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ABERNATHY HATCHERY

A COMPILATION AND SUMMARY OF  
IHOT AUDIT FOR FALL CHINOOK

JULY 1998

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**HATCHERY EVALUATION REPORT  
SUMMARY FOR**

**Abernathy Salmon Culture Technology Center  
- Tule Fall Chinook**

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

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JULY 1998**

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## Executive Summary

This report compiles a summary of the findings of the Hatchery Evaluation Reports for Tule Fall Chinook at Abernathy Salmon Culture Technology Center. 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 Abernathy Creek, approximately 3 miles upstream from the creek's confluence with the Columbia River. The hatchery is operated by the US Fish and Wildlife Service and used for adult collection, incubation, and rearing of tule fall chinook.

### 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.

## **Abernathy Salmon Culture Technology Center - Tule Fall Chinook Results**

The Abernathy facility includes 1 pond for adult holding, 12 concrete raceways, 92 circular starter tanks, 6 troughs, and incubation facilities. The facility was originally established as a National Fish Hatchery under provisions of the Mitchell Act -- a program to provide for the conservation of Columbia River fishery resources. In 1961, research activities at the Salmon Culture Laboratory in Entiat, Washington were transferred to Abernathy to expand the laboratory's research program to include fall chinook.

The Abernathy Salmon Culture Technology Center - Tule Fall 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 was not in compliance with the water temperature criteria for spawning and rearing, alkalinity and hardness criteria, water chemistry (copper, zinc, and iron), turbidity, contaminant monitoring requirement, and pathology-free water criteria for early rearing, which are all facilities requirements. The hatchery needs to develop a smoltification monitoring program, review the release size goal, and assess if it is possible to acclimate all the fish on creek water. The hatchery was not in full compliance with all the alarm and training requirements. The hatchery did not have a Genetics Monitoring and Evaluation Program in place.

The specific areas in which the Abernathy Salmon Culture Technology Center - Tule Fall 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 approved genetics M&E program
- Develop pathogen-free water supply for early rearing
- Develop exchange training details between other hatcheries and agencies
- Develop specific incubation standards for the IHOT Operations Plan
- Follow IHOT protocols for checking flow alarms daily and other alarms weekly
- Follow IHOT protocols for equipment and rain gear utilized in broodstock handling or spawning sanitized prior to its use elsewhere in the hatchery
- Follow IHOT temperature criteria for rearing
- Increase alkalinity and hardness or blend in well water to meet criteria
- Measure smoltification
- Review IHOT spawning temperature criteria
- Review program and/or assess ability to acclimate all fish on creek water prior to release
- Review release size goal or change program
- Run analysis for turbidity; contaminants in well water
- Treat well water to remove copper, zinc, and iron

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>	Abernathy Salmon Culture Technology Center
<b>Stock/Species:</b>	Tule Fall Chinook
<b>Operating Agency:</b>	U.S. Fish and Wildlife Service
<b>Funding Agency:</b>	Mitchell Act (NMFS)
<b>Location:</b>	The hatchery is located along Abernathy Creek, approximately 3 miles upstream from the creek's confluence with the Columbia River.
<b>Address:</b>	1440 Abernathy Road Longview, Washington 98632
<b>Hatchery Manager:</b>	Mr. Carl Burger
<b>Phone:</b>	(360) 425-6072
<b>Fax:</b>	(360) 636-1855
<b>Purpose:</b>	The facility was originally established as a National Fish Hatchery under provisions of the Mitchell Act -- a program to provide for the conservation of Columbia River fishery resources. Abernathy began operations in 1960 and in 1961, fall chinook research activities at the Salmon Culture Laboratory in Entiat, Washington were transferred to Abernathy.
<b>Production Goal:</b>	<b>Tule Fall Chinook</b>  Produce 1.5 million subyearling tule fall chinook for on-station release
<b>Water Supply:</b>	Water rights total 20,600 gpm from Abernathy Creek and one well. Actual water use averages about 6,000 gpm from Abernathy Creek and 300 gpm from the well.
<b>Facilities:</b>	
Adult Holding:	1 concrete adult holding pond - 6,314 cf
Incubation:	30 - 16 stack vertical incubators (480 trays)
Early Rearing:	32 steel circular starter tanks  60 fiberglass circular starter tanks  6 fiberglass troughs

Raceways:	12 concrete raceways - 1,500 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 Abernathy Salmon Culture Technology Center - Tule Fall Chinook**

This section presents the corrective actions required to bring the Abernathy Salmon Culture Technology Center - Tule Fall Chinook 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 Abernathy Salmon Culture Technology Center - Tule Fall Chinook**

Remedial Action Required	Cost	PMs <sup>1</sup>
<p><b>Type 1</b> - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery</p> <p>Improve adult returns</p>	----	4c, 4g, 4h, 22a4
<p><b>Type 2</b> - Remedial actions requiring changes in agency policies or procedures</p> <p>Review IHOT spawning temperature criteria</p> <p>Follow IHOT temperature criteria for rearing</p> <p>Follow IHOT protocols for checking flow alarms daily and other alarms weekly</p> <p>Develop alarm log</p> <p>Develop specific incubation standards for the IHOT Operations Plan</p> <p>Measure smoltification</p> <p>Review release size goal or change program</p> <p>Develop exchange training details between other hatcheries and agencies</p> <p>Follow IHOT protocols for equipment and rain gear utilized in broodstock handling or spawning sanitized prior to its use elsewhere in the hatchery</p> <p>Develop approved genetics M&amp;E program</p>	<p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p>	<p>5a</p> <p>5a</p> <p>6</p> <p>6</p> <p>18</p> <p>22a1</p> <p>22a5</p> <p>25</p> <p>28</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 3</b> - Remedial actions requiring changes in monitoring coverage or interval  Run analysis for turbidity; contaminants in well water	----	5d, 5g
<b>Type 4</b> - Remedial actions requiring significant capital expenditures  Increase alkalinity and hardness or blend in well water to meet criteria	\$3,000	5e
<b>Type 5</b> - Remedial actions that may require significant capital expenditures but are not clearly definable at this time  Treat well water to remove copper, zinc, and iron  Review program and/or assess ability to acclimate all fish on creek water prior to release  Develop pathogen-free water supply for early rearing	----  ----  ----	5c  22b, 22c  28

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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 Abernathy Salmon Culture Technology Center - Tule Fall Chinook 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:  
Abernathy Salmon Culture Technology Center - Tule Fall Chinook**

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					
1989	2768	81	447		0.18
1990	Not complete	Not complete	Not complete	Not complete	Not complete
1991	Not complete	Not complete	Not complete	Not complete	Not complete
1992	Not complete	Not complete	Not complete	Not complete	Not complete

<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, 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 Abernathy Salmon Culture Technology Center 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 - Abernathy Salmon Culture Technology Center**

<b>Program</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>
1. Tule Fall Chinook	<b>\$215,913</b>	<b>\$219,561</b>	<b>\$217,341</b>
2.			
3.			
4.			
5.			
<b>Total Hatchery Costs</b>	<b>\$215,913</b>	<b>\$219,561</b>	<b>\$217,341</b>

**Table 6. Detailed Expenditures at Abernathy Salmon Culture Technology Center by Program**

**Tule Fall Chinook**

<b>Component</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>
Personnel Costs	\$156,535	\$152,482	\$121,292
Operational Costs	\$59,378	\$64,807	\$71,576
Capital Costs		\$2,272	\$24,473
Indirect Costs			
Lumped Hatchery Costs <sup>1</sup>			
Lumped Third-Party Costs			
<b>Total Hatchery Costs</b>	<b>\$215,913</b>	<b>\$219,561</b>	<b>\$217,341</b>
<b>Source of Funds</b>			
Mitchell Act	<b>100%</b>	<b>100%</b>	<b>100%</b>
Program Production (lb)			
Total Production (lb)			
Program as Percent of Total	100%	100%	100%
<b>Program Costs</b>	<b>\$215,913</b>	<b>\$219,561</b>	<b>\$217,341</b>

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<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.