
VANCOUVER HATCHERY

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

JULY 1998

**HATCHERY EVALUATION REPORT
SUMMARY FOR
Vancouver Hatchery
- Winter Steelhead
- Summer Steelhead**

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

SUMMARY REPORT PREPARED BY:
DON SAMPSON
SAMPSEL CONSULTING SERVICES
FOR THE
NORTHWEST POWER PLANNING COUNCIL
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Original IHOT Audit Reports Prepared by:

Montgomery Watson
2375 130th Avenue NE
Suite 200
Bellevue, WA 98005
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Executive Summary

This report compiles a summary of the findings of two separate Hatchery Evaluation Reports for Winter Steelhead and Summer Steelhead at Vancouver 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

The hatchery is located along the lower Columbia River near Vancouver, Washington and is operated by the Washington Department of Fish and Wildlife. The hatchery is used for incubation and rearing of summer and winter 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) 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.

Vancouver Hatchery - Winter Steelhead and Summer Steelhead Results

The Vancouver facility includes 4 earthen ponds, 4 concrete raceways, 12 circular ponds, and incubation facilities. The Vancouver hatchery began operations in the 1930s. The goal of the hatchery is to produce adult steelhead and resident trout for harvest by sport and tribal anglers.

Winter Steelhead

The Vancouver Hatchery - Winter Steelhead program was in general compliance with most of the performance measures. In the area of program objectives, the hatchery was not meeting its production goal and did not have a Monitoring and Evaluation Plan. The audit found that the hatchery was not in compliance with the screen mesh criteria, double-screening requirements, water quality monitoring requirements, and alarm requirements, which are all facilities requirements. The hatchery exceeded its flow and density criteria for rearing. In the compliance area for fish health policy, the hatchery did not have foot baths for incubation. The hatchery also needed to develop specific incubation and rearing standards for the IHOT Operations Plan, develop a monitoring plan, and conduct fish contribution studies.

The specific areas in which the Vancouver 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 fishery contribution studies
- Conduct IHOT QA/QC tests for feed preparation
- Develop alarm log
- Develop hatchery M&E plan
- Develop specific incubation and rearing standards for the IHOT Operations Plan
- Double-screen rearing units
- Follow IHOT protocols for disinfection of fish transport vehicle (cab)
- Improve system for transferring fish to transport trucks
- Monitor DO and TGP and record
- Monitor DO in fish transport tank
- Provide foot baths in incubation facility
- Provide more water flow and rearing space
- Replace screen panels to meet screen mesh criteria
- Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants

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

Summer Steelhead

The Vancouver Hatchery - Summer 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. The audit found that the hatchery was not in compliance with the screen mesh criteria, double-screening requirements, water quality monitoring requirements, and alarm requirements, which are all facilities requirements. The hatchery exceeds its flow and density criteria for rearing. In the compliance area for fish health policy, the hatchery did not have foot baths for incubation. The hatchery needed to develop specific incubation and rearing standards for the IHOT Operations Plan, develop a smoltification goal and monitoring plan, and conduct fish contribution studies. The hatchery also needed to provide acclimation ponds for all out-of-basin releases.

The specific areas in which the Vancouver 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
- Conduct IHOT QA/QC tests for feed preparation
- Develop alarm log
- Develop hatchery M&E plan
- Develop smoltification goal and monitor
- Develop specific incubation and rearing standards for the IHOT Operations Plan
- Double-screen rearing units
- Follow IHOT protocols for disinfection of fish transport vehicle (cab)
- Improve system for transferring fish to transport trucks
- Monitor and record DO and TGP
- Monitor DO in fish transport tank
- Provide acclimation ponds for out-of-basin releases
- Provide foot baths in incubation facility
- Provide more water flow and rearing space
- Provide release number, size, date and location data
- Replace screen panels to meet screen mesh criteria
- Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, 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:	Vancouver Hatchery
Stock/Species:	Winter Steelhead Summer Steelhead
Operating Agency:	Washington Department of Fish and Wildlife
Funding Agency:	Mitchell Act (NMFS)
Location:	The hatchery is located along the lower Columbia River near Vancouver, Washington.
Address:	12208 SE Evergreen Hwy Vancouver, WA 98684
Hatchery Manager:	
Phone:	(360) 892-2581
Fax:	(360) 256-7427
Purpose:	The Vancouver hatchery began operations in the 1930s. The goal of the hatchery is to produce adult steelhead and resident trout for harvest by sport and tribal anglers.

Production Goal:

Winter Steelhead

Produce 120,000 fry for transfer to Skamania Hatchery (eggs obtained from Skamania Hatchery)

Summer Steelhead

Produce 110,000 smolts for off-station release

Rainbow Trout

Produce 600,000 fingerlings for release into Swift Reservoir

Brown Trout

Produce 40,000 legal-sized fish for release into Kress, Lacamas, and Ice House lakes

Channel Catfish

Produce 7,000 fingerlings for release in local lakes

Water Supply:

Water rights total 3,927 gpm from one well and several springs

Facilities:

Adult Holding:	None
Incubation:	90 troughs - 7 cf each
Early Rearing:	90 troughs - 7 cf each
Raceways:	4 concrete raceways - 1,366 cf each 12 circular ponds - 2,613 cf each
Rearing Ponds:	1 rearing lake - 350,000 cf 3 earthen ponds - 7,800, 11,340, and 9,000 cf
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 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 Vancouver Hatchery - Winter Steelhead and Summer Steelhead

This section presents the corrective actions required to bring the Vancouver Hatchery - Winter Steelhead 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 Vancouver Hatchery - Winter Steelhead

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		
Type 2 – Remedial actions requiring changes in agency policies or procedures Develop hatchery M&E plan Develop alarm log Conduct IHOT QA/QC tests for feed preparation Develop specific incubation and rearing standards for the IHOT Operations Plan Follow IHOT protocols for disinfection of fish transport vehicle (cab) Monitor DO in fish transport tank Conduct fishery contribution studies Provide foot baths in incubation facility	---- ---- ---- ---- ---- ---- ---- ---- ----	3 6 12 18-19 23 23 24 28
Type 3 – Remedial actions requiring changes in monitoring coverage or interval Monitor and record DO and TGP Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants	---- ----	5b 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		
Replace screen panels to meet screen mesh criteria	\$500	10
Double-screen rearing units	\$1,000	10
Improve system for transferring fish to transport trucks	\$10,000	13
Provide more water flow and rearing space	\$80,000	19, 22a2
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.

**Table 3b. Remedial Actions Required at Vancouver 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>None</p>	----	
<p>Type 2 - Remedial actions requiring changes in agency policies or procedures</p> <p>Develop hatchery M&E plan</p> <p>Develop alarm log</p> <p>Conduct IHOT QA/QC tests for feed preparation</p> <p>Develop specific incubation and rearing standards for the IHOT Operations Plan</p> <p>Develop smoltification goal and monitor</p> <p>Provide release number, size, date and location data</p> <p>Follow IHOT protocols for disinfection of fish transport vehicle (cab)</p> <p>Monitor DO in fish transport tank</p> <p>Conduct fishery contribution studies</p> <p>Provide foot baths in incubation facility</p>	<p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p>	<p>3</p> <p>6</p> <p>12</p> <p>18-19</p> <p>22a1</p> <p>22a4-22a7</p> <p>23</p> <p>23</p> <p>24</p> <p>28</p>
<p>Type 3 - Remedial actions requiring changes in monitoring coverage or interval</p> <p>Monitor and record DO and TGP</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>

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		
Replace screen panels to meet screen mesh criteria	\$500	10
Double screen rearing units	\$1,000	10
Improve system for transferring fish to transport trucks	\$10,000	13
Provide more water flow and rearing space	\$80,000	19
Provide acclimation ponds for out-of-basin releases	\$4.0 million	22b-22c
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 Vancouver Hatchery - Winter Steelhead 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:
Vancouver Hatchery - Winter Steelhead**

Year	Fisheries ¹ (Broodyear)	Spawning Grounds ¹ (Broodyear)	Hatchery ¹ (Broodyear)	Total Combined Contribution ² (Broodyear)	Smolt to Adult Survival (percent)
1984					
1985					
1986					
1987					
1988	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery
1989	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery
1990	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery
1991	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery
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:
Vancouver Hatchery - Summer Steelhead**

Year	Fisheries¹ (Broodyear)	Spawning Grounds¹ (Broodyear)	Hatchery¹ (Broodyear)	Total Combined Contribution² (Broodyear)	Smolt to Adult Survival (percent)
1985					
1986					
1987					
1988	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery
1989	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery
1990	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery
1991	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery	Reported at Skamania Hatchery
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 Vancouver Hatchery are presented in Table 5 by program. The detailed breakdown of the Winter Steelhead, and Summer Steelhead program expenditures at this hatchery are presented in separate tables (Tables 6a and 6b).

Table 5. Annual Operating Expenses - Vancouver Hatchery

Program	1994	1995	1996
1. Winter Steelhead	\$81,263	\$3,577	\$8,448
2. Summer Steelhead	\$14,775	\$88,405	\$122,280
3. Others Programs	\$88,652	\$96,388	\$59,276
4.			
5.			
Total Hatchery Costs	\$184,690	\$188,370	\$192,004

Table 6a. Detailed Expenditures at Vancouver Hatchery by Program

Winter Steelhead

Component	1994	1995	1996
Personnel Costs	\$138,040	\$140,118	\$142,256
Operational Costs	\$46,650	\$48,189	\$49,748
Capital Costs	?	?	?
Indirect Costs			
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs			
Total Hatchery Costs	\$184,690	\$188,370	\$192,004
Source of Funds			
NMFS			
Program Production (lb)	22,414	1,240	2,430
Total Production (lb)	50,458	65,980	54,957
Program as Percent of Total	44%	1.9%	4.4%
Program Costs	\$81,263	\$3,577	\$8,448

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 Vancouver Hatchery by Program

Summer Steelhead

Component	1994	1995	1996
Personnel Costs	\$138,040	\$140,118	\$142,256
Operational Costs	\$46,650	\$48,189	\$49,748
Capital Costs	?	?	?
Indirect Costs			
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs			
Total Hatchery Costs	\$184,690	\$188,370	\$192,004
Source of Funds			
Program Production (lb)	4,128	31,220	35,000
Total Production (lb)	50,458	65,980	54,957
Program as Percent of Total	8%	47%	64%
Program Costs	\$14,775	\$88,405	\$122,280

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