
NORTH TOUTLE HATCHERY

**A COMPILATION AND SUMMARY OF
IHOT AUDITS FOR FALL CHINOOK
AND COHO TYPE**

JULY 1998

**HATCHERY EVALUATION REPORT
SUMMARY FOR**

North Toutle Hatchery
- **Tule Fall Chinook**
- **Coho Type S**

**A Summarized Compilation of Independents 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 two separate Hatchery Evaluation Reports for Tule Fall Chinook and Coho (S) at North Toutle 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 Green River about 23 miles east of Castle Rock, Washington and is operated by the Washington Department of Fish and Wildlife. The hatchery is used for adult collection, egg incubation, and rearing of tule fall chinook and early (Type S) 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). 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.

North Toutle Hatchery - Tule Fall Chinook and Coho (S) Results

The North Toutle facility includes 1 pond for adult holding, 14 concrete raceways, 2 rearing ponds, and incubation facilities. The hatchery was authorized under the Mitchell Act, and began operation as part of the Columbia River Fisheries Development Program - a program to mitigate fishery losses caused by hydroelectric system development.

Tule Fall Chinook

The North Toutle Hatchery - Tule Fall Chinook program was in compliance with most of the performance measures. In the area of program objectives, the hatchery was not meeting its adult return goal and needed to document its fry-to-smolt survival. The audit found that the hatchery was not in compliance with the water temperature criteria, water quality monitoring requirements, predation control criteria, pollution control facility requirements, and pathology-free water criteria, which are all facilities requirements. The hatchery was not meeting the loading criteria for the deep tank incubators and the loading criteria for rearing. The hatchery needed to develop specific incubation and rearing standards for the IHOT Operations Plan, a smoltification goal, and smoltification monitoring plan. The hatchery was not meeting all of the alarm, food storage, and sanitation requirements. The hatchery did not have a Genetics Monitoring and Evaluation Program and was not following the IHOT fertilization protocols.

The specific areas in which the North Toutle Hatchery - 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:

- Conduct IHOT QA/QC tests for feed preparation
- Construct pollution abatement facility for hatchery
- Develop alarm log
- Develop approved genetics M&E plan
- Develop smoltification goal and monitor
- Develop specific incubation and rearing standards for the IHOT Operations Plan
- Document fry-to-smolt survival
- Follow IHOT fertilization protocols
- Follow IHOT loading criteria for deep trough incubators
- Follow IHOT protocols for not leaving buckets of feed or feed containers outside exposed to light or heat
- Follow IHOT protocols for sanitizing rearing vessels after fish are removed and prior to introducing a new fish lot or stock
- Heat 150 gpm of incubation water by 9 °F; chill 150 gpm of incubation water by 16 °F
- Increase DO by aeration
- Install 19,000 sf of new bird netting; replace 128,000 sf of existing bird netting
- Install security alarms

- Install telephone pagers
- Monitor and record TGP
- Provide additional 400 gpm of flow for raceways
- 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.

Coho (Type S)

The North Toutle Hatchery - Coho (Type S) program was in compliance with most of the performance measures. In the area of program objectives, the hatchery was not meeting its adult return goal and needed to review its management strategies for transfers that have impacted production. The audit found that the hatchery was not in compliance with the water temperature criteria, water quality monitoring requirements, predation control criteria, pollution control facility requirements, and pathology-free water criteria, which are all facilities requirements. The hatchery was not meeting the flow criteria for the vertical stack incubators and the loading criteria for rearing. The hatchery needed to develop written incubation and rearing standards for the IHOT Operations Plan, a smoltification goal, and smoltification monitoring plan. The hatchery was not meeting all of the alarm, food storage, and sanitation requirements. The hatchery did not have a Genetics Monitoring and Evaluation Program and was not following the IHOT fertilization protocols.

The specific areas in which the North Toutle Hatchery - Coho (Type S) 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
- Construct pollution abatement facility for hatchery
- Develop alarm log
- Develop approved genetics M&E plan
- Develop smoltification goal and monitor
- Develop written incubation and rearing standards for the IHOT Operations Plan
- Follow IHOT fertilization protocols
- Follow IHOT flow criteria for vertical stack incubators or revise
- Follow IHOT protocols for not leaving buckets of feed or feed containers outside exposed to light or heat
- Follow IHOT protocols for sanitizing rearing vessels after fish are removed and prior to introducing a new fish lot or stock

- Heat 100 gpm of incubation water by 8 °F; chill 100 gpm of incubation water by 3°F
- Increase DO by aeration
- Install 19,000 sf of new bird netting; replace 128,000 sf of existing bird netting
- Install security alarms
- Install telephone pagers
- Monitor TGP and record
- Provide additional 1,800 gpm of flow for raceways
- Provide flow bypass around adult holding pond to increase flow to earthen pond
- Review management strategy for program with respect to transfers that have adversely impacted production
- 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:	North Toutle Hatchery
Stock/Species:	Tule Fall Chinook Coho (Type S)
Operating Agency:	Washington Department of Fish and Wildlife
Funding Agency:	Mitchell Act (NMFS)
Location:	The hatchery is located along the Green River about 23 miles east of Castle Rock, Washington.
Address:	P.O. Box 73 Toutle, WA 98649
Hatchery Manager:	Mr. Mark Johnson

Phone: (360) 274-7757
Fax: (360) 274-2256

Purpose: The hatchery was authorized under the Mitchell Act and began operation as part of the Columbia River Fisheries Development Program - a program to mitigate fishery losses caused by hydroelectric system development. The hatchery began operating in 1951 but was destroyed in the 1980 eruption of Mount St. Helens. Hatchery operations were reestablished in 1985. The goal of the hatchery is to produce adult fall chinook and coho that will contribute to NE Pacific and Columbia River Basin commercial and sport fisheries.

Production Goal: **Tule Fall Chinook**
Produce 2,500,000 subyearling tule fall chinook for on-station release

Coho (Type S)
Produce 1,100,000 yearling Type S coho for on-station release

Water Supply: Water rights for the hatchery total 26,031 gpm from the Green River.

Facilities:

Adult Holding: 1 dirt adult holding pond - 18,525 cf

Incubation: 31 deep troughs - 31 cf each
24 8-tray vertical stack incubators - 192 trays

Early Rearing: 31 deep troughs - 31 cf each

Raceways: 14 concrete raceways - 3,650 cf each

Rearing Ponds: None

Satellite Facilities: Beaver Slough Rearing Pond
2 asphalt rearing ponds - 143,740 cf each

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 North Toutle Hatchery - Tule Fall Chinook and Coho (S)

This section presents the corrective actions required to bring the North Toutle Hatchery - Tule Fall Chinook and Coho (S) 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 maybe desirable for either operational or safety considerations.

**Table 3a. Remedial Actions Required at North Toutle Hatchery -
Tule Fall 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		
Increase adult returns	----	4c, 4g-4h
Type 2 - Remedial actions requiring changes in agency policies or procedures		
Document fry-to-smolt survival	----	4f
Develop alarm log	----	6
Conduct IHOT QA/QC tests for feed preparation		12
Follow IHOT protocols for not leaving buckets of feed or feed containers outside exposed to light or heat		12
Develop specific incubation and rearing standards for the IHOT Operations Plan	----	18-19
Follow IHOT loading criteria for deep trough incubators	----	18
Develop smoltification goal and monitor	----	22a1
Follow IHOT protocols for sanitizing rearing vessels after fish are removed and prior to introducing a new fish lot or stock	----	28
Follow IHOT fertilization protocols	----	42
Develop approved genetics M&E plan	----	
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Monitor and record TGP	----	5b
Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants	----	5c-5g

¹ PMS are performance measures that were extracted from the IHOT 1995 report.

Remedial Action Required	Cost	PMs¹
Type 4 - Remedial actions requiring significant capital expenditures		
Heat 150 gpm of incubation water by 9 °F; chill 150 gpm of incubation water by 16 °F	\$320,000	5a
Install security alarms	\$10,000	6
Install telephone pagers	\$5,000	6
Install 19,000 sf of new bird netting; replace 128,000 sf of existing bird netting	\$110,000	11
Provide additional 400 gpm of flow for raceways	\$15,000	19
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Increase DO by aeration	----	5b
Construct pollution abatement facility for hatchery	----	14

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		
Heat 100 gpm of incubation water by 8 °F; chill 100 gpm of incubation water by 3 °F	\$80,000	5a
Install security alarms	\$10,000	6
Install telephone pagers	\$5,000	6
Install 19,000 sf of new bird netting; replace 128,000 sf of existing bird netting	\$110,000	11
Provide additional 1,800 gpm of flow for raceways	\$40,000	19
Provide flow bypass around adult holding pond to increase flow to earthen pond	\$25,000	19
Type 5 – Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Increase DO by aeration	----	5b
Construct pollution abatement facility for hatchery	----	14

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 North Toutle Hatchery - Tule Fall Chinook and Coho (S) program's 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:
North Toutle Hatchery - Tule Fall 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	17	0	7	24	0.03%
1988					
1989	32	0	3	35	0.04%
1990					
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.

**Table 4b. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries:
North Toutle Hatchery - Coho (Type S)**

Year	Fisheries¹ (Broodyear)	Spawning Grounds¹ (Broodyear)	Hatchery¹ (Broodyear)	Total Combined Contribution² (Broodyear)	Smolt to Adult Survival (percent)
1981					
1982					
1983					
1984					
1985					
1986					
1987	1,298	0	488	1,786	3.61
1988	1,970	2	577	2549	5.18
1989	102	0	64	166	0.55
1990	396	1	316	713	1.44
1991	17	0	418	435	0.22
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 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 North Toutle Hatchery are presented in Table 5 by program. The detailed breakdown of the Tule Fall Chinook and Coho (type S) program expenditures at this hatchery are presented in separate tables (Tables 6a and 6b).

Table 5. Annual Operating Expenses - North Toutle Hatchery

Program	1992	1993	1994
1. Tule Fall Chinook	\$95,804	\$97,452	\$160,524
2. Coho (Type S)	\$225,686	\$207,000	\$167,077
3.			
4.			
5.			
Total Hatchery Costs	\$321,491	\$294,454	\$327,601

Table 6a. Detailed Expenditures at North Toutle Hatchery by Program

Tule Fall Chinook

Component	1992	1993	1994
Personnel Costs			
Operational Costs			
Capital Costs			
Indirect Costs			
Lumped Hatchery Costs ¹	\$174,491	\$147,454	\$180,601

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

Lumped Third-Party Costs	\$147,000	\$147,000	\$147,000
Total Hatchery Costs	\$321,491	\$294,454	\$327,601
Source of Funds			
NMFS	100%	100%	100%
Program Production (lb)	36,509	36,509	28,069
Total Production (lb)	122,703	122,794	57,328
Program as Percent of Total	29.8%	29.7%	49.0%
Program Costs	\$95,804	\$97,452	\$160,524

**Table 6b. Detailed Expenditures at North Toutle Hatchery by Program
Coho (Type S)**

Component	1992	1993	1994
Personnel Costs			
Operational Costs			
Capital Costs			
Indirect Costs			
Lumped Hatchery Costs ¹	\$174,491	\$147,454	\$180,601
Lumped Third-Party Costs	\$147,000	\$147,000	\$147,000
Total Hatchery Costs	\$321,491	\$294,454	\$327,601
Source of Funds			
NMFS	100%	100%	100%
Program Production (lb)	86,194	86,285	29,259
Total Production (lb)	122,703	122,794	57,328
Program as Percent of Total	70.2%	70.3%	51.0%
Program Costs	\$225,686	\$207,000	\$167,077

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