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**BEAVER CREEK HATCHERY**

**A COMPILATION AND SUMMARY OF  
HOT AUDITS FOR SUMMER  
STEELHEAD, WINTER STEELHEAD,  
AND CUTTHROAT TROUT**

**JULY 1998**

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**HATCHERY EVALUATION REPORT  
SUMMARY FOR**

**Beaver Creek Hatchery**

- **Summer Steelhead**
- **Winter Steelhead**
- **Cutthroat Trout**

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

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NORTHWEST POWER PLANNING COUNCIL  
JULY 1998**

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## Executive Summary

This report compiles a summary of the findings of three separate Hatchery Evaluation Reports for Summer Steelhead, Winter Steelhead, and Cutthroat Trout at the Beaver Creek 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.

The hatchery is located on the Elochoman River about 10 miles upstream from the river mouth. The hatchery is operated by the Washington Department of Fish and Wildlife. The Elochoman River is a north bank tributary of the lower Columbia River, just downstream of Cathlamet, Washington. The hatchery is used for adult collection, incubation, and rearing of winter steelhead and sea-run cutthroat trout. It is also used for incubation and rearing of summer steelhead.

### Background

The hatchery 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.

## **Beaver Creek Hatchery - Summer Steelhead, Winter Steelhead, and Cutthroat Trout Results**

The Beaver Creek facility includes 2 ponds for adult holding, 20 concrete raceways, 1 earthen rearing pond, 10 intermediate raceways, and incubation facilities. Beaver Creek Hatchery was authorized under the Mitchell Act and began operating in 1957 as part of the Columbia River Fisheries Development Program -- a program to mitigate for fishery losses caused by hydroelectric development in the Columbia River Basin.

### **SUMMER STEELHEAD**

The Beaver Creek 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 adult contribution and smolt-to-adult survival. The audit found that the hatchery was not in compliance with the water quality monitoring criteria, needed to increase the supply of disease-free water to early rearing, and needed more incubation, early rearing, and rearing facilities. The intake on Beaver Creek did not meet the approach or screen mesh criteria and needed to be replaced. The hatchery was direct releasing some smolts and needed to construct acclimation facilities for all releases. The hatchery needed to develop specific incubation and rearing criteria for the IHOT Operations Plan and a smoltification goal and monitoring program. The hatchery was not meeting all of the food storage and transportation requirements. The hatchery did not have a Genetics Monitoring and Evaluation Program in place.

The specific areas in which the Beaver Creek 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:

- Construct 10 more standard raceways
- Construct 2 more half stack vertical tray incubators
- Construct 40 more troughs and enlarge building
- Construct 6 more intermediate raceways
- Construct acclimation ponds for 5 release site out of subbasin
- Construct disinfection system for incubation and early rearing
- Construct new 20 cfs intake screen for Beaver Creek
- Develop alarm log
- Develop approved genetics M&E program
- Develop smoltification goal and monitor
- Develop specific incubation and rearing standards for the IHOT Operations Plan
- Document adult contribution
- Document release dates
- Document smolt-to-adult survival
- Evaluate release facilities to ensure that fish are not subjected to adverse conditions
- Follow IHOT criteria for water temperature in hauling units
- Follow IHOT QA/QC testing protocols for feed production monitoring

- Follow IHOT requirements for disinfection of exteriors and interiors of transport vehicles
- Follow IHOT requirements to check flow alarms daily
- Follow the IHOT criteria for incubation flow
- Install alarms for water treatment system
- Install security alarms
- Monitor and record DO and TGP
- Review program and water temperature criteria for rearing
- Review the need for insulation of automatic feeders and bulk storage facilities
- Run analysis for water chemistry 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.

### **WINTER STEELHEAD**

The Beaver Creek Hatchery - Winter Steelhead program was in general compliance with most of the performance measures. In the area of program objectives, the hatchery was not meeting its adult return goal and needed to improve the eyed-egg to smolt survival. The audit found that the hatchery was not in compliance with the water quality monitoring criteria, needed to increase the supply of disease-free water to early rearing, and needed more incubation, early rearing, and rearing facilities. The intake on Beaver Creek did not meet the approach or screen mesh criteria and needed to be replaced. The hatchery was direct releasing some smolts and needed to construct acclimation facilities for all releases. The hatchery needed to develop specific incubation and rearing criteria for the IHOT Operations Plan, a smoltification goal and monitoring program, and a specific broodstock collection plan. The hatchery was not meeting all of the food storage and transportation requirements. The hatchery did not have a Genetics Monitoring and Evaluation Program in place.

The specific areas in which the Beaver Creek 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:

- Construct 10 more standard raceways
- Construct 2 more half stack vertical tray incubators
- Construct 40 more troughs and enlarge building
- Construct 6 more intermediate raceways
- Construct acclimation ponds for 4 release sites out of subbasin
- Construct new 20 cfs intake screen for Beaver Creek
- Develop alarm log
- Develop approved genetics M&E program
- Develop smoltification goal and monitor
- Develop specific broodstock collection plan
- Develop specific incubation and rearing standards for the IHOT Operations Plan
- Document release dates
- Evaluate release facilities to ensure that fish are not subjected to adverse conditions
- Follow IHOT criteria for water temperature in hauling units
- Follow IHOT QA/QC testing protocols for feed production monitoring
- Follow IHOT requirements for disinfection of exteriors and interiors of transport vehicles
- Follow IHOT requirements to check flow alarms daily

- Follow the IHOT criteria for incubation flow
- Improve eyed-egg to smolt survival
- Improve fry-to-smolt survival
- Install alarms for water treatment system
- Install security alarms
- Monitor and record DO and TGP
- Provide more disease-free water for early rearing
- Review program and water temperature criteria for rearing
- Review the need for insulation of automatic feeders and bulk storage facilities
- Run analysis for water chemistry 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.

### **CUTTHROAT TROUT**

The Beaver Creek Hatchery - Sea-run Cutthroat program was in general compliance with most of the performance measures. In the area of program objectives, the hatchery was not meeting its adult return goal, needed to document its adult contribution and smolt-to-adult survival, and needed to improve the green-egg to eyed-egg survival. The audit found that the hatchery was not in compliance with the water quality monitoring criteria, needed to increase the supply of disease-free water to early rearing, and needed more incubation facilities. The intake on Beaver Creek did not meet the approach or screen mesh criteria and needed to be replaced. The hatchery was direct releasing some smolts and needed to construct acclimation facilities for all releases. The hatchery needed to develop specific incubation and rearing criteria for the IHOT Operations Plan, a smoltification goal and monitoring program, and a specific broodstock collection plan. The hatchery was not meeting all of the food storage and transportation requirements. The hatchery did not have a Genetics Monitoring and Evaluation Program in place.

The specific areas in which the Beaver Creek 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:

- Construct 6 more intermediate raceways
- Construct 10 more standard raceways
- Construct 2 more double stack vertical tray incubators
- Construct 40 more troughs and enlarge building
- Construct acclimation ponds for 3 release sites out of subbasin
- Construct new 20 cfs intake screen for Beaver Creek
- Develop alarm log
- Develop approved genetics M&E program
- Develop smoltification goal and monitor
- Develop specific broodstock collection plan
- Develop specific incubation standards for the IHOT Operations Plan
- Document adequacy of rearing facilities
- Document adult contribution
- Document release dates
- Document smolt to adult survival
- Evaluate release facilities to ensure that fish are not subjected to adverse conditions

- Follow IHOT criteria for water temperature in hauling units
- Follow IHOT QA/QC testing protocols for feed production monitoring
- Follow IHOT requirements for disinfection of exteriors and interiors of transport vehicles
- Follow IHOT requirements to check flow alarms daily
- Follow the IHOT criteria for incubation flow
- Improve green-egg to eyed-egg survival
- Install alarms for water treatment system
- Install security alarms
- Monitor and record DO and TGP
- Provide disease-free water for early rearing
- Review program and water temperature criteria for rearing
- Review the need for insulation of automatic feeders and bulk storage facilities
- Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants

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

## Section 2 Facility Description

<b>Name:</b>	Beaver Creek Hatchery
<b>Stock/Species:</b>	Winter Steelhead Summer Steelhead Sea-run Cutthroat
<b>Operating Agency:</b>	Washington Department of Fish and Wildlife
<b>Funding Agency:</b>	Mitchell Act (NMFS)
<b>Location:</b>	The hatchery is located on the Elochoman River about 10 miles upstream from the river mouth. The Elochoman River is a north bank tributary of the lower Columbia River, just downstream of Cathlamet, Washington.
<b>Address:</b>	28 Beaver Creek Road Cathlamet, WA 98612
<b>Hatchery Manager:</b>	Dick Aksamit
<b>Phone:</b>	(360) 795-3620
<b>Fax:</b>	(360) 795-0827
<b>Purpose:</b>	Beaver Creek Hatchery was authorized under the Mitchell Act and began operating in 1957 as part of the Columbia River Fisheries Development Program -- a program to mitigate for fishery losses caused by hydroelectric development in the Columbia River Basin.
<b>Production Goal:</b>	<b>Winter Steelhead</b>  Produce 260,000 smolts for on-station and off-station releases.  <b>Summer Steelhead</b>  Produce 230,000 smolts for on-station and off-station releases.  <b>Sea-run Cutthroat</b>  Produce 50,000 smolts for on-station and off-station releases.

**Water Supply:**

Water rights total 16,013 gpm from three sources: Elochoman River, Beaver Creek, and a well. Beaver Creek is gravity flow while the other two sources are pumped. The Elochoman River is used in summer and fall while Beaver Creek water is used from mid-November through mid-May. Filtered well water (1 cfs) is used to incubate eggs and for early rearing.

**Facilities:**

Adult Holding:	1 upper adult trap - 138 cf
	1 lower adult trap - 126 cf
	2 adult holding raceways - 4,327 cf each
Incubation:	2 vertical tray incubators (16 trays)
	320 bucket incubators
	40 shallow troughs - 8 cf each
	20 shallow troughs - 5 cf each
Early Rearing:	10 intermediate raceways - 209 cf each
Raceways:	20 concrete raceways - 1,636 cf each
Rearing Ponds:	1 earth rearing pond - 217,800 cf
Satellite Facilities:	Gobar Pond
	1 earth pond - 243,000 cf

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 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. 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 Beaver Creek Hatchery - Summer Steelhead, Winter Steelhead, and Cutthroat Trout**

This section presents the corrective actions required to bring the Beaver Creek Hatchery - Summer Steelhead, Winter Steelhead, and 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 (Tables 3a, 3 b, 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 maybe desirable for either operational or safety considerations.



<b>Remedial Action Required</b>	<b>Cost</b>	<b>PMS<sup>1</sup></b>
<b>Type 4 - Remedial actions requiring significant capital expenditures</b>		
Install alarms for water treatment system	\$5,000	6
Install security alarms	\$5,000	6
Construct 2 more half stack vertical tray incubators	\$2,000	8
Construct 40 more troughs and enlarge building	\$15,000	8
Construct 6 more intermediate raceways	\$40,000	9
Construct 10 more standard raceways	\$250,000	9, 19
Construct new 20 cfs intake screen for Beaver Creek	\$300,000	10
Construct acclimation ponds for 5 release sites out of subbasin	\$1,750,000	22b, 22c
<b>Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time</b>		
Provide more disease-free water for incubation and early rearing	----	4f, 4g, 22a4
Evaluate release facilities to ensure that fish are not subjected to adverse conditions	----	13

**Table 3b. Remedial Actions Required at Beaver Creek Hatchery - Winter Steelhead**

<b>Remedial Action Required</b>	<b>Cost</b>	<b>PMS<sup>2</sup></b>
<b>Type 1 - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery</b>		

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

<sup>2</sup> PMS are performance measures that were extracted from the IHOT 1995 report.

<b>Remedial Action Required</b>	<b>Cost</b>	<b>PMS<sup>2</sup></b>
Improve adult returns	----	4h, 41, 42
<b>Type 2</b> – Remedial actions requiring changes in agency policies or procedures		
Review program and water temperature criteria for rearing	----	5a
Develop alarm log	----	6
Follow IHOT requirements to check flow alarms daily	----	6
Follow IHOT QA/QC testing protocols for feed production monitoring	----	12
Review the need for insulation of automatic feeders and bulk storage facilities	----	12
Develop specific incubation and rearing standards for the IHOT Operations Plan	----	18-19
Follow the IHOT criteria for incubation flow	----	18
Develop smoltification goal and monitor	----	22a1
Document release dates	----	22a6
Follow IHOT requirements for disinfection of exteriors and interiors of transport vehicles	----	23
Follow IHOT criteria for water temperature in hauling units	----	23
Develop specific broodstock collection plan	----	41
Develop approved genetics M&E program	----	43
<b>Type 3</b> – Remedial actions requiring changes in monitoring coverage or interval		
Monitor and record DO and TGP	----	5b
Run analysis for water chemistry 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 - Remedial actions requiring significant capital expenditures</b>		
Install alarms for water treatment system	\$5,000	6
Install security alarms	\$5,000	6
Construct 2 more half stack vertical tray incubators	\$2,000	8
Construct 40 more troughs and enlarge building	\$15,000	8
Construct 6 more intermediate raceways	\$40,000	9
Construct 10 more standard raceways	\$250,000	9, 19
Construct new 20 cfs intake screen for Beaver Creek	\$200,000	10
Construct acclimation ponds for 4 release sites out of subbasin	\$1,400,000	22b
<b>Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time</b>		
Provide more disease-free water for early rearing	----	4e, 5h, 28
Improve fry-to-smolt survival	----	4f
Improve eyed-egg to smolt survival	----	4g
Evaluate release facilities to ensure that fish are not subjected to adverse conditions	----	13

**Table 3c. Remedial Actions Required at Beaver Creek Hatchery - Sea-run Cutthroat**

<b>Remedial Action Required</b>	<b>Cost</b>	<b>PMS<sup>2</sup></b>
<b>Type 1 - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery</b>		
Improve adult returns	----	4c, 17, 22a4, 41-42
<b>Type 2 – Remedial actions requiring changes in agency policies or procedures</b>		

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

<sup>2</sup> PMS are performance measures that were extracted from the IHOT 1995 report.

<b>Remedial Action Required</b>	<b>Cost</b>	<b>PMS<sup>2</sup></b>
Document adult contribution	----	4a
Document smolt to adult survival	----	4h
Review program and water temperature criteria for rearing	----	5a
Develop alarm log	----	6
Follow IHOT requirements to check flow alarms daily	----	6
Follow IHOT QA/QC testing protocols for feed production monitoring	----	12
Review the need for insulation of automatic feeders and bulk storage facilities	----	12
Document adequacy of rearing facilities	----	9
Develop specific incubation standards for the IHOT Operations Plan	----	18
Follow the IHOT criteria for incubation flow	----	18
Develop smoltification goal and monitor	----	22a1
Document release dates	----	22a6
Follow IHOT requirements for disinfection of exteriors and interiors of transport vehicles	----	23
Follow IHOT criteria for water temperature in hauling units	----	23
Develop specific broodstock collection plan	----	41
Develop approved genetics M&E program	----	43

<b>Remedial Action Required</b>	<b>Cost</b>	<b>PMS<sup>1</sup></b>
<b>Type 3</b> - Remedial actions requiring changes in monitoring coverage or interval		
Monitor and record DO and TGP	----	5b
Run analysis for water chemistry parameters, turbidity, alkalinity, hardness, nitrite, and contaminants	----	5c-5g
<b>Type 4</b> - Remedial actions requiring significant capital expenditures		
Install alarms for water treatment system	\$5,000	6
Install security alarms	\$5,000	6
Construct 2 more double stack vertical tray incubators	\$4,000	8
Construct 40 more troughs and enlarge building	\$15,000	8
Construct 6 more intermediate raceways	\$40,000	9
Construct 10 more standard raceways	\$250,000	9
Construct new 20 cfs intake screen for Beaver Creek	\$200,000	10
Construct acclimation ponds for 3 release site out of subbasin	\$1,050,000	22b
<b>Type 5</b> - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Improve green-egg to eyed-egg survival		4d
Provide disease-free water for early rearing	----	4f, 4g, 5h, 28
Evaluate release facilities to ensure that fish are not subjected to adverse conditions	----	13

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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 Beaver Creek Hatchery - Summer Steelhead, Winter Steelhead, and 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:  
Beaver Creek Hatchery - Summer 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)
1982					
1983					
1984					
1985					
1986					
1987					
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	No information provided	No information provided	No information provided	No information provided	No information provided

<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.

1992	No information provided				
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**Table 4b. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries:  
Beaver Creek Hatchery - Winter Steelhead**

<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>
1981					
1982					
1983					
1984					
1985					
1986					
1987					
1988				1,469	1.38%
1989				1,930	2.58%
1990				1,770	1.99%
1991				1,615	2.12%
1992				1,153	2.01%

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<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:  
Beaver Creek Hatchery - Sea-run Cutthroat**

<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>
1982					
1983					
1984					
1985					
1986					
1987					
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	No information provided	No information provided	No information provided	No information provided	No information provided
1992					

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<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 Beaver Creek Hatchery are presented in Table 5 by program. The detailed breakdown of program expenditures for Summer Steelhead, Winter Steelhead, and Cutthroat Trout at this hatchery are presented in separate tables (Table 6a, 6b, 6c).

**Table 5. Annual Operating Expenses - Beaver Creek Hatchery**

<b>Program</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>
1. Winter Steelhead	<b>\$181,652</b>	<b>\$345,632</b>	<b>\$182,172</b>
2. Summer Steelhead	<b>\$109,474</b>	<b>\$135,265</b>	<b>\$131,826</b>
3. Sea-run cutthroat	<b>\$14,000</b>	<b>\$56,511</b>	<b>\$38,755</b>
4.			
5.			
<b>Total Hatchery Costs</b>	<b>\$360,000</b>	<b>\$546,642</b>	<b>\$375,717</b>

**Table 6a. Detailed Expenditures at Beaver Creek Hatchery by Program**

**Winter Steelhead**

<b>Component</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>
Personnel Costs	\$172,800	\$179,700	\$157,668
Operational Costs	\$79,200	\$86,050	\$150,477
Capital Costs		\$167,000 (new generator)	
Indirect Costs	\$108,000	\$113,892	\$67,572
Lumped Hatchery Costs <sup>1</sup>			
Lumped Third-Party Costs			
<b>Total Hatchery Costs</b>	<b>\$360,000</b>	<b>\$546,642</b>	<b>\$375,717</b>
<b>Source of Funds</b>			
NMFS	<b>100%</b>	<b>100%</b>	<b>100%</b>
Program Production (#)	357,694	199,333	384,545
Total Production (#)	708,882	315,260	793,098
Program as Percent of Total	50.5%	63.2%	48.5%
<b>Program Costs</b>	<b>\$181,652</b>	<b>\$345,632</b>	<b>\$182,172</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 Beaver Creek Hatchery by Program**

**Summer Steelhead**

<b>Component</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>
Personnel Costs	\$172,800	\$179,700	\$157,668
Operational Costs	\$79,200	\$86,050	\$150,477
Capital Costs		\$167,000 (new generator)	
Indirect Costs	\$108,000	\$113,892	\$67,572
Lumped Hatchery Costs <sup>1</sup>			
Lumped Third-Party Costs			
<b>Total Hatchery Costs</b>	<b>\$360,000</b>	<b>\$546,642</b>	<b>\$375,717</b>
<b>Source of Funds</b>			
NMFS	<b>100%</b>	<b>100%</b>	<b>100%</b>
Program Production (lb)	215,567	78,010	278,270
Total Production (lb)	708,882	315,260	793,098
Program as Percent of Total	30.4%	24.7%	35.1%
<b>Program Costs</b>	<b>\$109,474</b>	<b>\$135,265</b>	<b>\$131,826</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 Beaver Creek Hatchery by Program**

**Sea-run Cutthroat**

<b>Component</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>
Personnel Costs	\$172,800	\$179,700	\$157,668
Operational Costs	\$79,200	\$86,050	\$150,477
Capital Costs		\$167,000 (new generator)	
Indirect Costs	\$108,000	\$113,892	\$67,572
Lumped Hatchery Costs <sup>1</sup>			
Lumped Third-Party Costs			
<b>Total Hatchery Costs</b>	<b>\$360,000</b>	<b>\$546,642</b>	<b>\$375,717</b>
<b>Source of Funds</b>			
NMFS	<b>100%</b>	<b>100%</b>	<b>100%</b>
Program Production (lb)	27,568	32,591	81,808
Total Production (lb)	708,882	315,260	793,098
Program as Percent of Total	3.9%	10.3%	10.3%
<b>Program Costs</b>	<b>\$14,000</b>	<b>\$56,511</b>	<b>\$38,755</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.