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WILLARD HATCHERY

A COMPILATION AND SUMMARY OF  
IHOT AUDIT FOR COHO

JULY 1998

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**HATCHERY EVALUATION REPORT  
SUMMARY FOR**

**Willard NFH  
- Coho**

**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 the Hatchery Evaluation Reports for Coho at Willar 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 on the Little White Salmon River approximately 4 miles upstream from the Little White Salmon NFH. The two hatcheries are operated as a single complex. The hatchery is operated by the US Fish and Wildlife Service and used for incubation and rearing of coho.

### 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.

## Willard NFH - Coho Results

The Willard facility includes 50 concrete raceways, 52 starter tanks, and incubation facilities (Carson Depot Springs). Willard NFH was authorized by the Mitchell Act in 1946 and constructed in 1952. The facility was originally planned as a fall chinook hatchery but was switched to spring chinook and coho because of cold water temperatures, and then switched completely to coho in the mid-1960's. The goal of the hatchery is to provide fish to the commercial, sport, and tribal fisheries.

The Willard NFH - Coho program was in general compliance with most of the performance measures. In the area of program objectives, the was not meeting its adult return or fry-to-smolt goals . The audit found that the hatchery was not in compliance with water quality monitoring requirements, pathology-free water criteria, alarm protocols, and predation control facility criteria, which are all facilities requirements. The hatchery was not meeting the IHOT incubation criteria for loading and flow and needed additional nursery tanks to meet the density criteria for early rearing. The hatchery did not have a Genetics Monitoring and Evaluation Program.

The specific areas in which the Willard NFH - 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:

- Develop approved genetics M&E plan
- Develop disease-free water supply for early rearing
- Develop smoltification goal and monitor
- Develop specific incubation and rearing standards for the IHOT Operations Plan
- Follow IHOT incubation flow criteria or revise criteria
- Follow IHOT protocols for checking of flow and other alarms
- Increase fry-to smolt survival
- Increase hardness of river water
- Install 1,100 ft of perimeter fencing and 41,700 sf of bird netting
- Install 40 additional nursery tanks
- Monitor DO and TGP and record
- Provide temperature control for rearing
- Run analysis for missing water chemistry parameters, turbidity, 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

<b>Name:</b>	Willard National Fish Hatchery
<b>Stock/Species:</b>	Coho
<b>Operating Agency:</b>	U.S. Fish and Wildlife Service
<b>Funding Agency:</b>	Mitchell Act (NMFS)
<b>Location:</b>	The hatchery is located on the Little White Salmon River approximately 4 miles upstream from the Little White Salmon NFH. The two hatcheries are operated as a single complex.
<b>Address:</b>	56961 SR 14 Cook, WA 98605
<b>Hatchery Manager:</b>	Mr. Speros Doulos
<b>Phone:</b>	(509) 538-27755
<b>Fax:</b>	
<b>Purpose:</b>	Willard NFH was authorized by the Mitchell Act in 1946 and constructed in 1952. It began operations in 1952. The facility was originally planned as a fall chinook hatchery but was switched to spring chinook and coho because of cold water temperatures, and then switched completely to coho in the mid-1960's. The goal of the hatchery is to provide fish to the commercial, sport, and tribal fisheries.
<b>Production Goal:</b>	Coho  Produce 2.5 million coho smolts (166,600 lb) for on-station release.
<b>Water Supply:</b>	Water use at the hatchery ranges from 11,221 to 24,442 gpm with most of the water supplied by the Little White Salmon River. Carson Depot Springs is located off station and used for incubation. Well water is used for incubation and temperature control during early rearing.
<b>Facilities:</b>	
Adult Holding:	None
Incubation:	At Carson Depot Springs, see below under satellite facilities
Early Rearing:	52 concrete starter tanks - 91 cf each
Raceways:	50 concrete raceways - 1,408 cf each

Rearing Ponds: None

Satellite Facilities: Carson Depot Springs

24 full stacks of vertical tray incubators (384 trays)

## 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 Willard NFH - Coho

This section presents the corrective actions required to bring the Willard NFH - Coho 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 (Table 3).

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 3. Remedial Actions Required at Willard NFH - Coho**

<b>Remedial Action Required</b>	<b>Cost</b>	<b>PMS<sup>1</sup></b>
<p><b>Type 1</b> - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery</p> <p>Increase adult returns</p>	----	4g, 4h, 22a4
<p><b>Type 2</b> - Remedial actions requiring changes in agency policies or procedures</p> <p>Review IHOT temperature criteria</p> <p>Follow IHOT protocols for checking of flow and other alarms</p> <p>Install security alarms</p> <p>Develop specific incubation and rearing standards for the IHOT Operations Plan</p> <p>Follow IHOT incubation flow criteria or revise criteria</p> <p>Develop smoltification goal and monitor</p> <p>Develop approved genetics M&amp;E plan</p>	<p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p>	<p>5a</p> <p>6</p> <p>6</p> <p>18-19</p> <p>18</p> <p>22a1</p> <p>43</p>
<p><b>Type 3</b> - Remedial actions requiring changes in monitoring coverage or interval</p> <p>Monitor DO and TGP and record</p> <p>Run analysis for missing water chemistry parameters, turbidity, nitrite, and contaminants</p>	<p>----</p> <p>----</p>	<p>5b</p> <p>5c, 5d, 5f, 5g</p>

<sup>1</sup> PMS are performance measures that were extracted from the IHOT 1995 report.

Remedial Action Required	Cost	PMs <sup>1</sup>
<b>Type 4</b> - Remedial actions requiring significant capital expenditures		
Provide temperature control for rearing	\$19.2 million	5a
Develop disease-free water supply for early rearing	\$15.0 million	5h, 28
Install 40 additional nursery tanks	\$850,000	9, 19,
Install 1,100 ft of perimeter fencing and 41,700 sf of bird netting	\$80,000	11
<b>Type 5</b> - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Increase fry-to-smolt survival	----	4f
Increase hardness of river water	----	5e

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<sup>1</sup> 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 Willard NFH - Coho program contribution of adult fish to fisheries, local fisheries, spawning grounds, and hatcheries (Table 4). 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 4. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries:  
Willard NFH - Coho**

Year	Fisheries <sup>1</sup> (Broodyear)	Spawning Grounds <sup>1</sup> (Broodyear)	Hatchery <sup>1</sup> (Broodyear)	Total Combined Contribution <sup>2</sup> (Broodyear)	Smolt to Adult Survival (percent)
1981					
1982					
1983					
1984					
1985					
1986					
1987					
1988	37,413	0	12,428	49,841	1.70
1989	6,199	0	2,210	8,400	0.32
1990	1,343	0	415	1,758	0.11
1991	552	0	1,657	2,209	0.072
1992					

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

<sup>2</sup> 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 Willard NFH are presented in Table 5 by program. The detailed breakdown of program expenditures at this hatchery are presented in separate tables (Table 6).

**Table 5. Annual Operating Expenses - Willard NFH**

<b>Program</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>
1. Coho (includes costs at Little White Salmon Hatchery)	<b>\$357,787</b>	<b>\$496,272</b>	<b>\$434,599</b>
2.			
3.			
4.			
5.			
<b>Total Hatchery Costs</b>	<b>\$357,787</b>	<b>\$496,272</b>	<b>\$434,599</b>

**Table 6. Detailed Expenditures at Willard NFH by Program**

**Coho**

<b>Component</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>
Personnel Costs	\$503,436	\$492,700	\$478,159
Operational Costs	\$304,210	\$358,975	\$384,141
Capital Costs			
Indirect Costs			
Lumped Hatchery Costs <sup>1</sup>			
Lumped Third-Party Costs			
<b>Total Hatchery Costs</b>	<b>\$807,646</b>	<b>\$851,675</b>	<b>\$862,300</b>
<b>Source of Funds</b>			
NMFS	<b>100%</b>	<b>100%</b>	<b>100%</b>
Program Production (lb)	105,304	112,723	91,460
Total Production (lb)	237,747	204,728	181,600
Program as Percent of Total	44.3	55.1	50.4
<b>Program Costs</b>	<b>\$357,787</b>	<b>\$496,272</b>	<b>\$434,599</b>

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