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**MARION FORKS HATCHERY**

**A COMPILATION AND SUMMARY OF  
IHOT AUDITS FOR WINTER  
STEELHEAD AND SPRING CHINOOK  
(NORTH FORK SANTIAM AND  
CLACKAMAS RIVER STOCKS)**

**JULY 1998**

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**HATCHERY EVALUATION REPORT  
SUMMARY FOR**

- Marion Forks Hatchery**  
- **Winter Steelhead**  
- **Spring Chinook (North Fork Santiam River Stock)**  
- **Spring Chinook (Clackamas River Stock)**

**A Summarized Compilation of Independents Audits Based on  
Integrated Hatchery Operations Team (IHOT) Performance  
Measures**

SUMMARY REPORT PREPARED BY:  
DON SAMPSON  
SAMPSEL CONSULTING SERVICES  
FOR THE  
NORTHWEST POWER PLANNING COUNCIL  
JULY 1998

Original IHOT Audit Reports Prepared by:

Montgomery Watson  
2375 130th Avenue NE  
Suite 200  
Bellevue, WA 98005  
March 1997  
BPA Project Number 95-2  
Contract Number 95AC49468

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## Executive Summary

This report compiles a summary of the findings of three separate Hatchery Evaluation Reports for Marion Forks Hatchery - Winter Steelhead and Spring Chinook (North Fork Santiam and Clackamas River Stocks) programs. The original Hatchery Evaluation Reports, prepared by Montgomery Watson, presented each species and program separately and include the complete findings. Details on the audit compliance status for each species and program are included in the original reports. The Hatchery Evaluation Reports were based upon audits conducted in 1996-1997 as part of a 2-year effort that will include 67 hatcheries and satellite facilities located on the Columbia and Snake River system in Idaho, Oregon, and Washington. The hatchery operating agencies include the U.S Fish and Wildlife Service, Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, and Washington Department of Fish and Wildlife.

The hatchery is located along Marion and Horn creeks (Santiam River tributaries in the Willamette Basin) about 17 miles east of Detroit, Oregon. Minto pond is operated as a satellite facility. The hatchery is operated by the Oregon Department of Fish and Wildlife and used for adult collection, egg incubation, and rearing of spring chinook and winter steelhead.

### Background

The hatchery audit was conducted as a requirement of the Northwest Power Planning Council (NPPC) “Strategy for Salmon” and the Columbia River Basin Fish and Wildlife Program. Under the audit, the hatcheries are evaluated against policies and related performance measures developed by the Integrated Hatchery Operations Team (IHOT) in January 1995. IHOT is a multi-agency group established by the NPPC to direct the development of new basinwide standards for managing and operating fish hatcheries. The Bonneville Power Administration (BPA) was contracted along with Montgomery Watson to complete the hatchery audit.

IHOT has established five basic policies that cover: (1) hatchery coordination, (2) hatchery performance standards, (3) fish health, (4) ecological interaction, and (5) genetics. The audit focuses on all these policies, with the exception of hatchery coordination. These policies are set forth in *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1995)*, which is the source for the performance measures that are the basis of this audit.

### The Audit Process

The audit was based on the facility management’s response to a 109-page questionnaire. This audit form was completed through a five-step process in which:

- Information was obtained from headquarters.
- The hatchery manager was asked to fill out and return the audit form.

- A 1-2 day site audit visit was conducted to inspect facilities, review hatchery records, discuss audit form responses, and develop remedial action plans.
- A compliance report was developed to document the compliance status of each performance measure. This report was then shared with the hatchery manager and IHOT representative.
- This hatchery evaluation report was written to document compliance with IHOT performance measures and to develop cost estimates for remedial actions when needed.

## **Marion Forks Hatchery - Winter Steelhead and Spring Chinook (N. Fork Santiam and Clackamas River Stocks) Results**

The Marion Forks facility includes one pond for adult holding, 8 concrete raceways, 48 circular rearing ponds, 12 Canadian troughs, and incubation facilities. The U.S. Army Corps of Engineers (COE) funds the majority of operation costs as mitigation for the development of Detroit and Big Cliff dams.

### **WINTER STEELHEAD**

The Marion Forks Hatchery - Winter Steelhead program was in compliance with most of the performance measures. In the area of program objectives, the hatchery needed to develop green-egg to eyed-egg, eyed-egg to fry, and smolt-to-adult survival goals for the IHOT Operations Plan. The hatchery was not meeting its adult return goal, production goal, fry-to-smolt survival goal, and needed to develop a hatchery M&E plan. The audit found that the hatchery was not in compliance with the water quality monitoring requirements, incubation and rearing temperature criteria, pathology-free water criteria, alarm requirements, and feed preparation protocols, which are all facilities requirements. The hatchery needed to develop a smoltification goal, smoltification monitoring program, and specific incubation and rearing standards for the IHOT Operations Plan. The hatchery was not meeting its size at release goal and needed to review the criteria and/or program. The hatchery was not meeting all the disinfection protocols for transportation equipment. The hatchery did not have a Genetics Monitoring and Evaluation Program.

The specific areas in which the Marion Forks 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:

- Conduct fishery contribution study
- Conduct IHOT QA/QC tests for feed preparation
- Develop alarm log
- Develop an approved genetics M&E plan
- Develop disease-free water supply for incubation and early rearing
- Develop green-egg to eyed-egg, eyed-egg to fry, and smolt-to-adult survival goals for IHOT Operational Plan
- Develop smoltification goal and monitor
- Develop specific incubation and rearing standards for the IHOT Operations Plan
- Develop written M&E plan
- Document adult contribution
- Document smolt-to-adult survival

- Follow IHOT protocols for disinfection of transportation equipment and personnel before and after use
- Follow IHOT requirements for disinfection of interiors and exteriors of transport vehicles
- Improve adult fish barrier
- Improve adult returns
- Improve fry-to-smolt survival
- Install alarms at intake, rearing ponds, and headboxes
- Install foot baths in the incubation facilities
- Install security alarms
- Install telephone pagers
- Measure temperature of moist pellets when delivered
- Need additional acclimation ponds for fish trucked and released below Detroit Dam.
- Remove moist pellets from freezer just prior to feeding
- Review IHOT temperature criteria for incubation and rearing
- Review size criteria and/or program to try to meet size goal
- Run analysis for water quality parameters, turbidity, alkalinity, hardness, nitrite and contaminants

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

### **Spring Chinook (North Fork Santiam River Stock)**

The Marion Forks Hatchery - Spring Chinook (North Fork Santiam River Stock) program was in compliance with most of the performance measures. In the area of program objectives, the hatchery needed to develop green-egg to eyed-egg, eyed-egg to fry, and smolt-to-adult survival goals for the IHOT Operations Plan. The audit found that the hatchery was not in compliance with the water quality monitoring requirements, rearing temperature criteria, pathology-free water criteria, alarm requirements, and feed preparation protocols, which are all facilities requirements. The hatchery needed to develop a smoltification goal, smoltification monitoring program, and specific incubation and rearing standards for the IHOT Operations Plan. The hatchery was not meeting its size at release goal and needed to review the criteria and/or program. The hatchery was not meeting all the disinfection protocols for transportation equipment. The hatchery did not have a Genetics Monitoring and Evaluation Program.

The specific areas in which the Marion Forks Hatchery - Spring Chinook (North Fork Santiam River Stock) 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 tests for feed preparation
- Construct additional acclimation ponds for fish trucked and released below Detroit Dam.
- Develop alarm log
- Develop an approved genetics M&E plan
- Develop disease-free water supply for incubation and early rearing
- Develop green-egg to eyed-egg, eyed-egg to fry, and smolt-to-adult survival goals for IHOT Operational Plan
- Develop smoltification goal and monitor

- Develop specific incubation and rearing standards for the IHOT Operations Plan
- Follow IHOT protocols for disinfection of transportation equipment and personnel before and after use
- Follow IHOT requirements for disinfection of interiors and exteriors of transport vehicles
- Install alarms at intake, rearing ponds, and headboxes
- Install foot baths in the incubation facilities
- Install telephone pagers
- Review IHOT temperature criteria for rearing
- Review size criteria and/or program to try to meet size goal
- Run analysis for water quality parameters, turbidity, alkalinity, hardness, nitrite and contaminants

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

### **Spring Chinook (Clackamas River Stock)**

The Marion Forks Hatchery - Spring Chinook (Clackamas River Stock) program was in compliance with most of the performance measures. In the area of program objectives, the hatchery needed to develop a eyed-egg to fry goal for the IHOT Operations Plan. The audit found that the hatchery was not in compliance with the water quality monitoring requirements, incubation and rearing temperature criteria, pathology-free water criteria, alarm requirements, feed preparation protocols, and release facilities, which are all facilities requirements. The hatchery needed to develop specific incubation and rearing standards for the IHOT Operations Plan. The hatchery was not meeting all the disinfection protocols for transportation equipment.

The specific areas in which the Marion Forks Hatchery - Spring Chinook (Clackamas River Stock) 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 tests for feed preparation
- Develop alarm log
- Develop disease-free water supply for incubation and early rearing
- Develop eyed-egg to fry goals for IHOT Operational Plan
- Develop specific incubation and rearing standards for the IHOT Operations Plan
- Follow IHOT protocols for disinfection of transportation equipment and personnel before and after use
- Follow IHOT protocols for removal of pellets from freezer
- Follow IHOT requirements for disinfection of interiors and exteriors of transport vehicles
- Install alarms at intake, rearing ponds, and headboxes
- Install foot baths in the incubation facilities
- Install telephone pagers
- Provide effluent screen in effluent channel - rotating drum screen for 24 cfs
- Review IHOT temperature criteria for rearing
- Review need for rearing in the subbasin

- Run analysis for water quality parameters, turbidity, alkalinity, hardness, nitrite and contaminants

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



## Facility Description

<b>Name:</b>	Marion Forks Fish Hatchery
<b>Stock/Species:</b>	Spring Chinook (North Fork Santiam River Stock) Spring Chinook (Clackamas River Stock) Winter Steelhead Cutthroat Trout
<b>Operating Agency:</b>	Oregon Department of Fish & Wildlife
<b>Funding Agency:</b>	COE ODFW
<b>Location:</b>	The hatchery is located along Marion and Horn creeks (Santiam River tributaries in the Willamette Basin) about 17 miles east of Detroit, Oregon. Minto pond is operated as a satellite facility.
<b>Address:</b>	Star Route, Box 71 Idanha, OR 97350
<b>Hatchery Manager:</b>	Mr. Terry Jones
<b>Phone:</b>	(541) 854-3522
<b>Fax:</b>	(541) 854-3503
<b>Purpose:</b>	The U.S. Army Corps of Engineers (COE) funds the majority of operation costs as mitigation for the development of Detroit and Big Cliff dams. The COE mitigation agreement requires the annual production of no more than 84,000 pounds of juvenile chinook and steelhead to mitigate for hydroelectric development in the North Santiam River.

**Production Goal:**

**Spring Chinook (N. Fork Santiam River stock)**

Produce 100,000 fry (500 lb) for release into Detroit Reservoir

Produce 667,000 smolts (60,636 lb) for release in the North Santiam River

**Spring Chinook (Clackamas River Stock)**

Rear 580,000 fingerlings for transfer to South Santiam Hatchery

Rear 365,000 smolts (18,250 lb) for transfer back to Clackamas Hatchery

**Winter Steelhead**

Produce 100,000 smolts (20,000 lb) for release into the North Santiam River

Provide 25,500 eggs to Oregon's Salmon and Trout Enhancement Program

**Cutthroat Trout**

Rear 68,000 fingerlings (454 lb) for transfer to Fall River Hatchery

**Water Supply:**

There are two water rights: 15,257 gpm from Marion Creek and 14,368 gpm from Horn Creek. Water is supplied from Marion Creek from April through September, and from Horn Creek from October through March.

**Facilities:**

Adult Holding:	None; see Minto Ponds under satellite facilities
Incubation:	18 full stacks of vertical tray incubators (288 trays)
Early Rearing:	12 fiberglass Canadian troughs - 98 cf each
Raceways:	8 concrete raceways - 4,000 cf each
Rearing Ponds:	48 circular concrete ponds - 980 cf each
Satellite Facilities:	Minto Pond
	1 concrete adult holding and acclimation pond - 31,488 cf



## 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 categories range 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 Marion Forks Hatchery - Winter Steelhead and Spring Chinook (N. Fork Santiam and Clackamas River Stocks)

This section presents the corrective actions required to bring the Marion Forks Hatchery - Winter Steelhead program into compliance with IHOT performance measures. The remedial actions described here are 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 (Tables 3a, 3b, and 3c).

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 yet been prepared. The cost estimates are essentially order of magnitude estimates ( $\pm 40\%$ ).

The suggested remedial activities may also present several levels of action. Optional actions have been listed for several problems. These optional actions may be desirable for either operational or safety considerations.

**Table 3a. Remedial Actions Required at Marion Forks 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		
Improve adult returns	----	4c, 4g, 22a4
Install security alarms	----	6
<b>Type 2</b> - Remedial actions requiring changes in agency policies or procedures		
Develop written M&E plan	----	3
Document adult contribution	----	4a
Develop green-egg to eyed-egg, eyed-egg to fry, and smolt-to-adult survival goals for IHOT Operational Plan	----	4d, 4e, 4h
Document smolt-to-adult survival	----	4h
Review IHOT temperature criteria for incubation and rearing	----	5a
Develop alarm log	----	6
Conduct IHOT QA/QC tests for feed preparation	----	12
Measure temperature of moist pellets when delivered	----	12
Remove moist pellets from freezer just prior to feeding	----	12
Develop specific incubation and rearing standards for the IHOT Operations Plan	----	18-19
Develop smoltification goal and monitor	----	22a1
Review size criteria and/or program to try to meet size goal	----	22a5
Follow IHOT protocols for disinfection of transportation equipment and personnel before and after use	----	23
Follow IHOT requirements for disinfection of interiors and exteriors of transport vehicles	----	23
Conduct fishery contribution study	----	24

<sup>1</sup> PMS are performance measures that were extracted from the IHOT 1995 report.

<b>Remedial Action Required</b>	<b>Cost</b>	<b>PMs<sup>1</sup></b>
<b>Type 2 (Continued)</b> - Remedial actions requiring changes in agency policies or procedures		
Install foot baths in the incubation facilities	----	28
Develop an approved genetics M&E plan	----	43
<b>Type 3</b> - Remedial actions requiring changes in monitoring coverage or interval		
Run analysis for water quality parameters, turbidity, alkalinity, hardness, nitrite and contaminants	----	5c-5g
<b>Type 4</b> - Remedial actions requiring significant capital expenditures		
Improve adult fish barrier	\$100,000	4c
Install alarms at intake, rearing ponds, and headboxes	\$30,000	6
Install telephone pagers	\$5,000	6
<b>Type 5</b> - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Improve fry-to-smolt survival	----	4f
Develop disease-free water supply for incubation and early rearing	----	5h, 28
Need additional acclimation ponds for fish trucked and released below Detroit Dam.	----	13, 22b

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<sup>1</sup> PMs are performance measures that were extracted from the IHOT 1995 report.

**Table 3b. Remedial Actions Required at Marion Forks Hatchery -  
Spring Chinook (North Fork Santiam River Stock)**

<b>Remedial Action Required</b>	<b>Cost</b>	<b>PMS<sup>1</sup></b>
<p><b>Type 1</b> - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery</p> <p>None</p>		
<p><b>Type 2</b> - Remedial actions requiring changes in agency policies or procedures</p> <p>Develop green-egg to eyed-egg, eyed-egg to fry, and smolt-to-adult survival goals for IHOT Operational Plan</p> <p>Review IHOT temperature criteria for rearing</p> <p>Develop alarm log</p> <p>Install security alarms</p> <p>Conduct IHOT QA/QC tests for feed preparation</p> <p>Develop specific incubation and rearing standards for the IHOT Operations Plan</p> <p>Develop smoltification goal and monitor</p> <p>Review size criteria and/or program to try to meet size goal</p> <p>Follow IHOT protocols for disinfection of transportation equipment and personnel before and after use</p> <p>Follow IHOT requirements for disinfection of interiors and exteriors of transport vehicles</p> <p>Install foot baths in the incubation facilities</p> <p>Develop an approved genetics M&amp;E plan</p>	<p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p>	<p>4d, 4e, 4h</p> <p>5a</p> <p>6</p> <p>6</p> <p>12</p> <p>18-19</p> <p>22a1</p> <p>22a5</p> <p>23</p> <p>23</p> <p>28</p> <p>43</p>

<sup>1</sup> PMS are performance measures that were extracted from the IHOT 1995 report.

Remedial Action Required	Cost	PMs <sup>1</sup>
<p><b>Type 3</b> - Remedial actions requiring changes in monitoring coverage or interval</p> <p>Run analysis for water quality parameters, turbidity, alkalinity, hardness, nitrite and contaminants</p>	----	5c-5g



Remedial Action Required	Cost	PMs <sup>1</sup>
<b>Type 4</b> - Remedial actions requiring significant capital expenditures		
Install alarms at intake, rearing ponds, and headboxes	\$30,000	6
Install telephone pagers	\$5,000	6
<b>Type 5</b> - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Develop disease-free water supply for incubation and early rearing	----	5h, 28
Need additional acclimation ponds for fish trucked and released below Detroit Dam.	----	13, 22b

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<sup>1</sup> PMs are performance measures that were extracted from the IHOT 1995 report.

**Table 3c. Remedial Actions Required at Marion Forks Hatchery - Spring Chinook (Clackamas River Stock)**

Remedial Action Required	Cost	PMs <sup>1</sup>
<p><b>Type 1</b> - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery</p> <p>None</p>		
<p><b>Type 2</b> - Remedial actions requiring changes in agency policies or procedures</p> <p>Develop eyed-egg to fry goals for IHOT Operational Plan</p> <p>Review IHOT temperature criteria for rearing</p> <p>Install security alarms</p> <p>Develop alarm log</p> <p>Conduct IHOT QA/QC tests for feed preparation</p> <p>Follow IHOT protocols for removal of pellets from freezer</p> <p>Develop specific incubation and rearing standards for the IHOT Operations Plan</p> <p>Reveiw need for rearing in the subbasin.</p> <p>Follow IHOT protocols for disinfection of transportation equipment and personnel before and after use</p> <p>Follow IHOT requirements for disinfection of interiors and exteriors of transport vehicles</p> <p>Install foot baths in the incubation facilities</p>	<p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p>	<p></p> <p>4e</p> <p>5a</p> <p>6</p> <p>6</p> <p>12</p> <p>12</p> <p>18-19</p> <p>22b</p> <p>23</p> <p>23</p> <p>28</p>
<p><b>Type 3</b> - Remedial actions requiring changes in monitoring coverage or interval</p>		

<sup>1</sup> PMs are performance measures that were extracted from the IHOT 1995 report.

<b>Remedial Action Required</b>	<b>Cost</b>	<b>PMs<sup>1</sup></b>
Run analysis for water quality parameters, turbidity, alkalinity, hardness, nitrite and contaminants	----	5c-5g

<b>Remedial Action Required</b>	<b>Cost</b>	<b>PMS<sup>1</sup></b>
<b>Type 4</b> - Remedial actions requiring significant capital expenditures		
Install alarms at intake, rearing ponds, and headboxes	\$30,000	6
Install telephone pagers	\$5,000	6
Provide effluent screen in effluent channel - rotating drum screen for 24 cfs	\$120,00	10
<b>Type 5</b> - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Develop disease-free water supply for incubation and early rearing	----	5h, 28

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<sup>1</sup> PMS are performance measures that were extracted from the IHOT 1995 report.

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

This section presents the audit findings for the Marion Forks Hatchery - Winter Steelhead and Spring Chinook (N.Fork Santiam and Clackamas River Stocks) programs contribution of adult fish to fisheries, local fisheries, spawning grounds, and hatcheries (Tables 4a, 4b, and 4c). Data is reported by broodyear. A broodyear refers to the adult contribution from the eggs produced from a single group of spawning adults. For some species, this may include fish caught as 2-, 3-, 4-, 5-, and 6-year old fish. Because of the return distribution and data processing delays, the complete adult contribution for a given broodyear may not be available until 4 to 5 years after the fish have been released from the hatchery.

**Table 4a. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries:  
Marion Forks Hatchery - Winter Steelhead**

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)
1983					
1984					
1985					
1986					
1987	No information provided	No information provided	No information provided	No information provided	No information provided
1988	No information provided	No information provided	No information provided	No information provided	No information provided
1989	No information provided	No information provided	No information provided	No information provided	No information provided
1990	No information provided	No information provided	No information provided	No information provided	No information provided
1991					
1992					

<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.

**Table 4b. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries:  
Marion Forks Hatchery - Spring Chinook (North Fork Santiam River Stock)**

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)
1981					
1982					
1983					
1984					
1985				2,874	1.01%
1986				1,431	1.17%
1987				983	1.63%
1988					
1989					
1990					
1991					
1992					

<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.

**Table 4c. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries:  
Marion Forks Hatchery - Spring Chinook (Clackamas River Stock)**

<b>Year</b>	<b>Fisheries<sup>1</sup> (Broodyear)</b>	<b>Spawning Grounds<sup>1</sup> (Broodyear)</b>	<b>Hatchery<sup>1</sup> (Broodyear)</b>	<b>Total Combined Contribution<sup>2</sup> (Broodyear)</b>	<b>Smolt to Adult Survival (percent)</b>
1984					
1985					
1986					
1987	Reported at Clackamas Hatchery	Reported at Clackamas Hatchery	Reported at Clackamas Hatchery	Reported at Clackamas Hatchery	Reported at Clackamas Hatchery
1988	Reported at Clackamas Hatchery	Reported at Clackamas Hatchery	Reported at Clackamas Hatchery	Reported at Clackamas Hatchery	Reported at Clackamas Hatchery
1989	Reported at Clackamas Hatchery	Reported at Clackamas Hatchery	Reported at Clackamas Hatchery	Reported at Clackamas Hatchery	Reported at Clackamas Hatchery
1990	Reported at Clackamas Hatchery	Reported at Clackamas Hatchery	Reported at Clackamas Hatchery	Reported at Clackamas Hatchery	Reported at Clackamas Hatchery
1991					
1992					

<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, and supplies), capital costs, indirect costs charged to the federal government, third-party costs, and other costs. These cost components were summed to determine a total hatchery annual cost. Based on discussion with the hatchery manager, the percent of total hatchery costs allocated to a given program was estimated. The total hatchery costs and the percent of hatchery costs allocated to a given program were used to compute the cost of a given program. The total expenditures for the Marion Forks Hatchery are presented in Table 5 by program. The detailed breakdown of the spring chinook and winter steelhead programs expenditures at this hatchery are presented in separate tables (Tables 6a, 6b, and 6c).

**Table 5. Annual Operating Expenses - Marion Forks Hatchery**

<b>Program</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>
1. Spring Chinook (N.F. Santiam River Stock)	<b>\$387,351</b>	<b>\$431,425</b>	<b>\$355,594</b>
2. Spring Chinook (Clackamas River Stock)	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
3. Winter Steelhead	<b>\$55,335</b>	<b>\$9,705</b>	<b>\$79,649</b>
<b>Total Hatchery Costs</b>	<b>\$442,686</b>	<b>\$441,130</b>	<b>\$435,243</b>

**Table 6a. Detailed Expenditures at Marion Forks Hatchery by Program**

### Spring Chinook (North Fork Santiam River Stock)

<b>Component</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>
Personnel Costs	\$196,088	\$200,303	\$191,936
Operational Costs	\$134,888	\$173,728	\$159,662
Capital Costs	\$49,451	\$3,000	\$17,000
Indirect Costs	\$62,259	\$64,099	\$66,645
Lumped Hatchery Costs <sup>1</sup>			

<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.



Lumped Third-Party Costs			
<b>Total Hatchery Costs</b>	<b>\$442,686</b>	<b>\$441,130</b>	<b>\$435,243</b>
<b>Source of Funds</b>			
COE	<b>83.75%</b>	<b>83.75%</b>	<b>83.75%</b>
ODFW	<b>16.25%</b>	<b>16.25%</b>	<b>16.25%</b>
Program Production (#)	884,820	739,757	670,000
Total Production (#)	1,010,319	756,000	820,000
Program as Percent of Total	87.5%	97.8%	81.7%
<b>Program Costs</b>	<b>\$387,351</b>	<b>\$431,425</b>	<b>\$355,594</b>

**Table 6b. Detailed Expenditures at Marion Forks Hatchery by Program**

**Spring Chinook (Clackamas River Stock) <sup>(a)</sup>**

<b>Component</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>
Personnel Costs	\$196,088	\$200,303	\$191,936
Operational Costs	\$134,888	\$173,728	\$159,662
Capital Costs	\$49,451	\$3,000	\$17,000
Indirect Costs	\$62,259	\$64,099	\$66,645
Lumped Hatchery Costs <sup>1</sup>			
Lumped Third-Party Costs			
<b>Total Hatchery Costs</b>	<b>\$442,686</b>	<b>\$441,130</b>	<b>\$435,243</b>
<b>Source of Funds</b>			
COE	<b>83.75%</b>	<b>83.75%</b>	<b>83.75%</b>
ODFW	<b>16.25%</b>	<b>16.25%</b>	<b>16.25%</b>
Program Production (#)			
Total Production (#)			
Program as Percent of Total	0%	0%	0%
<b>Program Costs</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>

(a) Cost for this program not charged to Marion Forks.

<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 Marion Forks Hatchery by Program**

**Winter Steelhead**

<b>Component</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>
Personnel Costs	\$196,088	\$200,303	\$191,936
Operational Costs	\$134,888	\$173,728	\$159,662
Capital Costs	\$49,451	\$3,000	\$17,000
Indirect Costs	\$62,259	\$64,099	\$66,645
Lumped Hatchery Costs <sup>1</sup>			
Lumped Third-Party Costs			
<b>Total Hatchery Costs</b>	<b>\$442,686</b>	<b>\$441,130</b>	<b>\$435,243</b>
<b>Source of Funds</b>			
COE	<b>83.75%</b>	<b>83.75%</b>	<b>83.75%</b>
ODFW	<b>16.25%</b>	<b>16.25%</b>	<b>16.25%</b>
Program Production (#)	125,499	17,118	138,801
Total Production (#)	1,010,319	756,000	820,000
Program as Percent of Total	12.5%	2.2%	18.3%
<b>Program Costs</b>	<b>\$55,335</b>	<b>\$9,705</b>	<b>\$79,649</b>

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<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.