
CARSON HATCHERY

A COMPILATION AND SUMMARY OF
IHOT AUDIT FOR SPRING CHINOOK

JULY 1998

**HATCHERY EVALUATION REPORT
SUMMARY FOR**

**Carson NFH
– Spring Chinook**

**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 Spring Chinook at Carson 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 13 miles northwest of Carson in Skamania County, Washington. It lies in a heavily forested valley within the Gifford Pinchot National Forest at the confluence of Tyee Creek and Wind River. The hatchery is operated by the US Fish and Wildlife Service and is used for adult collection, incubation, and rearing of spring 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.

Carson NFH - Spring Chinook Results

The Carson NFH facility includes two ponds for adult holding, 46 concrete raceways, 2 rearing ponds, and incubation facilities. Carson NFH was placed into operation in 1938 to rear and release chinook salmon and trout. The hatchery was remodeled in 1956 under the Mitchell Act in an attempt to establish a spring chinook run in the Wind River. The goal of the hatchery is to restore and maintain upriver Columbia River spring chinook salmon stocks.

The Carson NFH - Spring 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 screen approach criteria, water quality monitoring requirements, alarm requirements, and pathology-free water criteria, which are all facilities requirements. The hatchery exceeded its loading criteria for rearing and needs to develop specific incubation and rearing standards for the IHOT Operations Plan, smoltification goals, and a smoltification monitoring program. The hatchery did not have a Genetics Monitoring and Evaluation Program.

The specific areas in which the Carson NFH - Spring 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:

- Design intake screens that meet IHOT screen criteria (Tyee Creek and Wind River)
- Develop alarm log
- Develop approved genetics M&E plan
- Develop smoltification goal and monitor
- Develop specific incubation and rearing standards for IHOT Operations Plan
- Improve fry-to-smolt survival
- Install flow alarm in incubation facility
- Modify rearing program to meet IHOT loading criteria for rearing
- Monitor TGP and record
- Provide disease-free water for incubation and early rearing
- Review IHOT temperature criteria for rearing
- Run analysis for missing water chemistry parameters and missing contaminant parameters
- Set up exchange training details between other hatcheries and agencies

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: Carson National Fish Hatchery

Stock/Species: Spring Chinook

Operating Agency: U.S. Fish and Wildlife Service

Funding Agency: Mitchell Act

Location: The hatchery is located 13 miles northwest of Carson in Skamania County, Washington. It lies in a heavily forested valley within the Gifford Pinchot National Forest at the confluence of Tyee Creek and Wind River.

Address: 14041 Wind River Highway
Carson, WA 98610

Hatchery Manager: Mr. Bruce M. McLeod

Phone: (509) 427-5905
Fax: (509) 427-4238

Purpose: Carson NFH was placed into operation in 1938 to rear and release chinook salmon and trout. The hatchery was remodeled in 1956 under the Mitchell Act in an attempt to establish a spring chinook run in the Wind River. The hatchery also provides spring chinook eggs for re-establishing spring chinook runs in some mid-Columbia River tributaries. The goal of the hatchery is to restore and maintain upriver Columbia River spring chinook salmon stocks.

Production Goal: **Spring Chinook**

Produce 1.42 million spring chinook smolts for on-station release.

Produce 100,000 spring chinook smolts for off-station release.

Provide 2 million spring chinook eggs to Big White Salmon Ponds and state agencies.

Water Supply: Water rights total 42,639 gpm from three sources: Tyee Creek, Tyee Spring, and the Wind River. The main water source for the hatchery is Tyee Creek; the Wind River is used as a secondary supply.

Facilities:

Adult Holding: 2 concrete brood ponds - 23,360 cf each

Incubation: 24 troughs - 45 cf each

| | |
|-----------------------|------------------------------------------------|
| Early Rearing: | 24 starter troughs - 105 cf each |
| Raceways: | 46 concrete raceways - 1,280 cf each |
| Rearing Ponds: | 2 dirt rearing ponds - 63,180 cf and 17,212 cf |
| Satellite Facilities: | None |

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 Carson NFH - Spring Chinook

This section presents the corrective actions required to bring the Carson NFH - Spring 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 Carson NFH - Spring Chinook

| Remedial Action Required | Cost | PMS¹ |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------------------------------------|
| <p>Type 1 - 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>Type 2 - Remedial actions requiring changes in agency policies or procedures</p> <p>Review IHOT temperature criteria for rearing</p> <p>Develop alarm log</p> <p>Install building security system</p> <p>Develop specific incubation and rearing standards for IHOT Operations Plan</p> <p>Modify rearing program to meet IHOT loading criteria for rearing</p> <p>Develop smoltification goal and monitor</p> <p>Set up exchange training details between other hatcheries and agencies</p> <p>Develop approved genetics M&E plan</p> | ---- | 5a 6 6 18-19 19 22a1 43 |
| <p>Type 3 - Remedial actions requiring changes in monitoring coverage or interval</p> <p>Monitor TGP and record</p> <p>Run analysis for missing water chemistry parameters and missing contaminant parameters</p> | ---- | 5b 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 | | |
| Install flow alarm in incubation facility | \$10,000 | 6 |
| Design intake screens that meet IHOT screen criteria (Tye Creek and Wind River) | \$480,000 | 10 |
| Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time | | |
| Improve fry-to-smolt survival | ---- | 4f |
| Provide disease-free water 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 Carson NFH - Spring 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:
Carson NFH - Spring 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 | | | | | |
| 1988 | 6326 | 465 | 1628 | 8419 | 0.40 |
| 1989 | 2884 | 68 | 129 | 3081 | 0.13 |
| 1990 | 45 | 0 | 654 | 699 | 0.0002 |
| 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.

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 Carson 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 - Carson NFH

| Program | 1994 | 1995 | 1996 |
|-----------------------------|------------------|------------------|------------------|
| 1. Spring Chinook | \$612,635 | \$697,721 | \$478,290 |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Hatchery Costs | \$612,635 | \$697,721 | \$478,290 |

**Table 6. Detailed Expenditures at Carson NFH by Program
Spring Chinook**

| Component | 1994 | 1995 | 1996 |
|------------------------------------|------------------|------------------|------------------|
| Personnel Costs | \$265,852 | \$261,233 | \$230,582 |
| Operational Costs ¹ | \$156,821 | \$153,103 | \$171,051 |
| Capital Costs | \$189,962 | \$283,385 | \$76,657 |
| Indirect Costs | | | |
| Lumped Hatchery Costs ² | | | |
| Lumped Third-Party Costs | | | |
| Total Hatchery Costs | \$612,635 | \$697,721 | \$478,290 |
| Source of Funds | | | |
| NMFS | 100% | 100% | 100% |
| | | | |
| Program Production (lb) | | | |
| Total Production (lb) | | | |
| Program as Percent of Total | 100% | 100% | 100% |
| Program Costs | \$612,635 | \$697,721 | \$478,290 |

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¹ Includes cyclical maintenance contract projects estimated to be equal to \$20,000/year.

² When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.