
TURTLE ROCK HATCHERY

**A COMPILATION AND SUMMARY OF
HOT AUDITS FOR STEELHEAD AND
SUMMER CHINOOK**

JULY 1998

**HATCHERY EVALUATION REPORT
SUMMARY FOR**

Turtle Rock Hatchery
- **Steelhead**
- **Summer Chinook**

**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 Summer Chinook, and Steelhead at Turtle Rock 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 Turtle Rock Hatchery is located along the Columbia River 2 miles upstream from Rocky Reach Dam and is operated by the Washington Department of Fish and Wildlife. The hatchery includes the old Rocky Reach Hatchery, located just downstream from Rocky Reach Dam. The hatchery is used for incubation and rearing of summer chinook and the rearing of steelhead.

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.

Turtle Rock - Summer Chinook and Steelhead Results

The Turtle Rock Hatchery includes one rearing pond, 8 vinyl-lined raceways, and incubation facilities. The Turtle Rock Hatchery is operated as mitigation facilities for the fishery impacts caused by the construction and operation of Rocky Reach Dam.

Summer Chinook

The Turtle Rock - Summer Chinook program was in compliance with few of the performance measures. This was primarily a result of failing to fill out the audit form and/or provide the required information to the audit team.

The specific areas in which the Turtle Rock - Summer 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 fishery contribution studies
- Develop alarm logs
- Develop approved genetics monitoring and evaluation program
- Develop disease-free water supply for incubation and early rearing
- Develop monitoring and evaluation plan
- Develop smoltification goal and monitor
- Develop specific incubation and rearing standards for IHOT Operations Plan
- Document adult contribution, smolt production, and smolt to adult survival
- Document compliance with IHOT density and loading criteria for ponds
- Document DO and TGP levels
- Follow IHOT density criteria just prior to release
- Follow IHOT incubation standards for loading and flow criteria
- Follow IHOT QA/QC for feed preparation
- Follow IHOT requirements for storage of buckets of feed
- Install alarms in incubation facilities
- Install alarms in raceway headboxes and rearing ponds
- Install security alarms
- Modify program and rearing to meet release goal
- Replace intake screens at Turtle Rock
- Review IHOT Operations Plan and discussion with staff
- Review IHOT temperature criteria for incubation and rearing
- Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, and contaminants

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

Steelhead

The Turtle Rock - Steelhead program was in compliance with few of the performance measures. This was primarily a result of failing to fill out the audit form and/or provide the required information to the audit team.

The specific areas in which the Turtle Rock - 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
- Construct acclimation ponds for releases
- Develop alarm logs
- Develop approved genetics monitoring and evaluation program
- Develop monitoring and evaluation plan
- Develop smoltification goal and monitor
- Develop specific rearing standards for IHOT Operations Plan
- Document adult contribution, fry-to-smolt survival, smolt production, and smolt to adult survival
- Document compliance with IHOT density and loading criteria for ponds
- Document density just prior to release, number at release, size at release, and dates of release
- Document DO and TGP levels
- Follow IHOT QA/QC for feed preparation
- Follow IHOT requirements for storage of buckets of feed
- Install alarms in raceway headboxes and rearing ponds
- Install security alarms
- Replace intake screens at Turtle Rock
- Review IHOT Operations Plan and discussion with staff
- Review IHOT requirement for disease-free water for rearing
- Review IHOT temperature criteria for rearing
- Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, 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

Name:	Turtle Rock Hatchery
Stock/Species:	Summer Chinook Steelhead
Operating Agency:	Washington Department of Fish and Wildlife
Funding Agency:	Chelan PUD
Location:	The Turtle Rock Hatchery is located along the Columbia River 2 miles upstream from Rocky Reach Dam. The hatchery includes the old Rocky Reach Hatchery, located just downstream from Rocky Reach Dam.
Address:	Turtle Rock Hatchery Eastbank Fish Hatchery Complex Washington Department of Fish and Wildlife 13246 Lincoln Rock Road E East Wenatchee, WA 98802
Hatchery Manager:	Mr. Steve Robards
Phone:	(509) 884-8301
Fax:	(509) 886-0823
Purpose:	The Turtle Rock Hatchery is operated as mitigation facilities for the fishery impacts caused by the construction and operation of Rocky Reach Dam.
Production Goal:	Summer Chinook Produce 200,000 yearling summer chinook for release from Turtle Rock Hatchery Produce 1,600,000 subyearling summer chinook for release from Turtle Rock Hatchery Steelhead No information supplied
Water Supply:	Water available for use in the Turtle Rock Hatchery averages 12,000 gpm and is from the Columbia River. Water rights for the Rocky Reach Satellite total 3,613 and are from the Columbia River

Facilities:

Adult Holding:	None
Incubation:	None
Early Rearing:	None
Raceways:	None
Rearing Ponds:	1 concrete rearing pond - 29,700 cf
Satellite Facilities:	Rocky Reach Satellite
	40 8-stack vertical incubators (320 trays)
	8 vinyl-lined raceways - 1,600 cf each

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 Turtle Rock - Steelhead

This section presents the corrective actions required to bring the Turtle Rock - Steelhead and Summer Chinook 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 are desirable for either operational or safety considerations.

Table 3a. Remedial Actions Required at Turtle Rock - Steelhead

Remedial Action Required	Cost	PMS¹
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		
Review IHOT Operations Plan and discussion with staff	----	2
Develop monitoring and evaluation plan	----	3
Document adult contribution, fry-to-smolt survival, smolt production, and smolt to adult survival	----	4a, 4f, 4g, 4h
Review IHOT temperature criteria for rearing	----	5a
Review IHOT requirement for disease-free water for rearing	----	5h
Develop alarm logs	----	6
Follow IHOT QA/QC for feed preparation	----	12
Follow IHOT requirements for storage of buckets of feed	----	12
Develop specific rearing standards for IHOT Operations Plan	----	19
Document compliance with IHOT density and loading criteria for ponds	----	19
Develop smoltification goal and monitor	----	22a1
Document density just prior to release, number at release, size at release, and dates of release	----	22a2, 22a4, 22a5, 22a6
Conduct fishery contribution studies	----	24
Develop approved genetics monitoring and evaluation program	----	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		
Document DO and TGP levels	----	5b
Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, and contaminants	----	5c-5g
Type 4 - Remedial actions requiring significant capital expenditures		
Install alarms in raceway headboxes and rearing ponds	\$10,000	6
Install security alarms	\$5,000	6
Replace intake screens at Turtle Rock	Replacement underway	10
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Construct acclimation ponds for releases	----	

Table 3b. Remedial Actions Required at Turtle Rock - Summer Chinook

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		
Review IHOT Operations Plan and discussion with staff	----	2
Develop monitoring and evaluation plan	----	3
Document adult contribution, smolt production, and smolt to adult survival	----	4a, 4g, 4h
Review IHOT temperature criteria for incubation and rearing	----	5a
Develop alarm logs	----	6
Follow IHOT QA/QC for feed preparation	----	12
Follow IHOT requirements for storage of buckets of feed	----	12

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
Follow IHOT incubation standards for loading and flow criteria	----	18
Document compliance with IHOT density and loading criteria for ponds	----	19
Develop smoltification goal and monitor	----	22a1
Follow IHOT density criteria just prior to release	----	22a2
Modify program and rearing to meet release goal	----	22a4
Conduct fishery contribution studies	----	24
Develop approved genetics monitoring and evaluation program	----	43

Remedial Action Required	Cost	PMS¹
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Document DO and TGP levels	----	5b
Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, and contaminants	----	5c-5g
Type 4 - Remedial actions requiring significant capital expenditures		
Install alarms in raceway headboxes and rearing ponds	\$10,000	6
Install alarms in incubation facilities	\$5,000	6
Install security alarms	\$5,000	6
Replace intake screens at Turtle Rock	replacement underway	10
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Develop disease-free water supply for incubation and early rearing	----	5h, 28

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 Turtle Rock - Steelhead and Summer Chinook 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:
Turtle Rock - Steelhead**

Year	Fisheries ¹ (Broodyear)	Spawning Grounds ¹ (Broodyear)	Hatchery ¹ (Broodyear)	Total Combined Contribution ² (Broodyear)	Smolt to Adult Survival (percent)
1984					
1985					
1986					
1987	No information provided	No information provided	No information provided	No information provided	No information provided
1988	No information provided	No information provided	No information provided	No information provided	No information provided
1989	No information provided	No information provided	No information provided	No information provided	No information provided
1990	No information provided	No information provided	No information provided	No information provided	No information provided
1991	No information provided	No information provided	No information provided	No information provided	No information provided
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:
Turtle Rock - Summer Chinook**

Year	Fisheries¹ (Broodyear)	Spawning Grounds¹ (Broodyear)	Hatchery¹ (Broodyear)	Total Combined Contribution² (Broodyear)	Smolt to Adult Survival (percent)
1984					
1985					
1986					
1987	No information provided	No information provided	No information provided	No information provided	No information provided
1988	No information provided	No information provided	No information provided	No information provided	No information provided
1989	No information provided	No information provided	No information provided	No information provided	No information provided
1990	No information provided	No information provided	No information provided	No information provided	No information provided
1991	No information provided	No information provided	No information provided	No information provided	No information provided
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 Turtle Rock Hatchery are presented in Table 5 by program. The detailed breakdown of the Steelhead, and Summer Chinook expenditures at this hatchery are presented in separate tables (Tables 6a and 6b).

Table 5. Annual Operating Expenses - Turtle Rock Hatchery

Program	1993	1994	1995
1. Summer Chinook	Not possible to compute with the information supplied	Not possible to compute with the information supplied	Not possible to compute with the information supplied
2. Steelhead	Not possible to compute with the information supplied	Not possible to compute with the information supplied	Not possible to compute with the information supplied
3.			
4.			
5.			
Total Hatchery Costs	\$269,523	\$315,898	\$419,893

Table 6a. Detailed Expenditures at Turtle Rock Hatchery by Program

Steelhead

Component	1994	1995	1996
Personnel Costs	\$130,620	\$132,722	\$152,294
Operational Costs	\$76,188	\$120,461	\$204,884
Capital Costs			
Indirect Costs			
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs	\$62,715	\$62,715	\$62,715
Total Hatchery Costs	\$269,523	\$315,898	\$419,893
Source of Funds			
Program Production (lb)			
Total Production (lb)			
Program as Percent of Total	No information provided	No information provided	No information provided
Program Costs	Not possible to compute with information provided	Not possible to compute with information provided	Not possible to compute with information provided

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 Turtle Rock Hatchery by Program

Summer Chinook

Component	1994	1995	1996
Personnel Costs	\$130,620	\$132,722	\$152,294
Operational Costs	\$76,188	\$120,461	\$204,884
Capital Costs			
Indirect Costs			
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs	\$62,715	\$62,715	\$62,715
Total Hatchery Costs	\$269,523	\$315,898	\$419,893
Source of Funds			
Program Production (lb)			
Total Production (lb)			
Program as Percent of Total	No information provided	No information provided	No information provided
Program Costs	Not possible to compute with information provided	Not possible to compute with information provided	Not possible to compute with information provided

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