at satellites	----	5d
Reduce weather related stress on fish at acclimation sites	----	13
Develop disease-free water supply	----	5h,28
Reduce weather related stress on fish at acclimation sites	----	13

Table 3b. Remedial Actions Required at Clearwater 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		
Install alarms in quarantine area and security alarms	----	6
Install telephone pages	----	6
Follow IHOT disinfection protocols for transport vehicle cab	----	23
Type 2 - Remedial actions requiring changes in agency policies or procedures		
Document adult contribution data	----	4a
Document smolt-to-adult survival	----	4h
Develop smoltification goals and monitoring program	----	22a1
Review release strategy as it relates to overall program	----	22c

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

Remedial Action Required	Cost	PMs¹
Finalize genetics monitoring and evaluation (M&E) plan	----	43
Have qualified geneticist review the M&E plan	----	43
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Run analysis for water chemistry parameters	----	5c
Run analysis for nitrite	----	5f
Run analysis for contaminants	----	5g
Follow IHOT standards for checking “other” alarms	----	6
Follow IHOT QA/QC feed tests	----	12
Increase “monthly” fish health monitoring visits to once a month	----	21, 26
Type 4 - Remedial actions requiring significant capital expenditures		
Setup and program alarm system	\$20,000	6
Build 10 more incubator stacks	\$12,000	8
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Improve eyed-egg to fry survival	----	4e
Improve fry-to-smolt survival	----	4e
Increase alkalinity and hardness	----	5e
Develop disease-free water supply	----	5h,28
Reduce weather related stress on fish at acclimation and release sites	----	13
Develop acclimation sites	----	22b

Hatchery Contribution to Fisheries, Spawning Grounds, and Hatcheries

This section presents the audit findings for the Clearwater 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:
Clearwater Hatchery - Spring Chinook**

Year	Fisheries ¹ (Broodyear)	Spawning Grounds ¹ (Broodyear)	Hatchery ¹ (Broodyear)	Total Combined Contribution ¹ (Broodyear)	Smolt to Adult Survival (percent)
1981					
1982					
1983					
1984					
1985					
1986					
1987					
1988					
1989					
1990					
1991					
1992	first year of operation	first year of operation	first year of operation	first year of operation	first year of operation

The Summer Steelhead program at the Clearwater Hatchery is a new program; first returns to the hatchery are expected in 1997.

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

¹ 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:
Clearwater Hatchery - Summer Steelhead**

Year	Fisheries¹ (Broodyear)	Spawning Grounds¹ (Broodyear)	Hatchery¹ (Broodyear)	Total Combined Contribution² (Broodyear)	Smolt to Adult Survival (percent)
1981					
1982					
1983					
1984					
1985					
1986					
1987					
1988					
1989					
1990					
1991					
1992	first year of operation	first year of operation	first year of operation	first year of operation	first year of operation

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 Clearwater Hatchery are presented in Table 5 by program. The detailed breakdown of program expenditures at this hatchery is presented in separate tables (Tables 6a and 6b).

Table 5. Annual Operating Expenses - Clearwater Hatchery

Program	1993	1994	1995
1. Spring Chinook	\$743,260	\$363,720	\$20,046
2. Summer Steelhead	\$361,138	\$794,624	\$626,629
3. Rainbow Trout	?	?	?
4.			
5.			
Total Hatchery Costs	\$1,104,399	\$1,158,345	\$646,674

**Table 6a. Detailed Expenditures at Clearwater Hatchery by Program
Spring Chinook**

Component	1994	1995	1996
Personnel Costs	\$495,802	\$507,505	\$349,651
Operational Costs	\$421,669	\$446,216	\$167,984
Capital Costs	\$417,950	\$40,298	\$32,759
Indirect Costs	\$168,978	\$164,326	\$96,280
Lumped Hatchery Costs ¹	0	0	0
Lumped Third-Party Costs			
Total Hatchery Costs	\$1,104,399	\$1,158,345	\$646,674
Source of Funds			
Program Production (#)	1,298,774	361,622	25,413
Total Production (#)	1,929,874	1,152,949	828,413
Program as Percent of Total	67.3	31.4	3.1
Program Costs	\$743,260	\$363,720	\$20,046

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 Clearwater Hatchery by Program

Summer Steelhead

Component	1994	1995	1996
Personnel Costs	\$495,802	\$507,505	\$349,651
Operational Costs	\$421,669	\$446,216	\$167,984
Capital Costs	\$417,950	\$40,298	\$32,759
Indirect Costs	\$168,978	\$164,326	\$96,280
Lumped Hatchery Costs ¹	0	0	0
Lumped Third-Party Costs			
Total Hatchery Costs	\$1,104,399	\$1,158,345	\$646,674
Source of Funds			
Program Production (lb)	631,100	791,327	803,000
Total Production (lb)	1,929,874	1,152,949	828,413
Program as Percent of Total	32.7%	68.6	96.9
Program Costs	\$361,138	\$794,624	\$626,629

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