HATCHERY EVALUATION REPORT

Oxbow Hatchery - Coho
(Tanner Creek Stock: Bonneville Releases)

December 1996
Integrated Hatchery Operations Team (IHOT)
HATCHERY EVALUATION REPORT

Oxbow Hatchery - Coho (Tanner Creek Stock: Bonneville Releases)

An Independent Audit Based on Integrated Hatchery Operations Team (IHOT) Performance Measures

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Executive Summary

This report presents the findings of the independent audit of the Oxbow Hatchery - Coho (Tanner Creek Stock: Bonneville Releases) program. Oxbow Hatchery is located approximately 2 miles east of Cascade Locks, Oregon. Herman Creek Ponds, Lower Herman Creek Ponds, and Wahkeena Pond are operated as satellite facilities to Oxbow Hatchery. The hatchery is used for incubation and early rearing of Spring Chinook, Fall Chinook, and Coho.

The audit was 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.

Background

The audit is being conducted as a requirement of the Northwest Power Planning Council (NPPC) ÒStrategy for SalmonÓ 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) 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)*. That document 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.
Oxbow Hatchery - Coho

(Tanner Creek Stock: Bonneville Releases) Results

The Oxbow Hatchery includes 12 concrete raceways, incubation, and early rearing facilities. Oxbow Hatchery was originally constructed in 1913 to provide additional rearing facilities for Bonneville Hatchery. It was relocated to its present site in 1937 following construction of Bonneville Dam. Oxbow was operated as part of the Columbia River Fisheries Development Program (Mitchell Act) - a program to enhance declining fish runs in the Columbia River Basin.

The Oxbow Hatchery - Coho (Tanner Creek Stock: Bonneville Releases) program was in general compliance with most of the performance measures. The audit found that the hatchery was not in compliance with the water quality monitoring requirements and needed double screen for Herman Creek Ponds, The hatchery was not in compliance with the requirements for regional oversight of feed manufacturing, and needed to develop specific rearing standards.

The specific areas in which the Oxbow Hatchery - Coho (Tanner Creek Stock: Bonneville Releases) 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 and maintain alarm log
- Develop smoltification goal and implement program to monitor smoltification
- Develop specific rearing standards for the IHOT Operations Plan
- Follow IHOT recommendations for regional oversight of feed production
- Monitor and document DO and TPG for Oxbow Springs and Herman Creek
- Provide second set of screens for upper Herman Ponds
- Review IHOT temperature criteria for rearing
- Run analysis for chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants for Oxbow Springs and Herman Creek
Non-compliance issues resulting from items beyond human control or Performance Measures not relevant to this hatchery (Type 1 in Table 3, Section 4 of this report) were not listed above.
## Facility Description

<table>
<thead>
<tr>
<th>Name:</th>
<th>Oxbow Hatchery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stock/Species:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coho - Tanner Creek Stock (Umatilla Releases)</td>
</tr>
<tr>
<td></td>
<td>Coho - Tanner Creek Stock (CEDC Releases)</td>
</tr>
<tr>
<td></td>
<td>Coho - Mixed Tanner Creek/Sandy River Stock (CEDC Releases)</td>
</tr>
<tr>
<td></td>
<td>Coho - Tanner Creek Stock (Bonneville Releases)</td>
</tr>
<tr>
<td></td>
<td>Spring Chinook (Clackamas Stock)</td>
</tr>
<tr>
<td>Operating Agency:</td>
<td>Oregon Department of Fish &amp; Wildlife</td>
</tr>
<tr>
<td>Funding Agency:</td>
<td>Mitchell Act</td>
</tr>
<tr>
<td>Location:</td>
<td>Oxbow Hatchery is located approximately 2 miles east of Cascade Locks, Oregon.</td>
</tr>
<tr>
<td>Address:</td>
<td>Oxbow Fish Hatchery</td>
</tr>
<tr>
<td></td>
<td>Oregon Department of Fish &amp; Wildlife</td>
</tr>
<tr>
<td></td>
<td>Star Route, Box 750</td>
</tr>
<tr>
<td></td>
<td>Cascade Locks, OR 97014</td>
</tr>
<tr>
<td>Hatchery Manager:</td>
<td>Mr. Larry Dimmick</td>
</tr>
<tr>
<td>Phone:</td>
<td>(541) 374-8540</td>
</tr>
<tr>
<td>Fax:</td>
<td>(503) 374-8827</td>
</tr>
</tbody>
</table>
Purpose:
Oxbow Hatchery was originally constructed in 1913 to provide additional rearing facilities for Bonneville Hatchery. It was relocated to its present site in 1937 following construction of Bonneville Dam. Oxbow was operated as part of the Columbia River Fisheries Development Program (Mitchell Act) - a program to enhance declining fish runs in the Columbia River Basin.

The goal of the hatchery is to produce coho and spring chinook that will contribute to the Northeast Pacific and Columbia River commercial, tribal, and sports fisheries.

Production Goal:

Coho

- Produce 2 million fingerlings (83,850 lb) at Upper Herman Creek for transfer to Bonneville
- Produce 0.825 million fingerlings (at Lower Herman Creek Ponds (Tanner Creek Stock) for transfer to Lower Columbia River net pens
- Produce 0.600 million fingerlings at Lower Herman Creek Ponds (Mixed Tanner Creek and Sandy River Stock) for transfer to Lower Columbia River net pens
- Produce 500,000 smolts (33,300 lb) at Lower Herman Creek Ponds for release into the Umatilla River.

Spring Chinook

- Produce 637,000 fingerlings (5,095 lb) for transfer to Clackamas Hatchery

Water Supply:
The hatchery obtains its water supply from Oxbow Springs through gravity flow. The Oxbow Springs flow dwindles to about 300 gpm in...
the summer and fall and is not used for rearing fish during that period.

Facilities:

Adult Holding: None

Incubation: 32 deep troughs - 28 cf each
32 shallow troughs - 13 cf each

Early Rearing: 32 deep troughs - 28 cf each
32 shallow troughs - 13 cf each

Raceways: 12 concrete raceways - 4,695 cf each

Rearing Ponds: None

Satellite Facilities: Herman Creek Satellite

2 concrete raceways - 2,604 each
2 Asphalt ponds - 46,900 cf each

Lower Herman Creek Satellite

3 concrete ponds - 10,800 cf each

Wahkeena Satellite

1 18 acre pond
Compliance Status

The hatchery audits are based on compliance with written IHOT performance measures. These performance measures are documented in *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (referred to as *IHOT 1995* in this report).

The purpose of the performance measures is to implement new basinwide policies that provide regional guidelines for operating anadromous hatcheries in the Columbia Basin.

The audit focuses on performance measures for IHOT policies that cover (1) hatchery performance standards, (2) fish health, (3) ecological interaction, and (4) genetics. These performance measures are intended to guide hatchery operations once production is established. For that reason, the hatchery operations audit included broodstock collection, spawning, incubation of eggs, fish rearing and feeding, fish release, equipment maintenance and operations, and personnel training. Production priorities are beyond the scope of this audit.

Based on *IHOT 1995*, a detailed 109-page audit form was developed. The audit form divided the performance measures into six major sections along major program and technical criteria areas. Two additional sections (sections 1 and 8) include general information and expenditure information needed for this Hatchery Evaluation Report and blank forms for additional comments. The following is the basic structure of the IHOT audit form:

Section 1 Performance Measures for General Information and Expenditure Information (PMs General 1-2)

Several performance measures are repeated in various sections of the audit form. These performance measures overlap in *IHOT 1995* and were retained to allow individuals interested in specific portions of the audit (such as Genetics or Fish Health) to determine the compliance status of all performance measures for a given topic in one location. A repeated performance measure is indicated by shaded text.

**The Hatchery Audit Process**

The hatchery audit will be conducted over a 2-year period that concludes in 1997. At each hatchery, a five-step process was used to complete the overall hatchery audit. This process consisted of research and onsite visits. The site visit at the Oxbow Hatchery was conducted on October 29, 1996.

The following is the five-step audit process:

1. Information was obtained from headquarters.

2. The hatchery manager was asked to fill out and return the *Audit Form*. 
3. A 1-2 day site audit visit was conducted at each hatchery. During that visit an audit team inspected facilities, reviewed hatchery records, discussed audit form responses, and developed remedial action plans when appropriate.

4. During the site visit, the compliance status of each performance measure was discussed with the hatchery manager and IHOT representative. A portion of the Hatchery Evaluation Report was sent to the hatchery manager following the audit visit as a Compliance Report. That Compliance Report is Table 2 of this report.

5. Information from steps 1-4 was used to prepare a draft Hatchery Evaluation Report. This draft report was submitted to the operating agencies for review of the information used to determine compliance. Based on review and comments, a final Hatchery Evaluation Report was developed. The final report documents the compliance of a particular hatchery with the IHOT performance measures and presents cost estimates to correct any deficiencies.

Compliance Status of  Oxbow Hatchery - Coho
(Tanner Creek Stock: Bonneville Releases)

The following table includes information on life-stages that are held on this facility for some portion of their rearing cycle (Table 1). For multi-facility programs, summary cost and contribution data is presented at the facility where rearing occurs. For the compliance status relating to performance measures that do not occur at this hatchery, please refer to the Hatchery Evaluation Reports for the hatcheries and stocks listed in Table 1. A check mark (4) indicates that the specific life-stage is held at this facility.
This section documents the compliance status of the Oxbow Hatchery - Coho (Tanner Creek Stock: Bonneville Releases) program. Each performance measure is presented in a table taken from the audit form (Table 2). The compliance status is identified by the following categories:

- **N/A** (not applicable)
- **Yes** (in compliance)
- **?** (unknown; generally due to unavailability of information to determine compliance)
- **No** (not in compliance).

Remedial actions are suggested for performance measures not in compliance. These remedial actions are grouped into categories and listed in Section 4 of this report, where the cost of the required remedial actions is also presented.
Table 1  Summary Program Information for  Oxbow Hatchery - Coho (Tanner Creek Stock: Bonneville Releases)

<table>
<thead>
<tr>
<th>Component</th>
<th>Location of Adult Holding, Spawning, Incubation, and Rearing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bonneville Hatchery</td>
</tr>
<tr>
<td>Adult Collection</td>
<td>4</td>
</tr>
<tr>
<td>Adult Holding</td>
<td>4</td>
</tr>
<tr>
<td>Spawning</td>
<td>4</td>
</tr>
<tr>
<td>Fertilization</td>
<td>4</td>
</tr>
<tr>
<td>Incubation</td>
<td>4</td>
</tr>
<tr>
<td>green-to-eyed</td>
<td>4</td>
</tr>
<tr>
<td>eyed-to-hatch</td>
<td>4</td>
</tr>
<tr>
<td>Rearing</td>
<td>4</td>
</tr>
<tr>
<td>fry</td>
<td>4</td>
</tr>
<tr>
<td>fingerlings</td>
<td>4</td>
</tr>
<tr>
<td>smolts</td>
<td></td>
</tr>
<tr>
<td>Acclimation/release</td>
<td>4</td>
</tr>
<tr>
<td>PM #</td>
<td>Description of Performance Measure</td>
</tr>
<tr>
<td>------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Are the hatchery programs outlined in a subbasin management plan?</td>
</tr>
<tr>
<td>2</td>
<td>Is the hatchery operating under a current hatchery operational plan?</td>
</tr>
<tr>
<td></td>
<td>Is it understood by staff?</td>
</tr>
<tr>
<td></td>
<td>Is it being followed?</td>
</tr>
<tr>
<td>3</td>
<td>Is a hatchery monitoring and evaluation plan in place?</td>
</tr>
<tr>
<td></td>
<td>Do you have a written monitoring and evaluation plan?</td>
</tr>
<tr>
<td>4a</td>
<td>Adult contribution to fisheries, spawning grounds, and hatchery</td>
</tr>
<tr>
<td>4b</td>
<td>Adult pre-spawning survival as compared with established goal</td>
</tr>
<tr>
<td>#4c</td>
<td>Egg-take as compared with established hatchery goal</td>
</tr>
<tr>
<td>#4d</td>
<td>Green-egg to eyed-egg survival as compared with established goal</td>
</tr>
<tr>
<td>#4e</td>
<td>Eyed-egg to fry survival as compared with established goal</td>
</tr>
<tr>
<td>#4f</td>
<td>Fry to smolt survival as compared with established goal</td>
</tr>
<tr>
<td>#4g</td>
<td>Production as compared with established goal</td>
</tr>
<tr>
<td>#4h</td>
<td>Percent survival (smolt to adult) as compared with established goal</td>
</tr>
<tr>
<td>#4i</td>
<td>Number of eggs, fry, fingerlings, smolts, and/or adults to meet basinwide needs</td>
</tr>
<tr>
<td>PM #</td>
<td>Description of Performance Measure</td>
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<tr>
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<td></td>
</tr>
<tr>
<td>#5a</td>
<td>Temperature</td>
</tr>
<tr>
<td></td>
<td>Does your water temperature meet the criteria for spawning?</td>
</tr>
<tr>
<td></td>
<td>Does your water temperature meet the criteria for incubation?</td>
</tr>
<tr>
<td></td>
<td>Does your water temperature meet the criteria for rearing?</td>
</tr>
<tr>
<td>#5b</td>
<td>Dissolved gases</td>
</tr>
<tr>
<td></td>
<td>Is the oxygen level near saturation?</td>
</tr>
<tr>
<td></td>
<td>Is the dissolved nitrogen level less than saturation?</td>
</tr>
<tr>
<td>#5c</td>
<td>Chemistry</td>
</tr>
<tr>
<td></td>
<td>Ammonia (un-ionized)</td>
</tr>
<tr>
<td></td>
<td>Carbon Dioxide</td>
</tr>
<tr>
<td></td>
<td>Chlorine</td>
</tr>
<tr>
<td></td>
<td>pH</td>
</tr>
<tr>
<td></td>
<td>Copper</td>
</tr>
<tr>
<td></td>
<td>Hydrogen Sulfide</td>
</tr>
<tr>
<td></td>
<td>Iron</td>
</tr>
<tr>
<td>#5d</td>
<td>Turbidity</td>
</tr>
<tr>
<td>-------</td>
<td>-----------</td>
</tr>
<tr>
<td></td>
<td>Does your turbidity meet the criteria?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>N/A</th>
<th>Yes</th>
<th>?</th>
<th>No</th>
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<tr>
<td>Zinc</td>
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<td>No data</td>
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<td>PM #</td>
<td>Description of Performance Measure</td>
<td>Compliance Status</td>
<td>Basis for Compliance or Non-Compliance</td>
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<tr>
<td>------</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>N/A  Yes ? No</td>
<td></td>
</tr>
<tr>
<td>#5e</td>
<td>Alkalinity and hardness</td>
<td>4   No data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Does your alkalinity and hardness meet the criteria?</td>
<td>4   No data</td>
<td></td>
</tr>
<tr>
<td>#5f</td>
<td>Nitrite</td>
<td>4   No data</td>
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</tr>
<tr>
<td></td>
<td>Does your nitrite meet the criteria?</td>
<td>4   No data</td>
<td></td>
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<tr>
<td>#5g</td>
<td>Contaminants</td>
<td>4   No data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aldrin</td>
<td>4   No data</td>
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</tr>
<tr>
<td></td>
<td>Endrin</td>
<td>4   No data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dieldrin</td>
<td>4   No data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Heptachlor</td>
<td>4   No data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chlordane</td>
<td>4   No data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Methoxychlor</td>
<td>4   No data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lindane</td>
<td>4   No data</td>
<td></td>
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<tr>
<td></td>
<td>Malathion</td>
<td>4   No data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Guthion</td>
<td>4   No data</td>
<td></td>
</tr>
<tr>
<td>#5h</td>
<td>Pathogens</td>
<td>4   No data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>What portions of the hatchery have disease-free water?</td>
<td>4   No data</td>
<td></td>
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<tr>
<td></td>
<td>Adult holding</td>
<td>4   Not on station for this stock</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Incubation</td>
<td>4   Not on station for this stock</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N/A</td>
<td>Yes</td>
<td>?</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----</td>
<td>-----</td>
<td>---</td>
</tr>
<tr>
<td>Early rearing</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rearing</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td>4</td>
<td></td>
</tr>
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<td></td>
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<td></td>
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<tr>
<td>PM #</td>
<td>Description of Performance Measure</td>
<td>Compliance Status</td>
<td>Basis for Compliance or Non-Compliance</td>
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<td>------</td>
<td>-----------------------------------</td>
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<td>----------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N/A Yes ? No</td>
<td></td>
</tr>
<tr>
<td>#6</td>
<td>Alarm Systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Do the following areas have alarms?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intake</td>
<td>Yes</td>
<td>Inspection of facilities/Discussion</td>
</tr>
<tr>
<td></td>
<td>Large rearing ponds and adult holding ponds</td>
<td>Yes</td>
<td>Inspection of facilities/Discussion</td>
</tr>
<tr>
<td></td>
<td>Raceway headboxes and rearing ponds</td>
<td>Yes</td>
<td>Do not use for this stock</td>
</tr>
<tr>
<td></td>
<td>Incubation facilities</td>
<td>Yes</td>
<td>Do not use for this stock</td>
</tr>
<tr>
<td></td>
<td>Quarantine areas and facilities</td>
<td>Yes</td>
<td>None on station</td>
</tr>
<tr>
<td></td>
<td>Water treatment systems</td>
<td>Yes</td>
<td>None on station</td>
</tr>
<tr>
<td></td>
<td>Security</td>
<td>Yes</td>
<td>Site security not a problem</td>
</tr>
<tr>
<td></td>
<td>Are there outside systems and buzzers in onsite residences?</td>
<td>Yes</td>
<td>No but staff carry pagers</td>
</tr>
<tr>
<td></td>
<td>Are water flow alarms checked daily?</td>
<td>Yes</td>
<td>Discussion</td>
</tr>
<tr>
<td></td>
<td>Are all other alarms checked weekly?</td>
<td>Yes</td>
<td>Only water flow alarms on station</td>
</tr>
<tr>
<td></td>
<td>Is there a log of alarms for emergencies, tests, and maintenance requirements?</td>
<td>Yes</td>
<td>Review of records/Discussion</td>
</tr>
<tr>
<td></td>
<td>Are telephone pagers used?</td>
<td>Yes</td>
<td>Use radio pagers</td>
</tr>
<tr>
<td>#7</td>
<td>Adult collection and holding facilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>Yes</td>
<td>?</td>
<td>No</td>
</tr>
<tr>
<td>-----</td>
<td>-----</td>
<td>---</td>
<td>----</td>
</tr>
<tr>
<td>Do you meet the adult holding criteria?</td>
<td>4</td>
<td></td>
<td>Adult collection at Bonneville; holding at Cascade</td>
</tr>
<tr>
<td>PM #</td>
<td>Description of Performance Measure</td>
<td>Compliance Status</td>
<td>Basis for Compliance or Non-Compliance</td>
</tr>
<tr>
<td>------</td>
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<td></td>
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<td>N/A</td>
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<tr>
<td>#8</td>
<td>Incubation facilities</td>
<td>4</td>
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</tr>
<tr>
<td></td>
<td>Type 1: None</td>
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<td>Do you have an adequate number of units for the overall program?</td>
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<td>Type 2: None</td>
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<td>Do you have an adequate number of units for the overall program?</td>
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<tr>
<td>#9</td>
<td>Rearing facilities</td>
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<td>Type 1: Large asphalt ponds</td>
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<td>Do you have an adequate number of units for the overall program?</td>
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<td>Type 2: ________________</td>
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<td>Type 3: ________________</td>
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<tr>
<td>#10</td>
<td>Screening facilities</td>
<td>N/A</td>
<td>Yes</td>
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<tr>
<td>Do you meet the approach velocity criteria?</td>
<td>4</td>
<td>Review of records</td>
<td></td>
</tr>
<tr>
<td>Are the fish screens regularly cleaned?</td>
<td>4</td>
<td>Discussion</td>
<td></td>
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<tr>
<td>Does the screen mesh meet screen opening criteria?</td>
<td>4</td>
<td>Review of Records</td>
<td></td>
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<tr>
<td>Are rearing containers double screened for fish that should not be released to adjacent water?</td>
<td>4</td>
<td>Inspection of facilities/Discussion</td>
<td></td>
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<td></td>
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<tr>
<td>#11</td>
<td>Predator control facilities</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>Are your predation control facilities effective?</td>
<td>4</td>
<td>Inspection of facilities/Discussion</td>
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Provide second set of screens for upper Herman Creek ponds.
<table>
<thead>
<tr>
<th>PM #</th>
<th>Description of Performance Measure</th>
<th>Compliance Status</th>
<th>Basis for Compliance or Non-Compliance</th>
<th>Remedial Action Needed for Compliance</th>
</tr>
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<tr>
<td></td>
<td></td>
<td>N/A Yes ? No</td>
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<tr>
<td>#12</td>
<td><strong>Food storage facilities and quality control</strong></td>
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<tr>
<td></td>
<td>Does the storage of dry/semi-moist/moist foods (dry&lt;12%; semi-moist 12-20%; moist &gt;20% moisture) follow food manufacturer’s recommendations?</td>
<td>4</td>
<td>Inspection of facilities/Discussion</td>
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<tr>
<td></td>
<td>Does a regional quality control officer oversee production procedures and monitor:</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Verification by feed manufacturer that ingredients meet specifications?</td>
<td>4</td>
<td>Correspondence from regional quality control (QC) officer. QC officer no longer funded to do this task</td>
<td>Follow IHOT recommendations for regional QC and monitoring of food production</td>
</tr>
<tr>
<td></td>
<td>Ensure feed does not contain unwanted drugs or other additives?</td>
<td>4</td>
<td>Correspondence from regional quality control (QC) officer. QC officer no longer funded to do this task</td>
<td>See above</td>
</tr>
<tr>
<td></td>
<td>Analyze ingredients contained in the final food product to ensure that feed specifications have been met?</td>
<td>4</td>
<td>Correspondence from regional quality control (QC) officer. QC officer no longer funded to do this task</td>
<td>See above</td>
</tr>
<tr>
<td></td>
<td>Are the foods stored and handled according to the following criteria?</td>
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<tr>
<td>N/A</td>
<td>Yes</td>
<td>?</td>
<td>No</td>
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<tr>
<td>Moist pellets should not exceed 10°F at point of delivery.</td>
<td>4</td>
<td></td>
<td>Do not measure on arrival. Delivered in refrigerated trucks</td>
<td></td>
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<tr>
<td>Moist pellets should be removed from freezer just prior to feeding.</td>
<td>4</td>
<td></td>
<td>Inspection/Discussion</td>
<td></td>
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<tr>
<td>Do not leave buckets of feed or feed containers outside exposed to light or heat.</td>
<td>4</td>
<td></td>
<td>Inspection/Discussion</td>
<td></td>
</tr>
<tr>
<td>Open bags of feed should be fed within 1 to 2 days except when feeding small groups of fish.</td>
<td>4</td>
<td></td>
<td>Inspection/Discussion</td>
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<tr>
<td>Automatic feeder hoppers and bulk storage facilities should be insulated against excessive temperatures (80°F and above).</td>
<td>4</td>
<td></td>
<td>Inspection/Discussion</td>
<td></td>
</tr>
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<td>#13</td>
<td>Release facilities</td>
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<td></td>
<td>Do the release facilities ensure that fish are not subjected to adverse conditions?</td>
<td>4</td>
<td>No on-station releases</td>
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<td>#14</td>
<td>Pollution abatement facilities</td>
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<td>Do the pollution abatement facilities meet all federal and state regulations (or good engineering practice)?</td>
<td>4</td>
<td>Inspection of facilities/Discussion</td>
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<td>Are pollution abatement facilities operated correctly?</td>
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<td>Inspection of facilities/Discussion</td>
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<tr>
<td>#15</td>
<td>Transportation facilities</td>
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<td></td>
<td>Are the transport systems adequate to meet IHOT performance measures for transportation practices?</td>
<td>4</td>
<td>Use transportation from the region as well as other adjacent hatcheries</td>
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<td>#16</td>
<td>Broodstock selection practices</td>
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<tr>
<td></td>
<td>Is the donor selection process document attached? (PM #40a)</td>
<td>4</td>
<td>Existing program; does not apply</td>
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<tr>
<td></td>
<td>Was the donor selection outline followed in selecting the hatchery broodstock? (PM #40b-c)</td>
<td>4</td>
<td>Existing program; does not apply</td>
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<td>#17</td>
<td>Spawning practices</td>
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<td></td>
<td>Were the appropriate number of spawners, male/female ratios, and fertilization protocols used? (PM #42c-g)</td>
<td>4</td>
<td>Spawning practice covered at Cascade Hatchery</td>
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<tr>
<td>#18</td>
<td>Incubation practices</td>
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<td></td>
<td>Are specific incubation standards listed in the hatchery operations plan?</td>
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<td>Incubation a Cascade Hatchery; not Oxbow</td>
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<tr>
<td></td>
<td>Are incubation practices written?</td>
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<td>Incubation a Cascade Hatchery; not Oxbow</td>
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<tr>
<td></td>
<td>Incubation Type 1: (see PM #8)</td>
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<td>Incubation a Cascade Hatchery; not Oxbow</td>
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<td></td>
<td>Do you meet the loading and flow criteria?</td>
<td>4</td>
<td>Incubation a Cascade Hatchery; not Oxbow</td>
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<td>Incubation Type 2: (see PM #8)</td>
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<td>Incubation a Cascade Hatchery; not Oxbow</td>
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<td>Do you meet the loading and flow criteria?</td>
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<td>#19</td>
<td><strong>Rearing practices</strong></td>
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<td>Are specific rearing standards listed in the hatchery operations plan?</td>
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<td>Are rearing practices written?</td>
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<td>Rearing Unit Type 1: large asphalt ponds (see PM #9)</td>
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<td>Do you meet the density and DI criteria?</td>
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<td>Do you meet the Loading and FI criteria?</td>
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<td></td>
<td>Rearing Unit Type 2: (see PM #9)</td>
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<td>Do you meet the density and DI criteria?</td>
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<td>Rearing Unit Type 3: (see PM #9)</td>
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<td>Do you meet the density and DI criteria?</td>
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<td>Do you meet the Loading and FI criteria?</td>
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<td>#20</td>
<td><strong>Smolt quality</strong></td>
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<td>Do you produce a high quality smolt?</td>
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<td>#21</td>
<td>Fish health management practices</td>
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<td>Are the monthly hatchery monitoring visits being conducted? (PM #26)</td>
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<td></td>
<td>Are the annual broodstock inspections being conducted? (PM #27)</td>
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<td>Is there pathogen-free water (PM #5h) and are the sanitation procedures being followed? (PM #28)</td>
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<td>Are the following water quality parameters within criteria? (PM #5a-5g)</td>
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<td>Water temperature</td>
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<td>Dissolved gases</td>
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<td>Alkalinity and hardness</td>
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<td>Nitrite</td>
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<td>Contaminants</td>
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<td>Are rearing standards being followed? (PM #19)</td>
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<tr>
<td>Are egg and fish transfer/release requirements met? (PM #31)</td>
<td>N/A</td>
<td>Yes</td>
<td>?</td>
<td>No</td>
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<td>4</td>
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<td>Review by audit team pathologist</td>
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<tr>
<td>#22a</td>
<td>Does hatchery performance meet requirements outlined in the regional hatchery policies and in subbasin and hatchery plans for the following areas?</td>
<td></td>
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</tr>
<tr>
<td>#22a1</td>
<td><strong>Percent smoltification</strong>&lt;br&gt;Do you measure percent smoltification?</td>
<td>4</td>
<td>Not measured</td>
<td>Develop smoltification criteria and implement program to measure smoltification</td>
</tr>
<tr>
<td></td>
<td>Did you meet the smoltification criteria?</td>
<td>4</td>
<td>Do not have any criteria</td>
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<tr>
<td>#22a2</td>
<td><strong>Rearing density (prior to release)</strong></td>
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<td>Did you meet the rearing density criteria just prior to release?</td>
<td>4</td>
<td>Transferred to Bonneville prior to release</td>
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<tr>
<td>#22a3</td>
<td><strong>Disease condition (at release)</strong></td>
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<tr>
<td></td>
<td>Did you meet all disease regulations just prior to release?</td>
<td>4</td>
<td>Transferred to Bonneville prior to release. Disease regulations for transport are met</td>
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</tr>
<tr>
<td>#22a4</td>
<td><strong>Number (at release)</strong></td>
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<tr>
<td></td>
<td>Did you meet the release number goal?</td>
<td>4</td>
<td>Transferred to Bonneville; not released at Oxbow</td>
<td></td>
</tr>
<tr>
<td>#22a5</td>
<td>Size at release</td>
<td>N/A</td>
<td>Yes</td>
<td>?</td>
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<tr>
<td>Did you meet the size goal?</td>
<td>4</td>
<td>Transferred to Bonneville; not released at Oxbow</td>
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<table>
<thead>
<tr>
<th>#22a6</th>
<th>Dates of release</th>
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<th>Yes</th>
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<tr>
<td>Did you meet the release date goal?</td>
<td>4</td>
<td>Transferred to Bonneville; not released at Oxbow</td>
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</table>

<table>
<thead>
<tr>
<th>#22a7</th>
<th>Location of release</th>
<th>N/A</th>
<th>Yes</th>
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</thead>
<tbody>
<tr>
<td>Did you release the fish at the specified location?</td>
<td>4</td>
<td>Transferred to Bonneville; not released at Oxbow</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>#22b</th>
<th>Are fish reared in the subbasin or acclimated in the subbasin?</th>
<th>N/A</th>
<th>Yes</th>
<th>?</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are the fish reared in the subbasin?</td>
<td>4</td>
<td>Reared in Herman Creek water</td>
<td>None</td>
<td></td>
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<tr>
<td>Are the fish acclimated in the subbasin?</td>
<td>4</td>
<td>Acclimated in Tanner Creek water at Bonneville</td>
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</table>

<table>
<thead>
<tr>
<th>#22c</th>
<th>Is the release strategy appropriate for the program?</th>
<th>N/A</th>
<th>Yes</th>
<th>?</th>
<th>No</th>
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<tr>
<td></td>
<td>4</td>
<td>Discussion</td>
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<tr>
<td>#23</td>
<td>Transportation facilities</td>
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<table>
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<tr>
<th>Description</th>
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<th>Remedial Action Needed for Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do transportation equipment and personnel receive disinfection before and after use?</td>
<td>4</td>
<td>All transportation facilities provided by other ODF&amp;W hatcheries</td>
<td></td>
</tr>
<tr>
<td>Is the fish tank interior disinfected using a solution of 200 ppm active chlorine for 30 minutes minimum or formaldehyde gas generation method (relative humidity of 60% for 2 hrs)?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td>Is the exterior of the fish transport vehicle disinfected using high pressure steam (115-130°C), high temperature acid, or with 200 ppm chlorine for 30 minutes?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td>Is the fish transport vehicle (cab) disinfected using 600 ppm quaternary ammonia compounds (1.5 ml of 50% stock solution/liter water)?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td>Is other equipment disinfected including fish pumps, nets, egg sorters, waders, boots, rain gear, hoses and other equipment using one of the following solutions?</td>
<td>4</td>
<td>See above</td>
<td></td>
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</table>

200 ppm chlorine for 30 minutes
<table>
<thead>
<tr>
<th></th>
<th>N/A</th>
<th>Yes</th>
<th>?</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>600 ppm quaternary ammonia compound for 30 minutes</strong></td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>200 ppm iodophor solution for 10 minutes</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Do personnel wear protective garments when handling fish eggs or cultural water?</strong></td>
<td>4</td>
<td></td>
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</tr>
<tr>
<td><strong>Do the fish transport truck/chassis and tank/unit receive an inspection and service prior to the release season?</strong></td>
<td>4</td>
<td></td>
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<tr>
<td><strong>Is a daily service inspection completed before starting up and leaving for the day?</strong></td>
<td>4</td>
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<tr>
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<tr>
<td>#23</td>
<td>Transportation facilities</td>
<td></td>
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<tr>
<td></td>
<td>Does the fish transport unit receive an inspection prior to loading?</td>
<td>4</td>
<td>All transportation facilities provided by other ODF&amp;W hatcheries</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Does a pre-loading inspection covering tank water level, pumps or aerators, oxygen injection system settings, displacement gauge, and truck loading/hauling density tables checked and reviewed occur prior to loading fish in the transport unit?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Do hauling criteria include checking the fish 45 minutes to 1 hour after loading?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td></td>
<td>When fish are active and systems are functioning properly, is the oxygen concentration reduced and maintained at approximately 8 ppm?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is water temperature in the transportation unit maintained within the 42-48 °F range?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Do fish releasing procedures include the following criteria?</td>
<td></td>
<td></td>
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<td></td>
<td>N/A</td>
<td>Yes</td>
<td>?</td>
<td>No</td>
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<tr>
<td>Releasing the fish at the correct release site or into the correct water body.</td>
<td>4</td>
<td>?</td>
<td></td>
<td>See above</td>
</tr>
<tr>
<td>Tempering or the difference between the liberation tank and the target water body should not exceed 10°F.</td>
<td>4</td>
<td>?</td>
<td></td>
<td>See above</td>
</tr>
<tr>
<td>The liberation hose should be angled so that fish gently hit the water. Using a tripod is a method of ensuring the hose will stay at the proper angle.</td>
<td>4</td>
<td>?</td>
<td></td>
<td>See above</td>
</tr>
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<tr>
<td>24</td>
<td>Evaluation practices</td>
<td>N/A</td>
<td>4 Review of records for CWT program</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Has the hatchery conducted fishery contribution studies to:</td>
<td></td>
<td></td>
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<td></td>
<td>Determine the requirements for evaluating and improving management programs?</td>
<td>Yes</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Develop guidelines that define the geographical area and identify component stocks (hatchery and/or wild) that comprise the management unit?</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Develop guidelines that define if the proper stocks of fish are currently being used?</td>
<td>Yes</td>
<td></td>
<td></td>
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<td></td>
<td>Determine which management units contribute to a specific fishery and the time periods of those contributions?</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Determine the relative contributions of the various management units to a specific fishery over the different time periods?</td>
<td>Yes</td>
<td></td>
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<tr>
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<tr>
<td>#25</td>
<td>Training practices</td>
<td></td>
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<tr>
<td></td>
<td>Does the hatchery have a training schedule for its staff?</td>
<td>4</td>
<td>Discussion</td>
<td></td>
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<tr>
<td></td>
<td>Does each staff member have a personal training plan approved by a supervisor and reviewed annually?</td>
<td>4</td>
<td>Discussion</td>
<td></td>
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<tr>
<td></td>
<td>Does the hatchery routinely exchange training details between other hatcheries and agencies?</td>
<td>4</td>
<td>Discussion</td>
<td></td>
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<tr>
<td></td>
<td>Does the hatchery encourage and reward off-duty training of staff?</td>
<td>4</td>
<td>Discussion</td>
<td></td>
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<tr>
<td></td>
<td>Does the hatchery conduct monthly staff meetings?</td>
<td>4</td>
<td>Discussion</td>
<td></td>
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<td></td>
<td>N/A</td>
<td>Yes</td>
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<tr>
<td>#26</td>
<td>Are monthly hatchery monitoring visits being conducted by a qualified fish health specialist as described below?</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Conduct visit at least monthly</td>
<td>4</td>
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<td></td>
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<tr>
<td></td>
<td>Monitoring conducted by qualified fish health specialist</td>
<td>4</td>
<td></td>
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<td></td>
<td>Examine a representative sample of healthy and moribund fish from each lot.</td>
<td>4</td>
<td></td>
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<td></td>
<td>Review fish culture practices with hatchery manager.</td>
<td>4</td>
<td></td>
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<td></td>
<td>Report finding and results of necropsies on standard form.</td>
<td>4</td>
<td></td>
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<td></td>
<td>Recommend appropriate drug or chemical treatment.</td>
<td>4</td>
<td></td>
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<td></td>
<td>Summarize fish health status or stock prior to release or transfer to another facility.</td>
<td>4</td>
<td></td>
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<tr>
<td>#27</td>
<td>Are all of the functions of the hatchery yearly monitoring visits being completed as described below?</td>
<td></td>
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<tr>
<td></td>
<td>N/A</td>
<td>Yes</td>
<td>？</td>
<td>No</td>
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<tr>
<td>Annually examine each broodstock for the presence of reportable viral pathogens.</td>
<td></td>
<td>4</td>
<td></td>
<td>Review of records at regional lab by audit team pathologist</td>
</tr>
<tr>
<td>Annually screen each salmon broodstock for the presence of <em>Renibacterium salmoninarum</em>.</td>
<td>4</td>
<td></td>
<td></td>
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<tr>
<td>Conduct inspection by or under the supervision of qualified fish health specialist.</td>
<td></td>
<td>4</td>
<td></td>
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<td></td>
<td>N/A Yes ? No</td>
<td></td>
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<tr>
<td>#28</td>
<td>Is the hatchery following accepted sanitation procedures?</td>
<td></td>
<td>Available from Oxbow Springs; but not needed for this program</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Are there any sources of pathogen-free water, especially for incubation and early rearing?</td>
<td>4</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Are the hatchery sanitation procedures understood and being followed as described below?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Disinfect/water harden eggs in iodophor?</td>
<td>4</td>
<td>No spawning at this hatchery</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Are foot baths containing disinfectant placed at the incubation facility's entrance and exit?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is equipment and rain gear utilized in broodstock handling or spawning sanitized prior to its use elsewhere in the hatchery?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is equipment used to collect dead fish sanitized prior to its use in another pond and/or lot of fish?</td>
<td>4</td>
<td>Inspection of facilities/Discussion</td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>N/A</td>
<td>Yes</td>
<td>?</td>
<td>No</td>
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<tr>
<td>Is equipment, including vehicles used to transfer fish between facilities, disinfected prior to use with any other fish lots or at any other location?</td>
<td></td>
<td>4</td>
<td>?</td>
<td>No</td>
</tr>
<tr>
<td>Are rearing vessels sanitized after fish are removed and prior to introducing a new fish lot or stock?</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
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<tr>
<td>Are dead fish properly disposed of?</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
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<tr>
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<td></td>
<td>N/A Yes ? No</td>
<td></td>
<td></td>
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<tr>
<td>#29</td>
<td>Are water quality parameters being followed?</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Are the following water quality parameters within criteria? (PM #5a-5g)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Water temperature</td>
<td>4</td>
<td>Review of records</td>
<td>See PM #5a</td>
</tr>
<tr>
<td></td>
<td>Dissolved gases</td>
<td>4</td>
<td>No dissolved nitrogen data</td>
<td>See PM #5b</td>
</tr>
<tr>
<td></td>
<td>Chemistry</td>
<td>4</td>
<td>No data</td>
<td>See PM #5c</td>
</tr>
<tr>
<td></td>
<td>Turbidity</td>
<td>4</td>
<td>No data</td>
<td>See PM #5d</td>
</tr>
<tr>
<td></td>
<td>Alkalinity and hardness</td>
<td>4</td>
<td>No data</td>
<td>See PM #5e</td>
</tr>
<tr>
<td></td>
<td>Nitrite</td>
<td>4</td>
<td>No data</td>
<td>See PM #5f</td>
</tr>
<tr>
<td></td>
<td>Contaminants</td>
<td>4</td>
<td>No data</td>
<td>See PM #5g</td>
</tr>
<tr>
<td></td>
<td>Go to PM #21</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>#30</td>
<td>Are incubation and rearing standards being followed?</td>
<td></td>
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<tr>
<td></td>
<td>Are the incubation practices following the IHOT incubation criteria? (PM #18)</td>
<td>4</td>
<td>Incubation occurs at Cascade Hatchery</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Are the rearing practices following the IHOT criteria? (PM #19)</td>
<td>4</td>
<td>Discussion</td>
<td>See PM #19</td>
</tr>
<tr>
<td></td>
<td>Go to rearing practices PM #18-PM #19</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>#31</td>
<td>Are egg and fish transfer/release requirements met?</td>
<td>4</td>
<td>Discussion</td>
<td></td>
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<tr>
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<td></td>
<td>N/A</td>
<td>Yes</td>
<td>?</td>
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<tr>
<td>#32</td>
<td>Is the hatchery’s program outlined in a subbasin management plan?</td>
<td>4</td>
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<tr>
<td>#33</td>
<td>Is the hatchery operating under a current hatchery operational plan?</td>
<td>4</td>
<td></td>
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<tr>
<td>#34</td>
<td>Is a hatchery monitoring and evaluation plan in place?</td>
<td>4</td>
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<tr>
<td>#35</td>
<td>Does the hatchery program meet requirements established in the regional hatchery policies and subbasin planning documents in the following areas: species, stock, broodstock collection location, broodstock numbers, broodstock collection strategy, and spawning and egg-take protocols?</td>
<td></td>
<td>All these elements occur at Cascade and/or Bonneville hatcheries</td>
<td></td>
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<tr>
<td></td>
<td>Does the hatchery program meet the requirements for the following?</td>
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<td></td>
<td>Species protocols (PM #4a)</td>
<td>4</td>
<td>See above</td>
<td></td>
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<tr>
<td></td>
<td>Stock protocols (PM #4a)</td>
<td>4</td>
<td>See above</td>
<td></td>
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<tr>
<td></td>
<td>Broodstock collection location protocols (PM #41b)</td>
<td>4</td>
<td>See above</td>
<td></td>
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<td></td>
<td>Broodstock numbers protocols (PM #42c)</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Broodstock collection strategy protocols (PM #41b-d)</td>
<td>4</td>
<td>See above</td>
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<td></td>
<td>N/A</td>
<td>Yes</td>
<td>?</td>
<td>No</td>
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<td>Spawning protocols (PM #42d-e)</td>
<td>4</td>
<td></td>
<td></td>
<td>See above</td>
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<tr>
<td>Egg-take protocols (PM #42f-g)</td>
<td>4</td>
<td></td>
<td></td>
<td>See above</td>
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<tr>
<td>#36</td>
<td>Does the hatchery’s performance meet requirements outlined in the regional hatchery policies and in subbasin and hatchery plans for the following areas: percent smoltification, rearing density, disease condition, and the number, size date(s), and location of release?</td>
<td>N/A</td>
<td>Not measured; no criteria</td>
<td>See PM #22a1</td>
</tr>
<tr>
<td></td>
<td>Percent smoltification (PM #22a1)</td>
<td>4</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Rearing density (PM #22a2)</td>
<td>4</td>
<td>Transferred to Bonneville</td>
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<td></td>
<td>Disease condition (PM #22a3)</td>
<td>4</td>
<td>Discussion</td>
<td></td>
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<tr>
<td></td>
<td>Number at release (PM #22a4)</td>
<td>4</td>
<td>Transferred to Bonneville</td>
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<td></td>
<td>Size at release (PM #22a5)</td>
<td>4</td>
<td>Transferred to Bonneville</td>
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<td></td>
<td>Date of release (PM #22a6)</td>
<td>4</td>
<td>Transferred to Bonneville</td>
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</tr>
<tr>
<td></td>
<td>Location of release (PM #22a7)</td>
<td>4</td>
<td>Transferred to Bonneville</td>
<td></td>
</tr>
<tr>
<td>#37</td>
<td>Are fish reared in the subbasin or acclimated in the subbasin?</td>
<td>N/A</td>
<td>Yes</td>
<td>?</td>
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<tr>
<td></td>
<td>See PM #22b</td>
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<thead>
<tr>
<th>#38</th>
<th>Is the release strategy appropriate for the program?</th>
<th>N/A</th>
<th>Yes</th>
<th>?</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>4</td>
<td></td>
<td></td>
<td>Discussion</td>
</tr>
<tr>
<td></td>
<td>See PM #22c</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PM #</td>
<td>Description of Performance Measure</td>
<td>Compliance Status</td>
<td>Basis for Compliance or Non-Compliance</td>
<td>Remedial Action Needed for Compliance</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>-----------------------------------</td>
<td>-------------------</td>
<td>---------------------------------------</td>
<td>--------------------------------------</td>
<td></td>
</tr>
<tr>
<td>#39</td>
<td>For new programs, has a broodstock collection plan been developed?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is the broodstock collection plan written?</td>
<td>4</td>
<td>Existing Program; does not apply</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For a non-captive broodstock program:</td>
<td>4</td>
<td>Existing Program; does not apply</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Was an unbiased, representative sample collected?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Was the recommended number of broodstock collected?</td>
<td>4</td>
<td>Existing Program; does not apply</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For a captive broodstock program:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Were captive brood progeny excluded as donors for propagating the next generation of the captive broodstock program?</td>
<td>4</td>
<td>Existing Program; does not apply</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Were full-sib crosses avoided?</td>
<td>4</td>
<td>Existing Program; does not apply</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is the broodstock collection plan understood and being followed by staff?</td>
<td>4</td>
<td>Existing Program; does not apply</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#40</td>
<td>For a new program, was the donor selection outline followed in selecting the hatchery broodstock?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#40a</td>
<td>Is a donor selection plan written?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#40b</td>
<td>Was the donor selection outline followed in selecting the broodstock?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#40c</td>
<td>Was the target stock recommended in the donor selection process actually used?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>N/A</th>
<th>Yes</th>
<th>?</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>#40</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#40a</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#40b</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#40c</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Existing Program; does not apply
<table>
<thead>
<tr>
<th>PM #</th>
<th>Description of Performance Measure</th>
<th>Compliance Status</th>
<th>Basis for Compliance or Non-Compliance</th>
<th>Remedial Action Needed for Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>#41</td>
<td>For existing programs, were the broodstock collection procedures followed?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>N/A</td>
<td>Broodstock collection occurs at Bonneville with holding at spawning at Cascade</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#41a</td>
<td>Is the broodstock collection plan written?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Does the broodstock collection plan follow the guideline:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#41b</td>
<td>Was an unbiased, representative sample collected?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#41c</td>
<td>Was the recommended number of broodstock collected?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#41d</td>
<td>Were the broodstock collection procedures in hatchery operation plan understood and followed?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td>PM #</td>
<td>Description of Performance Measure</td>
<td>Compliance Status</td>
<td>Basis for Compliance or Non-Compliance</td>
<td>Remedial Action Needed for Compliance</td>
</tr>
<tr>
<td>------</td>
<td>---------------------------------------------------------------------------------------------------</td>
<td>-------------------</td>
<td>---------------------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>#42</td>
<td>Was the appropriate number of spawners, male/female ratios, and fertilization protocols used?</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#42a</td>
<td>Are the spawning protocols written?</td>
<td>4</td>
<td>These elements occur at Cascade Hatchery</td>
<td></td>
</tr>
<tr>
<td>#42b</td>
<td>Are daily or weekly spawning logs available?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td>#42c</td>
<td>Was the appropriate number of spawners used?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td>#42d</td>
<td>Did you attempt to spawn all collected broodstock and randomize mating with respect to age class, and other traits?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td>#42e</td>
<td>Was the sex-ratio within the limits given in the performance standards?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td>#42f</td>
<td>Were the fertilization protocols followed?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td>#42g</td>
<td>If the hatchery needed to reduce the number of eggs retained, was this done by representative sampling of each male/female cross?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td>PM #</td>
<td>Description of Performance Measure</td>
<td>Compliance Status</td>
<td>Basis for Compliance or Non-Compliance</td>
<td>Remedial Action Needed for Compliance</td>
</tr>
<tr>
<td>------</td>
<td>-----------------------------------------------------------------------------------------------------</td>
<td>-------------------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------</td>
</tr>
<tr>
<td>#43</td>
<td>Is there a genetics monitoring and evaluation program in place?</td>
<td>N/A</td>
<td>Not responsible for broodstock collection, spawning, or release. These occur at Cascade and Bonneville hatcheries</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is a genetics monitoring and evaluation program available?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Does the plan address the following elements listed in IHOT:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Does the program have elements needed to meet evaluation goals 1-4?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Has a qualified geneticist reviewed and endorsed the program (goal 5)?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Will the program collect the data and maintain the records needed to evaluate compliance on an ongoing basis (goal 5)?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is the program understood and followed by staff?</td>
<td>4</td>
<td>See above</td>
<td></td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery</td>
</tr>
<tr>
<td>2</td>
<td>Remedial actions requiring changes in agency policies or procedures</td>
</tr>
<tr>
<td>3</td>
<td>Remedial actions requiring changes in monitoring coverage or interval</td>
</tr>
<tr>
<td>4</td>
<td>Remedial actions requiring significant capital expenditures</td>
</tr>
<tr>
<td>5</td>
<td>Remedial actions that may require significant capital expenditures but are not clearly definable at this time</td>
</tr>
</tbody>
</table>
Remedial Actions at Oxbow Hatchery - Coho (Tanner Creek Stock: Bonneville Releases)

This section presents the corrective actions required to bring the Oxbow Hatchery - Coho (Tanner Creek Stock: Bonneville Releases) program into compliance with IHOT performance measures. The remedial actions suggested here are just that, suggestions developed by the Montgomery Watson Audit Team. 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 (± 40%).

More importantly, 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 Oxbow Hatchery - Coho (Tanner Creek Stock: Bonneville Releases)

<table>
<thead>
<tr>
<th>Remedial Action Required</th>
<th>Cost</th>
<th>PMs¹</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type 1</strong> - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Install security alarms</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td><strong>Type 2</strong> - Remedial actions requiring changes in agency policies or procedures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Review IHOT temperature criteria for rearing</td>
<td></td>
<td>5a</td>
</tr>
<tr>
<td>Develop and maintain alarm log</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Follow IHOT recommendations for regional oversight of feed production</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Develop specific rearing standards for the IHOT Operations Plan</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>Develop smoltification goal and implement program to monitor</td>
<td></td>
<td>22a1</td>
</tr>
<tr>
<td><strong>Type 3</strong> - Remedial actions requiring changes in monitoring coverage or interval</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitor and document DO and TGP for Oxbow Springs and Herman Creek</td>
<td></td>
<td>5b</td>
</tr>
<tr>
<td>Run analysis for chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants for Oxbow Springs and Herman Creek</td>
<td></td>
<td>5c, 5d, 5e, 5f, 6g</td>
</tr>
<tr>
<td><strong>Type 4</strong> - Remedial actions requiring significant capital expenditures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide second set of screens for upper Herman Ponds</td>
<td>$400</td>
<td>10</td>
</tr>
<tr>
<td><strong>Type 5</strong> - Remedial actions that may require significant capital expenditures but are not clearly definable at this time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Hatchery Contribution to Fisheries, Spawning Grounds, and Hatcheries

This section presents the audit findings for the Oxbow Hatchery - Coho (Tanner Creek Stock: Bonneville Releases) program contribution of adult fish to fisheries, local fisheries, spawning grounds, and hatcheries. 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:
Oxbow Hatchery - Coho (Tanner Creek Stock: Bonneville Releases)

<table>
<thead>
<tr>
<th>Year</th>
<th>Fisheries (Broodyear)</th>
<th>Spawning Grounds¹ (Broodyear)</th>
<th>Hatchery¹ (Broodyear)</th>
<th>Total Combined Contribution (Broodyear)</th>
<th>Smolt to Adult Survival (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1984</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data obtained from Missing Production Groups Annual Report or from the Regional Mark Information System database.
Total combined adult contribution: presented when it is not possible to subdivide the contribution into fisheries, spawning grounds, and hatchery contributions.
<table>
<thead>
<tr>
<th>Year</th>
<th>1st Column</th>
<th>2nd Column</th>
<th>3rd Column</th>
<th>4th Column</th>
<th>5th Column</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1986</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1987</td>
<td>See Bonneville</td>
<td>See Bonneville</td>
<td>See Bonneville</td>
<td>See Bonneville</td>
<td>See Bonneville</td>
</tr>
<tr>
<td></td>
<td>Hatchery</td>
<td>Hatchery</td>
<td>Hatchery</td>
<td>Hatchery</td>
<td>Hatchery</td>
</tr>
<tr>
<td>1988</td>
<td>See Bonneville</td>
<td>See Bonneville</td>
<td>See Bonneville</td>
<td>See Bonneville</td>
<td>See Bonneville</td>
</tr>
<tr>
<td></td>
<td>Hatchery</td>
<td>Hatchery</td>
<td>Hatchery</td>
<td>Hatchery</td>
<td>Hatchery</td>
</tr>
<tr>
<td>1989</td>
<td>See Bonneville</td>
<td>See Bonneville</td>
<td>See Bonneville</td>
<td>See Bonneville</td>
<td>See Bonneville</td>
</tr>
<tr>
<td></td>
<td>Hatchery</td>
<td>Hatchery</td>
<td>Hatchery</td>
<td>Hatchery</td>
<td>Hatchery</td>
</tr>
<tr>
<td>1990</td>
<td>See Bonneville</td>
<td>See Bonneville</td>
<td>See Bonneville</td>
<td>See Bonneville</td>
<td>See Bonneville</td>
</tr>
<tr>
<td></td>
<td>Hatchery</td>
<td>Hatchery</td>
<td>Hatchery</td>
<td>Hatchery</td>
<td>Hatchery</td>
</tr>
<tr>
<td>1991</td>
<td>See Bonneville</td>
<td>See Bonneville</td>
<td>See Bonneville</td>
<td>See Bonneville</td>
<td>See Bonneville</td>
</tr>
<tr>
<td></td>
<td>Hatchery</td>
<td>Hatchery</td>
<td>Hatchery</td>
<td>Hatchery</td>
<td>Hatchery</td>
</tr>
<tr>
<td>1992</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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. Table 5 shows the annual operating expenses for the Oxbow Hatchery - Coho (Tanner Creek Stock: Bonneville Releases) program. For programs that occur at more than one facility (as shown on Table 1 in Section 3 of this report), the cost breakdown for the component(s) at each facility is presented in separate tables (Table 5a).

Table 5. Annual Operating Expenses: Oxbow Hatchery - Coho (Tanner Creek Stock: Bonneville Releases)

<table>
<thead>
<tr>
<th>Hatchery</th>
<th>1993</th>
<th>1994</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Oxbow Hatchery</td>
<td>$219,959</td>
<td>$143,200</td>
<td>$98,781</td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Total Program Costs

See Bonneville Hatchery
See Bonneville Hatchery
See Bonneville Hatchery
The total expenditures for the Oxbow Hatchery are presented in Table 6 by program. The detailed breakdown of program expenditures at this hatchery are presented in separate tables (Tables 6a, 6b, 6c, 6d, and 6e).

### Table 6. Annual Operating Expenses - Oxbow Hatchery

<table>
<thead>
<tr>
<th>Program</th>
<th>1994</th>
<th>1995</th>
<th>1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Spring Chinook (Clackamas Stock)</td>
<td>$19,356</td>
<td>$14,661</td>
<td>$10,804</td>
</tr>
<tr>
<td>2. Coho (Tanner Creek Stock, Umatilla releases)</td>
<td>$61,589</td>
<td>$34,095</td>
<td>$27,782</td>
</tr>
<tr>
<td>3. Coho (Tanner Creek Stock, Bonneville releases)</td>
<td>$219,959</td>
<td>$143,200</td>
<td>$98,781</td>
</tr>
<tr>
<td>4. Coho (Tanner Creek Stock, CEDC release)</td>
<td>$158,370</td>
<td>$88,648</td>
<td>$70,999</td>
</tr>
<tr>
<td>5. Coho (Mixed Tanner Creek and Sandy River Stock, CEDC release)</td>
<td>$0</td>
<td>$64,781</td>
<td>$108,042</td>
</tr>
<tr>
<td><strong>Total Hatchery Costs</strong></td>
<td>$439,918</td>
<td>$340,952</td>
<td>$308,692</td>
</tr>
</tbody>
</table>
When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

Table 5a. Detailed Expenditures at Oxbow Hatchery by Program

Coho (Tanner Creek Stock: Bonneville Release)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Personnel Costs</td>
<td>$198,941</td>
<td>$190,665</td>
<td>$185,401</td>
</tr>
<tr>
<td>Operational Costs</td>
<td>$156,758</td>
<td>$90,519</td>
<td>$57,624</td>
</tr>
<tr>
<td>Capital Costs</td>
<td>$15,821</td>
<td>$2,890</td>
<td>$20,842</td>
</tr>
<tr>
<td>Indirect Costs</td>
<td>$68,399</td>
<td>$56,878</td>
<td>$44,825</td>
</tr>
<tr>
<td>Lumped Third-Party Costs</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
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<tr>
<td>Total Hatchery Costs</td>
<td>$439,918</td>
<td>$340,952</td>
<td>$308,692</td>
</tr>
</tbody>
</table>

Source of Funds

| Program Production (lb)    | 46,250     | 53,748     | 46,250     |
| Total Production (lb)      | 91,627     | 125,332    | 142,229    |
| Program as Percent of Total| 50%        | 42%        | 32%        |
| Program Costs              | $219,959   | $143,200   | $98,781    |
Table 6a. Detailed Expenditures at Oxbow Hatchery by Program

Spring Chinook (Clackamas Stock)

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Personnel Costs</td>
<td>$198,941</td>
<td>$190,665</td>
<td>$185,401</td>
</tr>
<tr>
<td>Operational Costs</td>
<td>$156,758</td>
<td>$90,519</td>
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<tr>
<td>Capital Costs</td>
<td>$15,821</td>
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<td>$20,842</td>
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</tr>
</tbody>
</table>

Source of Funds

| Program Production (lb)        | 4,074  | 5,460  | 5,096  |
| Total Production (lb)          | 91,627 | 125,332| 142,229|
| Program as Percent of Total    | 4.4%   | 4.3%   | 3.5%   |
| Program Costs                  | $19,356 | $14,661 | $10,804 |

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 Oxbow Hatchery by Program

Coho (Tanner Creek Stock: Umatilla Release)

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
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Source of Funds

<table>
<thead>
<tr>
<th>Program Production (lb)</th>
<th>13,553</th>
<th>13,466</th>
<th>13,133</th>
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</thead>
<tbody>
<tr>
<td>Total Production (lb)</td>
<td>91,627</td>
<td>125,332</td>
<td>142,229</td>
</tr>
<tr>
<td>Program as Percent of Total</td>
<td>14%</td>
<td>10%</td>
<td>9%</td>
</tr>
<tr>
<td>Program Costs</td>
<td>$61,589</td>
<td>$34,095</td>
<td>$27,782</td>
</tr>
</tbody>
</table>

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 Oxbow Hatchery by Program

Coho (Tanner Creek Stock: Bonneville Releases)

<table>
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<tr>
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Source of Funds

|                                |         |         |         |
|                                | Program Production (lb) | 46,250 | 53,748 | 46,250 |
|                                | Total Production (lb)   | 91,627 | 125,332| 142,229|
|                                | Program as Percent of Total | 50%  | 42%  | 32%  |
|                                | Program Costs           | $219,959| $143,200| $98,781|

When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.
Table 6d. Detailed Expenditures at Oxbow Hatchery by Program

Coho (Tanner Creek Stock: CEDC Releases)

<table>
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<tr>
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Source of Funds

|                           |           |           |           |
| Program Production (lb)   | 33,000    | 33,000    | 33,000    |
| Total Production (lb)     | 91,627    | 125,332   | 142,229   |
| Program as Percent of Total | 36% | 26% | 23% |
| Program Costs             | $158,370  | $88,648   | $70,999   |

When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.
Table 6e. Detailed Expenditures at Oxbow Hatchery by Program

Coho (Mixed Tanner Creek and Sandy River Stocks: CEDC Release)

<table>
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<td>$340,952</td>
<td>$308,692</td>
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</tbody>
</table>

Source of Funds

Program Production (lb)        | 0         | 24,000    | 50,000    |
Total Production (lb)          | 91,627    | 125,332   | 142,229   |
Program as Percent of Total    | 0%        | 19%       | 35%       |
Program Costs                  | $0        | $64,781   | $108,042  |

When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.
PMs are performance measures that were extracted from the IHOT 1995 report. The IHOT performance measures are listed in Table 2 (Section 3 of this report) in numerical order.