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# **HATCHERY EVALUATION REPORT**

**Umatilla Hatchery - Winter Steelhead**

**September 1996**

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**Integrated Hatchery Operations Team (IHOT)**

# **HATCHERY EVALUATION REPORT**

## **Umatilla Hatchery - Winter Steelhead**

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

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# CONTENTS

Section 1 Executive Summary .....	1-1
Section 2 Facility Description .....	2-1
Section 3 Compliance Status.....	3-1
Section 4 Remedial Actions .....	4-1
Section 5 Hatchery Contribution to Fisheries, Spawning Grounds and Hatcheries .....	5-1
Section 6 Annual Operating Expenditures .....	6-1

## List of Tables

### Table

1	Summary Program Information for Umatilla Hatchery - Winter Steelhead
2	Compliance with Performance Measures: Umatilla Hatchery - Winter Steelhead
3	Remedial Actions Required: Umatilla Hatchery - Winter Steelhead
4	Adult Contribution to Fisheries, Spawning Grounds and Hatcheries: Umatilla Hatchery - Winter Steelhead
5	Annual Operating Expenditures: Umatilla Hatchery - Winter Steelhead
6	Annual Operating Expenses for all Programs

## Executive Summary

This report presents the findings of the independent audit of the Umatilla Hatchery - Winter Steelhead program. The hatchery is located on the Columbia River near Irrigon in northeastern Oregon. The hatchery is used for egg incubation and rearing of summer steelhead, spring chinook, fall chinook, and winter 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.
- The hatchery manager was asked to fill out and return the audit form.
- A 1-2 day site audit inspection 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.

## Umatilla Hatchery - Winter Steelhead Results

The hatchery began operation in 1991 to provide salmon and steelhead for release into the Umatilla River. The Umatilla Hatchery facility includes 10 concrete Oregon ponds, 24 concrete Michigan ponds, 8 Canadian troughs, and incubation facilities. One aspect of the Umatilla Hatchery's operation is an evaluation of the results of rearing in Oregon vs. Michigan ponds. The entire hatchery water supply is groundwater.

The hatchery was in general compliance with most of the performance measures. In the area of facilities requirements, the audit found that the hatchery was not in compliance with the recommended water temperature criteria for incubation and rearing and did not meet the monitoring requirements for chemistry, nitrite, and contaminants. The audit also found that the facility was not in compliance with monitoring requirements for the frequency of checking alarms and the criteria for verification of feed ingredients by a regional quality control officer. The hatchery has insulated feed hoppers, but they are not adequate to maintain the contents at or below 80°F on very hot days. In the area of hatchery practices, the audit found that the hatchery had no written standards for incubation, rearing, written loading and flow criteria. The hatchery also did not meet two IHOT criteria for disinfection of transport vehicles.

The specific areas in which the Umatilla Hatchery - Winter 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:

- Begin routine testing of alarms using IHOT recommendations
- Conduct IHOT feed QA/QC testing
- Develop goals for green-to-eyed-egg and eyed-egg-to-fry survival
- Develop specific incubation standards and written incubation practices for the IHOT Operations Plan
- Develop written flow and loading criteria for incubation in IHOT Operations Plan
- Follow IHOT disinfection policies for transportation
- Monitor chemistry, nitrite, and contaminants on routine basis
- Provide a second set of screens for all raceways (24 Michigan ponds and 12 Oregon ponds)

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>	Umatilla Hatchery
<b>Stock/Species:</b>	Winter Steelhead
<b>Operating Agency:</b>	Oregon Department of Fish and Wildlife
<b>Funding Agency:</b>	Bonneville Power Administration
<b>Location:</b>	Near Irrigon, OR on the Columbia River
<b>Address:</b>	Umatilla Hatchery Oregon Department of Fish and Wildlife Route 2, Box 151 Irrigon, OR 97844
<b>Hatchery Manager:</b>	Mr. Jack Hurst
<b>Phone:</b>	(541) 922-5659
<b>Fax:</b>	(541) 922-5664
<b>Purpose:</b>	The Umatilla Hatchery was authorized under the Northwest Power Planning Council's (NPPC) Fish and Wildlife Program and began operation in 1991. Hatchery funding is provided by Bonneville Power Administration. The hatchery is used for egg incubation and rearing of spring chinook, fall chinook and summer steelhead for release into the Umatilla River.
<b>Production Goal:</b>	Production goal for the Umatilla Hatchery has been reduced from original plan because of water shortage; planned for 15,000 gpm but only can produce 8,000 to 10,000. These are the FY96 (reduced) production goals for the Umatilla Hatchery:
	<p><b>Winter Steelhead</b> 51,000 fish at 200/lb (255 lbs) transferred to Oak Springs Hatchery</p> <p><b>Spring Chinook</b> 390,000 smolts (48,750 lbs) for acclimation and release at Thornhollow and Imeques C-mem-ini-kem facilities on the Umatilla River</p>

**URB Fall Chinook**

2,682,000 subyearlings (44,700 lbs) for acclimation and release at Thornhollow and Imeqes C-mem-ini-kem facilities on the Umatilla River

**Water Supply:**

Pumped supply from 4 remote wells producing a total of 5,100 gpm

**Facilities:**

Adult Holding: N/A

Incubation: 192 16-tray vertical incubators  
30 stacks of 3, 4-tray vertical incubators

Early Rearing: 8 Canadian troughs - 576 cf

Raceways: 10 Oregon ponds - 5,972 cf each  
24 Michigan ponds - 2,252 cf each

Rearing Ponds: None

Satellite Facilities: Acclimation and release of all stocks: Bonifer, Minthorn, Thornhollow, and Imeqes C-mem-ini-kem ponds

Fall chinook broodstock holding and spawning: Three Mile Falls Dam facility

## 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 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 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 17 - 18, 1996.

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<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 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 Umatilla Hatchery - Winter 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 Umatilla Hatchery - Winter 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 Umatilla Hatchery - Winter Steelhead**

Component	Location of Adult Holding, Spawning, Incubation, and Rearing					
	Hood River	Umatilla	Oak Springs			
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 Umatilla Hatchery and Basin Annual Operation Plan (AOP)	
the hatchery operating under a current hatchery operational plan?		✓			IHOT Operations Plan and Umatilla Hatchery and Basin AOP	
is it understood by staff?		✓				
is it being followed?		✓				
hatchery monitoring and evaluation plan in place?						
do you have a written monitoring and evaluation plan?		✓			Umatilla Hatchery and Basin AOP	
direct contribution to fisheries, spawning grounds, and hatchery	✓				Temporary program at Umatilla Hatchery	
direct pre-spawning survival as compared with established goal	✓				No adults held on station	
egg take as compared with established hatchery goal	✓				No egg take on station	
pre-egg to eyed-egg survival as compared with established goal				✓	No goal established	Establish goal
eyed-egg to fry survival as compared with established goal				✓	No goal established	Establish goal
smolt to smolt survival as compared with established goal	✓				Transferred to Oak Springs at fingerling stage	
production as compared with established goal				✓	In compliance 2 out of 3 years	Improve production by transferring all rearing to Oak Springs when facility is ready
percent survival (smolt to adult) as compared with established goal			✓		No data provided. Will evaluate during Oak Springs site visit	Unknown
number of eggs, fry, fingerlings, smolts, and/or adults meet basinwide needs	✓				Review of records/Discussion	Not a compliance-related measure

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?	✓				No adults held on station	None. Temperature modification required to meet program goals.
Does your water temperature meet the criteria for incubation?				✓	Use chillers to retard development and meet program requirements	
Does your water temperature meet the criteria for rearing?		✓			Review of records	
<b>Dissolved gases</b>						
Is the oxygen level near saturation?		✓			Review of 4 years' data	
Is the dissolved nitrogen level less than saturation?		✓			Review of 4 years' data	
<b>Chemistry</b>						
Ammonia (un-ionized)			✓		No data for supply water	Run analysis
Carbon Dioxide			✓		No data for supply water	Run analysis
Chlorine			✓		No data for supply water	Run analysis
Hardness			✓		No data for supply water	Run analysis
Copper			✓		No data for supply water	Run analysis
Hydrogen Sulfide			✓		No data for supply water	Run analysis
Iron			✓		No data for supply water	Run analysis
Manganese			✓		No data for supply water	Run analysis
<b>Turbidity</b>						
Does your turbidity meet the criteria?		✓			Groundwater supply with no visible turbidity	
<b>Alkalinity and hardness</b>						
Does your alkalinity and hardness meet the criteria?		✓			Review of 4 years' data	
<b>Nitrite</b>						
Does your nitrite meet the criteria?			✓		No data	Run analysis

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
<b>pesticides</b>						
Alachlor			✓		No data for supply water	Run analysis
Endosulfan			✓		No data for supply water	Run analysis
Permethrin			✓		No data for supply water	Run analysis
Triphenylethylchlor			✓		No data for supply water	Run analysis
Chlorpyrifos			✓		No data for supply water	Run analysis
Disulfoton			✓		No data for supply water	Run analysis
Imidacloprid			✓		No data for supply water	Run analysis
Malathion			✓		No data for supply water	Run analysis
Thionex			✓		No data for supply water	Run analysis
<b>biosecurity</b>						
What portions of the hatchery have disease-free water?						
Adult holding	✓				No adults held on station	
Incubation		✓			Groundwater	
Early rearing		✓			Groundwater	
Rearing		✓			Groundwater	
Others		✓			Groundwater at truck fill station	
<b>Alarm Systems</b>						
Do the following areas have alarms?						
Intake		✓				
Large rearing ponds and adult holding ponds	✓				No adults held on station	
Raceway headboxes and rearing ponds		✓			Inspection of facilities/Discussion	
Incubation facilities		✓			Inspection of facilities/Discussion	
Quarantine areas and facilities	✓				No quarantine areas or facilities	
Water treatment systems		✓				
Security		✓				

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
Are there outside systems and buzzers in on-site residences?		✓			Discussion	
Are water flow alarms checked daily?				✓	Discussion	Develop daily checking routine
Are all other alarms checked weekly?				✓	Discussion	Develop weekly checking routine
Is there a log of alarms for emergencies, tests, and maintenance requirements?				✓	Discussion	Develop alarm log
Are telephone pagers used?				✓	Discussion, residences are hard-wired to alarms	None, not a problem
<b>Waste collection and holding facilities</b>						
Do you meet the adult holding criteria?	✓				No adults held on station	
<b>Sanitation facilities</b>						
Type 1: <u>16-tray vertical stacks</u> Do you have an adequate number of units for the overall program?		✓			Inspection of facilities/Discussion	
Type 2: <u>3,4-tray stacks</u> Do you have an adequate number of units for the overall program?		✓			Inspection of facilities/Discussion	
<b>Drinking water facilities</b>						
Type 1: <u>Oregon Ponds</u> Do you have an adequate number of units for the overall program?		✓			Inspection of facilities/Discussion	
Type 2: <u>Michigan Ponds</u> Do you have an adequate number of units for the overall program?		✓			Inspection of facilities/Discussion	
Type 3: <u>Canadian Troughs</u> Do you have an adequate number of units for the overall program?		✓			Inspection of facilities/Discussion	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
<b>Screening facilities</b>						
Do you meet the approach velocity criteria?	✓				Groundwater supply - no screens needed	
Are the fish screens regularly cleaned?	✓				Groundwater supply - no screens needed	
Does the screen mesh meet screen opening criteria?	✓				Groundwater supply - no screens needed	
Are rearing containers double screened for fish that should not be released to adjacent water?				✓	Have slots for second screen but do not use them	Provide second set of screens
<b>Predator control facilities</b>						
Are your predation control facilities effective?		✓			Inspection of facilities/Discussion	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
<p><b>d storage facilities and quality control</b></p> <p>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?</p> <p>Does a regional quality control officer oversee production procedures and monitor:</p> <p>Verification by feed manufacturer that ingredients meet specifications?</p> <p>Ensure feed does not contain unwanted drugs or other additives? Analyze ingredients contained in the final food product to ensure that feed specifications have been met?</p> <p>Are the foods stored and handled according to the following criteria?</p> <p>Moist pellets should not exceed 10 °F at point of delivery.</p> <p>Moist pellets should be removed from freezer just prior to feeding.</p>		✓			<p>Inspection of facilities/Discussion Discussion, inspection of facilities</p> <p>Discussion with hatchery manager and regional quality control officer</p> <p>Discussion with hatchery manager and regional quality control officer</p> <p>Discussion with hatchery manager and regional quality control officer</p> <p>Discussion</p> <p>Discussion</p>	<p>Verify ingredients meet specifications</p> <p>Inspect for unwanted drugs and additives</p> <p>Analyze ingredients against feed specifications</p>

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
Do not leave buckets of feed or feed containers outside exposed to light or heat.		✓			Discussion	Unknown. Have not noticed a problem when this occurs.
Open bags of feed should be fed within one to two days except when feeding small groups of fish.		✓			Discussion	
Automatic feeder hoppers and bulk storage facilities should be insulated against excessive temperatures (80°F and above).				✓	Discussion/Feed hoppers are insulated but reach or exceed ambient in hot (>90°F) weather	
<b>ease facilities</b>						
Do the release facilities ensure that fish are not subjected to adverse conditions?	✓				At Oak Springs Hatchery	
<b>ution abatement facilities</b>						
Do the pollution abatement facilities meet all federal and state regulations (or good engineering practice)?		✓			Inspection of facilities/Discussion	
Are pollution abatement facilities operated correctly?		✓			Discussion	
<b>nsportation facilities</b>						
Are the transport systems adequate to meet IHOT performance measures for transportation practices?		✓			Inspection of facilities/Discussion	

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? Refer to PM #40 in Genetics Section	✓				Existing program; does not apply	
<b>Spawning practices</b>						
Were the appropriate number of spawners, male/female ratios, and fertilization protocols used? Refer to PM #42 in Genetics Section	✓				No spawning on station	
<b>Incubation practices</b>						
Are specific incubation standards listed in the hatchery operations plan?				✓	Reviewed IHOT Operations Plan (OP)	Develop standards for the OP
Are incubation practices written?				✓	None supplied to inspection team	Develop standards for the OP
Incubation Type 1: <u>Vertical</u> (See PM #8) Do you meet the loading and flow criteria?			✓		Review of records/Discussion. Not a problem in meeting program requirements.	Develop written loading and flow criteria
Incubation Type 2: <u>Vertical</u> (See PM #8) Do you meet the loading and flow criteria?			✓		Review of records/Discussion. Not a problem in meeting program requirements.	Develop written loading and flow criteria
<b>Rearing practices</b>						
Are specific rearing standards listed in the hatchery operations plan?				✓	No written standards in AOP for this stock	Develop written standards for IHOT OP
Are rearing practices written?				✓	Rearing practices for this stock not written in AOP	Develop written practices for IHOT OP
Rearing Unit Type 1: <u>Oregon</u> (see PM #9) Do you meet the density and DI criteria?	✓				No outdoor rearing of StW at Umatilla	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
Do you meet the Loading and FI criteria? Rearing Unit Type 2: <u>Michigan</u> (see PM 9)	✓				No outdoor rearing of Winter Steelhead at Umatilla	
Do you meet the density and DI criteria?	✓				No outdoor rearing of Winter Steelhead at Umatilla	
Do you meet the Loading and FI criteria? Rearing Unit Type 3: <u>Canadian</u> (see PM #9)	✓				No outdoor rearing of StW at Umatilla	
Do you meet the density and DI criteria?			✓		No density and DI criteria	Develop criteria for IHOT OP
Do you meet the Loading and FI criteria?			✓		No loading and FI criteria	Develop criteria for IHOT OP
<b>Smolt quality</b>						
Do you produce a high quality smolt?	✓				Transferred to Oak Springs at 200/lb	

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)		✓			Review of records/Discussion	
Is there pathogen-free water and are the sanitation procedures being followed? (PM #28)		✓			Review of records/Discussion	
Are the following water quality parameters within criteria? (PM #5a-5h)						
Water temperature				✓	Review of records/Discussion	Not a problem. See PM #5a
Dissolved gases		✓			Review of records/Discussion	
Chemistry			✓		No data	Run analysis
Turbidity		✓			Review of records/Discussion	
Alkalinity and hardness		✓			Review of records/Discussion	
Nitrite			✓		No data	Run analysis
Contaminants			✓		No data	Run analysis
Are rearing standards being followed? (PM #19)	✓				Review of records/Discussion	
Are egg and fish transfer/release requirements met? (PM #31)		✓			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>Do hatchery performance meet requirements defined in the regional hatchery policies and in basin and hatchery plans for the following areas?</b></p> <p><b>Percent smoltification</b></p> <p>Do you measure percent smoltification?</p> <p>Did you meet the smoltification criteria?</p>	✓				Transferred to Oak Springs at 200/lb	
<p><b>Rearing density (prior to release)</b></p> <p>Did you meet the rearing density criteria just prior to release?</p>	✓				Transferred to Oak Springs at 200/lb	
<p><b>Disease condition (at release)</b></p> <p>Did you meet all disease regulations just prior to release?</p>	✓				Transferred to Oak Springs at 200/lb	
<p><b>Release number (at release)</b></p> <p>Did you meet the release number goal?</p>	✓				Transferred to Oak Springs at 200/lb	
<p><b>Release size (at release)</b></p> <p>Did you meet the size goal?</p>	✓				Transferred to Oak Springs at 200/lb	
<p><b>Release date (at release)</b></p> <p>Did you meet the release date goal?</p>	✓				Transferred to Oak Springs at 200/lb	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
<b>Location of release</b>						
Did you release the fish at the specified location?	✓				Transferred to Oak Springs at 200/lb	
<b>fish reared in the subbasin or acclimated in the basin?</b>						
Were the fish reared in the subbasin?		✓			Discussion	
Were the fish acclimated in the subbasin?		✓			Discussion	
<b>Is release strategy appropriate for the program?</b>		✓			Discussion	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
<b>Transportation 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)?		✓			Discussion	
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?				✓	Discussion	ODF&W disinfection policies differ from IHOT. Resolve differences
Is the fish transport vehicle (cab) disinfected using 600 ppm quaternary ammonia compounds (1.5 ml of 50% stock solution/liter water)?				✓	Discussion	ODF&W disinfection policies differ from IHOT. Resolve differences
Is other equipment disinfected including fish pumps, nets, egg sorters, waders, boots, rain gear, hoses and other equipment using one of the following solutions?  200 ppm chlorine for 30 minutes 600 ppm quaternary ammonia compound for 30 minutes 200 ppm iodophor solution for 10 minutes		✓			Discussion	
Do personnel wear protective garments when handling fish eggs or cultural water?		✓			Discussion	
Do the fish transport truck/chassis and tank/unit receive an inspection and service prior to the release season?		✓			Discussion	
Is a daily service inspection completed before starting up and leaving for the day?		✓			Discussion	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
Does the fish transport unit receive an inspection prior to loading?		✓			Discussion	
Does a pre-loading inspection covering the following: 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?		✓			Discussion	
Do hauling criteria include checking the fish 45 minutes to 1 hour after loading occur?		✓			Discussion	
When fish are active and systems are functioning properly, is the oxygen concentration reduced and maintained at approximately 8 ppm?		✓			Discussion	
Is water temperature in the transportation unit maintained within the 42-48 °F range?		✓			Discussion	
Do fish releasing procedures include the following criteria?		✓			Discussion	
Releasing the fish at the correct release site or into the correct water body.		✓			Discussion	
Tempering or the difference between the liberation tank and the target water body should not exceed 10°F.		✓			Discussion	
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.		✓			Discussion	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
<b>Evaluation practices</b>						
Has the hatchery conducted fishery contribution studies?						
Determine the requirements for evaluating and improving management programs?	✓				At Oak Springs	
Develop guidelines that define the geographical area and identify component stocks (hatchery and/or wild) that comprise the management unit?	✓				See above	
Develop guidelines that define if the proper stocks of fish are currently being used?	✓				See above	
Determine which management units contribute to a specific fishery and the time periods of those contributions?	✓				See above	
Determine the relative contributions of the various management units to a specific fishery over the different time periods?	✓				See above	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
<b>ining practices</b>						
Does the hatchery have a training schedule for its staff?		✓			Review of records/Discussion	
Does each staff member have a personal training plan approved by a supervisor and reviewed annually?		✓			Review of records/Discussion	
Does the hatchery routinely exchange training details between other hatcheries and agencies?		✓			Review of records/Discussion	
Does the hatchery encourage and reward off-duty training of staff?		✓			Review of records/Discussion	
Does the hatchery conduct monthly staff meetings?		✓			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		
<b>monthly hatchery monitoring visits being conducted by a qualified fish health specialist as described below?</b>						
Conduct visit at least monthly		✓			Review of records/Discussion	
Monitoring conducted by qualified fish health specialist		✓			Review of records/Discussion	
Examine a representative sample of healthy and moribund fish from each lot.		✓			Review of records/Discussion	
Review fish culture practices with hatchery manager.		✓			Review of records/Discussion	
Report finding and results of necropsies on standard form.		✓			Review of records/Discussion	
Recommend appropriate drug or chemical treatment.		✓			Review of records/Discussion	
Summarize fish health status or stock prior to release or transfer to another facility.		✓			Review of records/Discussion	
<b>all of the functions of the hatchery yearly monitoring visits being completed as described below?</b>						
Annually examine each broodstock for the presence of reportable viral pathogens.	✓				At Oak Springs	
Annually screen each salmon broodstock for the presence of <i>Renibacterium salmoninarum</i> .	✓				See above	
Conduct inspection by or under the supervision of qualified fish health specialist.	✓				See above	



Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
<b>water quality parameters being followed?</b>						
Are the following water quality parameters within criteria? (PM #5a-5h)						
Water temperature				✓	Review of records/Discussion	Not a problem. See PM #5a
Dissolved gases		✓			Review of records/Discussion	
Chemistry			✓		No data	Run analysis
Turbidity		✓			Review of records/Discussion	
Alkalinity and hardness		✓			Review of records/Discussion	
Nitrite			✓		No data	Run analysis
Contaminants			✓		No data	Run analysis
Refer to PM #21						
<b>incubation and rearing standards being followed?</b>						
Are the incubation practices following the IHOT incubation criteria? (PM #18)			✓		No written criteria	Develop written criteria for IHOT OP
Are the rearing practices following the IHOT criteria? (PM #19)				✓	No written criteria	Develop written criteria for IHOT OP
Refer to rearing practices PM #18-PM #19						
<b>egg and fish transfer/release requirements met?</b>		✓			Discussion	

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>Refer to subbasin plan PM # 1</p>		✓			Columbia Basin System Planning Production Plan and Umatilla Basin Master Plan	
<p><b>Is the hatchery operating under a current hatchery operational plan?</b></p> <p>Refer to operational plan PM # 2</p>		✓			Review IHOT Operations Plan and Umatilla Hatchery and Basin Annual Operations Plan (AOP)	
<p><b>Is a hatchery monitoring and evaluation plan in place?</b></p> <p>Refer to hatchery monitoring and evaluation plan PM # 3</p>		✓			M&E program described in AOP	
<p><b>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?</b></p> <p>Does the hatchery program meet the requirements for the following?</p>						
Species protocols (PM #4a)		✓			Review of records/Discussion	
Stock protocols (PM #4a)		✓			Review of records/Discussion	
Broodstock collection location protocols (PM #41)	✓				No broodstock collection at hatchery	
Broodstock numbers protocols (PM #42)	✓				No broodstock at hatchery	
Broodstock collection strategy protocols (PM #41)	✓				No broodstock at hatchery	
Spawning protocols (PM #42)	✓				No spawning at hatchery	
Egg-take protocols (PM #42)	✓				No egg-take at hatchery	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
<b>Do the hatchery's performance meet requirements defined in the regional hatchery policies and in the subbasin and hatchery plans for the following areas: percent smoltification, rearing density, disease condition, and the number, size date(s), and location of release?</b>						
Percent smoltification (PM #22a1)	✓				Transferred to Oak Springs at 200/lb	
Rearing density (PM #22a2)		✓			Review of records/Discussion	
Disease condition (PM #22a3)	✓				Not released at Umatilla	
Number at release (PM #22a4)	✓				Not released at Umatilla	
Size at release (PM #22a5)	✓				Not released at Umatilla	
Date of release (PM #22a6)	✓				Not released at Umatilla	
Location of release (PM #22a7)	✓				Not released at Umatilla	
<b>Are fish reared in the subbasin or acclimated in the subbasin?</b>		✓			Discussion	
See PM #22b						
<b>Is the release strategy appropriate for the program?</b>		✓			Discussion	
See PM #22c						

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

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>	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>				<p>Will evaluate during Hood River site visit</p>	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
<b>Are the appropriate number of spawners, male/female ratios, and fertilization protocols used?</b>						
Are the spawning protocols written?	✓				Will evaluate during Hood River site visit	
Are daily or weekly spawning logs available?	✓				Will evaluate during Hood River site visit	
Was the appropriate number of spawners used?	✓				Will evaluate during Hood River site visit	
Did you attempt to spawn all collected broodstock and randomize mating with respect to age class, and other traits?	✓				Will evaluate during Hood River site visit	
Was the sex-ratio within the limits given in the performance standards?	✓				Will evaluate during Hood River site visit	
Were the fertilization protocols followed?	✓				Will evaluate during Hood River site visit	
If the hatchery needed to reduce the number of eggs retained, was this done by representative sampling of each male/female cross?	✓				Will evaluate during Hood River site visit	

Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
	N/A	Yes	?	No		
<p><b>Is 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 HOT:</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>Will evaluate during Hood River site visit</p>	

## 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 Umatilla Hatchery - Winter Steelhead

This section presents the corrective actions required to bring the Umatilla Hatchery - Winter 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 Umatilla Hatchery - Winter 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		
<b>Type 2</b> - Remedial actions requiring changes in agency policies or procedures		
Improve production by transferring program to Oak Springs following completion of their rearing facilities	----	4g
Develop goals for green egg to eyed egg and eyed egg to fry survival for IHOT Operations Plan	----	4d, 4e
Begin routine testing of alarms using IHOT recommendations	----	6
No telephone pagers in use (not a problem because onsite residences are hard wired to alarms)	----	6
Interior of insulated feed hoppers exceeds 80 °F on very hot days	----	12
Develop specific incubation standards and written incubation practices for the IHOT Operations Plan	----	18
Develop written flow and loading criteria for incubation in IHOT Operations Plan	----	18
Develop specific rearing standards and written rearing practices for the Operations Plan	----	19, 30
Follow IHOT disinfection policies for transportation	----	23
<b>Type 3</b> - Remedial actions requiring changes in monitoring coverage or interval		
Run analysis for chemistry parameters	----	5c, 21, 29
Run analysis for nitrite	----	5f, 21, 29
Run analysis for contaminants	----	5g, 21, 29
Conduct IHOT feed QA/QC testing	----	12

<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.

Remedial Action Required	Cost	PMs <sup>1</sup>
<b>Type 4</b> - Remedial actions requiring significant capital expenditures  Provide a second set of screens for all raceways (24 Michigan ponds and 12 Oregon ponds)	\$18,000	10
<b>Type 5</b> - Remedial actions that may require significant capital expenditures but are not clearly definable at this time  Modify temperature of hatchery water supply (not a problem because the hatchery meets program requirements)	----	5a, 21, 29

<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.

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

This section presents the audit findings for the Umatilla Hatchery - Winter 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:  
Umatilla Hatchery - Winter Steelhead (a)**

Year	Fisheries <sup>1</sup> (Broodyear)	Spawning Grounds <sup>1</sup> (Broodyear)	Hatchery <sup>1</sup> (Broodyear)	Total Combined Contribution <sup>2</sup> (Broodyear)	Smolt to Adult Survival (percent)
1982					
1983					
1984					
1985					
1986					
1987	No information available	No information available	No information available	No information available	No information available
1988	No information available	No information available	No information available	No information available	No information available
1989	No information available	No information available	No information available	No information available	No information available
1990	No information available	No information available	No information available	No information available	No information available
1991					
1992					

(a) Data determined to be unavailable following audit Oak Springs facility.

<sup>1</sup> Data obtained from Missing Production Groups Annual Report or from the Regional Mark Information System database.

<sup>2</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 overall Umatilla Hatchery Winter Steelhead program. For programs that occur at more than one facility (as shown on Table 1 in Section 3), the cost breakdown for the component(s) at each facility is presented in separate tables (Tables 5a and 5b).

**Table 5. Annual Operating Expenses: Umatilla Hatchery - Winter Steelhead**

Facility	1994	1995	1996
1. Umatilla Hatchery	small	small	small
2.			
3.			
4.			
5.			
<b>Total Program Costs</b>	<b>Reported at Oak Springs Hatchery</b>	<b>Reported at Oak Springs Hatchery</b>	<b>Reported at Oak Springs Hatchery</b>

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

**Table 6. Annual Operating Expenses for All Programs - Umatilla Hatchery**

Program	1994	1995	1996
1. Summer Steelhead	\$150,898	\$208,110	\$191,650
2. Spring Chinook	\$516,517	\$300,453	\$260,190
3. Fall Chinook	\$234,010	\$333,986	\$421,281
4. Winter Steelhead	\$0	\$0	\$0
5.			
<b>Total Hatchery Costs</b>	<b>\$901,425</b>	<b>\$842,549</b>	<b>\$873,121</b>

**Table 5a. Annual Operating Expenses - Umatilla Hatchery Winter Steelhead  
Expenditure Occurring at Umatilla Hatchery**

<b>Component</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>
Personnel Costs	\$342,901	\$344,365	\$333,483
Operational Costs	\$427,692	\$371,874	\$421,818
Capital Costs	\$300	\$0	\$0
Indirect Costs	\$130,532	\$126,310	\$117,820
Lumped Hatchery Costs <sup>1</sup>			
Lumped Third-Party Costs	\$0	\$0	\$0
<b>Total Hatchery Costs</b>	<b>\$901,425</b>	<b>\$824,549</b>	<b>\$873,121</b>
<b>Source of Funds</b>			
100% BPA			
Program Production (lb)	203	390	304
Total Production (lb)	168,762	114,048	132,067
Program as Percent of Total	< 0.2%	< 0.4%	< 0.3%
<b>Program Costs</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</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 Umatilla Hatchery by Program**

**Summer Steelhead**

<b>Component</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>
Personnel Costs	\$342,901	\$344,365	\$333,483
Operational Costs	\$427,692	\$371,874	\$421,818
Capital Costs	\$300	\$0	\$0
Indirect Costs	\$130,532	\$126,310	\$117,820
Lumped Hatchery Costs <sup>1</sup>			
Lumped Third-Party Costs	\$0	\$0	\$0
<b>Total Hatchery Costs</b>	<b>\$901,425</b>	<b>\$824,549</b>	<b>\$873,121</b>
<b>Source of Funds</b>			
100% BPA			
Program Production (lb)	28,253	28,166	28,990
Total Production (lb)	168,762	114,048	132,067
Program as Percent of Total	16.74	24.7	21.95
<b>Program Costs</b>	<b>\$150,898</b>	<b>\$208,110</b>	<b>\$191,650</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 6b. Detailed Expenditures at Umatilla Hatchery by Program**

**Spring Chinook**

<b>Component</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>
Personnel Costs	\$342,901	\$344,365	\$333,483
Operational Costs	\$427,692	\$371,874	\$421,818
Capital Costs	\$300	\$0	\$0
Indirect Costs	\$130,532	\$126,310	\$117,820
Lumped Hatchery Costs <sup>1</sup>			
Lumped Third-Party Costs	\$0	\$0	\$0
<b>Total Hatchery Costs</b>	<b>\$901,425</b>	<b>\$824,549</b>	<b>\$873,121</b>
<b>Source of Funds</b>			
100% BPA			
Program Production (lb)	96,700	40,676	39,358
Total Production (lb)	168,762	114,048	132,067
Program as Percent of Total	57.3	35.66	29.8
<b>Program Costs</b>	<b>\$516,517</b>	<b>\$300,453</b>	<b>\$260,190</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 6c. Detailed Expenditures at Umatilla Hatchery by Program**

**Fall Chinook**

<b>Component</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>
Personnel Costs	\$342,901	\$344,365	\$333,483
Operational Costs	\$427,692	\$371,874	\$421,818
Capital Costs	\$300	\$0	\$0
Indirect Costs	\$130,532	\$126,310	\$117,820
Lumped Hatchery Costs <sup>1</sup>			
Lumped Third-Party Costs	\$0	\$0	\$0
<b>Total Hatchery Costs</b>	<b>\$901,425</b>	<b>\$824,549</b>	<b>\$873,121</b>
<b>Source of Funds</b>			
100% BPA			
Program Production (lb)	43,809	45,206	63,719
Total Production (lb)	168,762	114,048	132,067
Program as Percent of Total	25.96	39.64	48.25
<b>Program Costs</b>	<b>\$234,010</b>	<b>\$333,986</b>	<b>\$421,281</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 6d. Detailed Expenditures at Umatilla Hatchery by Program**

**Winter Steelhead**

<b>Component</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>
Personnel Costs	\$342,901	\$344,365	\$333,483
Operational Costs	\$427,692	\$371,874	\$421,818
Capital Costs	\$300	\$0	\$0
Indirect Costs	\$130,532	\$126,310	\$117,820
Lumped Hatchery Costs <sup>1</sup>			
Lumped Third-Party Costs	\$0	\$0	\$0
<b>Total Hatchery Costs</b>	<b>\$901,425</b>	<b>\$824,549</b>	<b>\$873,121</b>
<b>Source of Funds</b>			
100% BPA			
Program Production (lb)	203	390	304
Total Production (lb)	168,762	114,048	132,067
Program as Percent of Total	< 0.2%	< 0.4%	< 0.3%
<b>Program Costs</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</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.