
MERWIN DAM HATCHERY

A COMPILATION AND SUMMARY
OF IHOT AUDITS FOR WINTER
STEELHEAD, SUMMER
STEELHEAD, AND SEA-RUN
CUTTHROAT TROUT

JULY 1998

**HATCHERY EVALUATION REPORT
SUMMARY FOR**

- Merwin Dam Hatchery**
- **Winter Steelhead**
- **Summer Steelhead**
- **Sea-Run Cutthroat Trout**

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

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Executive Summary

This report compiles a summary of the findings of three separate Hatchery Evaluation Reports for Winter Steelhead, Summer Steelhead, and Sea-Run Cutthroat Trout at Merwin Dam Hatchery. The original Hatchery Evaluation Reports, prepared by Montgomery Watson, presented each species and program separately and include the complete findings. Details on the audit compliance status for each species and program are included in the original reports. The Hatchery Evaluation Reports were based upon audits conducted in 1996-1997 as part of a 2-year effort that will include 67 hatcheries and satellite facilities located on the Columbia and Snake River system in Idaho, Oregon, and Washington. The hatchery operating agencies include the U.S Fish and Wildlife Service, Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, and Washington Department of Fish and Wildlife.

Merwin Dam Hatchery is located on the North Fork Lewis River downstream of Merwin Dam near Ariel, Washington and is operated by the Washington Department of Fish and Wildlife. The hatchery is used for adult collection, incubation, and rearing of winter steelhead, summer steelhead, and sea-run cutthroat.

Background

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

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

The Audit Process

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

- Information was obtained from headquarters.
- The hatchery manager was asked to fill out and return the audit form.
- A 1-2 day site audit visit was conducted to inspect facilities, review hatchery records, discuss audit form responses, and develop remedial action plans.

- A compliance report was developed to document the compliance status of each performance measure. This report was then shared with the hatchery manager and IHOT representative.
- This hatchery evaluation report was written to document compliance with IHOT performance measures and develop cost estimates for remedial actions when needed.

Merwin Dam Hatchery - Winter Steelhead, Summer Steelhead, and Sea-Run Cutthroat Results

The Merwin Dam facility includes 4 ponds for adult holding, 10 concrete raceways, 6 intermediate raceways, 6 rearing ponds, and incubation facilities. Merwin Dam Hatchery began operating in 1993. It was constructed by PacificCorp to mitigate for losses of resident and anadromous trout resulting from construction and operation of the Merwin Project on the North Fork Lewis River. The goal of the hatchery is to provide winter and summer steelhead, sea-run cutthroat trout, and rainbow trout for harvest by sport anglers.

Winter Steelhead

The Merwin Dam Hatchery - Winter Steelhead program was in general compliance with most of the performance measures. In the area of program objectives, the hatchery needed to document its green-egg to eyed-egg and eyed-egg to fry survival. The audit found that the hatchery was not in compliance with the rearing temperature criteria, adult holding facilities, water quality monitoring requirements, alkalinity and hardness criteria, and pathology-free water criteria, 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 the flow criteria for vertical tray incubators and the density criteria for the intermediate raceways. The hatchery needed to develop a smoltification goal and smoltification monitoring plan and conduct fishery contribution studies. The hatchery was not meeting all the food storage, transportation, and sanitation protocols. The hatchery needed to develop spawning protocols and a Genetics Monitoring and Evaluation Program.

The specific areas in which the Merwin Dam 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:

- Adjust alkalinity and hardness to meet IHOT criteria
- Check water flow alarms daily
- Collect representative sample of adults
- Conduct fishery contribution studies
- Conduct IHOT QA/QC tests for feed preparation
- Construct one more intermediate raceway (374 cf)
- Develop approved genetics M&E plan
- Develop smoltification goal and monitor
- Develop specific incubation and rearing standards for IHOT Operations Plan
- Develop written spawning protocols
- Document eyed-egg to fry survival
- Document green-egg to eyed-egg survival if compatible with IHN screening
- Expand ozone system to produce 1,600 gpm more water
- Follow IHOT protocols for disinfection of fish pumps, nets, egg sorters, waders, boots, rain gear, hoses, and other equipment
- Follow IHOT protocols for disinfection of interiors and exteriors of transport vehicles
- Follow IHOT temperature criteria for transport
- Increase capacity of adult holding, control IHN, or eliminate holding for other hatcheries to meet adult holding criteria
- Increase incubation water temperature by 5°F (40 gpm)
- Monitor DO in transport truck
- Review IHOT flow criteria for vertical tray incubators
- Run analysis for missing water chemistry parameters, nitrite, and contaminants
- Sanitize rearing vessels after fish are removed and prior to introducing a new fish lot or stock

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

Summer Steelhead

The Merwin Dam Hatchery - Summer Steelhead program was in general compliance with most of the performance measures. In the area of program objectives, the hatchery needed to document its green-egg to eyed-egg and eyed-egg to fry survival. The audit found that the hatchery was not in compliance with the rearing temperature criteria, adult holding facilities, water quality monitoring requirements, alkalinity and hardness criteria, and pathology-free water criteria, 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 the flow criteria for vertical tray incubators or the density criteria for the intermediate raceways. The hatchery needed to develop a smoltification goal and smoltification monitoring plan and to conduct fishery contribution studies. The hatchery was not meeting all the food storage, transportation, and sanitation protocols. The hatchery needed to develop spawning protocols and a Genetics Monitoring and Evaluation Program.

The specific areas in which the Merwin Dam 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:

- Adjust alkalinity and hardness to meet IHOT criteria
- Check water flow alarms daily
- Conduct fishery contribution studies
- Conduct IHOT QA/QC tests for feed preparation
- Construct one more intermediate raceway (374 cf)
- Develop approved genetics M&E plan
- Develop smoltification goal and monitor
- Develop specific incubation and rearing standards for IHOT Operations Plan
- Develop written spawning protocols
- Document eyed-egg to fry survival
- Document green-egg to eyed-egg survival if compatible with IHN screening
- Expand ozone system to produce 1,600 gpm more water
- Follow IHOT protocols for disinfection of fish pumps, nets, egg sorters, waders, boots, rain gear, hoses, and other equipment
- Follow IHOT protocols for disinfection of interiors and exteriors of transport vehicles
- Follow IHOT temperature criteria for transport
- Increase capacity of adult holding, control IHN, or eliminate holding for other hatcheries to meet adult holding criteria
- Increase incubation water temperature by 5°F (40 gpm)
- Monitor DO in transport truck
- Review IHOT flow criteria for vertical tray incubators
- Run analysis for missing water chemistry parameters, nitrite, and contaminants
- Sanitize rearing vessels after fish are removed and prior to introducing a new fish lot or stock

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

Sea-Run Cutthroat

The Merwin Dam Hatchery - Sea-run Cutthroat program was in general compliance with most of the performance measures. In the area of program objectives, the hatchery needed to document its green-egg to eyed-egg and eyed-egg to fry survival and to develop a hatchery M&E plan. The audit found that the hatchery was not in compliance with the rearing temperature criteria, adult holding facilities, water quality monitoring requirements, alkalinity and hardness criteria, and pathology-free water criteria, which are all facilities requirements. The hatchery needed to develop specific incubation and rearing standards for the IHOT Operations Plan. The hatchery needed additional shallow troughs for early rearing. The hatchery needed to develop a smoltification goal and smoltification monitoring plan and conduct fishery contribution studies. The hatchery was not meeting all the food storage, transportation, and sanitation protocols. The hatchery needed to develop spawning protocols and a Genetics Monitoring and Evaluation Program.

The specific areas in which the Merwin Dam Hatchery - Sea-run Cutthroat 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:

- Adjust alkalinity and hardness to meet IHOT criteria
- Check water flow alarms daily
- Collect representative sample of adults
- Conduct fishery contribution studies
- Conduct IHOT QA/QC tests for feed preparation
- Construct 4 (88 cf) more early rearing shallow troughs
- Develop approved genetics M&E plan
- Develop criteria for adult holding of sea-run cutthroat
- Develop hatchery M&E plan
- Develop smoltification goal and monitor
- Develop specific incubation and rearing standards for IHOT Operations Plan
- Develop written spawning protocols
- Document eyed-egg to fry survival
- Document green-egg to eyed-egg survival
- Expand ozone system to produce 1,600 gpm more water
- Follow IHOT protocols for disinfection of fish pumps, nets, egg sorters, waders, boots, rain gear, hoses, and other equipment
- Follow IHOT protocols for disinfection of interiors and exteriors of transport vehicles
- Follow IHOT temperature criteria for transport
- Increase incubation water temperature by 5°F (40 gpm)
- Monitor DO in transport truck
- Run analysis for missing water chemistry parameters, nitrite, and contaminants
- Sanitize rearing vessels after fish are removed and prior to introducing a new fish lot or stock

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

Facility Description

Name:	Merwin Dam Hatchery
Stock/Species:	Winter Steelhead Summer Steelhead Sea-run Cutthroat Rainbow Trout
Operating Agency:	Washington Department of Fish and Wildlife
Funding Agency:	PacificCorp
Location:	Merwin Dam Hatchery is located on the North Fork Lewis River downstream of Merwin Dam near Ariel, Washington.
Address:	111 Merwin Dam Hatchery Court Ariel, WA 98603-9727
Hatchery Manager:	Mr. Rick Stillwater
Phone:	(360) 225-6201
Fax:	(360) 225-6330
Purpose:	Merwin Dam Hatchery began operating in 1993. It was constructed by PacificCorp to mitigate for losses of resident and anadromous trout resulting from construction and operation of the Merwin Project on the North Fork Lewis River. The goal of the hatchery is to provide winter and summer steelhead, sea-run cutthroat trout, and rainbow trout for harvest by sport anglers.

Production Goal:

Winter Steelhead

Produce 125,000 smolts for release in the Lewis River

Summer Steelhead

Produce 125,000 smolts for release in the Lewis River

Sea-run Cutthroat

Produce 25,000 smolts for release in the Lewis River

Rainbow Trout

Produce 1,000,000 fingerlings for release in area lakes

Water Supply:

Water is supplied to the hatchery from Lake Merwin using a 5,000 gpm pump station on the dam face. Two intakes are used at depths of 15 and 110 feet.

Facilities:

Adult Holding:	4 adult holding ponds - 1,011 cf each
Incubation:	68 isolation incubators 15 16-tray vertical stack incubators - 240 trays
Early Rearing:	4 shallow troughs - 8 cf each 4 deep troughs - 21 cf each
Raceways:	6 intermediate raceways - 353 cf each 10 raceways - 1,871 cf each
Rearing Ponds:	4 concrete rearing ponds - 46,918 cf each 2 concrete rearing ponds - 1,364 cf each
Satellite Facilities:	None

Section 3
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 Merwin Dam Hatchery - Winter Steelhead, Summer Steelhead, and Sea-Run Cutthroat Trout

This section presents the corrective actions required to bring the Merwin Dam Hatchery - Winter Steelhead, Summer Steelhead, and Sea-Run Cutthroat Trout programs into compliance with IHOT performance measures. The remedial actions described here are suggestions developed by the Montgomery Watson Audit Team. The remedial actions and associated cost estimates have not been analyzed or prioritized by the respective operating agencies, fishery managers, or IHOT. There may be additional remedial actions, not included in this report, proposed by the respective operating agencies. For some non-compliance areas, other remedial actions could be proposed. The required remedial actions are cross-referenced to each IHOT performance measure that was not in compliance. Where appropriate, the costs associated with the remedial actions are also presented (Table 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 been prepared. The cost estimates are essentially order of magnitude estimates ($\pm 40\%$).

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

Table 3a. Remedial Actions Required at Merwin Dam Hatchery - Winter Steelhead

Remedial Action Required	Cost	PMs¹
Type 1 - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery		
None	----	
Type 2 - Remedial actions requiring changes in agency policies or procedures		
Document green-egg to eyed-egg survival if compatible with IHN screening	----	4d
Document eyed-egg to fry survival	----	4e
Check water flow alarms daily	----	6
Conduct IHOT QA/QC tests for feed preparation	----	12
Develop specific incubation and rearing standards for IHOT Operations Plan	----	18-19
Review IHOT flow criteria for vertical tray incubators	----	18
Develop smoltification goal and monitor	----	22a1
Follow IHOT protocols for disinfection of interiors and exteriors of transport vehicles	----	23
Follow IHOT protocols for disinfection of fish pumps, nets, egg sorters, waders, boots, rain gear, hoses, and other equipment	----	23
Monitor DO in transport truck	----	23
Follow IHOT temperature criteria for transport	----	23
Conduct fishery contribution studies	----	24
Sanitize rearing vessels after fish are removed and prior to introducing a new fish lot or stock	----	28
Collect representative sample of adults	----	41
Develop written spawning protocols	----	42
Develop approved genetics M&E plan	----	

¹ PMs are performance measures that were extracted from the IHOT 1995 report.

Remedial Action Required	Cost	PMS ¹
Type 3 - Remedial actions requiring changes in monitoring coverage or interval Run analysis for missing water chemistry parameters, nitrite, and contaminants	----	5c, 5f, 5g
Type 4 - Remedial actions requiring significant capital expenditures Increase incubation water temperature by 5°F (40 gpm) Expand ozone system to produce 1,600 gpm more water Construct one more intermediate raceway (374 cf)	\$20,000 \$1.0 million \$20,000	5a 5h 19
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time Adjust alkalinity and hardness to meet IHOT criteria Increase capacity of adult holding, control IHN, or eliminate holding for other hatcheries to meet adult holding criteria	---- ----	5e 7

Table 3b. Remedial Actions Required at Merwin Dam Hatchery - Summer Steelhead

Remedial Action Required	Cost	PMS ²
Type 1 - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery None	----	
Type 2 - Remedial actions requiring changes in agency policies or procedures Document green-egg to eyed-egg survival if compatible with IHN screening Document eyed-egg to fry survival Check water flow alarms daily Conduct IHOT QA/QC tests for feed preparation	---- ---- ---- ----	4d 4e 6 12

¹ PMS are performance measures that were extracted from the IHOT 1995 report.

² PMS are performance measures that were extracted from the IHOT 1995 report.

Remedial Action Required	Cost	PMS²
Develop specific incubation and rearing standards for IHOT Operations Plan	----	18-19
Review IHOT flow criteria for vertical tray incubators	----	18
Develop smoltification goal and monitor	----	22a1
Follow IHOT protocols for disinfection of interiors and exteriors of transport vehicles	----	23
Follow IHOT protocols for disinfection of fish pumps, nets, egg sorters, waders, boots, rain gear, hoses, and other equipment	----	23
Monitor DO in transport truck	----	23
Follow IHOT temperature criteria for transport	----	23
Conduct fishery contribution studies	----	24
Sanitize rearing vessels after fish are removed and prior to introducing a new fish lot or stock	----	28
Develop written spawning protocols	----	42
Develop approved genetics M&E plan	----	

Remedial Action Required	Cost	PMS ¹
Type 3 - Remedial actions requiring changes in monitoring coverage or interval Run analysis for missing water chemistry parameters, nitrite, and contaminants	----	5c, 5f, 5g
Type 4 - Remedial actions requiring significant capital expenditures Increase incubation water temperature by 5°F (40 gpm) Expand ozone system to produce 1,600 gpm more water Construct one more intermediate raceway (374 cf)	\$20,000 1.0 million \$20,000	5a 5h 19
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time Adjust alkalinity and hardness to meet IHOT criteria Increase capacity of adult holding, control IHN, or eliminate holding for other hatcheries to meet adult holding criteria	---- ----	5e 7

Table 3c. Remedial Actions Required at Merwin Dam Hatchery - Sea-run Cutthroat

Remedial Action Required	Cost	PMS ²
Type 1 - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery None	----	
Type 2 - Remedial actions requiring changes in agency policies or procedures Develop hatchery M&E plan Document green-egg to eyed-egg survival Document eyed-egg to fry survival Check water flow alarms daily Develop criteria for adult holding of sea-run cutthroat	---- ---- ---- ----	3 4d 4e 6 7

¹ PMS are performance measures that were extracted from the IHOT 1995 report.

² PMS are performance measures that were extracted from the IHOT 1995 report.

Remedial Action Required	Cost	PMS²
Conduct IHOT QA/QC tests for feed preparation	----	12
Develop specific incubation and rearing standards for IHOT Operations Plan	----	18-19
Develop smoltification goal and monitor	----	22a1
Follow IHOT protocols for disinfection of interiors and exteriors of transport vehicles	----	23
Follow IHOT protocols for disinfection of fish pumps, nets, egg sorters, waders, boots, rain gear, hoses, and other equipment	----	23
Monitor DO in transport truck	----	23
Follow IHOT temperature criteria for transport	----	23
Conduct fishery contribution studies	----	24
Sanitize rearing vessels after fish are removed and prior to introducing a new fish lot or stock	----	28
Collect representative sample of adults	----	41
Develop written spawning protocols	----	42
Develop approved genetics M&E plan	----	
Remedial Action Required	Cost	PMS¹
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Run analysis for missing water chemistry parameters, nitrite, and contaminants	----	5c, 5f, 5g
Type 4 - Remedial actions requiring significant capital expenditures		
Increase incubation water temperature by 5F (40 gpm)	\$20,000	5a
Expand ozone system to produce 1,600 gpm more water	\$1.0 million	5h
Construct 4 (88 cf) more early rearing shallow troughs	\$20,000	19
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		

¹ PMS are performance measures that were extracted from the IHOT 1995 report.

Remedial Action Required	Cost	PMS²
Adjust alkalinity and hardness to meet IHOT criteria	---	5e

Hatchery Contribution to Fisheries, Spawning Grounds, and Hatcheries

This section presents the audit findings for the Merwin Dam Hatchery - Winter Steelhead, Summer Steelhead, and Sea-Run Cutthroat Trout 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:
Merwin Dam Hatchery - Winter Steelhead**

Year	Fisheries ¹ (Broodyear)	Spawning Grounds ¹ (Broodyear)	Hatchery ¹ (Broodyear)	Total Combined Contribution ² (Broodyear)	Smolt to Adult Survival (percent)
1981					
1982					
1983					
1984					
1985					
1986					
1987					
1988					
1989					
1990					
1991					

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

² Total combined adult contribution; presented when it is not possible to subdivide the contribution into fisheries, spawning grounds, and hatchery contributions.

1992	First releases in 1995	First releases in 1995	First releases in 1995	First releases in 1995	First releases in 1995
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**Table 4b. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries:
Merwin Dam Hatchery - Summer Steelhead**

Year	Fisheries¹ (Broodyear)	Spawning Grounds¹ (Broodyear)	Hatchery¹ (Broodyear)	Total Combined Contribution² (Broodyear)	Smolt to Adult Survival (percent)
1982					
1983					
1984					
1985					
1986					
1987					
1988					
1989					
1990					
1991					
1992	First releases in 1995	First releases in 1995	First releases in 1995	First releases in 1995	First releases in 1995

**Table 4c. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries:
Merwin Dam Hatchery - Sea-run Cutthroat**

Year	Fisheries³ (Broodyear)	Spawning Grounds¹ (Broodyear)	Hatchery¹ (Broodyear)	Total Combined Contribution⁴ (Broodyear)	Smolt to Adult Survival (percent)
1981					

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

² Total combined adult contribution; presented when it is not possible to subdivide the contribution into fisheries, spawning grounds, and hatchery contributions.

³ Data obtained from Missing Production Groups Annual Report or from the Regional Mark Information System database.

⁴ Total combined adult contribution; presented when it is not possible to subdivide the contribution into fisheries, spawning grounds, and hatchery contributions.

1982					
1983					
1984					
1985					
1986					
1987					
1988					
1989					
1990					
1991					
1992	First releases in 1995	First releases in 1995	First releases in 1995	First releases in 1995	First releases in 1995

Annual Operating Expenditures

The level and detail of annual operating expenditures varies widely depending on hatchery, operating agency, and funding source. When provided, expenditures were presented in terms of personnel costs, operating costs (power, feed, supplies), capital costs, indirect costs charged to the federal government, third-party costs, and other costs. These cost components were summed to determine a total hatchery annual cost. Based on discussion with the hatchery manager, the percent of total hatchery costs allocated to a given program was estimated. The total hatchery costs and the percent of hatchery costs allocated to a given program were used to compute the cost of a given program. The total expenditures for the Merwin Dam Hatchery are presented in Table 5 by program. The detailed breakdown of program expenditures at this hatchery are presented in separate tables (Tables 6a, 6b, 6c, and 6d).

Table 5. Annual Operating Expenses - Merwin Dam Hatchery

Program	1994	1995	1996
1. Winter Steelhead	\$71,178	\$80,533	\$93,737
2. Summer Steelhead	\$66,057	\$69,225	\$94,094
3. Sea-run Cutthroat	\$20,483	\$21,512\$	\$29,226
4. Rainbow Trout	\$98,318	\$97,705	\$139,359
5.			
Total Hatchery Costs	\$256,036	\$275,797	\$356,416

Table 6a. Detailed Expenditures at Merwin Dam Hatchery by Program

Winter Steelhead

Component	1994	1995	1996
Personnel Costs	\$88,374	\$96,573	\$109,940
Operational Costs	\$28,994	\$32,332	\$56,456
Capital Costs	\$0	\$0	\$0
Indirect Costs	\$22,410	\$26,434	\$65,020
Lumped Hatchery Costs ¹			

¹ 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	\$116,258	\$120,458	\$125,000
Total Hatchery Costs	\$256,036	\$275,797	\$356,416
Source of Funds			
	100%	100%	100%
Program Production (lb)	N/A	22,285	21,130
Total Production (lb)	N/A	76,292	80,201
Program as Percent of Total	27.8% (assumed)	29.2%	26.3%
Program Costs	\$71,178	\$80,533	\$93,737

Table 6b. Detailed Expenditures at Merwin Dam Hatchery by Program

Summer Steelhead

Component	1994	1995	1996
Personnel Costs	\$88,374	\$96,573	\$109,940
Operational Costs	\$28,994	\$32,332	\$56,456
Capital Costs	\$0	\$0	\$0
Indirect Costs	\$22,410	\$26,434	\$65,020
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs	\$116,258	\$120,458	\$125,000
Total Hatchery Costs	\$256,036	\$275,797	\$356,416
Source of Funds			
PacificCorp	100%	100%	100%
Program Production (lb)	N/A	19184	21235
Total Production (lb)	N/A	76,292	80,201
Program as Percent of Total	25.8% (assumed)	25.1%	26.4%
Program Costs	\$66,057	\$69,225	\$94,094

¹ 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 Merwin Dam Hatchery by Program

Sea-run Cutthroat

Component	1994	1995	1996
Personnel Costs	\$88,374	\$96,573	\$109,940
Operational Costs	\$28,994	\$32,332	\$56,456
Capital Costs	\$0	\$0	\$0
Indirect Costs	\$22,410	\$26,434	\$65,020
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs	\$116,258	\$120,458	\$125,000
Total Hatchery Costs	\$256,036	\$275,797	\$356,416
Source of Funds			
PacificCorp	100%	100%	100%
Program Production (lb)	N/A	6,018	6,654
Total Production (lb)	N/A	76,292	80,201
Program as Percent of Total	8% (assumed)	7.8%	8.2%
Program Costs	\$20,483	\$21,512\$	\$29,226

¹ 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 Merwin Dam Hatchery by Program

Rainbow Trout

Component	1994	1995	1996
Personnel Costs	\$88,374	\$96,573	\$109,940
Operational Costs	\$28,994	\$32,332	\$56,456
Capital Costs	\$0	\$0	\$0
Indirect Costs	\$22,410	\$26,434	\$65,020
Lumped Hatchery Costs ¹			
Lumped Third-Party Costs	\$116,258	\$120,458	\$125,000
Total Hatchery Costs	\$256,036	\$275,797	\$356,416
Source of Funds			
PacificCorp	100%	100%	100%
Program Production (lb)	N/A	6,018	6,654
Total Production (lb)	N/A	76,292	80,201
Program as Percent of Total	38.4% (assumed)	37.9%	39.1%
Program Costs	\$98,318	\$97,705	\$139,359

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