
GNAT CREEK HATCHERY

A COMPILATION AND SUMMARY OF
HOT AUDITS FOR SUMMER
STEELHEAD AND WINTER
STEELHEAD

JULY 1998

**HATCHERY EVALUATION REPORT
SUMMARY FOR**

- Gnat Creek Hatchery**
- **Summer Steelhead**
- **Winter 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 Summer and Winter Steelhead at Gnat Creek 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 Gnat Creek, a lower Columbia River tributary approximately 17 miles east of Astoria, Oregon. The hatchery is operated by the Oregon Department of Fish and Wildlife and has been used for the incubation and rearing of steelhead. Due to reduction in funding, this hatchery is currently not being used for the rearing of anadromous fish.

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.

Gnat Creek Hatchery - Summer and Winter Steelhead Results

The Gnat Creek facility includes 15 concrete raceways, 6 starter tanks, and incubation facilities. Gnat Creek Hatchery was constructed in 1960 as part of the Columbia River Fisheries Development Program (Mitchell Act) - a program to enhance declining fish runs in the Columbia River Basin. Hatchery production is designed to meet harvest objectives of creating consumptive steelhead trout fisheries for the North Coast, lower Columbia River and Willamette River tributaries. Due to reduction in funding, this hatchery is currently not being used for the rearing of anadromous fish.

SUMMER STEELHEAD

The Gnat Creek Hatchery - Summer Steelhead program was in general compliance with most of the performance measures. The audit found that the hatchery was not in compliance with water quality monitoring requirements, alarm requirements, double screening requirements and acclimation requirements, which are all facilities requirements. The hatchery needed to develop specific rearing standards, conduct IHOT QA/QC tests for feed preparation, develop a smoltification goal and a smoltification monitoring plan.

The specific areas in which the Gnat Creek 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 IHOT QA/QC tests for feed preparation
- Construct acclimation ponds in the Clackamas, Sandy and Mollala subbasins
- Develop smoltification goal and monitor
- Develop specific rearing standards for IHOT Operations Plan
- Double screen 4 ponds
- Follow IHOT protocols for disinfection of vehicles interiors and exteriors
- Increase water supply or reduce production to meet size goal
- Install telephone pagers
- Monitor and record DO and TGP
- Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants
- Verify compliance with rearing standards

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

WINTER STEELHEAD

The Gnat Creek Hatchery - Winter Steelhead program was in general compliance with most of the performance measures. In the area of program objectives, the hatchery did not have a Monitoring and Evaluation Plan and was not documenting its adult contribution. The audit found that the hatchery was not in compliance with water quality monitoring requirements, pathology-free water criteria, alarm requirements, and acclimation requirements, which are all facilities requirements. The hatchery needed to develop specific incubation and rearing standards, conduct IHOT QA/QC tests for feed preparation, develop a smoltification goal and a monitoring plan. The hatchery was not meeting all of the disinfection requirements, needed to install foot baths in the incubation facilities, and conduct fishery contribution studies. The hatchery did not have a Genetics Monitoring and Evaluation Program.

The specific areas in which the Gnat Creek Hatchery - Winter 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 IHOT QA/QC tests for feed preparation
- Construct acclimation ponds in the Sandy and Clackamas subbasins
- Develop approved genetics M&E plan
- Develop smoltification goal and monitor
- Develop specific incubation and rearing standards for IHOT Operations Plan
- Develop written hatchery M&E plan
- Document adult contribution
- Follow IHOT protocols for disinfection of vehicles interiors and exteriors
- Increase water supply or reduce production to meet size goal
- Install foot baths
- Install telephone pagers
- Monitor and record DO and TGP
- Resolve release date conflict with NMFS
- Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants
- Verify compliance with rearing standards

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

Facility Description

Name:	Gnat Creek Hatchery
Stock/Species:	Winter Steelhead Summer Steelhead
Operating Agency:	Oregon Department of Fish and Wildlife
Funding Agency:	Mitchell Act (NMFS)
Location:	The hatchery is located along Gnat Creek, a lower Columbia River tributary approximately 17 miles east of Astoria, Oregon.
Address:	Route 2, Box 149 Clatskanie, OR 97016
Hatchery Manager:	Mr. Bob Mills
Phone:	(503) 455-2234
Fax:	(503) 455-0701
Purpose:	<p>Gnat Creek Hatchery was constructed in 1960 as part of the Columbia River Fisheries Development Program (Mitchell Act) - a program to enhance declining fish runs in the Columbia River Basin. Hatchery production is designed to meet harvest objectives of creating consumptive steelhead trout fisheries for the North Coast, lower Columbia River and Willamette River tributaries.</p> <p>Due to reduction in funding, this hatchery is currently not being used for the rearing of anadromous fish.</p>
Production Goal:	<p>Winter Steelhead</p> <p>Produce 446,000 smolts (90,000 lb) for release into Clackamas, Sandy, Tualatin, Gales Creek, North Fork Scapoose, Clatskanie, Lewis and Clark, and Gnat Creek river systems.</p> <p>Summer Steelhead</p> <p>Produce 210,000 smolts (42,050 lb) for release into Clackamas, Salmon, and Molalla river systems.</p>
Water Supply:	Water rights total 21,643 gpm from Gnat Creek, an unnamed stream, and a well. Water flows range from a high of 15,700 gpm to a low of 1,200 gpm.

Facilities:

Adult Holding:	None
Incubation:	None
Early Rearing:	24 troughs 6 starter tanks - 225 cf each
Raceways:	15 raceways - 6,400 cf each
Rearing Ponds:	None
Satellite Facilities:	None

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 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 Gnat Creek Hatchery - Summer and Winter Steelhead

This section presents the corrective actions required to bring the Gnat Creek Hatchery - Summer and Winter Steelhead program 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 Gnat Creek Hatchery - Summer Steelhead

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>Install security alarms</p>	----	6
<p>Type 2 - Remedial actions requiring changes in agency policies or procedures</p> <p>Conduct IHOT QA/QC tests for feed preparation</p> <p>Develop specific rearing standards for IHOT Operations Plan</p> <p>Verify compliance with rearing standards</p> <p>Develop smoltification goal and monitor</p> <p>Increase water supply or reduce production to meet size goal</p> <p>Follow IHOT protocols for disinfection of vehicles interiors and exteriors</p>	<p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p>	<p>12</p> <p>18-19, 22a2</p> <p>19</p> <p>22a1</p> <p>22a5</p> <p>23</p>
<p>Type 3 - Remedial actions requiring changes in monitoring coverage or interval</p> <p>Monitor DO and TGP and record</p> <p>Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants</p>	<p>----</p> <p>----</p>	<p>5b</p> <p>5c-5g</p>
<p>Type 4 - Remedial actions requiring significant capital expenditures</p> <p>Install telephone pagers</p> <p>Double screen 4 ponds</p> <p>Construct acclimation ponds in the Clackamas, Sandy and Molalla subbasins. (6)</p>	<p>\$5,000</p> <p>\$1,200</p> <p>\$6.0 million</p>	<p>6</p> <p>10</p> <p>22b, 22c, 37, 38</p>
<p>Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time</p> <p>None</p>	----	

Table 3b. Remedial Actions Required at Gnat Creek Hatchery - Winter Steelhead

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

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 security alarms	----	6
Type 2 - Remedial actions requiring changes in agency policies or procedures		
Develop written hatchery M&E plan	----	3
Conduct IHOT QA/QC tests for feed preparation	----	12
Develop specific incubation and rearing standards for IHOT Operations Plan	----	18-19, 22a2
Verify compliance with rearing standards	----	19
Develop smoltification goal and monitor	----	22a1
Increase water supply or reduce production to meet size goal	----	22a5
Resolve release date conflict with NMFS	----	22a6
Follow IHOT protocols for disinfection of vehicles interiors and exteriors	----	23
Conduct fishery contribution studies	----	
Install foot baths	----	28
Develop approved genetics M&E plan	----	43
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Monitor and record DO and TGP	----	5b
Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants	----	5c-5g

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 Install telephone pagers Construct acclimation ponds in the Sandy and Clackamas subbasins (2)	\$5,000 \$2.0 million	6 22b, 22c, 37, 38
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 Gnat Creek Hatchery - Summer and Winter Steelhead program 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:
Gnat Creek Hatchery - Summer Steelhead**

Year	Fisheries ¹ (Broodyear)	Spawning Grounds ¹ (Broodyear)	Hatchery ¹ (Broodyear)	Total Combined Contribution ² (Broodyear)	Smolt to Adult Survival (percent)
1983					
1984					
1985					
1986					
1987	Complete data not available	Complete data not available	Complete data not available	Complete data not available	Complete data not available
1988	Complete data not available	Complete data not available	Complete data not available	Complete data not available	Complete data not available
1989	Complete data not available	Complete data not available	Complete data not available	Complete data not available	Complete data not available
1990	Complete data not available	Complete data not available	Complete data not available	Complete data not available	Complete data not available
1991					
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:
Gnat Creek Hatchery - Winter Steelhead**

Year	Fisheries¹ (Broodyear)	Spawning Grounds¹ (Broodyear)	Hatchery¹ (Broodyear)	Total Combined Contribution² (Broodyear)	Smolt to Adult Survival (percent)
1983					
1984					
1985					
1986					
1987	Complete data not available	Complete data not available	Complete data not available	Complete data not available	Complete data not available
1988	Complete data not available	Complete data not available	Complete data not available	Complete data not available	Complete data not available
1989	Complete data not available	Complete data not available	Complete data not available	Complete data not available	Complete data not available
1990	Complete data not available	Complete data not available	Complete data not available	Complete data not available	Complete data not available
1991					
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 Gnat Creek Hatchery are presented in Table 5 by program. The detailed breakdown of program expenditures for winter and summer steelhead at this hatchery are presented in separate tables (Tables 6a and 6b).

Table 5. Annual Operating Expenses - Gnat Creek Hatchery

Program	1994	1995	1996
1. Winter Steelhead	\$261,804	\$232,659	\$193,264
2. Summer Steelhead	\$94,468	\$70,378	\$75,820
3.			
4.			
5.			
Total Hatchery Costs	\$364,884	\$313,346	\$269,057

Table 6a. Detailed Expenditures at Gnat Creek Hatchery by Program

Winter Steelhead

Component	1994	1995	1996
Personnel Costs	\$151,271	\$151,203	\$143,056
Operational Costs	\$148,019	\$116,134	\$85,064
Capital Costs	\$0	\$0	\$1,750
Indirect Costs	\$54,305	\$46,009	\$39,187
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs			
Total Hatchery Costs	\$364,884	\$313,346	\$269,057
Source of Funds			
NMFS	100%	100%	100%
Program Production (#)	481,000	446,250	446,250
Total Production (#)	676,000	601,000	621,000
Program as Percent of Total	71.8%	74.3%	71.8%
Program Costs	\$261,804	\$232,659	\$193,264

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 Gnat Creek Hatchery by Program

Summer Steelhead

Component	1994	1995	1996
Personnel Costs	\$151,271	\$151,203	\$143,056
Operational Costs	\$148,019	\$116,134	\$85,064
Capital Costs	\$0	\$0	\$1,750
Indirect Costs	\$54,305	\$46,009	\$39,187
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs			
Total Hatchery Costs	\$364,884	\$313,346	\$269,057
Source of Funds			
NMFS	100%	100%	100%
Program Production (#)	175,000	135,000	175,000
Total Production (#)	676,000	601,000	621,000
Program as Percent of Total	25.9%	22.5%	28.2%
Program Costs	\$94,468	\$70,378	\$75,820

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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.