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# **HATCHERY EVALUATION REPORT**

**Niagara Springs Hatchery - Summer Steelhead**

**September 1996**

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**Integrated Hatchery Operations Team (IHOT)**

# **HATCHERY EVALUATION REPORT**

## **Niagara Springs Fish Hatchery - Summer Steelhead**

### **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 Niagara Springs Hatchery - Summer Steelhead program. The hatchery is in the Snake River Canyon, 10 miles south of the town of Wendell, Idaho. The hatchery is used for incubation and rearing of summer steelhead.

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) "Strategy for Salmon" and the Columbia River Basin Fish and Wildlife Program. Under the audit, the hatcheries are evaluated against policies and related performance measures developed by the Integrated Hatchery Operations Team (IHOT). IHOT is a multi-agency group established by the NPPC to direct the development of new basinwide standards for managing and operating fish hatcheries. The Bonneville Power Administration (BPA) 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' sources.
- 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.

## Niagara Springs Hatchery - Summer Steelhead Results

The Niagara Springs facility includes 14 concrete raceways, 7 nursery inserts for early rearing, and incubation facilities. Niagara Springs is owned and financed by Idaho Power Company as required under the terms of their Federal Energy Regulatory Commission license for the operation of the Hells Canyon hydroelectric complex.

The hatchery was in general compliance with most of the performance measures. The audit found that the hatchery was not in compliance with the temperature criteria, water quality and contaminant monitoring criteria, water hardness criteria, pathogen-free water supply criteria, flow alarm requirements, predation control facilities, hauling requirements, incubation facilities, and early rearing facilities, which are all facilities requirements. The hatchery also exceeded its loading and density criteria for early rearing and needed to develop loading and density criteria for the IHOT Operation Plan. The hatchery also did not have an approved Genetics Monitoring and Evaluation Program in place.

The specific areas in which the Niagara Springs Hatchery - Summer Steelhead program requires remedial actions based on the IHOT performance measures are listed below. These remedial actions are listed in alphabetical order without intent of ranking or otherwise assigning priority:

- Conduct IHOT QA/QC feed tests
- Develop acclimation sites for release sites
- Develop approved genetics and monitoring plan
- Develop DI and FI goals for IHOT Operations Plan
- Develop smoltification goal and monitoring programs
- Do not leave buckets of feed exposed to heat or light
- Document smolt-to-adult survival
- Follow IHOT disinfection protocols for vehicle cab
- Install 32 more upwelling incubators and circular vats (1800 sf of additional building space); consider replacements of vats with enclosed rectangular nursery raceways
- Install bird netting over raceways
- Install chillers for incubation (400 gpm)
- Install flow alarms as appropriate for a gravity flow water supply
- Insulate bulk storage facilities
- Monitor DO during hauling
- Monitor TGP
- Need more fishery contribution evaluations for Hells Canyon releases
- Obtain additional transportation trucks to comply with IHOT hauling standards
- Obtain copies of transfer/release records
- Remove fish from spring, block upstream passage, and install bird netting over springs
- Run analysis for contaminants
- Run analysis for missing water chemistry parameters

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

|                          |  |
|--------------------------|--|
| <b>Name:</b>             | Niagara Springs Hatchery   |
| <b>Stock/Species:</b>    | Summer Steelhead   |
| <b>Operating Agency:</b> | Idaho Department of Fish and Game  |
| <b>Funding Agency:</b>   | Idaho Power Company  |
| <b>Location:</b>         | In the Snake River Canyon, 10 miles south of the town of Wendel, Idaho. The elevation of the facility is 3,000 feet above sea level.   |
| <b>Address:</b>          | Idaho Department of Fish and Game<br>Niagara Springs Fish Hatchery<br>2131 Niagara Springs Road<br>Wendell, ID 83355   |
| <b>Hatchery Manager:</b> | Mr. Jerry Chapman  |
| <b>Phone:</b>            | (208) 536-2283   |
| <b>Fax:</b>              | (208) 536-5137   |
| <b>Purpose:</b>          | Niagara Springs is owned and financed by Idaho Power Company as required under the terms of their Federal Energy Regulatory Commission license for the operation of the Hells Canyon hydroelectric complex. The mitigation goals for the hatchery are to (1) enhance steelhead run in the Snake River below Hells Canyon Dam, and (2) relocate part of this run to the Salmon River and its tributaries. |
| <b>Production Goal:</b>  | <b>Summer Steelhead</b><br><br>Produce 900,000 smolts (200,000 lb) for release into the Salmon River and its tributaries.<br><br>Produce 900,000 smolts (200,000 lb) for release into the Snake River below Hells Canyon Dam.  |
| <b>Water Supply:</b>     | The hatchery's water supply is by gravity flow from Niagara Spring, with a constant water temperature of 58 °F. Flow increases from 30 cfs in June to 120 cfs in March.  |

**Facilities:**

|                       |   |
|-----------------------|---|
| Adult Holding:        | none  |
| Incubation:           | 20 upwelling incubators                             |
| Early Rearing:        | 20 circular vats<br>7 nursery inserts - 350 cf each |
| Raceways:             | 14 concrete raceways - 9,000 cf each                |
| Rearing Ponds:        | none  |
| Satellite Facilities: | none  |

## 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).<sup>1</sup> 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) includes general information and expenditure information needed for the Hatchery Evaluation Report and blank forms for additional comments:

|           |  |
|-----------|--|
| Section 1 | Performance Measures for General Information and Expenditure Information (PMs General 1-2) |
| Section 2 | Performance Measures for Program Objectives (PMs 1-4)                                      |
| Section 3 | Performance Measures for Facility Requirements (PMs 5-15)                                  |
| Section 4 | Performance Measures for Hatchery Practices (PMs 16-25)                                    |
| Section 5 | Performance Measures for Fish Health Policy (PMs 26-34)                                    |
| Section 6 | Performance Measures for Ecological Interactions (PMs 35-38)                               |
| Section 7 | Performance Measures for Genetics Policy (PMs 39-43)                                       |
| Section 8 | Blank Forms for Additional Comments  |

Several performance measures are repeated in various sections of the audit. 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 light gray shading.

### 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 on-site visits. The site visit was conducted on September 2, 1996.

<sup>1</sup>Integrated Hatchery Operations Team (IHOT) 1995. *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries*, Bonneville Power Administration, Portland, Oregon.

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 document.
5. This 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 Niagara Springs Hatchery - Summer Steelhead**

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 (✓) indicates that the specific life-stage is held at this facility.

This section documents the compliance status of the Niagara Springs Hatchery - Summer Steelhead 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 Niagara Springs Hatchery - Summer Steelhead**

| Component           | Location of Adult Holding, Spawning, Incubation, and Rearing |                          |                                |                |                                      |  |
|---------------------|--|--------------------------|--------------------------------|----------------|--------------------------------------|--|
|                     | Pahsimeroi Hatchery  | Niagara Springs Hatchery | Pahsimeroi Weir, Little Salmon | Oxbow Hatchery | Hells Canyon, Pine Bar, Hammer Creek |  |
| Adult Collection    | ✓  |                          |                                | ✓              |                                      |  |
| Adult Holding       | ✓  |                          |                                | ✓              |                                      |  |
| Spawning            | ✓  |                          |                                | ✓              |                                      |  |
| Fertilization       | ✓  |                          |                                | ✓              |                                      |  |
| Incubation          |  |                          |                                |                |                                      |  |
| green-to-eyed       | ✓  |                          |                                | ✓              |                                      |  |
| eyed-to-hatch       | ✓  | ✓                        |                                | ✓              |                                      |  |
| Rearing             |  |                          |                                |                |                                      |  |
| fry                 |  | ✓                        |                                |                |                                      |  |
| fingerlings         |  | ✓                        |                                |                |                                      |  |
| smolts              |  | ✓                        |                                |                |                                      |  |
| Acclimation/release |  |                          | ✓                              |                | ✓                                    |  |

| Description of Performance Measure   | Compliance Status |                            |   |    | Basis for Compliance or Non-Compliance   | Remedial Action Needed for Compliance                            |
|--|-------------------|----------------------------|---|----|--|--|
|  | N/A               | Yes                        | ? | No |  |  |
| the hatchery programs outlined in a subbasin management plan?  |                   | ✓                          |   |    | Columbia Basin System Planning Production Plan and Idaho Power settlement agreement through FERC |  |
| <p>Is the hatchery operating under a current hatchery operational plan?</p> <p>Is it understood by staff?</p> <p>Is it being followed?</p> |                   | <p>✓</p> <p>✓</p> <p>✓</p> |   |    | IHOT Operations Plan and Niagara Springs Steelhead Operations Manual                             |  |
| <p>Is a hatchery monitoring and evaluation plan in place?</p> <p>Do you have a written monitoring and evaluation plan?</p>                 |                   | <p>✓</p> <p>✓</p>          |   |    | LSRCP Fish Hatchery Evaluations - Idaho  |  |
| Does the hatchery contribute to fisheries, spawning grounds, and hatchery  |                   | ✓                          |   |    |  |  |
| Is the pre-spawning survival as compared with established goal   | ✓                 |                            |   |    | No spawning at this hatchery   |  |
| Is the take as compared with established hatchery goal   | ✓                 |                            |   |    | No spawning at this hatchery   |  |
| Is the green-egg to eyed-egg survival as compared with established goal  | ✓                 |                            |   |    | No green-eggs at this hatchery   |  |
| Is the eyed-egg to fry survival as compared with established goal  |                   |                            |   | ✓  | In compliance 0 out of last 4 years  | See PM #9  |
| Is the smolt to adult survival as compared with established goal   |                   |                            |   | ✓  | In compliance 0 out of last 3 years  | See PM #9  |
| Is the production as compared with established goal  |                   | ✓                          |   |    | In compliance 4 out of last 4 years  |  |
| Is the percent survival (smolt to adult) as compared with established goal   |                   |                            | ✓ |    | No goal in IHOT operations plan  | Develop goal for smolt to adult survival and monitor performance |
| Does the number of eggs, fry, fingerlings, smolts, and/or adults meet basinwide needs  | ✓                 |                            |   |    |  |  |

| Description of Performance Measure                            | Compliance Status |     |   |    | Basis for Compliance or Non-Compliance            | Remedial Action Needed for Compliance     |
|---|-------------------|-----|---|----|---|---|
|   | N/A               | Yes | ? | No |   |   |
| <b>Temperature</b>  |                   |     |   |    |   |   |
| Does your water temperature meet the criteria for spawning?   | ✓                 |     |   |    | Review of records/Discussion                      |   |
| Does your water temperature meet the criteria for incubation? |                   |     |   | ✓  | Review of records/Discussion                      | Install chillers for incubation (400 gpm) |
| Does your water temperature meet the criteria for rearing?    |                   | ✓   |   |    | Review of records/Discussion                      |   |
| <b>Dissolved gases</b>  |                   |     |   |    |   |   |
| Is the oxygen level near saturation?                          |                   | ✓   |   |    | Review of records/Discussion                      |   |
| Is the dissolved nitrogen level less than saturation?         |                   |     | ✓ |    | No gas bubble disease detected                    | Monitor TGP                               |
| <b>Chemistry</b>  |                   |     |   |    |   |   |
| Ammonia (un-ionized)  |                   |     | ✓ |    | No data   | Run analysis                              |
| Carbon Dioxide  |                   |     | ✓ |    | No data   | Run analysis                              |
| Chlorine  |                   | ✓   | ✓ |    | No data   | Run analysis                              |
| pH  |                   | ✓   | ✓ |    | Review of records/Discussion                      |   |
| Copper  |                   | ✓   | ✓ |    | Review of records/Discussion                      | Run analysis                              |
| Hydrogen Sulfide  |                   | ✓   |   |    | No data   |   |
| Iron  |                   |     | ✓ |    | Review of records/Discussion                      | Run analysis                              |
| Zinc  |                   |     | ✓ |    | No data   |   |
| <b>Turbidity</b>  |                   |     |   |    |   |   |
| Does your turbidity meet the criteria?                        |                   | ✓   |   |    | Review of records/Discussion                      |   |
| <b>Alkalinity and hardness</b>                                |                   |     |   |    |   |   |
| Does your alkalinity and hardness meet the criteria?          |                   |     |   | ✓  | Review of records/Discussion; hardness > criteria | Reduce hardness                           |
| <b>Nitrite</b>  |                   |     |   |    |   |   |
| Does your nitrite meet the criteria?                          |                   | ✓   |   |    | Review of records/Discussion                      |   |



| Description of Performance Measure  | Compliance Status |     |   |   | Basis for Compliance or Non-Compliance  | Remedial Action Needed for Compliance                                |
|---|-------------------|-----|---|---|---|--|
|   | N/A               | Yes | ? | No  |   |  |
| <p><b>Alarm Systems</b></p> <p>Do the following areas have alarms?</p> <p>Intake ✓<br/> Large rearing ponds and adult holding ponds ✓<br/> Raceway headboxes and rearing ponds ✓<br/> Incubation facilities ✓<br/> Quarantine areas and facilities ✓<br/> Water treatment systems ✓<br/> Security ✓</p> <p>Are there outside systems and buzzers in on-site residences? ✓</p> <p>Are water flow alarms checked daily? ✓</p> <p>Are all other alarms checked weekly? ✓</p> <p>Is there a log of alarms for emergencies, tests, and maintenance requirements? ✓</p> <p>Are telephone pagers used?</p> |                   |     |   |   | <p>Inspection of facilities/ Discussion</p> <p>Discussion</p> <p>Review of records /Discussion</p> <p>Review of records /Discussion</p> <p>Review of records/Discussion</p> <p>Discussion</p> | <p>Install alarms as appropriate for a gravity flow water supply</p> |
| <p><b>Adult Holding Facilities</b></p> <p>Do you meet the adult holding criteria? ✓</p>   | ✓                 |     |   |   | <p>No holding at this hatchery</p>  |  |
| <p><b>Incubation facilities</b></p> <p>Type 1: <u>Upwelling Jar</u><br/> Do you have an adequate number of units for the overall program? ✓</p> <p>Type 2: <u>N/A</u><br/> Do you have an adequate number of units for the overall program? ✓</p>   |                   |     |   | <p>✓</p> <p>Inspection of facilities/Discussion</p> | <p>Install 32 more upwelling incubators and circular vats (1,800 sf of additional building space); consider replace of circular vats with rectangular nursey racways<br/> See also PM #9</p>  |  |

| Description of Performance Measure   | Compliance Status |     |   |    | Basis for Compliance or Non-Compliance  | Remedial Action Needed for Compliance   |
|--|-------------------|-----|---|----|---|---|
|  | N/A               | Yes | ? | No |   |   |
| <p><b>ring facilities</b></p> <p>Type 1: <u>Circular Vats</u><br/>Do you have an adequate number of units for the overall program?</p> <p>Type 2: <u>Nursery Raceways</u><br/>Do you have an adequate number of units for the overall program?</p> <p>Type 3: <u>Large Raceways</u><br/>Do you have an adequate number of units for the overall program?</p> |                   | ✓   |   | ✓  | <p>Inspection of facilities/Discussion. Significant over capacity problems lead to suffocation</p> <p>Inspection of facilities/Discussion (would not use these if indoor early rearing vats available)</p> <p>Inspection of facilities/Discussion</p> | <p>Install 32 more upwelling incubators and circular vats (1,800 sf of additional building space); consider replace of circular vats with rectangular nurseway racways<br/>See also PM #8</p> |
| <p><b>eeening facilities</b></p> <p>Do you meet the approach velocity criteria:</p> <p>Are the fish screens regularly cleaned?</p> <p>Does Screen Mesh (openings) meet current opening criteria?</p> <p>Are rearing containers double screened for fish that should not be released to adjacent water?</p>   | ✓                 | ✓   | ✓ | ✓  | <p>Inspection of intake facilities/ Discussion</p> <p>Stock is appropriate for Snake River drainage.</p>  |   |
| <p><b>ator control facilities</b></p> <p>Are your predation control facilities effective?</p>  |                   |     |   | ✓  | <p>Discussion. Using “terror-eye” balloons, cracker and screamer shells, scarecrows and water spray. Hatchery manager doesn’t feel any system used works well.</p>  | <p>Install bird netting over raceways</p>   |

| Description of Performance Measure   | Compliance Status |     |   |    | Basis for Compliance or Non-Compliance   | Remedial Action Needed for Compliance                 |
|--|-------------------|-----|---|----|--|---|
|  | N/A               | Yes | ? | No |  |   |
| <b>d storage facilities and quality control</b>  |                   |     |   |    |  |   |
| Does the storage of dry/semi-moist/moist foods (dry<12%; semi-moist 12-20%; moist >20% moisture) follow food manufacturer's recommendations? |                   | ✓   |   |    | Discussion. Follow verbal information from manufacturer.   |   |
| Does a regional quality control officer oversee production procedures and monitor:   |                   |     |   |    |  |   |
| Verification by feed manufacturer that ingredients meet specifications?  |                   |     |   | ✓  | Discussion. Feed is purchased by Idaho Power. Suspect no detailed QA/QC.   | Conduct IHOT QA/QA feed tests                         |
| Ensure feed does not contain unwanted drugs or other additives?  |                   |     |   | ✓  | Hatchery does occasional testing but usually only when there is a problem.   | Conduct IHOT QA/QA feed tests                         |
| Analyze ingredients contained in the final food product to ensure that feed specifications have been met?                                    |                   |     |   | ✓  |  | Conduct IHOT QA/QA feed tests                         |
| Are the foods stored and handled according to the following criteria?  |                   |     |   |    |  |   |
| Moist pellets should not exceed 10 °F at point of delivery.  | ✓                 |     |   |    | Use semi-moist feed  |   |
| Moist pellets should be removed from freezer just prior to feeding.  | ✓                 |     |   |    |  |   |
| Do not leave buckets of feed or feed containers outside exposed to light or heat.  |                   |     |   | ✓  | Discussion   | Do not leave buckets of feed exposed to heat or light |
| Open bags of feed should be fed within one to two days except when feeding small groups of fish.   |                   | ✓   |   |    |  |   |
| Automatic feeder hoppers and bulk storage facilities should be insulated against excessive temperatures (80°F and above).                    |                   |     |   | ✓  | Bulk storage used from November through April; High temperatures during this period are not a problem. Condensation may be a problem | Insulate bulk storage facilities                      |

| Description of Performance Measure   | Compliance Status |            |   |    | Basis for Compliance or Non-Compliance   | Remedial Action Needed for Compliance   |
|--|-------------------|------------|---|----|--|---|
|  | N/A               | Yes        | ? | No |  |   |
| <p><b>Release facilities</b></p> <p>Do the release facilities ensure that fish are not subjected to adverse conditions?</p>  | ✓                 |            |   |    | Discussion. Fish trucked to river release sites. Release directly into River. Truck and release by Idaho Power personnel. State biologist goes with first trucks to identify release location .  |   |
| <p><b>Pollution abatement facilities</b></p> <p>Do the pollution abatement facilities meet all federal and state regulations (or good engineering practice)?</p> <p>Are pollution abatement facilities operated correctly?</p> |                   | ✓<br><br>✓ |   |    | Discussion. Ponds inlets were modified to distribute flow and reduce short circuiting.   |   |
| <p><b>Transportation facilities</b></p> <p>Are the transport systems adequate to meet IHOT performance measures for transportation practices?</p>  |                   |            |   | ✓  | Discussion. Trucking done by Idaho Power. Hauling densities are higher than IHOT recommendations but needed to meet delivery schedules. Densities were reduced from past practice to approach IHOT PMs. No fish problems are caused by current practice. | Obtain additional transportation trucks to comply with IHOT hauling standards |

| Description of Performance Measure  | Compliance Status |     |   |    | Basis for Compliance or Non-Compliance           | Remedial Action Needed for Compliance |
|---|-------------------|-----|---|----|--|---------------------------------------|
|   | N/A               | Yes | ? | No |  |                                       |
| <b>Broodstock selection practices</b>   |                   |     |   |    |  |                                       |
| Is the donor selection process document attached?   | ✓                 |     |   |    | Existing program; does not apply                 |                                       |
| Was the donor selection outline followed in selecting the hatchery broodstock?<br>to PM #40 in Genetics                         | ✓                 |     |   |    | Existing program; does not apply                 |                                       |
| <b>Spawning practices</b>   |                   |     |   |    |  |                                       |
| Were the appropriate number of spawners, male/female ratios, and fertilization protocols used?<br>to PM #42 in Genetics Section | ✓                 |     |   |    | No spawning at this hatchery                     |                                       |
| <b>Incubation practices</b>   |                   |     |   |    |  |                                       |
| Are specific incubation standards listed in the hatchery operations plan?   |                   | ✓   |   |    | Not in IHOT Operations Plan but in hatchery plan | Need additional incubators            |
| Are incubation practices written?   |                   | ✓   |   |    |  |                                       |
| Incubation Type 1: <u>Upwellers</u> (See PM #8)<br>Do you meet the loading and flow criteria?                                   |                   |     |   | ✓  |  |                                       |
| Incubation Type 2: <u>N/A</u> (See PM #8)<br>Do you meet the loading and flow criteria?   | ✓                 |     |   |    |  |                                       |

| Description of Performance Measure   | Compliance Status |        |   |        | Basis for Compliance or Non-Compliance   | Remedial Action Needed for Compliance  |
|--|-------------------|--------|---|--------|--|--|
|  | N/A               | Yes    | ? | No     |  |  |
| <b>rearing practices</b>   |                   |        |   |        |  |  |
| Are specific rearing standards listed in the hatchery operations plan?   |                   | ✓      |   |        | In hatchery Operations Plan. Not in IHOT   |  |
| Are rearing practices written?   |                   | ✓      |   |        | Review of rearing standards, O&M   |  |
| Rearing Unit Type 1: <u>Circular Vats</u> (see PM #9)<br>Do you meet the density and DI criteria?<br>Do you meet the Loading and FI criteria?    |                   |        |   | ✓<br>✓ | Discussion; swim-up fry are removed as soon as possible to avoid suffocation.  | Provide more hatchery vats in hatchery building  |
| Rearing Unit Type 2: <u>Nursery Raceways</u> (see PM #9)<br>Do you meet the density and DI criteria?<br>Do you meet the Loading and FI criteria? |                   | ✓      |   | ✓      | Discussion/ Nursery sections are only 20 ft long, next slots are at 100 ft. They install wooden screens at 35 ft, 50 ft and 75 ft  | Provide additional inside hatchery space for rearing, or provide more screens and permanent slots along the raceway. |
| Rearing Unit Type 3: <u>Raceways</u> (see PM #9)<br>Do you meet the density and DI criteria?<br>Do you meet the Loading and FI criteria?         |                   | ✓<br>✓ |   |        | No DI or FI in IHOT  | Develop DI and FI goal for IHOT Operation Plan   |
| <b>smolt quality</b>   |                   |        |   |        |  |  |
| Do you produce a high quality smolt?   |                   | ✓      |   |        | Discussion. Hatchery manager feels that the feeding method may contribute to fin damage. Hatchery has done test that suggests a lower density provides better fins. Five additional raceways would be needed |  |

| Description of Performance Measure   | Compliance Status |     |   |    | Basis for Compliance or Non-Compliance | Remedial Action Needed for Compliance   |
|--|-------------------|-----|---|----|--|---|
|  | N/A               | Yes | ? | No |  |   |
| <b>Health management practices</b>   |                   |     |   |    |  |   |
| Are the monthly hatchery monitoring visits being conducted? (PM #26)   |                   | ✓   |   |    | Review of records/Discussion           |   |
| Are the annual broodstock inspections being conducted? (PM #27)  | ✓                 |     |   |    | No adults at this facility             |   |
| Is there pathogen-free water and are the sanitation procedures being followed? (PM #28)  |                   |     |   | ✓  | No pathogen-free water                 |   |
| Are the following water quality parameters within criteria? (PM #5a-5h)  |                   |     |   |    |  |   |
| Water temperature  |                   |     |   | ✓  | Review of records/Discussion           | Install chiller for 400 gpm<br>Monitor TGP<br>Run analysis for missing parameters |
| Dissolved gases  |                   |     | ✓ |    | Review of records/Discussion           |   |
| Chemistry  |                   |     | ✓ |    | Review of records/Discussion           |   |
| Turbidity  |                   | ✓   |   |    | Review of records/Discussion           |   |
| Alkalinity and hardness  |                   |     | ✓ |    | Review of records/Discussion           |   |
| Nitrite  |                   | ✓   |   |    | Review of records/Discussion           |   |
| Contaminants   |                   |     |   | ✓  | Review of records/Discussion           |   |
| Are rearing standards being followed? (PM #19)   |                   |     |   | ✓  | Problems in early rearing only         | Reduce hardness   |
| Are egg and fish transfer/release requirements met? (PM #31)   |                   | ✓   |   |    | Review of records/Discussion           | Run analysis for contaminants<br>Install additional early rearing vats            |
| <b>Do hatchery performance meet requirements outlined in the regional hatchery policies and in basin and hatchery plans for the following areas?</b> |                   |     |   |    |  |   |
| <b>Percent smoltification</b>  |                   |     |   |    |  |   |
| Do you measure percent smoltification?   |                   |     |   | ✓  |  | Develop smoltification goal and monitoring program                                |
| Do you have a smoltification goal?   |                   |     |   | ✓  | No goal found                          |   |
| Did you meet the smoltification criteria?  |                   |     | ✓ |    |  |   |

| Description of Performance Measure   | Compliance Status |     |   |    | Basis for Compliance or Non-Compliance  | Remedial Action Needed for Compliance |
|--|-------------------|-----|---|----|---|---------------------------------------|
|  | N/A               | Yes | ? | No |   |                                       |
| <b>ring density (prior to release)</b><br><br>Did you meet the rearing density criteria just prior to release?   |                   | ✓   |   |    | Discussion  |                                       |
| <b>ease condition (at release)</b><br><br>Did you meet all disease regulations just prior to release?  |                   | ✓   |   |    | Discussion  |                                       |
| <b>nber (at release)</b><br><br>Did you meet the release number goal?  |                   | ✓   |   |    |   |                                       |
| <b>at release</b><br><br>Did you meet the size goal?   |                   | ✓   |   |    |   |                                       |
| <b>es of release</b><br><br>Did you meet the release date goal?  |                   |     |   | ✓  | Discussion/Need one more truck or an increased hauling density  | Purchase another truck                |
| <b>ation of release</b><br><br>Did you release the fish at the specified location?   |                   | ✓   |   |    | Review of records/Discussion  |                                       |
| <b>fish reared in the subbasin or acclimated in the basin?</b><br><br>Are the fish reared in the subbasin?<br><br>Are the fish acclimated in the subbasin? |                   | ✓   |   | ✓  | Discussion. Stock is mixed Snake River and Salmon River.<br><br>Plant directly from hatchery to river | Develop acclimation sites for release |
| <b>ie release strategy appropriate for the program?</b>  |                   | ✓   |   |    |   |                                       |

| Description of Performance Measure   | Compliance Status |     |   |    | Basis for Compliance or Non-Compliance      | Remedial Action Needed for Compliance              |
|--|-------------------|-----|---|----|---|--|
|  | N/A               | Yes | ? | No |   |  |
| <b>nsportation facilities</b>  |                   |     |   |    |   |  |
| Do transportation equipment and personnel receive disinfection before and after use?   |                   | ✓   |   |    | Discussion                                  |  |
| 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)?   |                   | ✓   |   |    | Use acid-bath wash at milk processing plant |  |
| 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?   |                   | ✓   |   |    | Acid Bath                                   |  |
| Is the fish transport vehicle (cab) disinfected using 600 ppm quaternary ammonia compounds (1.5 ml of 50% stock solution/liter water)?   |                   |     |   | ✓  |   | Follow IHOT disinfection protocols for vehicle cab |
| Is other equipment disinfected including fish pumps, nets, egg sorters, waders, boots, rain gear, hoses and other equipment using one of the following solutions?<br><br>200 ppm chlorine for 30 minutes<br>600 ppm quaternary ammonia compound for 30 minutes<br>200 ppm iodophor solution for 10 minutes |                   | ✓   |   |    |   |  |
| Do personnel wear protective garments when handling fish eggs or cultural water?   |                   | ✓   |   |    |   |  |
| Do the fish transport truck/chassis and tank/unit receive an inspection and service prior to the release season?   |                   | ✓   |   |    |   |  |
| Is a daily service inspection completed before starting up and leaving for the day?  |                   | ✓   |   |    | By Idaho Power                              |  |
| Does the fish transport unit receive an inspection prior to loading?   |                   | ✓   |   |    |   |  |
|  |                   | ✓   |   |    |   |  |

| Description of Performance Measure  | Compliance Status |  |   |                  | Basis for Compliance or Non-Compliance   | Remedial Action Needed for Compliance |
|---|-------------------|--|---|------------------|--|---------------------------------------|
|   | N/A               | Yes  | ? | No               |  |                                       |
| <p><b>Transportation facilities</b></p> <p>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 the fish in the transport unit?</p> <p>Do hauling criteria include checking the fish 45 minutes to 1 hour after loading?</p> <p>When fish are active and systems are functioning properly, is the oxygen concentration reduced and maintained at approximately 8 ppm?</p> <p>Is water temperature in the transportation unit maintained within the 42-48 °F range?</p> <p>Do fish releasing procedures include the following criteria?</p> <p>Releasing the fish at the correct release site or into the correct water body.</p> <p>Tempering or the difference between the liberation tank and the target water body should not exceed 10°F.</p> <p>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.</p> |                   | <p>✓</p> <p>✓</p> <p></p> <p>✓</p> <p>✓</p> <p>✓</p> |   | <p></p> <p>✓</p> | <p>Based on guidelines</p> <p>Not measured by carrier. Inject 5 liters/minute through 4 stones</p> <p>Fish released by Idaho Power. State biologist goes with first truck to inspect release point</p> | <p>Monitor DO during hauling</p>      |

| Description of Performance Measure  | Compliance Status |  |   |                            | Basis for Compliance or Non-Compliance  | Remedial Action Needed for Compliance   |
|---|-------------------|--|---|----------------------------|---|---|
|   | N/A               | Yes  | ? | No                         |   |   |
| <p><b>Evaluation practices</b></p> <p>Has the hatchery conducted fishery contribution studies to:</p> <p>Determine the requirements for evaluating and improving management programs?</p> <p>Develop guidelines that define the geographical area and identify component stocks (hatchery and/or wild) that comprise the management unit?</p> <p>Develop guidelines that define if the proper stocks of fish are currently being used?</p> <p>Determine which management units contribute to a specific fishery and the time periods of those contributions?</p> <p>Determine the relative contributions of the various management units to a specific fishery over the different time periods?</p> |                   | <p>✓</p> <p>✓</p> <p>✓</p>                   |   | <p>✓</p> <p>✓</p> <p>✓</p> | <p>Discussion.<br/>Pahsimeroi is yes / Hells Canyon is No</p> <p>Pahsimeroi is yes / Hells Canyon is No</p> <p>Pahsimeroi is yes / Hells Canyon is No</p> | <p>Need more fishery contribution evaluations for Hells Canyon releases</p> <p>Need more fishery contribution evaluations for Hells Canyon releases</p> <p>Need more fishery contribution evaluations for Hells Canyon releases</p> |
| <p><b>Training practices</b></p> <p>Does the hatchery have a training schedule for its staff?</p> <p>Does each staff member have a personal training plan approved by a supervisor and reviewed annually?</p> <p>Does the hatchery routinely exchange training details between other hatcheries and agencies?</p> <p>Does the hatchery encourage and reward off-duty training of staff?</p> <p>Does the hatchery conduct monthly staff meetings?</p>  |                   | <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> |   |                            | <p>In O&amp;M manual job descriptions</p> <p>In annual review process for hatchery staff</p>  |   |

| Description of Performance Measure  | Compliance Status |  |   |    | Basis for Compliance or Non-Compliance  | Remedial Action Needed for Compliance |
|---|-------------------|--|---|----|---|---------------------------------------|
|   | N/A               | Yes  | ? | No |   |                                       |
| <p><b>monthly hatchery monitoring visits being conducted by a qualified fish health specialist as described below?</b></p> <p>Conduct visit at least monthly</p> <p>Monitoring conducted by qualified fish health specialist</p> <p>Examine a representative sample of healthy and moribund fish from each lot.</p> <p>Review fish culture practices with hatchery manager.</p> <p>Report finding and results of necropsies on standard form.</p> <p>Recommend appropriate drug or chemical treatment.</p> <p>Summarize fish health status or stock prior to release or transfer to another facility.</p> |                   | <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> |   |    | <p>Review of records/Discussion</p> |                                       |
| <p><b>all of the functions of the hatchery yearly monitoring visits being completed as described below?</b></p> <p>usually examine each broodstock for the presence of portable viral pathogens.</p> <p>usually screen each salmon broodstock for the presence of <i>Aeromonas salmonicida</i>.</p> <p>conduct inspection by or under the supervision of qualified health specialist.</p>   |                   | <p>✓</p> <p>✓</p> <p>✓</p>                                     |   |    | <p>Review of records/Discussion</p> <p>Review of records/Discussion</p> <p>Review of records/Discussion</p>   |                                       |

| Description of Performance Measure   | Compliance Status |   |   |    | Basis for Compliance or Non-Compliance   | Remedial Action Needed for Compliance |
|--|-------------------|---|---|----|--|---------------------------------------|
|  | N/A               | Yes   | ? | No |  |                                       |
| <p><b>Are hatchery sanitation procedures followed as described below?</b></p> <p>Are there any sources of pathogen-free water, especially for incubation and early rearing?</p> <p>Are the hatchery sanitation procedures understood and followed as described below?</p> <p>Disinfect/water harden eggs in iodophor?</p> <p>Are foot baths containing disinfectant placed at the incubation facility's entrance and exit?</p> <p>Is equipment and rain gear utilized in broodstock handling or spawning sanitized prior to its use elsewhere in the hatchery?</p> <p>Is equipment used to collect dead fish sanitized prior to its use in another pond and/or lot of fish?</p> <p>Is equipment, including vehicles used to transfer fish between facilities, disinfected prior to use with any other fish lots or at any other location?</p> <p>Are rearing vessels sanitized after fish are removed and prior to introducing a new fish lot or stock?</p> <p>Are dead fish properly disposed of?</p> |                   | <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> |   |    | <p>Discussion. Upper intake that provides incubation and early rearing water is pathogen free. Only about 5 ft open water</p> <p>Frozen and hauled off</p> |                                       |

| Description of Performance Measure   | Compliance Status |                            |                            |                   | Basis for Compliance or Non-Compliance  | Remedial Action Needed for Compliance  |
|--|-------------------|----------------------------|----------------------------|-------------------|---|--|
|  | N/A               | Yes                        | ?                          | No                |   |  |
| <p><b>water quality parameters being followed?</b></p> <p>Are the following water quality parameters within criteria? (PM #5a-5h)</p> <p>Water temperature<br/>Dissolved gases<br/>Chemistry<br/>Turbidity<br/>Alkalinity and hardness<br/>Nitrite<br/>Contaminants</p> <p>to PM #21</p> |                   | <p>✓</p> <p>✓</p> <p>✓</p> | <p>✓</p> <p>✓</p> <p>✓</p> | <p>✓</p>          | <p>Review of records/Discussion<br/>Review of records/Discussion<br/>Review of records/Discussion<br/>Review of records/Discussion<br/>Review of records/Discussion<br/>Review of records/Discussion<br/>Review of records/Discussion</p> | <p>Install chiller for 400 gpm<br/>Monitor TGP<br/>Run analysis for missing parameters</p> <p>Reduce hardness</p> <p>Run analysis for contaminants</p> |
| <p><b>incubation and rearing standards being followed?</b></p> <p>Are the incubation practices being following the IHOT incubation criteria? (PM #18)</p> <p>Are the rearing practices following the IHOT criteria? (see PM #19)</p> <p>to rearing practices PM #18-PM #19</p>           |                   |                            |                            | <p>✓</p> <p>✓</p> | <p>Review of records/Discussion<br/>Review of records/Discussion</p>  | <p>Need more incubators</p> <p>Need more early rearing vats</p>  |
| <p><b>egg and fish transfer/release requirements met?</b></p>  |                   | <p>✓</p>                   |                            |                   | <p>Information is recorded and records held by pathologists.</p>  | <p>Hatchery should obtain copies of transfer/release records.</p>  |

| Description of Performance Measure  | Compliance Status |     |   |    | Basis for Compliance or Non-Compliance   | Remedial Action Needed for Compliance |
|---|-------------------|-----|---|----|--|---------------------------------------|
|   | N/A               | Yes | ? | No |  |                                       |
| <p><b>Is the hatchery's program outlined in a subbasin management plan?</b></p> <p>to subbasin plan PM # 1</p>              |                   | ✓   |   |    | Columbia Basin System Planning Production Plan and Idaho Power settlement agreement through FERC |                                       |
| <p><b>Is the hatchery operating under a current hatchery operational plan?</b></p> <p>to operational plan PM # 2</p>        |                   | ✓   |   |    | IHOT Operations Plan and Niagara Springs Steelhead Operations Manual                             |                                       |
| <p><b>Is hatchery monitoring and evaluation plan in place?</b></p> <p>to hatchery monitoring and evaluation plan PM # 3</p> |                   | ✓   |   |    | LSRCP Fish Hatchery Evaluations - Idaho  |                                       |

| Description of Performance Measure  | Compliance Status |                   |   |    | Basis for Compliance or Non-Compliance  | Remedial Action Needed for Compliance |
|---|-------------------|-------------------|---|----|---|---------------------------------------|
|   | N/A               | Yes               | ? | No |   |                                       |
| <p>Does the hatchery program meet requirements established in the regional hatchery policies and basin planning documents in the following areas: species, stock, broodstock collection location, broodstock numbers, broodstock collection strategy, spawning and egg-take protocols?</p> <p>Does the hatchery program meet the requirements for the following?</p> <p>Species protocols (PM #4a)</p> <p>Stock protocols (PM #4a)</p> <p>Broodstock collection location protocols (PM #41)</p> <p>Broodstock numbers protocols (PM #42)</p> <p>Broodstock collection strategy protocols (PM #41)</p> <p>Spawning protocols (PM #42)</p> <p>Egg-take protocols (PM #42)</p> |                   | <p>✓</p> <p>✓</p> |   |    | <p>Review of records/Discussion</p> <p>Review of records/Discussion</p> <p>No broodstock collected at this hatchery</p> <p>No spawning at this hatchery</p> |                                       |

| Description of Performance Measure   | Compliance Status |          |   |   | Basis for Compliance or Non-Compliance  | Remedial Action Needed for Compliance  |
|--|-------------------|----------|---|---|---|--|
|  | N/A               | Yes      | ? | No  |   |  |
| <p><b>Do the hatchery's performance meet requirements defined in the regional hatchery policies and in basin and hatchery plans for the following areas: percent smoltification, rearing density, disease condition, and the number, size date(s), and location of release?</b></p> <p>Percent smoltification (PM #22a1)</p> <p>Rearing density (PM #22a2)</p> <p>Disease condition (PM #22a3)</p> <p>Number at release (PM #22a4)</p> <p>Size at release (PM #22a5)</p> <p>Date of release (PM #22a6)</p> <p>Location of release (PM #22a7)</p> |                   |          |   | <p>✓</p> <p></p> <p></p> <p></p> <p></p> <p>✓</p> | <p>Review of records/Discussion</p> | <p>Develop smoltification goal and monitor</p> <p></p> <p></p> <p></p> <p></p> <p>Need additional transportation truck</p> <p></p> |
| <p><b>Are fish reared in the subbasin or acclimated in the basin?</b></p> <p>PM #22b</p>   |                   |          |   | <p>✓</p>  | <p>Discussion</p>   | <p>Develop acclimation ponds for release sites</p>   |
| <p><b>Is the release strategy appropriate for the program?</b></p> <p>PM #22c</p>  |                   | <p>✓</p> |   |   | <p>Discussion</p>   |  |

| Description of Performance Measure   | Compliance Status  |     |   |    | Basis for Compliance or Non-Compliance  | Remedial Action Needed for Compliance |
|--|--|-----|---|----|---|---------------------------------------|
|  | N/A  | Yes | ? | No |   |                                       |
| <p><b>new programs, has a broodstock collection plan developed?</b></p> <p>Is the broodstock collection plan written?</p> <p>For a non-captive broodstock program:</p> <p>Was an unbiased, representative sample collected?</p> <p>Was the recommended number of broodstock collected?</p> <p>For a captive broodstock program:</p> <p>Were captive brood progeny excluded as donors for propagating the next generation of the captive broodstock program?</p> <p>Were full-sib crosses avoided?</p> <p>Is the broodstock collection plan understood and being followed by staff?</p> | <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> |     |   |    | <p>Existing Program; does not apply</p> |                                       |
| <p><b>a new program, was the donor selection outline followed in selecting the hatchery broodstock?</b></p> <p>Is a donor selection plan written?</p> <p>Was the donor selection outline followed in selecting the broodstock?</p> <p>Was the target stock recommended in the donor selection process actually used?</p>   | <p>✓</p> <p>✓</p> <p>✓</p>                                     |     |   |    | <p>Existing Program; does not apply</p> <p>Existing Program; does not apply</p> <p>Existing Program; does not apply</p>   |                                       |

| Description of Performance Measure  | Compliance Status |     |   |    | Basis for Compliance or Non-Compliance   | Remedial Action Needed for Compliance |
|---|-------------------|-----|---|----|--|---------------------------------------|
|   | N/A               | Yes | ? | No |  |                                       |
| <p><b>existing programs, were the broodstock collection cedures followed?</b></p> <p>Is the broodstock collection plan written?</p> <p>Does the broodstock collection plan follow the guideline:</p> <p>    Was an unbiased, representative sample collected?</p> <p>    Was the recommended number of broodstock collected?</p> <p>    Were the broodstock collection procedures in hatchery operation plan understood and followed?</p> <p>    Were the broodstock collection procedures in hatchery operation plan understood and followed?</p>  | ✓                 |     |   |    | No broodstock collected at this hatchery |                                       |
| <p><b>s the appropriate number of spawners, male/female os, and fertilization protocols used?</b></p> <p>Are the spawning protocols written?</p> <p>Are daily or weekly spawning logs available?</p> <p>Was the appropriate number of spawners used?</p> <p>Did you attempt to spawn all collected broodstock and randomize mating with respect to age class, and other traits?</p> <p>Was the sex-ratio within the limits given in the performance standards?</p> <p>Were the fertilization protocols followed?</p> <p>If the hatchery needed to reduce the number of eggs retained, was this done by representative sampling of each male/female cross?</p> | ✓                 |     |   |    |  |                                       |

| Description of Performance Measure  | Compliance Status |     |   |  | Basis for Compliance or Non-Compliance   | Remedial Action Needed for Compliance                 |
|---|-------------------|-----|---|--|--|---|
|   | N/A               | Yes | ? | No   |  |   |
| <p><b>Are there a genetics monitoring and evaluation program in place?</b></p> <p>Is a genetics monitoring and evaluation program available?</p> <p>Does the plan address the following elements listed in IHOT:</p> <p>Does the program have elements needed to meet evaluation goals 1-4?</p> <p>Has a qualified geneticist reviewed and endorsed the program (goal 5)?</p> <p>Will the program collect the data and maintain the records needed to evaluate compliance on an ongoing basis (goal 5)?</p> <p>Is the program understood and followed by staff?</p> |                   |     |   | <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> | <p>Discussion. There are provisions in place to monitor for size, survival, conditions, arrival and to compensate for problems with run timing. These provisions are not in a reviewed and approved genetics plan.</p> | <p>Develop approved genetics and monitoring plan.</p> |

Section 4

## 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 Niagara Springs Hatchery - Summer Steelhead

This section presents the corrective actions required to bring the Niagara Springs Hatchery - Summer Steelhead program into compliance with the 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 ( $\pm 40\%$ ).

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 Niagara Springs Hatchery - Summer Steelhead**

| <b>Remedial Action Required</b>  | <b>Cost</b> | <b>PMs<sup>1</sup></b> |
|--|-------------|------------------------|
| <b>Type 1</b> - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery |             |                        |
| Reduce water hardness  | ----        | 5e                     |
| <b>Type 2</b> - Remedial actions requiring changes in agency policies or procedures  |             |                        |
| Develop goal for smolt-to-adult survival and monitor performance   | ----        | 4h                     |
| Conduct IHOT QA/QC feed tests  | ----        | 12                     |
| Do not leave buckets of feed exposed to heat or light  | ----        | 12                     |
| Develop DI and FI goals for IHOT Operations Plan   |             | 19                     |
| Develop smoltification goal and monitoring programs  |             | 22a1                   |
| Follow IHOT disinfection protocols for vehicle cab   |             | 23                     |
| Need more fishery contribution evaluations for Hells Canyon releases   |             | 24                     |
| Obtain copies of transfer/release records  |             | 31                     |
| Develop approved genetics and monitoring plan  | ----        |                        |
| <b>Type 3</b> - Remedial actions requiring changes in monitoring coverage or interval  |             |                        |
| Monitor TGP  | ----        | 5b                     |
| Run analysis for missing water chemistry parameters  | ----        | 5c                     |
| Run analysis for contaminants  | ----        | 5g                     |
| Monitor DO during hauling  | ----        | 23                     |

<sup>1</sup> PMs are performance measures that were extracted from the IHOT 1995 report. The IHOT performance measures are listed in Table 2 in Section 3 in numerical order.

| <b>Remedial Action Required</b>  | <b>Cost</b> | <b>PMs<sup>1</sup></b> |
|--|-------------|------------------------|
| <b>Type 4 - Remedial actions requiring significant capital expenditures</b>  |             |                        |
| Install chillers for incubation (400 gpm)  | \$190,000   | 5a                     |
| Block upstream passage into springs  | \$5,000     | 5h                     |
| Install flow alarms as appropriate for a gravity flow water supply   | \$5,000     | 6                      |
| Install 32 more upwelling incubators and circular vats (1800 sf) of additional building space; consider replacements of vats with enclosed rectangular nurseway raceways | \$210,000   | 4e,4f,8,9              |
| Install bird netting over raceways   | \$200,000   | 11                     |
| Insulate bulk storage facilities   | 10,000      | 12                     |
| Obtain additional transportation trucks to comply with IHOT hauling standards  | \$60,000    | 15                     |
| Develop acclimation sites for release sites  |             |                        |
| 5 acclimation sites at \$1,000,000   | \$5,000,000 |                        |
| <b>Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time</b>  |             |                        |
| Remove fish from spring and install bird netting over springs  | ----        | 5h                     |

<sup>1</sup> 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.

## Hatchery Contribution to Fisheries, Spawning Grounds, and Hatcheries

This section presents the audit findings for the Niagara Springs Hatchery - Summer Steelhead 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:  
Niagara Springs Hatchery - Summer Steelhead<sup>1</sup>**

| Year | Fisheries <sup>2</sup><br>(Broodyear) | Spawning Grounds <sup>2</sup><br>(Broodyear) | Hatchery <sup>2</sup><br>(Broodyear) | Total Combined Contribution <sup>3</sup><br>(Broodyear) | Smolt to Adult Survival<br>(percent) |
|------|---------------------------------------|--|--------------------------------------|---|--------------------------------------|
| 1981 |                                       |  |                                      |   |                                      |
| 1982 |                                       |  |                                      |   |                                      |
| 1983 |                                       |  |                                      |   |                                      |
| 1984 |                                       |  |                                      |   |                                      |
| 1985 |                                       |  |                                      |   |                                      |
| 1986 |                                       |  |                                      |   |                                      |
| 1987 |                                       |  |                                      |   |                                      |
| 1988 |                                       |  |                                      |   |                                      |
| 1989 | ---                                   | ---  | 810                                  |   | ---                                  |
| 1990 | 547                                   | ---  | 2,159                                |   | 0.28                                 |
| 1991 | 2,503                                 |  | 2,333                                |   | 0.56                                 |
| 1992 |                                       |  |                                      |   |                                      |

<sup>1</sup> Combined information for Pahsimeroi and Oxbow Hatcheries

<sup>2</sup> Data obtained from Missing Production Groups Annual Report or from the Regional Mark Information System database.

<sup>3</sup> 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. Table 5 shows the annual operating expenses for the Niagara Springs Hatchery - Summer Steelhead 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 (Tables 5a, 5b and 5c).

**Table 5. Annual Operating Expenses: Niagara Springs Hatchery - Summer Steelhead**

| Hatchery                    | 1993             | 1993               | 1995             |
|-----------------------------|------------------|--------------------|------------------|
| 1. Niagara Springs Hatchery | \$676,398        | \$688,683          | \$628,363        |
| 2. Pahsimeroi Hatchery      | \$90,283         | \$237,722          | \$89,027         |
| 3. Oxbow Hatchery           | \$110,100        | \$94,143           | \$94,128         |
| 4.                          |                  |                    |                  |
| 5.                          |                  |                    |                  |
| <b>Total Program Costs</b>  | <b>\$876,736</b> | <b>\$1,020,548</b> | <b>\$811,518</b> |

The total expenditures for the Niagara Springs Hatchery are presented in Table 6 by program. The detailed breakdown of program expenditures at this hatchery is presented in a separate table (Table 6a).

**Table 6. Annual Operating Expenses - Niagara Springs Hatchery**

| Program                     | 1993             | 1994             | 1995             |
|-----------------------------|------------------|------------------|------------------|
| 1. Summer Steelhead         | \$676,398        | \$688,683        | \$628,363        |
| 2.                          |                  |                  |                  |
| 3.                          |                  |                  |                  |
| 4.                          |                  |                  |                  |
| 5.                          |                  |                  |                  |
| <b>Total Hatchery Costs</b> | <b>\$676,398</b> | <b>\$688,683</b> | <b>\$628,363</b> |

**Table 5a. Annual Operating Expenses: Niagara Springs Hatchery  
Summer Steelhead**

**Expenditure Occurring at Niagara Springs Hatchery**

| <b>Component</b>                   | <b>1993</b>      | <b>1994</b>      | <b>1995</b>      |
|------------------------------------|------------------|------------------|------------------|
| Personnel Costs                    |                  |                  |                  |
| Operational Costs                  |                  |                  |                  |
| Capital Costs                      |                  |                  |                  |
| Indirect Costs                     |                  |                  |                  |
| Lumped Hatchery Costs <sup>1</sup> | \$319,805        | \$344,904        | \$308,245        |
| Lumped Third Party Costs           | \$356,593        | \$343,958        | \$320,138        |
| <b>Total Hatchery Costs</b>        | <b>\$676,398</b> | <b>\$688,683</b> | <b>\$628,363</b> |
| <b>Source of Funds</b>             |                  |                  |                  |
| Idaho Power                        |                  |                  |                  |
|                                    |                  |                  |                  |
| Program Production (lb)            |                  |                  |                  |
| Total Production (lb)              |                  |                  |                  |
| Program as Percent of Total        | 100%             | 100%             | 100%             |
| <b>Program Costs</b>               | <b>\$676,398</b> | <b>\$688,683</b> | <b>\$628,363</b> |

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

**Table 5b. Annual Operating Expenses: Niagara Springs Hatchery -  
Summer Steelhead**

**Expenditure Occurring at Pahsimeroi Hatchery**

| <b>Component</b>                   | <b>1993</b>      | <b>1994</b>      | <b>1995</b>      |
|------------------------------------|------------------|------------------|------------------|
| Personnel Costs                    | \$94,512         | \$91,290         | \$101,300        |
| Operational Costs                  | \$114,523        | \$138,640        | \$80,521         |
| Capital Costs                      | 0                | 0                | 0                |
| Indirect Costs                     |                  |                  |                  |
| Lumped Hatchery Costs <sup>1</sup> |                  |                  |                  |
| Lumped Third Party Costs           | \$16,673         | \$109,673        | \$114,936        |
| <b>Total Hatchery Costs</b>        | <b>\$225,708</b> | <b>\$339,603</b> | <b>\$296,757</b> |
| <b>Source of Funds</b>             |                  |                  |                  |
| Idaho Power Corporation            | <b>100%</b>      | <b>100%</b>      | <b>100%</b>      |
|                                    |                  |                  |                  |
| Program Production (lb)            |                  |                  |                  |
| Total Production (lb)              |                  |                  |                  |
| Program as Percent of Total        | 30%              | 70%              | 30%              |
| <b>Program Costs</b>               | <b>\$90,283</b>  | <b>\$237,722</b> | <b>\$89,027</b>  |

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

**Table 5c. Annual Operating Expenses: Niagara Springs Hatchery -  
Summer Steelhead**

**Expenditure Occurring at Oxbow Hatchery**

| <b>Component</b>                   | <b>1993</b>      | <b>1994</b>     | <b>1995</b>     |
|------------------------------------|------------------|-----------------|-----------------|
| Personnel Costs                    |                  |                 |                 |
| Operational Costs                  |                  |                 |                 |
| Capital Costs                      |                  |                 |                 |
| Indirect Costs                     |                  |                 |                 |
| Lumped Hatchery Costs <sup>1</sup> | \$188,754        | \$161,398       | \$161,372       |
| Lumped Third Party Costs           |                  |                 |                 |
| <b>Total Hatchery Costs</b>        |                  |                 |                 |
| <b>Source of Funds</b>             |                  |                 |                 |
| Idaho Power Corporation            | <b>100%</b>      | <b>100%</b>     | <b>100%</b>     |
|                                    |                  |                 |                 |
| Program Production (lb)            |                  |                 |                 |
| Total Production (lb)              |                  |                 |                 |
| Program as Percent of Total        | \$58.33%         | \$58.33%        | \$58.33%        |
| <b>Program Costs</b>               | <b>\$110,100</b> | <b>\$94,143</b> | <b>\$94,128</b> |

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

**Table 6a. Detailed Expenditures at Niagara Springs Hatchery by Program**

**Summer Steelhead**

| <b>Component</b>                   | <b>1993</b>      | <b>1994</b>      | <b>1995</b>      |
|------------------------------------|------------------|------------------|------------------|
| Personnel Costs                    |                  |                  |                  |
| Operational Costs                  |                  |                  |                  |
| Capital Costs                      |                  |                  |                  |
| Indirect Costs                     |                  |                  |                  |
| Lumped Hatchery Costs <sup>1</sup> | \$319,805        | \$344,904        | \$308,245        |
| Lumped Third Party Costs           | \$356,593        | \$343,958        | \$320,138        |
| <b>Total Hatchery Costs</b>        | <b>\$676,398</b> | <b>\$688,683</b> | <b>\$628,363</b> |
| <b>Source of Funds</b>             |                  |                  |                  |
|                                    |                  |                  |                  |
|                                    |                  |                  |                  |
| Program Production (lb)            |                  |                  |                  |
| Total Production (lb)              |                  |                  |                  |
| Program as Percent of Total        | 100%             | 100%             | 100%             |
| <b>Program Costs</b>               | <b>\$676,398</b> | <b>\$688,683</b> | <b>\$628,363</b> |

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