KLASKANINE HATCHERY

A COMPILATION AND SUMMARY OF IHOT AUDITS FOR COHO AND WINTER STEELHEAD

JULY 1998

HATCHERY EVALUATION REPORT
SUMMARY FOR

Klaskanine Hatchery
- **Coho**
- **Winter 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
JULY 1998

Original IHOT Audit Reports Prepared by:

Montgomery Watson
2375 130th Avenue NE
Suite 200
Bellevue, WA 98005
March 1997
BPA Project Number 95-2
Contract Number 95AC49468

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Section 1

Executive Summary

This report compiles a summary of the findings of two separate Hatchery Evaluation Reports for Coho and Winter Steelhead at Klaskanine 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 the North Fork Klaskanine River approximately 12 miles southeast of Astoria, Oregon. The hatchery is operated by the Oregon Department of Fish and Wildlife and used for adult collection, incubation, and rearing of coho and rearing of winter steelhead. Due to reduction in funding, this hatchery is not currently being used for the rearing of anadromous fish.

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.

Klaskanine Hatchery - Coho and Winters Steelhead Results

The Klaskanine facility includes 6 series ponds, 16 concrete raceways, 1 rearing pond, and incubation facilities. Klaskanine Hatchery was first operated in 1911 by the state of Oregon. In 1953, the hatchery was enlarged and renovated under the Columbia River Fisheries Development Program (Mitchell Act) - a program to enhance declining fish runs in the Columbia River Basin. The goal of the hatchery is to produce lower river coho that will contribute to NE Pacific and Columbia River basin commercial and sport fisheries and create a consumptive winter steelhead fishery in the Klaskanine River. Due to reduction in funding, this hatchery is currently not being used for the rearing of anadromous fish.

COHO

The Klaskanine Hatchery - Coho program was in general compliance with most of the performance measures. In the area of program objectives, the hatchery did not have a goal for green-egg to eyed-egg, eyed-egg to fry and smolt-to-adult survival and was not meeting its adult return goal. The audit found that the hatchery was not in compliance with water quality monitoring criteria, alarm requirements, and pathology-free water criteria, which are all facilities requirements. The hatchery needed to develop specific incubation and rearing standards for the IHOT Operations Plan and develop a smoltification goal and monitoring plan. The hatchery was not in compliance with the flow and density criteria for rearing and male:female fertilization ratio criteria. Likewise, the hatchery did not have a broodstock collection plan, spawning protocols, and Genetics Monitoring and Evaluation Program.

The specific areas in which the Klaskanine 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:

- Conduct IHOT QA/QC tests for feed preparation
- Develop alarm log
- Develop approved genetics M&E plan
- Develop smoltification goal and monitor
- Develop specific incubation and rearing standards for IHOT Operations Plan
- Develop survival goal for green-egg to eyed-egg, eyed-egg to fry, and smolt-to-adult.
- Develop written broodstock collection plan
- Develop written spawning protocols

- Follow IHOT protocols for 1:1 spawning
- Improve enumeration techniques for pond releases
- Install alarms at two intakes
- Install foot baths in incubation facility
- Monitor DO and TPG and record
- Provide disease-free water supply for incubation and early rearing
- Review rearing density and loading criteria and/or reduce production to meet criteria
- Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants
- Sanitize equipment and rain gear utilized in broodstock handling or spawning prior to its use elsewhere in the hatchery
- Water harden eggs in idophor

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

Winter Steelhead

The Klaskanine Hatchery - Winter Steelhead program was in general compliance with most of the performance measures. In the area of program objectives, the hatchery was not documenting its adult contribution and smolt-to-adult contribution and needed to develop a written hatchery M&E plan. The audit found that the hatchery was not in compliance with water quality monitoring criteria, alarm requirements, and pathology-free water criteria, which are all facilities requirements. The hatchery needed to develop specific rearing standards for the IHOT Operations Plan, develop a smoltification goal and monitoring plan, and conduct fisheries contribution studies. The hatchery was also not in compliance with the male:female fertilization ratio criteria. The hatchery did not have a broodstock collection plan, spawning protocols, and Genetics Monitoring and Evaluation Program.

The specific areas in which the Klaskanine 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 approved genetics M&E plan
- Develop smoltification goal and monitor
- Develop specific rearing standards for IHOT Operations Plan
- Develop written broodstock collection plan
- Develop written hatchery M&E plan
- Develop written spawning protocols
- Document adult contribution

- Document flow and density in adult holding
- Document smolt-to-adult survival
- Follow IHOT protocols for 1:1 spawning
- Install alarms at two intakes
- Monitor and record DO and TPG
- 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.

Section 2

Facility Description

Name:	Klaskanine Hatchery
Stock/Species:	Coho Winter Steelhead
Operating Agency:	Oregon Department of Fish and Wildlife
Funding Agency:	Mitchell Act
Location:	The hatchery is located along the North Fork Klaskanine River approximately 12 miles southeast of Astoria, Oregon
Address:	Route 1, Box 764 Astoria, OR 97103
Hatchery Manager:	Mr. Bobby Bivans
Phone: **Fax:**	(503) 326-3653 (503) 326-6883
Purpose:	Klaskanine Hatchery was first operated in 1911 by the state of Oregon. In 1953, the hatchery was enlarged and renovated under the Columbia River Fisheries Development Program (Mitchell Act) - a program to enhance declining fish runs in the Columbia River Basin. The goal of the hatchery is to produce lower river coho that will contribute to NE Pacific and Columbia River basin commercial and sport fisheries and create a consumptive winter steelhead fishery in the Klaskanine River.

Production Goal:

Coho

Produce 1,125,000 smolts (93,750 lb) for on-station releases

Provide 600,000 green eggs to the Clatsop Economic Development Commission when needed

Provide 20,000 eyed eggs to Oregon's Salmon and Trout Enhancement Program

Winter Steelhead

Produce 60,000 smolts (12,000 lb) for on-station release

Water Supply:

Water is supplied by gravity flow and from three intakes located on the North Fork Klaskanine River and North Fork of the North Fork Klaskanine River. The current water right is for 22,442 gpm although the maximum water usage is 11,000 gpm.

Facilities:

Adult Holding:	In last section of series raceway (see below)
Incubation:	14 shallow troughs
	40 half stack vertical - 320 trays
Early Rearing:	14 shallow troughs
Raceways:	16 concrete raceways - 4,800 cf each
	6 series raceways - 7,200 cf each
Rearing Ponds:	1 asphalt pond - 210,000 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 Klaskanine Hatchery – Coho and Winter Steelhead

This section presents the corrective actions required to bring the Klaskanine Hatchery - Coho 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 (± 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 Klaskanine Hatchery - Coho

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		
Increase adult returns	----	4c, 4g
Install security alarms	----	6
Type 2 - Remedial actions requiring changes in agency policies or procedures		
Develop survival goal for green-egg to eyed-egg, eyed-egg to fry, and smolt-to-adult.	----	4d, 4e, 4h
Develop alarm log	----	6
Conduct IHOT QA/QC tests for feed preparation	----	12
Develop specific incubation and rearing standards for IHOT Operations Plan	----	18-19
Review rearing density and loading criteria and/or reduce production to meet criteria	----	19, 22a2
Develop smoltification goal and monitor	----	22a1
Improve enumeration techniques for pond releases	----	22a4
Water harden eggs in idophor	----	28
Install foot baths in incubation facility	----	28
Sanitize equipment and rain gear utilized in broodstock handling or spawning prior to its use elsewhere in the hatchery	----	28
Develop written broodstock collection plan	----	41
Develop written spawning protocols	----	42
Follow IHOT protocols for 1:1 spawning	----	42
Develop approved genetics M&E plan	----	43

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

Remedial Action Required	Cost	PMs[1]
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Monitor DO and TPG and record	----	5b
Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants	----	5c-5g
Type 4 - Remedial actions requiring significant capital expenditures		
Provide disease-free water supply, (groundwater or disinfected surface water), for incubation and early rearing (2100 gpm)	$1.5 million	5h, 28
Install alarms at two intakes	$20,000	6
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. The IHOT performance measures are listed in Table 2 (Section 3 of this report) in numerical order.

Table 3b. Remedial Actions Required at Klaskanine 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		
Install security alarms	----	6
Type 2 - Remedial actions requiring changes in agency policies or procedures		
Develop written hatchery M&E plan	----	3
Document adult contribution	----	4a
Document smolt-to-adult survival	----	4h
Develop alarm log	----	6
Document flow and density in adult holding	----	7
Conduct IHOT QA/QC tests for feed preparation	----	12
Develop specific rearing standards for IHOT Operations Plan	----	18-19
Develop smoltification goal and monitor	----	22a1
Conduct fishery contribution studies	----	24
Develop written broodstock collection plan	----	41
Develop written spawning protocols	----	42
Follow IHOT protocols for 1:1 spawning	----	42

[1] PMs are performance measures that were extracted from the IHOT 1995 report. The IHOT performance measures are listed in Table 2 (Section 3 of this report) in numerical order.

Remedial Action Required	**Cost**	**PMs**[1]
Develop approved genetics M&E plan	----	43
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Monitor DO and TPG and record	----	5b
Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants	----	5c-5g

Remedial Action Required	Cost	PMs[1]
Type 4 - Remedial actions requiring significant capital expenditures Install alarms at two intakes	$20,000	6
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.

Section 4

Hatchery Contribution to Fisheries, Spawning Grounds, and Hatcheries

This section presents the audit findings for the Klaskanine Hatchery – Coho and Winter 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: Klaskanine 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				27,894	2.55
1988				68,054	4.83
1989				19,765	1.57
1990				3,779	0.37
1991				2,716	0.32

[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.

1992					

Table 4b. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries: Klaskanine Hatchery - Winter 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.

Section 5

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 Klaskanine Hatchery are presented in Table 5 by program. The detailed breakdown of the program expenditures for coho and winter steelhead at this hatchery are presented in separate tables (Tables 6a and 6b).

Table 5. Annual Operating Expenses - Klaskanine Hatchery

Program	1994	1995	1996
1. Coho	**$372,243**	**$302,179**	**$268,536**
2. Winter Steelhead	**$9,000**	**$9,000**	**$12,000**
3.			
4.			
5.			
Total Hatchery Costs	**$381,243**	**$311,179**	**$270,536**

Table 6a. Detailed Expenditures at Klaskanine Hatchery by Program

Coho

Component	**1994**	**1995**	**1996**
Personnel Costs	$165,025	$163,499	$142,794
Operational Costs	$136,792	$97,795	$84,327
Capital Costs	$23,956	$1,809	$0
Indirect Costs	$55,471	$48,076	$43,418
Lumped Hatchery Costs[1]			
Lumped Third-Party Costs			
Total Hatchery Costs	**$381,243**	**$311,179**	**$270,536**
Source of Funds			
NMFS	**100%**	**100%**	**100%**
Program Production (lb)			
Total Production (lb)			
Program as Percent of Total			
Program Costs	**$372,243**	**$302,179**	**$268,536**

[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 Klaskanine Hatchery by Program

Winter Steelhead

Component	1994	1995	1996
Personnel Costs	$165,025	$163,499	$142,794
Operational Costs	$136,792	$97,795	$84,327
Capital Costs	$23,956	$1,809	$0
Indirect Costs	$55,471	$48,076	$43,418
Lumped Hatchery Costs[1]			
Lumped Third-Party Costs			
Total Hatchery Costs	**$381,243**	**$311,179**	**$270,536**
Source of Funds			
NMFS	**100%**	**100%**	**100%**
Program Production (lb)			
Total Production (lb)			
Program as Percent of Total			
Program Costs	**$9,000**	**$9,000**	**$12,000**

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