
WINTHROP HATCHERY

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

JULY 1998

**HATCHERY EVALUATION REPORT
SUMMARY FOR**

- Winthrop NFH**
- **Spring Chinook**
- **Summer Steelhead**

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

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CONTENTS

Section 1 Executive Summary	1
Section 2 Facility Description	4
Section 3 Remedial Actions.....	6
Section 4 Hatchery Contribution to Fisheries, Spawning Grounds and Hatcheries.....	11
Section 5 Annual Operating Expenditures.....	13

Executive Summary

This report compiles a summary of the findings of two separate Hatchery Evaluation Reports for Spring Chinook and Summer Steelhead at Winthrop National Fish 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 Methow River in north-central Washington, near the town of Winthrop. The hatchery is operated by the US Fish and Wildlife Service and used for adult collection, incubation, and rearing of spring chinook and summer steelhead

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.

Winthrop NFH - Spring Chinook and Summer Steelhead Results

The Winthrop NFH facility includes 2 ponds for adult holding, 62 concrete raceways, 46 starter tanks, and incubation facilities. The hatchery was constructed in 1942 to mitigate for fish losses in the upper Columbia River drainage caused by the construction of Grand Coulee Dam.

SPRING CHINOOK

The Winthrop NFH - 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. The audit found that the hatchery did not have current water quality data showing compliance with IHOT standards and was not in compliance with the pathology-free water criteria and was lacking some alarm systems, which are all facilities requirements. The hatchery also was not in compliance with the adult holding criteria, did not have enough useable rearing space for the full program and needed to upgrade the pollution abatement facilities. In the compliance area for Hatchery Practices, the hatchery did not have written incubation standards for the incubation buckets, did not meet the release number or size goals. In the compliance area for fish health policy, the hatchery did not have a pathogen free water supply and did not use foot baths at the incubation facility. As with program objectives, in the area of ecological interactions the hatchery did not have a smoltification goal in place. Likewise, the hatchery did not have a Genetics Monitoring and Evaluation Program.

The specific areas in which the Winthrop NFH - 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 disease-free water supply for incubation and early rearing
- Develop pathogen free water supply and implement IHOT sanitation procedures
- Develop genetics M&E plan and have it reviewed by a geneticist
- Establish criteria for incubation buckets
- Implement checking procedures for alarms
- Implement use of foot baths according to IHOT protocols
- Improve pollution abatement pond and system to meet current engineering practice (currently under design)
- Install flow/level alarms at the intake
- Review release size goal to reflect hatchery conditions and current management policy.
- Monitor and record dissolved nitrogen
- Monitor and record DO
- Monitor the facility security and take appropriate actions if needed
- Provide smoltification data
- Replace A and B - Bank with 64 - 8 x 80 raceways (based on equivalent F-L Volume)
- Replace C - Bank with 32 - 8 x 80 raceways (based on equivalent F-L Volume)

- Run analysis for alkalinity and hardness
- Run analysis for IHOT-listed contaminants
- Run analysis for turbidity
- Run analysis on nitrites
- Run chemical analysis for IHOT water quality parameters

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

SUMMER STEELHEAD

The Winthrop NFH - Summer Steelhead program was in general compliance with most of the performance measures. In the area of program objectives, the hatchery does not have an operating plan that outlines the goals and operating criteria for the Summer Steelhead program at this Hatchery. The audit found that the hatchery did not have current water quality data showing compliance with IHOT standards and was not in compliance with the pathology-free water criteria and was lacking some alarm systems, which are all facilities requirements. The hatchery also did not have enough useable rearing space for the full program and needed to upgrade the pollution abatement facilities. In the compliance area for Hatchery Practices, the primary remedial action that is required is to develop an overall hatchery plan to establish appropriate production goals. In the compliance area for fish health policy the hatchery did not have a pathogen-free water supply and did not use foot baths at the incubation facility. As with program objectives, in the area of ecological interactions the hatchery did not have a smoltification monitoring program in place. Likewise, the hatchery did not have a Genetics Monitoring and Evaluation Program in place.

The specific areas in which the Winthrop NFH - 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:

- Develop Genetics M&E plan and have it reviewed by a geneticist
- Develop goals for pre-spawning survival, egg-take, green-egg to eyed-egg, eyed-egg to fry, and fry to smolt survival
- Develop pathogen-free water supply and implement
- Develop specific incubation and rearing standards for IHOT Operations Plan
- Document compliance with rearing criteria for loading and density
- Establish alarm log
- Establish appropriate smoltification monitoring
- Implement alarm checking procedures
- Implement use of foot baths according to IHOT protocols
- Improve pollution abatement pond and system to meet current engineering practice (currently under design)
- Install flow/level alarms at the intake
- Monitor and record dissolved nitrogen
- Monitor and record DO
- Monitor the facility security and take appropriate actions, if needed
- Replace A and B- Bank with 64 - 8 x 80 raceways (based on equivalent F-L Volume)
- Run analysis for alkalinity and hardness
- Run analysis for IHOT-listed contaminants
- Run analysis for turbidity
- Run analysis on nitrites
- Run chemical analysis for IHOT water quality parameters

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

Facility Description

Name:	Winthrop National Fish Hatchery (operated as a part of the Leavenworth National Fish Hatchery Complex)
Stock/Species:	Spring Chinook Summer Steelhead
Operating Agency:	U.S. Fish and Wildlife Service
Funding Agency:	U.S. Fish and Wildlife Service
Location:	Winthrop NFH is located along the Methow River in north-central Washington, near the town of Winthrop.
Address:	Winthrop National Fish Hatchery Leavenworth National Fish Hatchery Complex U.S. Fish and Wildlife Service 12790 Fish Hatchery Road Leavenworth, WA 98826
Hatchery Manager:	Mr. Bill Wallien
Phone:	(509) 996-2424
Fax:	(509) 996-3207
Purpose:	<p>The hatchery was originally authorized as part of the Grand Coulee Fish Maintenance Project. The first fish cultural operation began in 1942 by trapping adult sockeye, chinook, and steelhead at Rock Island Dam and transporting them to the hatchery. By 1951, the station was rearing sockeye, chinook, steelhead, kokanee, coho, and resident trout.</p> <p>The goal of Winthrop Hatchery is to produce spring chinook to help compensate for fish losses in the upper Columbia River drainage caused by the construction of Grand Coulee Dam.</p>
Production Goal:	<p>Spring Chinook</p> <p>Produce 1 million yearling spring chinook for on-station releases</p> <p>Summer Steelhead</p> <p>Produce 100,000 smolts for on-station release</p>
Water Supply:	Water rights total 29,930 gpm from the Methow River, Spring Branch Spring, and two wells (6,000 gpm total capacity). Water use ranges

from 8,528 to 27, 686 gpm with the Methow River providing the majority of the flow.

Facilities:

Adult Holding:	Adults held in upper end of fish ladder 2 large concrete adult holding ponds (not used)
Incubation:	400 individual bucket incubators for green to eye-eggs Vertical tray incubators (336 trays)
Early Rearing:	46 starter tanks
Raceways:	30 raceways - 1,300 cf each 16 Converted Foster-Lucas ponds - 2400 cf each 16 Foster-Lucas ponds - 2400 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 Winthrop NFH - Spring Chinook and Summer Steelhead

This section presents the corrective actions required to bring the Winthrop NFH - 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 3q. Remedial Actions Required at Winthrop NFH - Spring Chinook

Remedial Action Required	Cost	PMS¹
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		
Implement alarm checking procedures	----	6
Develop alarm log	----	6
Establish criteria for incubation buckets	----	18
Review release size goal to reflect hatchery conditions and current management policy.	----	22a5, 36
Implement use of foot baths according to IHOT protocols	----	28
Develop genetics M&E plan and have it reviewed by a geneticist	----	43
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Monitor and record DO	----	5b,21,29
Monitor and record dissolved nitrogen	----	5b,21,29
Run chemical analysis for IHOT water quality parameters	----	5c,21,29
Run analysis for turbidity	----	5d,21,29
Run analysis for alkalinity and hardness	----	5e,21,29
Run analysis on nitrites.	----	5f, 21,29
Run analysis for IHOT-listed contaminants	----	5g, 21,29
Provide smoltification data	----	22a1

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 flow/level alarms at the intake.	\$5,000	6
Replace C- Bank with 32 - 8 x 80 raceways (based on equivalent F-L Volume)	\$635,000 to \$750,000	9
Replace A and B- Bank with 64 - 8x80 raceways (based on equivalent F-L Volume)	\$1.3 - \$1.5 million	9
Improve pollution abatement pond and system to meet current engineering practice (currently under design)	\$500,000	14
Develop disease-free water supply for incubation and early rearing	\$800,000	21, 28
Improve pollution abatement pond and system to meet current engineering practice (currently under design)	\$500,000	14
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Monitor the facility security and take appropriate actions if needed	---	6
Rebuild the adult collection facility	\$100,000 to \$1.5 million	7
Increase adult returns and fry to smolt survival	---	4c, 4g, 4h, 22a4, 36

Table 3b. Remedial Actions Required at Winthrop NFH - 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		
None	---	---
Type 2 - Remedial actions requiring changes in agency policies or procedures		
Develop goals for pre-spawning survival, egg-take, green-egg to eyed-egg, eyed-egg to fry, and fry to smolt survival	---	4b-4f
Implement alarm checking procedures	---	6
Establish alarm log	---	6

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
Develop specific incubation and rearing standards for IHOT Operations Plan	----	18-19
Document compliance with rearing criteria for loading and density	----	19
Implement procedures for measuring percent smoltification	----	22a1
Implement use of foot baths according to IHOT protocols	----	28
Develop genetics M&E plan and have it reviewed by a geneticist	----	43
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Monitor and record DO	----	5b,21,29
Monitor and record dissolved nitrogen	----	5b,21,29
Run chemical analysis for IHOT water quality parameters	----	5c,21,29
Run analysis for turbidity	----	5d,21,29
Run analysis for alkalinity and hardness	----	5e,21,29
Run analysis on nitrites	----	5f, 21,29
Run analysis for IHOT-listed contaminants	----	5g, 21,29

Remedial Action Required	Cost	PMs ¹
Type 4 - Remedial actions requiring significant capital expenditures		
Install flow/level alarms at the intake	\$5,000	6
Replace A and B- Bank with 64 - 8 x 80 raceways (based on equivalent F-L Volume)	\$1.3 - \$1.5 million	9
Improve pollution abatement pond and system to meet current engineering practice (currently under design)	\$500,000	14
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Develop pathogen-free water supply	----	5h, 21, 28
Monitor the facility security and take appropriate actions if needed	----	6

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 Winthrop NFH - 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: Winthrop NFH - 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					
1984					
1985					
1986					
1987					
1988					
1989				225	0.0213%
1990				not available	
1991				not available	
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: Winthrop NFH - Summer Steelhead

Year	Fisheries¹ (Broodyear)	Spawning Grounds¹ (Broodyear)	Hatchery¹ (Broodyear)	Total Combined Contribution² (Broodyear)	Smolt to Adult Survival (percent)
1982					
1983					
1984					
1985					
1986					
1987					
1988					
1989					
1990	New program; no data available	New program; no data available	New program; no data available	New program; no data available	New program; no data available
1991	New program; no data available	New program; no data available	New program; no data available	New program; no data available	New program; no data available
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 Winthrop NFH 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 (Table 6a and 6b).

Table 5. Annual Operating Expenses - Winthrop NFH

Program	1993	1994	1995
1. Spring Chinook	\$369,273	\$367,690	\$950,773
2. Summer Steelhead	\$0	\$0	\$143,327
3.			
4.			
5.			
Total Hatchery Costs	\$369,273	\$367,690	\$1,094,100

Table 6a. Detailed Expenditures at Winthrop NFH by Program

Spring Chinook

Component	1993	1994	1995
Personnel Costs	\$219,647	\$202,742	\$201,650
Operational Costs	\$149,626	\$164,948	\$102,450
Capital Costs			\$790,791
Indirect Costs			
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs			
Total Hatchery Costs	\$369,273	\$367,690	\$1,094,100
Source of Funds			
	100%	100%	100%
Program Production (lb)	43,137	35,128	24,632
Total Production (lb)	43,137	35,128	28,347
Program as Percent of Total	100%	100%	86.9%
Program Costs	\$369,273	\$367,690	\$950,773

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 Winthrop NFH by Program

Summer Steelhead

Component	1993	1994	1995
Personnel Costs	\$219,647	\$202,742	\$201,650
Operational Costs	\$149,626	\$164,948	\$102,450
Capital Costs			\$790,791
Indirect Costs			
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs			
Total Hatchery Costs	\$369,273	\$367,690	\$1,094,100
Source of Funds			
	100%	100%	100%
Program Production (lb)	0	0	3,715
Total Production (lb)	43,137	35,128	28,347
Program as Percent of Total	0%	0%	13.1%
Program Costs	\$0	\$	\$143,327

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