
GRAYS RIVER HATCHERY

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

JULY, 1998

**HATCHERY EVALUATION REPORT
SUMMARY FOR
Grays River Hatchery
- Fall Chinook
- 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 two separate Hatchery Evaluation Reports for Fall Chinook and Coho at Grays River 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.

Grays River Hatchery is located at about river mile 2 of the West Fork Grays River, a lower Columbia River tributary. The hatchery is operated by the Washington Department of Fish and Wildlife and used for adult collection, incubation, and of lower river Tule fall chinook, early (Type S) coho, and winter and summer 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 basin-wide 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.

Grays River Hatchery - Fall Chinook and Coho Results

The Grays River facility includes 2 ponds for adult holding, 10 concrete raceways, 1 rearing pond, and incubation facilities. The hatchery was authorized under the Mitchell Act and began operating in 1961 as part of the Columbia River Fisheries Development Program -- a program to mitigate for fishery losses caused by hydroelectric system development.

FALL CHINOOK

The Grays River Hatchery - Fall Chinook program was in general compliance with most of the performance measures. In the area of program objectives, the hatchery needed to improve its adult returns. The audit found that the hatchery was not in compliance with spawning and rearing temperature criteria, water quality monitoring requirements, alarm requirements, and regional review of feed preparation protocols, which are all facilities requirements. The hatchery was not in compliance with incubation and rearing loading criteria, smoltification goal and monitoring program, and disinfection protocols. The hatchery did not have a Genetics Monitoring and Evaluation Program in place.

The specific areas in which the Grays River Hatchery - 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:

- Continue to eye eggs at other facilities
- Develop alarm log
- Develop approved genetics M&E program
- Develop smoltification goal and monitor
- Develop specific incubation and rearing standards for IHOT Operations Plan
- Follow IHOT disinfection protocols for exteriors and interiors of transport vehicles
- Follow IHOT incubation standards
- Follow IHOT QA/QC test for feed preparation
- Follow IHOT recommendations for checking alarms on a daily basis
- Follow IHOT temperature criteria for transportation
- Improve smolt-to-adult survival
- Increase flow to adult ponds during rearing or reduce production
- Install chiller for incubation water
- Install intake alarms and telephone pagers
- Monitor and record DO and TGP
- Provide disease-free water supply for early rearing
- Redesign rearing pond outlet structure
- Review IHOT water temperature criteria for spawning and rearing
- Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants
- Use appropriate treatment when disease is evident

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

COHO

The Grays River Hatchery - Coho program was in general compliance with most of the performance measures. In the area of program objectives, the hatchery needed to improve its adult returns. The audit found that the hatchery was not in compliance with spawning and rearing temperature criteria, water quality monitoring requirements, alarm requirements, and regional review of feed preparation protocols, which are all facilities requirements. The hatchery was not in compliance with incubation and rearing loading criteria, smoltification goal and monitoring program, size at release, and disinfection protocols. The hatchery did not have a Genetics Monitoring and Evaluation Program in place.

The specific areas in which the Grays River Hatchery - 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:

- Continue to eye eggs at Toutle facility
- Develop alarm log
- Develop approved genetics M&E program
- Develop smoltification goal and monitor
- Develop specific incubation and rearing standards for IHOT Operations Plan
- Follow IHOT disinfection protocols for exteriors and interiors of transport vehicles
- Follow IHOT incubation standards
- Follow IHOT QA/QC test for feed preparation
- Follow IHOT recommendations for checking alarms on a daily basis
- Follow IHOT temperature criteria for transportation
- Improve smolt-to-adult survival
- Increase flow to adult ponds during rearing or reduce production
- Install intake alarms and telephone pagers
- Monitor and DO and TGP
- Provide disease-free water supply for early rearing
- Reconcile differences between IHOT and WDFW release size
- Redesign rearing pond outlet structures
- Review IHOT water temperature criteria for spawning and rearing
- Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants
- Use appropriate therapy for disease

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

Facility Description

Name: Grays River Hatchery

Stock/Species: Fall Chinook
Coho (S type)
Winter Steelhead
Summer Steelhead

Operating Agency: Washington Department of Fish and Wildlife

Funding Agency: Mitchell Act through the National Marine Fisheries Service

Location: Grays River Hatchery is located at about river mile 2 of the West Fork Grays River, a lower Columbia River tributary

Address: Grays River Hatchery
Washington Department of Fish and Wildlife
P.O. Box 128
Grays River, WA 98621

Hatchery Manager: Mr. Ken Jasma

Phone: (360) 465-2446
Fax: (360) 465-2697

Purpose: The hatchery was authorized under the Mitchell Act and began operating in 1961 as part of the Columbia River Fisheries Development Program -- a program to mitigate for fishery losses caused by hydroelectric system development.

Production Goal: **Fall Chinook**
Produce 1,200,000 subyearlings for on-station release
Provide eggs/fish to other facilities

Type-S Coho
Produce 150,000 yearlings for on-station release
Provide eggs/fish to other facilities

Steelhead
Produce varying number of winter and summer steelhead yearlings for release in local streams

Water Supply:

Water rights total 22,448 gpm from three sources: the West Fork Grays River, an unnamed stream, and wells. Most of the water is supplied by gravity flow from an intake located approximately 0.5 miles upstream from the hatchery. During the summer and fall months, virtually the entire river flow is diverted for hatchery use.

Facilities:

| | |
|-----------------------|--|
| Adult Holding: | 2 concrete adult holding ponds - 10,800 cf each (also used for rearing) |
| Incubation: | 48 vertical stack incubators (16 stack units) 32 deep troughs 1 shallow trough |
| Early Rearing: | 32 deep troughs |
| Raceways: | 10 raceways - 5,275 cf each |
| Rearing Ponds: | 1 dirt pond - 49,500 cf |
| Satellite Facilities: | None in current use |

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 Grays River Hatchery - Fall Chinook and Coho

This section presents the corrective actions required to bring the Grays River Hatchery - Fall Chinook and Coho 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.

| Remedial Action Required | Cost | PMS¹ |
|---|-------------|------------------------|
| Type 3 - Remedial actions requiring changes in monitoring coverage or interval | | |
| Monitor and record DO and TGP | ---- | 5b |
| Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants | ---- | 5c-5g |
| Type 4 - Remedial actions requiring significant capital expenditures | | |
| Install chiller for incubation water (500 gpm) | \$300,000 | 5a |
| Provide disease-free water supply for early rearing | \$10,000 | 5h, 28 |
| Install security alarms | 10,000 | 6 |
| Install intake alarms and telephone pagers | \$5,000 | 6 |
| Redesign rearing pond outlet structure | \$2,500 | 13 |
| Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time | | |
| Increase flow to adult ponds during rearing or reduce production | ---- | 19 |

Table 3b. Remedial Actions Required at Grays River Hatchery - Coho

| Remedial Action Required | Cost | PMS² |
|--|-------------|------------------------|
| Type 1 - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery | | |
| Improve adult returns | ---- | 4c, 4g, 4i |
| Type 2 - Remedial actions requiring changes in agency policies or procedures | | |
| Continue to eye eggs at Toutle facility | ---- | 4d |
| Use appropriate therapy for disease | ---- | 4f |
| Improve smolt-to-adult survival | ---- | 4h |
| Review IHOT water temperature criteria for spawning and rearing | ---- | 5a |

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 alarm log | ---- | 6 |
| Follow IHOT recommendations for checking alarms on a daily basis | ---- | 6 |
| Follow IHOT QA/QC test for feed preparation | ---- | 12 |
| Develop specific incubation and rearing standards for IHOT Operations Plan | ---- | 18-19 |
| Follow IHOT incubation standards | ---- | 18 |
| Develop smoltification goal and monitor | ---- | 22a1 |
| Reconcile differences between IHOT and WDFW release size | | 22a5 |
| Follow IHOT disinfection protocols for exteriors and interiors of transport vehicles | ---- | 23 |
| Follow IHOT temperature criteria for transportation | ---- | 23 |
| Develop approved genetics M&E program | ---- | 43 |
| Monitor and record DO and TGP | ---- | 5b |
| Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants | ---- | 5c-5g |
| Type 4 - Remedial actions requiring significant capital expenditures | | |
| Provide disease-free water supply for early rearing | \$10,000 | 5h, 28 |
| Install intake alarms and telephone pagers | \$5,000 | 6 |
| Install security alarms | 10,000 | 6 |
| Redesign rearing pond outlet structures | \$2,500 | 13 |
| Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time | | |
| Increase flow to adult ponds during rearing or reduce production | ---- | 19 |

Hatchery Contribution to Fisheries, Spawning Grounds, and Hatcheries

This section presents the audit findings for the Grays River Hatchery - Fall Chinook and Coho 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:
Grays River Hatchery - Fall Chinook**

| Year | Fisheries ¹ (Broodyear) | Spawning Grounds ¹ (Broodyear) | Hatchery ¹ (Broodyear) | Total Combined Contribution ² (Broodyear) | Smolt to Adult Survival (percent) |
|------|---------------------------------------|---|--------------------------------------|---|---|
| 1983 | | | | | |
| 1984 | | | | | |
| 1985 | 210 | 15 | 11 | 236 | 0.23% |
| 1986 | No Information provided | No Information provided | No Information provided | No Information provided | No Information provided |
| 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 | 166 | 9 | 17 | 192 | 0.07% |
| 1990 | No Information provided | No Information provided | No Information provided | No Information provided | No Information provided |
| 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:
Grays River Hatchery - Coho**

| Year | Fisheries¹ (Broodyear) | Spawning Grounds¹ (Broodyear) | Hatchery¹ (Broodyear) | Total Combined Contribution² (Broodyear) | Smolt to Adult Survival (percent) |
|-------------|--|---|---|--|--|
| 1983 | | | | | |
| 1984 | | | | | |
| 1985 | | | | | |
| 1986 | | | | | |
| 1987 | | | | | |
| 1988 | 882 | 10 | 300 | 1,192 | 3.71% |
| 1989 | 34 | No Information provided | 6 | 40 | 0.13% |
| 1990 | 8 | No Information provided | 3 | 11 | 0.04% |
| 1991 | 2 | No Information provided | 20 | 22 | 0.04% |
| 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 Grays River Hatchery are presented in Table 5 by program. The detailed breakdown of program expenditures at this hatchery are presented in separate tables (Tables 6a, 6b, and 6c).

Table 5. Annual Operating Expenses - Grays River Hatchery

| Program | 1994 | 1995 | 1996 |
|--------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Fall Chinook (Tule) | \$15,185 | \$38,465 | \$114,505 |
| 2. Coho (S-type) | \$195,511 | \$184,949 | \$77,104 |
| 3. Winter and Summer Steelhead | Included with Beaver Creek Hatchery | Included with Beaver Creek Hatchery | Included with Beaver Creek Hatchery |
| 4. | | | |
| 5. | | | |
| Total Hatchery Costs | \$210,908 | \$223,639 | \$191,802 |

Table 6a. Detailed Expenditures at Grays River Hatchery by Program

Fall Chinook

| Component | 1994 | 1995 | 1996 |
|------------------------------------|-------------|-------------|-------------|
| Personnel Costs | \$91,064 | \$91,064 | \$81,544 |
| Operational Costs | \$73,311 | \$80,635 | \$75,311 |
| Capital Costs | | | |
| Indirect Costs | \$46,533 | \$51,940 | \$34,947 |
| Lumped Hatchery Costs ¹ | | | |

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 | | | |
| Total Hatchery Costs | \$210,908 | \$223,639 | \$191,802 |
| Source of Funds | | | |
| | | | |
| | | | |
| Program Production (lb) | 3,205 | 4,287 | 20,232 |
| Total Production (lb) | 44,086 | 24,915 | 33,840 |
| Program as Percent of Total | 7.2% | 17.2% | 59.7% |
| Program Costs | \$15,185 | \$38,465 | \$114,505 |

**Table 6b. Detailed Expenditures at Grays River Hatchery by Program
Coho (S-Type)**

| Component | 1994 | 1995 | 1996 |
|------------------------------------|------------------|------------------|------------------|
| Personnel Costs | \$91,064 | \$91,064 | \$81,544 |
| Operational Costs | \$73,311 | \$80,635 | \$75,311 |
| Capital Costs | | | |
| Indirect Costs | \$46,533 | \$51,940 | \$34,947 |
| Lumped Hatchery Costs ¹ | | | |
| Lumped Third-Party Costs | | | |
| Total Hatchery Costs | \$210,908 | \$223,639 | \$191,802 |
| Source of Funds | | | |
| | | | |
| | | | |
| Program Production (lb) | 40,881 | 20,628 | 13,608 |
| Total Production (lb) | 44,086 | 24,915 | 33,840 |
| Program as Percent of Total | 92.7% | 82.7% | 40.2% |
| Program Costs | \$195,511 | \$184,949 | \$77,104 |

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 6c. Detailed Expenditures at Grays River Hatchery by Program

Steelhead

| Component | 1993 | 1994 | 1995 |
|------------------------------------|---|---|---|
| Personnel Costs | | | |
| Operational Costs | | | |
| Capital Costs | | | |
| Indirect Costs | | | |
| Lumped Hatchery Costs ¹ | | | |
| Lumped Third-Party Costs | | | |
| Total Hatchery Costs | | | |
| Source of Funds | | | |
| I | | | |
| | | | |
| Program Production (lb) | | | |
| Total Production (lb) | | | |
| Program as Percent of Total | | | |
| Program Costs | Included with Beaver Creek Hatchery | Included with Beaver Creek Hatchery | Included with Beaver Creek Hatchery |

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