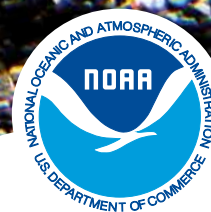


# 2011 Report to Congress

Pacific Coastal Salmon Recovery Fund  
FY 2000–2010

## NATIONAL MARINE FISHERIES SERVICE

*Science, Service, Stewardship*



# ▶▶ The Economic Benefits of Salmon Restoration

Salmon restoration not only benefits fish populations and their habitat but infuses local communities with much needed jobs and economic activity. In 2010, the Oregon Watershed Enhancement Board (OWEB) funded a research project at the University of Oregon Ecosystem Workforce Program to examine the potential economic benefits of habitat restoration projects. OWEB is the largest provider of restoration funding in Oregon and the projects examined by this research project included those that use the Pacific Coastal Salmon Recovery Fund (PCSRF). This research found that restoration projects, including those funded by PCSRF, created jobs at a rate on par with “shovel ready” infrastructure Federal Stimulus projects funded by the American Recovery and Reinvestment Act. The relative stability of salmon restoration programs such as PCSRF has supported the development of an “emerging restoration economy” along the Pacific Coast:

- Ninety percent of OWEB dollars are staying in Oregon. Organizations that received OWEB grants typically hired local businesses.
- Over 97% of the organizations funded meet the Small Business Administration definition of small business, most with less than \$1 million in annual revenue.
- Every \$1 million of public investment in clean water and habitat restoration projects creates 15 total jobs for the duration of a given project, usually lasting from 3–5 years.
- OWEB project investments have supported nearly 2,700 total jobs (on average 230 jobs each year).

“Every dollar invested in watershed restoration projects travels through Oregon’s economy in several ways. Restoration project managers hire consultants, contractors, and employees to design, implement and maintain projects. Consultants and contractors hire field crews, rent or purchase equipment, and buy goods and services. Employees spend wages on goods and services to support their livelihoods in their local communities. The payoffs of habitat restoration projects yield immediate jobs at a level very similar to traditional infrastructure investments.”

Reference: *The Economic Impacts of Forest and Watershed Restoration in Oregon*, [http://www.oregon.gov/OWEB/MONITOR/job\\_creation\\_local\\_economies.shtml](http://www.oregon.gov/OWEB/MONITOR/job_creation_local_economies.shtml).



## PCSRF Timeline

<b>1989</b> Sacramento River winter-run Chinook are listed as threatened by National Marine Fisheries Service (NMFS) under the Endangered Species Act (ESA).	<b>1991</b> Snake River sockeye are listed as endangered.	<b>1992</b> Snake River spring/summer-run Chinook and Snake River fall-run Chinook are listed as threatened under ESA.	<b>1994</b> Sacramento River winter-run Chinook are listed as endangered under ESA. NMFS begins a complete review of the ESA status for all anadromous species along the West Coast.	<b>1996</b> Central California Coast coho are listed as threatened.	<b>1997</b> Upper Columbia River steelhead are listed as endangered. Snake River steelhead, S. Oregon/N. California Coasts coho, Central California Coast steelhead, and South-Central California Coast steelhead are listed as threatened. Governors of Washington, Oregon, and Alaska meet to discuss coast-wide salmon issues.	<b>1998</b> Southern California steelhead are listed as endangered. Lower Columbia River steelhead, Oregon Coast coho, and Central Valley steelhead are listed as threatened.	<b>1999</b> Upper Columbia River spring-run Chinook are listed as endangered. Hood Canal summer-run chum, Ozette Lake sockeye, Puget Sound Chinook, Lower Columbia River Chinook, Columbia River chum, Upper Willamette River Chinook, Upper Willamette River steelhead, Middle Columbia River steelhead, California Coastal Chinook, and Central Valley spring-run Chinook are listed as threatened.  Pacific Salmon Treaty Agreement is signed by the U.S. and Canada.
---	--	---	---	--	--	--	---

# 2011 Report to Congress

## Pacific Coastal Salmon Recovery Fund

### FY 2000–2010

#### 2000

Northern California steelhead are listed as threatened. PCSRF is first funded by Congress, dedicating funds to the states of WA, OR, CA, and AK and regional tribes\* to protect declining salmon populations.

#### 2002

Population boundary for endangered Southern California Coast steelhead is extended to the Mexico border.

#### 2004

Idaho is added as a PCSRF recipient recognizing upstream spawning habitat as critical to Pacific salmon and steelhead survival.

#### 2005

PCSRF Performance Framework of goals and measures is developed and implemented. Central California Coast coho are reclassified as endangered (originally listed in 1996). Lower Columbia River coho are listed as threatened.

#### 2006

Upper Columbia River steelhead are upgraded to threatened status (originally listed in 1997).

#### 2007

Puget Sound steelhead are listed as threatened. NMFS reviews and implements a competitive selection process to allocate PCSRF funds among grantees to improve the likelihood that projects are funded to address limiting factors.

#### 2009

Nevada is added as a PCSRF recipient, recognizing the historic geographic extent of anadromous fish in the Columbia Basin.

#### 2010

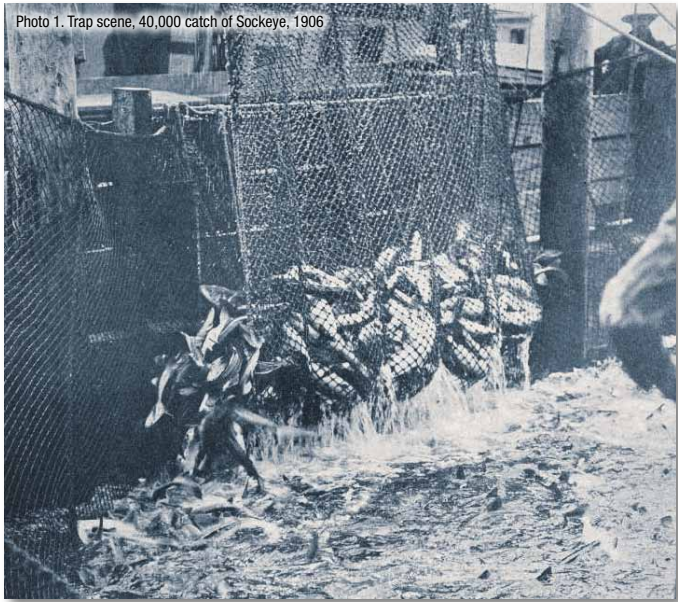
PCSRF implements the second phase of performance metric reporting to more comprehensively track project implementation data to support scientific analyses and adaptive management.

\* Pacific Coastal Tribes include the Northwest Indian Fisheries Commission (NWIFC) on behalf of twenty western Washington treaty tribes (Hoh Indian Tribe, Jamestown S'Klallam Tribe, Lower Elwha Klallam Tribe, Lummi Nation, Makah Nation, Muckleshoot Tribe, Nisqually Indian Tribe, Nooksack Tribe, Port Gamble S'Klallam Tribe, Puyallup Tribe of Indians, Quileute Indian Tribe, Quinault Indian Nation, Sauk-Suiattle Tribe, Skokomish Tribe, Squaxin Island Tribe, Stillaguamish Tribe, Suquamish Tribe, Swinomish Tribe, Tulalip Tribes, and Upper Skagit Tribes); the Klamath River Inter-Tribal Fish & Water Commission (KRITFWC) on behalf of four Klamath Basin tribes (Hoopa Valley Indian Tribe (CA), Karuk Tribe (CA), Klamath Tribes (OR), and Yurok Tribe (CA)); and tribes not associated with a tribal commission (Round Valley Indian Tribes (CA), the Chehalis Tribe (WA), Coquille Indian Tribe (OR), the Confederated Tribes of the Grand Ronde (OR), and the Confederated Tribes of Siletz Indians (OR)).

Columbia River Tribes include the Columbia River Inter-Tribal Fish Commission (CRITFC) on behalf of four tribes (Nez Perce Tribe (ID), Confederated Tribes of the Umatilla Indian Reservation (OR), Confederated Tribes of the Warm Springs Reservation (OR), and the Confederated Tribes and Bands of the Yakama Nation (WA)); and tribes not affiliated with a tribal commission (Confederated Tribes of the Colville Reservation (WA), and the Shoshone-Bannock Tribes (ID), Shoshone Paiute Tribes of the Duck Valley Indian Reservation (NV)).

# Overview

Pacific salmon and steelhead are much more than essential elements of a healthy Pacific Coast ecosystem; they are cultural icons woven into the fabric of local communities and native tribes. Centuries of healthy salmon runs sustained native peoples, nurtured the economies of coastal and inland towns, and became an indelible part of cultural practices, traditions, and the connection between people and the natural landscape. Memories have faded of year-round salmon fishing, 100 pound behemoths, and local streams choked with thousands of fish returning to spawn. The consequences of losing such an important part of the national heritage are dire.



Today, pressures from natural and human activities have pushed populations to the brink of survival. Salmonids<sup>1</sup> are complex species, requiring suitable habitat in mainstem rivers, tributaries, coastal estuaries, wetlands, and the Pacific Ocean at various stages in their life cycle. While they are a fairly adaptable species, more than one hundred years of human land and water use, harvest, and hatchery practices have increased their vulnerability to fluctuating ocean conditions and a variable climate. Populations have declined to levels necessitating active intervention and protection as derived from listing as threatened or endangered species under the federal Endangered Species Act (ESA).

The Pacific Coastal Salmon Recovery Fund (PCSRF) was established by Congress in fiscal year (FY) 2000 to reverse these declines and listings. The goal of PCSRF is to restore, conserve, and protect Pacific salmon and steelhead and their habitats. PCSRF also seeks to maintain the healthy populations necessary for exercising tribal treaty fishing rights and native subsistence fishing. Under PCSRF, the National Marine Fisheries Service

<sup>1</sup> In this report, the term 'salmonids' refers to both salmon and steelhead.

(NMFS) provides competitive funding to states (California, Oregon, Washington, Alaska, Idaho, and Nevada) and tribes of the Pacific Coast region to implement habitat restoration and recovery projects that contribute to the sustainability of the species.

This 2011 Report to Congress documents the activities and progress under PCSRF for the last eleven years, highlighting activities of the states and tribes, and depicting the geographic extent of their projects. This document also provides background information about the status of factors affecting salmon and steelhead populations throughout the Pacific Coast and interior river basins.

PCSRF provides a critical source of stable funding that supports the ability of managers to conduct all phases of restoration and recovery activities, including assessment, planning, implementation, and monitoring. NMFS' awards to states and tribes have averaged \$73 million annually for the last 11 years (Exhibit 1).

With this funding states and tribes have undertaken 10,214 projects, resulting in significant changes in habitat conditions and availability, as well as establishing concrete planning and monitoring programs that support prioritization and tracking for salmon and steelhead population conservation. Significant accomplishments from 2000 to date include:

- 879,194 acres of habitat improved or added for salmonid use.
- 5,336 miles of stream made accessible to spawning populations.
- Marking programs tagging 238,643,775 fish, improving stock identification and supporting more effective fishery management practices.

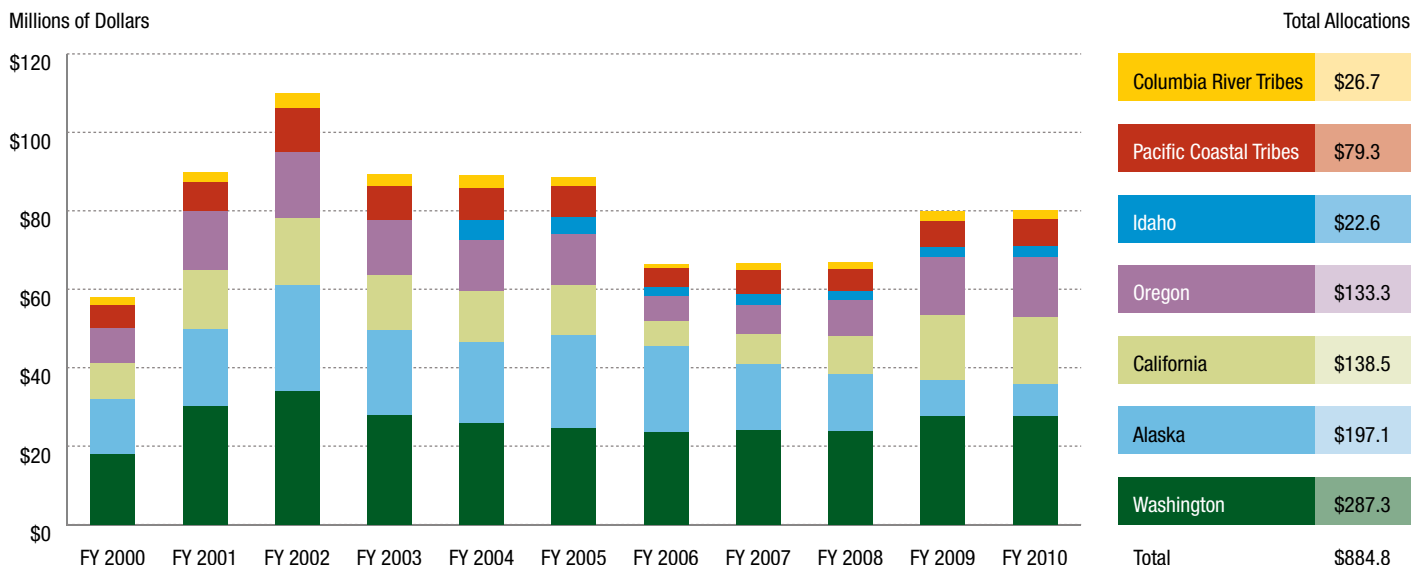
## Salmon Populations and Limiting Factors

Pacific salmon and steelhead<sup>2</sup> are anadromous fish, meaning they migrate up rivers from the ocean to spawn in freshwater. These salmonids include pink, sockeye, chum, Chinook, and coho salmon, and steelhead trout. Of these, many populations of sockeye, chum, Chinook, coho, and steelhead are listed as threatened and endangered. The migratory ranges of these populations overlap, that is, the different species make use of some of the same freshwater habitat for rearing and spawning.

Salmon recovery on the Pacific Coast is organized by recovery domains (Exhibit 2). Domains represent geographically-based areas

<sup>2</sup> Steelhead are the anadromous form of freshwater rainbow trout, migrating to the ocean as juveniles and returning to freshwater streams to spawn.

Exhibit 1: NMFS PCSRF Fiscal Year Allocations to States and Tribes (in Millions)



within which multi-species recovery plans for anadromous salmonids have been and are being developed in Washington, Oregon, California, and Idaho. The broad expanse of these domains reflect the complex life cycle of anadromous fish that spans inland streams and rivers, coastal estuaries, and ocean waters. The land area affected by ESA listings of salmon and steelhead on the Pacific Coast is vast, spanning approximately 176,000 square miles in Washington, Oregon, California, and Idaho (61% of Washington land area, 55% of Oregon, 32% of California, and 26% of Idaho).<sup>3</sup>

The ESA allows listing of “distinct population segments” (DPS) of vertebrates. NMFS developed a policy that establishes a group of salmon populations to be a DPS if it is an “evolutionarily significant unit” (ESU). Scientists consider a population or group of populations to be an ESU if: 1) they exhibit substantial reproductive isolation from other such population groups; and 2) they are an important component of the evolutionary legacy of the species as a whole.<sup>4</sup> Salmon are described in ESUs and steelhead in DPSs. There are 37 ESUs and 15 DPSs on the Pacific Coast. Of these, 17 ESUs and 11 DPSs are listed as threatened or endangered (Exhibits 2 and 3).

Recovery plans for each domain address all salmon and steelhead populations within the geographic area. These plans have involved extensive stakeholder input to identify the specific factors limiting the recovery and sustainability of salmon populations for each DPS and ESU (Exhibit 3). These factors represent many of the challenges to recovery that are being addressed through PCSRF investments. ESUs and DPSs are comprised of individual populations which are monitored within specific reaches of watersheds. Based on counts of these populations (See: “Salmon Population

Summary” at <https://www.webapps.nwfsc.noaa.gov>), the stability of individual populations is assessed, as is the aggregate health of the populations at the ESU/DPS level. Eleven ESUs and six DPSs with ten or more years of abundance data are currently stable or increasing, while three ESUs are declining. Data to determine trends are not available for three ESUs and five DPSs (Exhibit 3).

## Measuring Progress

The PCSRF program has evolved to better meet the conservation needs of Pacific salmon since its inception in FY 2000, including changes in the types of projects funded, the approach to allocating funding, and how progress is measured. NMFS, states, tribes, and local project managers have developed an integrated approach to track progress, measure performance, and ensure accountability of PCSRF funds. Performance metrics designed to provide consistent indicators of the activities being implemented and their accomplishments are described in the *Pacific Coastal Salmon Recovery Fund Performance, Goals, Measures, and Report Framework* (referred to as the Reporting Framework).<sup>5</sup> This Framework is examined periodically and updated to reflect improvements in monitoring approaches, trends in habitat conditions, and changes in limiting factors that change as projects are implemented. In FY 2011, PCSRF will continue to adapt the Reporting Framework.

The indicators of performance that are currently measured by the program focus on specific investments made within PCSRF for salmonid restoration and conservation. The metrics for the short-, mid-, and long-term goals shown below address the major habitat limiting factors identified across the Pacific Coast region.

<sup>3</sup> <http://www.nwr.noaa.gov/Regional-Office/upload/ESA-land-area-10-10.pdf>.

<sup>4</sup> Good, T.P., R.S. Waples, and P. Adams (editors). 2005. Updated status of federally listed ESUs of West Coast salmon and steelhead. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-66, 598 p.

<sup>5</sup> <http://www.nwr.noaa.gov/Salmon-Recovery-Planning/PCSRF/upload/PCSRF-Perf-Framework.pdf>.

## Exhibit 2: Recovery Domains

### Puget Sound

- 1—Ozette Lake Sockeye ESU (T)
- 2—Hood Canal Summer-run Chum ESU (T)
- 3—Puget Sound Steelhead DPS (T)
- 4—Puget Sound Chinook ESU (T)

### Willamette/Lower Columbia

- 5—Columbia River Chum ESU (T)
- 6—Lower Columbia River Chinook ESU (T)
- 7—Upper Willamette River Chinook ESU (T)
- 8—Lower Columbia River Steelhead DPS (T)
- 9—Lower Columbia River Coho ESU (T)
- 10—Upper Willamette River Steelhead DPS (T)

### Oregon Coast

- 11—Oregon Coast Coho ESU (T)

### Interior Columbia

- 12—Snake River Sockeye ESU (E)
- 13—Upper Columbia River Spring-run Chinook ESU (E)
- 14—Snake River Fall-run Chinook ESU (T)
- 15—Snake River Spring/Summer-run Chinook ESU (T)
- 16—Upper Columbia River Steelhead DPS (T)
- 17—Middle Columbia River Steelhead DPS (T)
- 18—Snake River Basin Steelhead DPS (T)

### Southern Oregon/Northern California Coast

- 19—S. Oregon/N. California Coast Coho ESU (T)

### Central Valley

- 20—Sacramento River Winter-run Chinook ESU (E)
- 21—California Central Valley Spring-run Chinook ESU (T)
- 22—California Central Valley Steelhead DPS (T)

### North-Central California Coast

- 23—California Coastal Chinook ESU (T)
- 24—Northern California Steelhead DPS (T)
- 25—Central California Coast Coho ESU (E)
- 26—Central California Coast Steelhead DPS (T)

### South-Central/Southern California Coast

- 27—S. Central California Coast Steelhead DPS (T)
- 28—Southern California Steelhead DPS (E)

Recovery domain coloring matches domain coloring in Exhibit 3.

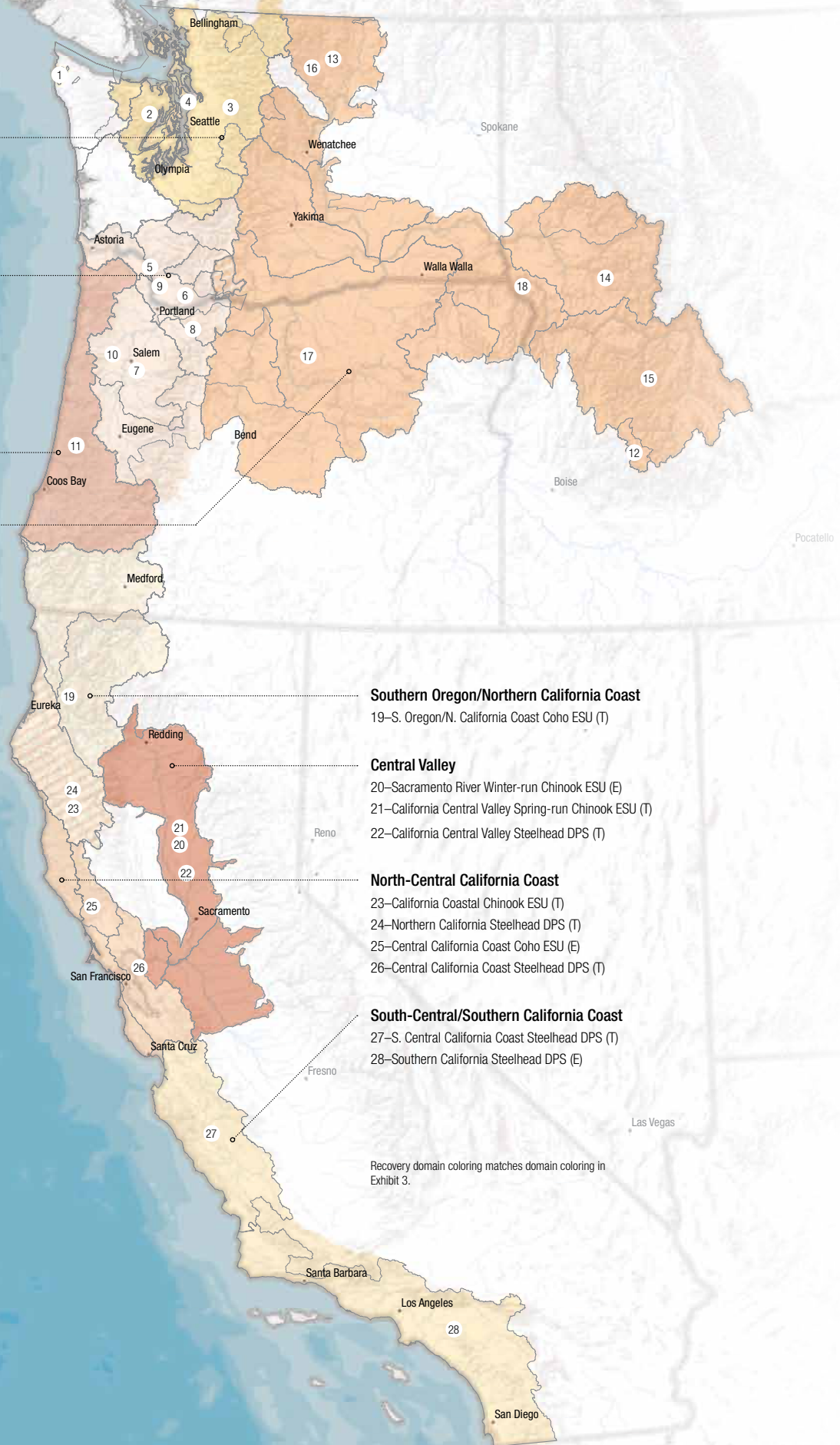


Exhibit 3: Limiting Factors of ESUs and DPSs

Geographic Area	Recovery Domain	ESU/DPS Number	ESU/DPS Name	Abundance Stable or Increasing	Limiting Factors											
					Estuarine and nearshore marine	Flood plain connectivity and function	Channel structure and complexity	Riparian areas and large woody debris recruitment	Stream substrate	Stream flow	Water quality	Fish passage	Hatchery-related adverse effects	Harvest-related adverse effects	Predation/competition/disease (Non-native species)	Mainstem Columbia River hydropower adverse effects
Northern Pacific Coast	Puget Sound	1	Ozette Lake Sockeye ESU (T)	Yes		•	•	•	•					•		
		2	Hood Canal Summer-run Chum ESU (T)	Yes	•	•	•	•	•	•						
		3	Puget Sound Steelhead DPS (T)*	Yes												
		4	Puget Sound Chinook ESU (T)	Yes	•	•	•	•	•			•				
	Willamette/Lower Columbia	5	Columbia River Chum ESU (T)	Yes	•	•	•	•	•	•		•				
		6	Lower Columbia River Chinook ESU (T)	Yes	•	•	•	•	•	•		•	•	•		
		7	Upper Willamette River Chinook ESU (T)	Yes		•	•	•				•	•	•		
		8	Lower Columbia River Steelhead DPS (T)	Yes		•	•	•	•	•	•	•			•	
		9	Lower Columbia River Coho ESU (T)	Yes		•	•	•	•	•	•		•	•		
		10	Upper Willamette River Steelhead DPS (T)	Yes		•	•	•			•		•			
	OR Coast	11	Oregon Coast Coho ESU (T)	Yes		•	•	•	•		•			•		
Interior Columbia Basin	Interior Columbia	12	Snake River Sockeye ESU (E)	Mixed***											•	
		13	Upper Columbia River Spring-run Chinook ESU (E)	Yes	•	•	•	•	•	•			•		•	
		14	Snake River Fall-run Chinook ESU (T)	Yes		•	•						•	•	•	
		15	Snake River Spring/Summer-run Chinook ESU (T)	Yes		•	•	•	•	•	•		•		•	
		16	Upper Columbia River Steelhead DPS (T)	Yes		•	•		•	•		•	•		•	
		17	Middle Columbia River Steelhead DPS (T)	Yes		•		•	•	•	•				•	
		18	Snake River Basin Steelhead DPS (T)	Yes		•	•		•	•	•	•	•		•	
		California and Southern Oregon	S. OR/N. CA Coast	19	S. Oregon/N. California Coast Coho ESU (T)	Unknown**	•	•	•	•		•	•	•		
Central Valley	20		Sacramento River Winter-run Chinook ESU (E)	Declining	•	•	•	•	•	•	•	•	•	•	•	
	21		California Central Valley Spring-run Chinook ESU (T)	Declining	•	•	•	•	•	•	•	•	•	•	•	
	22		California Central Valley Steelhead DPS (T)	Unknown**	•	•	•	•	•	•	•	•	•		•	
N. Central California Coast	23		California Coastal Chinook ESU (T)	Unknown**	•	•	•	•	•	•	•	•				
	24		Northern California Steelhead DPS (T)	Unknown**	•	•	•	•	•	•	•			•		
	25		Central California Coast Coho ESU (E)	Declining	•	•	•	•	•	•	•			•		
	26		Central California Coast Steelhead DPS (T)	Unknown**	•	•	•	•	•	•	•	•		•		
S. Central/S. CA Coast	27		S. Central California Coast Steelhead DPS (T)	Unknown**	•	•	•	•	•	•	•	•				
	28		Southern California Steelhead DPS (E)	Unknown**	•	•	•	•	•	•	•	•		•		

(T) = Threatened / (E) = Endangered

\* Trends in abundance may not be indicative of true recovery status. Other risk factors such as low levels of abundance, lack of access to historical spawning habitats, extirpation of component populations, and the lack of spatial connectivity among extant component populations are significant factors in determining recovery status. See <http://www.nwfsc.Noaa.gov/trt/index.cfm> and <http://swfsc.Noaa.gov/textblock.aspx?Division=FED&id=2242> for detailed information on ESU status and technical recovery planning.

\*\* Unknown means that data considered representative of the whole ESU/DPS are either not available or, if available, are of insufficient duration (<10 years) to assess trends.

\*\*\* This ESU consists almost entirely of artificially propagated fish. While the total abundance (hatchery + wild) has exhibited recent increases, the status is listed as "mixed" to reflect the degree of artificial propagation necessary to sustain the ESU.

## Short-term Outcomes

- Enhanced availability and quality of salmonid habitat
- Improved management practices
- Major habitat limiting factors addressed

## Mid-term Outcomes

- Improved status of ESA-listed salmonids (naturally spawning populations increased)
- Maintained healthy salmon populations

## Long-term Outcome

- Overall sustainability of Pacific salmon

The projects funded by PCSRF address concerns biologists have identified as crucial to advancing salmonid recovery and sustaining healthy populations and habitats. Instream habitat restoration projects improve the quality and quantity of salmon habitat in mainstem rivers, tributaries, wetlands, and coastal estuaries, addressing water quality and quantity concerns for a variety of aquatic species. Upland restoration projects can reduce erosion and enhance streambed conditions necessary for successful spawning and egg survival. Coastal and estuarine projects improve availability of feeding and rearing habitat for juvenile fish as they transition from freshwater to the open ocean. Projects that remove man-made barriers to fish passage, such as culvert removal and bridge replacement, can open up hundreds of miles of pristine habitat to migrating fish. Each project is a step towards protecting or recovering salmonid populations and the habitats that support them. The funds allocated by broad project category can be tracked between PCSRF contributions and state matching funds, as shown in Exhibit 4.

All recipients of PCSRF funds are required to report on a standard series of metrics. The sum of all these projects metrics can be depicted in a series of “roll-up” measures that aggregate the accomplishments of many activities funded with PCSRF and state matching funds (Exhibit 5). The following pages depict the geographic extent of projects across recovery domains and highlight specific examples of activities supported by PCSRF grantees. Metrics are summarized by geographic area.

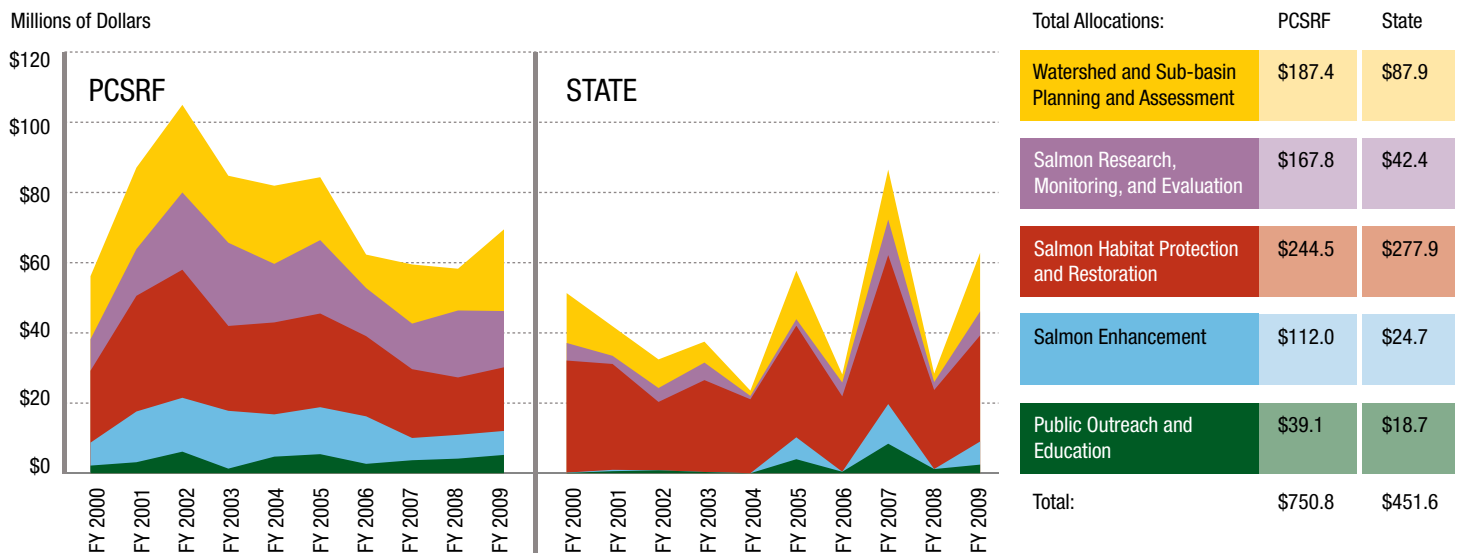
Exhibit 5: Summary Region-wide Performance Reporting Results, FY 2000-2010

Output	Regional Indicator	Completed*
Instream Habitat Projects	Stream Miles Treated	1,430
Wetland Habitat Projects	Acres Created	2,095
	Acres Treated	27,715
Estuarine Habitat Projects	Acres Created	1,187
	Acres Treated	2,036
Land Acquisition Projects	Acres Acquired or Protected	228,247
	Stream Bank Miles Acquired or Protected	3,256
Riparian Habitat Projects	Stream Miles Treated	6,302
	Acres Treated	65,267
Upland Habitat Projects	Acres Treated	542,657
Fish Passage Projects	Number of Barriers Removed	2,203
	Stream Miles Opened	5,336
	Number of Fish Screens Installed	1,284
Hatchery Fish Enhancement Projects	Number of Fish Marked for Management Strategies	238,643,775**
Watershed Planning and Assessment Projects	Number of ESUs and DPSs with Factors Limiting Recovery Identified	27 of 28
Research, Monitoring and Evaluation Projects	Miles of Stream Monitored	171,948
	Number of Assessments Completed	546

\* PCSRF grantees report indicator values to the nearest 0.1 acres or stream miles. The region-wide totals may not match the sum of the Geographic Area metrics on the following pages due to rounding.

\*\* This number has not changed since last reporting because no additional fish were marked in 2010.

Exhibit 4: Funding Allocations by Project Type







# Geographic Area – California and Southern Oregon

The California and Southern Oregon geographic area includes four recovery domains: the Southern Oregon/Northern California Coast, North-Central California Coast, South-Central/Southern California Coast, and the California Central Valley. These recovery domains encompass large tracts of suburban, forest, and agricultural lands, as well as several major population centers. There are seven listings of threatened salmonids (four salmon ESUs and three steelhead DPSs) and three endangered listings (two salmon ESUs and one steelhead DPS). Issues in the area include habitat degradation, low water quality, limited water availability, and barriers to fish passage. Exhibit 6 summarizes metrics for projects within these four domains.

## Fish Creek Restoration Project

**SPONSOR:** California Department of Fish and Game (CDFG), NOAA, landowner

**LOCATION:** California, Humboldt County, Eel River – Fish Creek

**RESULTS:** Presence of fish after restoration projects completed, assessed by long term monitoring

**TOTAL COST:** \$92,494 (since FY 2000)

**PCSRF CONTRIBUTION:** \$29,883

**PROJECT TYPE:** Monitoring

In 1991, the CDFG conducted a stream habitat assessment and inventory on Fish Creek, an important tributary of the Eel River. The survey determined that upstream access for migrating salmonids was severely limited. The mouth of Fish Creek was wide, shallow, and braided and presented fish with an impassable eight foot waterfall above the confluence with Lawrence Creek. No fish were found above this barrier. The habitat assessment crew recommended creation of a boulder fishway to provide upstream access, installation of complex habitat structures using large woody debris and boulders, and modification of log debris accumulations to improve access to more than a mile of upstream spawning and rearing habitat.

More than twenty projects were subsequently undertaken between 1992 and 2006, with at least seven of these funded by PCSRF since 2000.

During the late 1990s and early 2000s, upstream monitoring still showed very few fish (e.g., five Chinook, one steelhead, and no Coho observed in 2001). In 2010, however, scientists conducted additional monitoring and discovered over 25 Coho salmon as well as numerous steelhead utilizing pools scoured by the previously installed habitat structures. This provides an example of the need for long-term monitoring to track changes that make habitat more conducive to supporting fish.



### ESU Status

- Endangered
- Threatened
- Not Listed

### Project Types

- Enhancement and Harvest Management
- Habitat Protection and Restoration
- Outreach and Education
- Planning and Assessment
- Research, Monitoring, and Evaluation

## Evaluation of Fish Passage Improvement Projects in the South Coast and Rogue River Basins

**SPONSOR:** Oregon Watershed Enhancement Board (OWEB)

**LOCATION:** Oregon; Coos, Curry, Josephine, and Jackson Counties; South Coast and Rogue River Basins

**RESULTS:** Presence of fish after restoration projects completed, assessed by long-term monitoring

**TOTAL COST:** \$39,450

**PCSRF CONTRIBUTION:** \$3,650

**PROJECT TYPE:** Monitoring

PCSRF resources play a critical role in local organizations' ability to implement projects, including planning and designing fish barrier removal projects and monitoring performance. In 2009, an OWEB effectiveness monitoring project was developed in the South Coast and Rogue River Basins to evaluate fish passage improvement projects implemented from 1995-2001. The project was designed to determine if the replaced culverts and other structures still functioned as intended and whether juvenile salmon were using the habitat upstream. The evaluation showed that juvenile salmonids were now present upstream of 85% of the fish improvement projects. Salmonids had not been in the streams prior to the projects.



## Exhibit 6: Metrics

Regional Indicator	Measure
Instream Miles Treated	393
Wetland Acres Created	1,872
Wetland Acres Treated	7,533
Estuarine Acres Created	0
Estuarine Acres Treated	1
Land Acres Acquired or Protected	46,896
Stream Bank Miles Acquired or Protected	579
Riparian Stream Miles Treated	1,007
Riparian Acres Treated	12,657
Upland Acres Treated	6,186
Fish Passage Barriers Removed	506
Fish Passage Miles Opened	874
Fish Screens Installed	254
Hatchery Fish Marked	0
Stream Miles Monitored	2,178
Assessments Completed	77

Measure totals are approximate and have changed from last year. Some projects continue to be difficult to estimate by geographic area, while others have been more accurately located based on database improvements and have shifted from one geographic area to another.



# Geographic Area – Interior Columbia Basin

The Interior Columbia Basin geographic area includes the Snake River Basin and portions of eastern Washington and Oregon and central Idaho. This area includes the Interior Columbia recovery domain with five listings of threatened salmonids (two salmon ESUs and three steelhead DPSs) and two ESUs listed as endangered. The domain is composed of agricultural, range, and federal forest lands with a number of large dams impeding natural fish passage upstream. Exhibit 7 summarizes metrics for projects within the domain.

## Stream Ecology in the Classroom Project

**SPONSOR:** Columbia River Inter-Tribal Fish Commission (CRITFC), Confederated Tribes of the Warm Springs Reservation of Oregon (CTWSRO)

**LOCATION:** Oregon, Wasco and Jefferson Counties, Warm Springs Reservation

**RESULTS:** Educated elementary school children on salmon and steelhead conservation and salmon life cycles

**TOTAL COST:** \$75,000

**PROJECT TYPE:** Outreach and Education

Funding from PCSRF has allowed the CTWSRO to hire an educator to develop their Stream Ecology Education Program. Along with the hiring of an educator, additional curriculum activities have been selected for implementation in 2011. Watershed stewardship is also promoted through programs created by the Freshwater Trust, a local non-profit organization. These programs incorporate Oregon Department of Education curriculum benchmarks, exposing local youth to stream ecology both in the classroom and through outdoor field activities in Shitike Creek. Presentations and trainings were given to over 600 children (Grades 3 through 8) at 11 different schools and in 19 classrooms during 2010, in Parkdale and Fossil, Oregon. Two elementary classes participated in "Parkdale Salmon Days" with engagement of several volunteers (12) and agencies (5). An educational outreach booth was also developed for community events.

Salmon and trout egg incubators were established in classrooms to increase awareness about salmonids. Three Warm Spring Elementary School third grade classrooms reared eggs and released fry. Children were able to watch and document development of eggs (Chinook salmon from the Warm Springs National Fish Hatchery) and steelhead (from the Round Butte Hatchery) over the course of several weeks and participated in releasing the fry into Shitike Creek on the reservation. The program developed watershed education materials depicting the movement of pollution and impacts on ecological conditions.

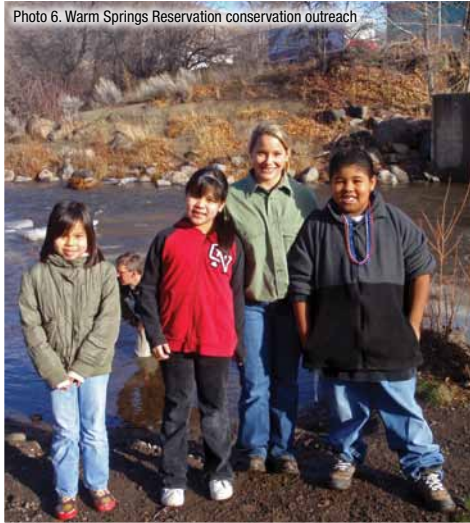
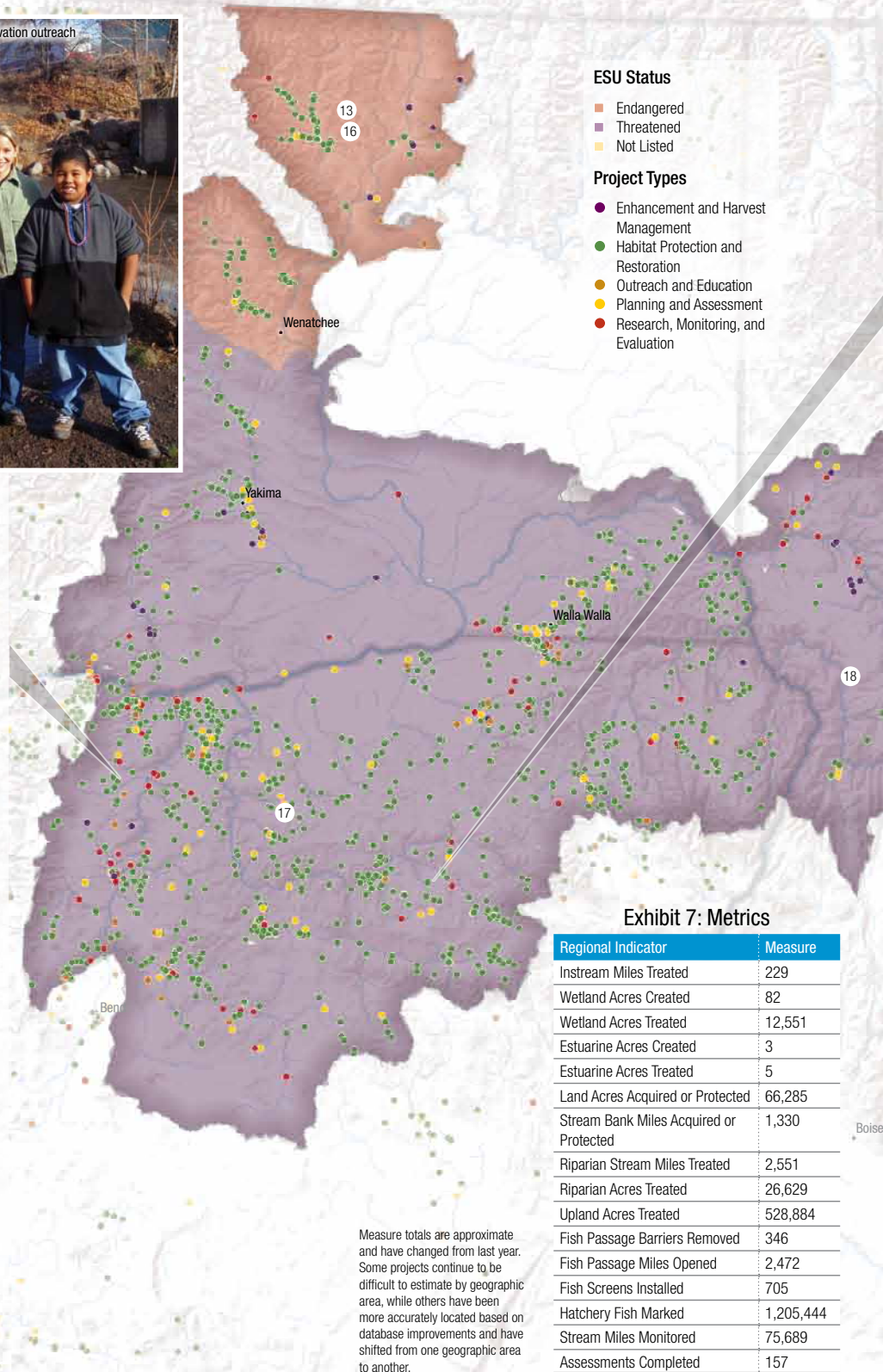


Photo 6. Warm Springs Reservation conservation outreach



### ESU Status

- Endangered
- Threatened
- Not Listed

### Project Types

- Enhancement and Harvest Management
- Habitat Protection and Restoration
- Outreach and Education
- Planning and Assessment
- Research, Monitoring, and Evaluation

### Exhibit 7: Metrics

Regional Indicator	Measure
Instream Miles Treated	229
Wetland Acres Created	82
Wetland Acres Treated	12,551
Estuarine Acres Created	3
Estuarine Acres Treated	5
Land Acres Acquired or Protected	66,285
Stream Bank Miles Acquired or Protected	1,330
Riparian Stream Miles Treated	2,551
Riparian Acres Treated	26,629
Upland Acres Treated	528,884
Fish Passage Barriers Removed	346
Fish Passage Miles Opened	2,472
Fish Screens Installed	705
Hatchery Fish Marked	1,205,444
Stream Miles Monitored	75,689
Assessments Completed	157

Measure totals are approximate and have changed from last year. Some projects continue to be difficult to estimate by geographic area, while others have been more accurately located based on database improvements and have shifted from one geographic area to another.



## Intensively Monitored Watersheds

**SPONSOR:** Oregon Watershed Enhancement Board (OWEB)

**LOCATION:** Oregon, Middle Fork John Day River

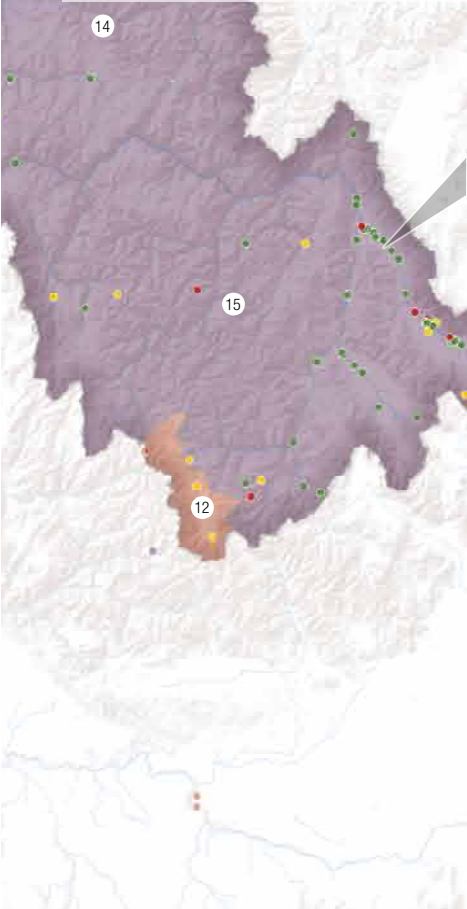
**RESULTS:** Monitoring to assess effective restoration strategies and to identify future restoration priorities

**TOTAL COST:** \$1.38 Million

**PCSRF CONTRIBUTION:** \$154,087

**PROJECT TYPE:** Monitoring

Past restoration efforts have seldom included effectiveness monitoring programs to determine if restoration actions have delivered intended measurable benefits to fish populations. Intensively Monitored Watersheds (IMWs) have been developed to detect the linkages among restoration, habitat changes, and fish populations. In Oregon, an IMW was established in the Middle Fork John Day River Basin to focus on documenting improvements to salmon habitat and assessing how restoration actions affect the health of salmon at a large scale. To date, results indicate improvements in water and habitat quality and fish migration opportunities from ten years of restoration actions in the Basin. This knowledge will help guide priorities for future restoration investment decisions.



## Iron Creek Culvert Replacement

**SPONSORS:** Idaho Office of Species Conservation, Upper Salmon Basin Watershed Program, and Lemhi Soil and Water Conservation District

**LOCATION:** Idaho, Lemhi County, Upper Salmon River Watershed

**RESULTS:** Restored access to 4 miles of stream

**TOTAL COST:** \$96,558

**PCSRF CONTRIBUTION:** \$53,240

**PROJECT TYPE:** Fish Passage

In August 2010, a culvert on the lower reach of Iron Creek, a tributary of the Salmon River, was removed and replaced with a modular steel bridge. The culvert created a velocity barrier to several life stages of ESA-listed anadromous and resident fish species including Snake River Spring/Summer Chinook Salmon, Snake River Basin Steelhead Trout, Columbia River Basin Bull trout and Snake River Sockeye Salmon. The Iron Creek watershed is comprised of approximately 40 miles of mainstem and tributary habitat. This tributary had been seasonally dewatered for agricultural uses for nearly a century. When flow conditions are suitable for migration, this watershed provides important spawning and rearing habitat for ESA-listed and resident salmonids. This culvert replacement project complemented an earlier effort to restore a year-round connection between Iron Creek and the mainstem Salmon River.





# Geographic Area – Northern Pacific Coast

The Northern Pacific Coast geographic area includes Washington and Oregon from the Cascade Mountains to the Pacific Ocean. As shown in the Exhibit 2, this area is divided into three recovery domains, including Puget Sound, Willamette/Lower Columbia, and Oregon Coast, encompassing 11 listed populations: 8 salmon ESUs and 3 steelhead DPSs. The geography of this area includes several major metropolitan centers where habitat loss and degradation of stream, estuarine, riparian, and upland ecosystems has occurred and is severely limiting salmon and steelhead sustainability. Exhibit 8 summarizes metrics for projects within the three domains.

## Skokomish Estuary Island Restoration

**SPONSOR:** Washington State, Skokomish Tribe

**LOCATION:** Washington, Hood Canal, Mason County

**RESULTS:** Restoration of natural tidal hydrology to 214 acres in the Skokomish Estuary

**TOTAL COST:** \$3.1 Million

**PCSRF CONTRIBUTION:** \$400,000

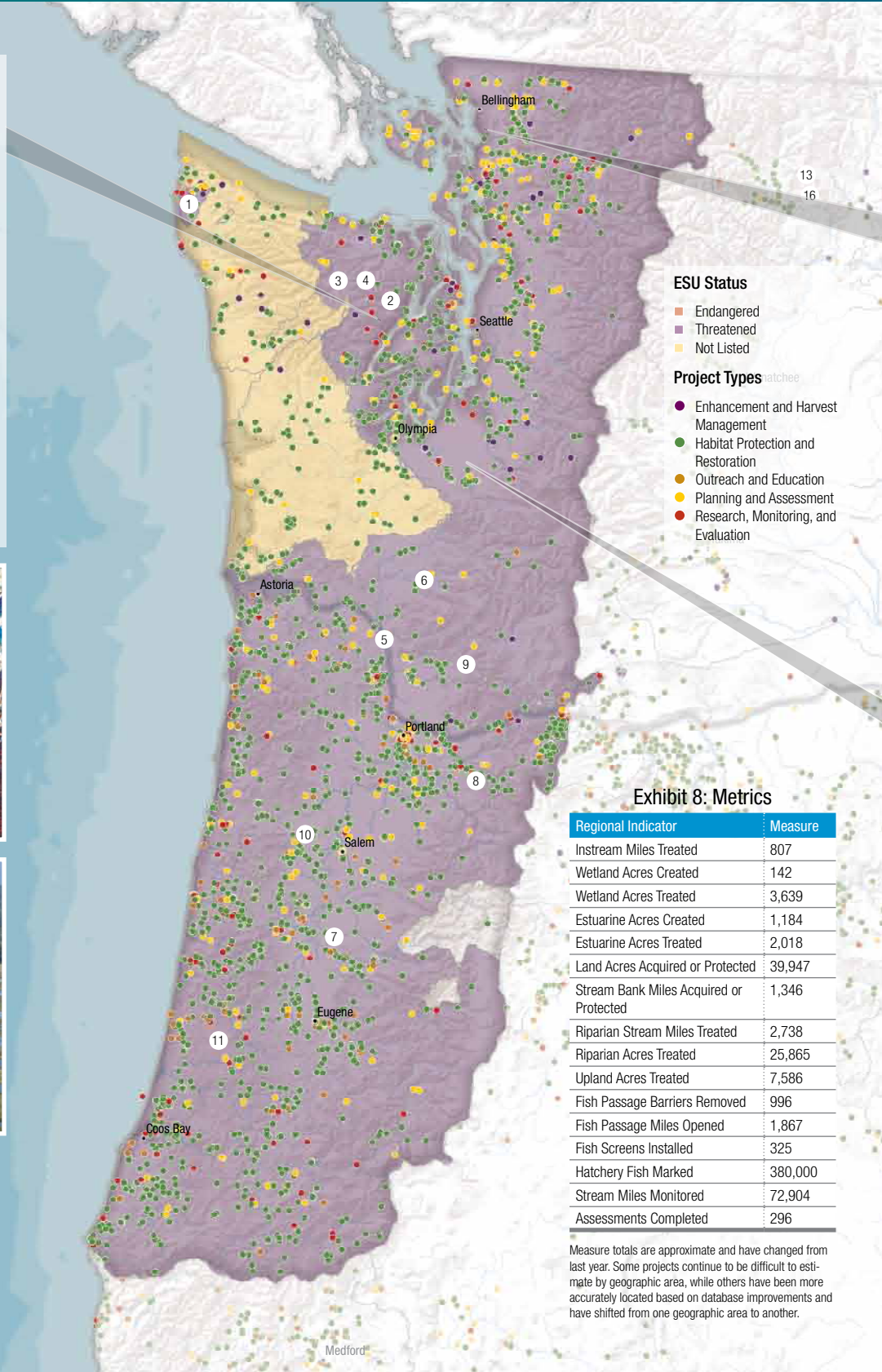
**PROJECT TYPE:** Riparian Habitat Project

This project removed 2.12 miles of island dikes and levees, 1.3 miles of roads, and 2.7 miles of roadside ditches to improve salmon habitat in the Skokomish Estuary for the listed Puget Sound Chinook, Hood Canal Summer-run chum, and Puget Sound coho while improving water quality and dissolved oxygen levels for all aquatic species. The removal of dikes, levees, and roads will also help reduce flooding in populated areas along the Estuary.

Photo 11. Skokomish Estuary aerial of island restoration



Photo 12. Skokomish Estuary after restoration



### Exhibit 8: Metrics

Regional Indicator	Measure
Instream Miles Treated	807
Wetland Acres Created	142
Wetland Acres Treated	3,639
Estuarine Acres Created	1,184
Estuarine Acres Treated	2,018
Land Acres Acquired or Protected	39,947
Stream Bank Miles Acquired or Protected	1,346
Riparian Stream Miles Treated	2,738
Riparian Acres Treated	25,865
Upland Acres Treated	7,586
Fish Passage Barriers Removed	996
Fish Passage Miles Opened	1,867
Fish Screens Installed	325
Hatchery Fish Marked	380,000
Stream Miles Monitored	72,904
Assessments Completed	296

Measure totals are approximate and have changed from last year. Some projects continue to be difficult to estimate by geographic area, while others have been more accurately located based on database improvements and have shifted from one geographic area to another.

## Nooksack Tribe Salmon Recovery Planning

**SPONSOR:** Northwest Indian Fisheries Commission, Nooksack Tribe

**LOCATION:** Washington, Whatcom County, Nooksack River Basin

**RESULTS:** Scientifically-driven recovery plan implementation and monitoring. Effective use of limited funding. Maintained pace of restoration efforts. Increased availability of complex woody cover and scoured deep pools to create cold-water refuges for holding and rearing fish. Increased channel stability and Chinook redd survival.

**TOTAL COST:** \$122,000

**PROJECT TYPE:** Salmonid Restoration Planning and Assessment

The Nooksack Tribe is an active participant on the Water Resource Inventory Area (WRIA) 1 Salmonid Recovery Board, helping to prioritize and coordinate implementation of salmon recovery actions in the Nooksack River watershed. The Tribe plays an important role in salmon recovery, as primary author of the WRIA 1 *Salmonid Recovery Plan*, developer of key technical guidance to support planning and prioritization, and policy leader at Board, Puget Sound Partnership, and Washington state levels.

Natural-origin Nooksack spring Chinook spawner populations are critically low. Tribal staff have supported reach assessment and restoration planning for over 76 miles of Chinook habitat in the Forks and implemented 7 log jam projects in the North and South Forks of the Nooksack River, including 58 engineered log jams and stabilization of 3 natural accumulations to treat over 1.9 miles of priority river habitat. In cooperation with partners on the WRIA 1 Board, the Tribe implements a strategic approach to project development, including: (1) habitat assessment of priority reaches, and development of reach-scale restoration plans to identify and prioritize recovery actions; (2) project implementation; and (3) monitoring to evaluate effectiveness of projects. In addition to restoration, the Tribe provides technical and policy input in multiple forums to support habitat protection.

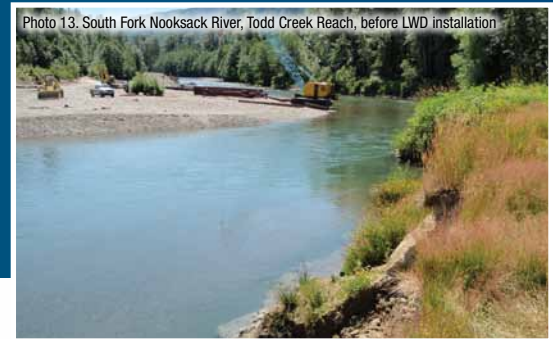


Photo 14. South Fork Nooksack River, Todd Creek Reach, after log jam construction



## Ohop Creek Restoration

**SPONSOR:** South Puget Sound Salmon Enhancement Group (SPSSEG), the Nisqually Land Trust, and the Nisqually Indian Tribe

**LOCATION:** Washington, Pierce County, Nisqually River Basin

**RESULTS:** Creation of a new and more natural stream channel. Enhancement of stream habitat for rearing fish. Eradication of invasive reed canary grass in project area.

**TOTAL COST:** \$1.5 million

**PCSRF CONTRIBUTION:** \$1,025,000

**PROJECT TYPE:** Instream Habitat Restoration

The SPSSEG is a 16-year-old Regional Fish Enhancement Group that works to restore vital salmon habitat in the south Puget Sound region. Ohop Creek is a tributary of the Nisqually River located near Eatonville, WA. The Nisqually Land Trust acquired the project site in 2002 with Salmon Recovery Funding Board funds which has allowed SPSSEG to complete the project with significant landowner support.

SPSSEG restored this section of Ohop Creek by excavating a new, 1.08 mile section of channel that is higher in elevation, more sinuous, and hydrologically connected to the adjacent floodplain and wetland areas. Within the stream itself SPSSEG installed 40 log jams with over 400 pieces of wood and increased stream-bed gravels to restore habitat diversity in the stream. SPSSEG backfilled the old, straightened stream channel and restored the area with large woody debris and riparian plantings. Additionally, SPSSEG and partners re-vegetated 80 acres of floodplain with over 50,000 native trees and shrubs and eradicated an acre of invasive reed canary grass from the adjacent floodplain. Reed canary grass is an aggressive invasive species that competes with native riparian plant and tree species, crowding out native seedlings, reducing shading, constricting waterways, and affecting natural nutrient and carbon cycling.



Photo 16. Ohop Creek, old channel with fill and buried logs



Pocatello

# Geographic Area – Alaska

Alaska's program focuses on research and monitoring efforts, as well as maintaining healthy populations of salmon through habitat protection and restoration. There are no listed salmonids and thus no recovery domains in Alaska. Exhibit 9 shows metrics for projects in Alaska.

## Exhibit 9: Metrics

Regional Indicator	Measure
Instream Miles Treated	0
Wetland Acres Created	0
Wetland Acres Treated	3,992
Estuarine Acres Created	0
Estuarine Acres Treated	12
Land Acres Acquired or Protected	75,120
Stream Bank Miles Acquired or Protected	0
Riparian Stream Miles Treated	6
Riparian Acres Treated	117
Upland Acres Treated	2
Fish Passage Barriers Removed	355
Fish Passage Miles Opened	125
Fish Screens Installed	0
Hatchery Fish Marked	237,058,331
Stream Miles Monitored	21,176
Assessments Completed	16

Some projects continue to be difficult to estimate by geographic area, while others have been more accurately located based on database improvements and have shifted from one geographic area to another.



## Cost Share Program

**SPONSOR:** Alaska Sustainable Salmon Fund (AKSSF)

**LOCATION:** Alaska, Statewide

**RESULTS:** Fostering a culture of land stewardship through private-public collaborations to restore salmon habitat

**TOTAL COST:** \$3,427,362

**PCSRF CONTRIBUTION:** \$2,375,113

**PROJECT TYPE:** Habitat Protection and Restoration

Since 2007, AKSSF has provided funding for the Alaska Cost Share Program (CSP) to help achieve conservation and restoration of salmon habitat. Through partnerships with private landowners, watershed groups, and governmental entities, the CSP program has rehabilitated and enhanced salmon habitat at over 130 sites across Alaska. Restoration work at over 100 additional sites is planned for the next three years. Specific approaches vary from site to site, but typically consist of removing detrimental structures, stabilizing banks, minimizing erosion, re-vegetating with native plants, and protecting the site from future impacts. Public outreach and landowner involvement are essential aspects of the program. CSP staff educate the public on characteristics and value of fish habitat through workshops, presentations, site visits, and meetings with landowners. Once projects are identified, the CSP provides technical expertise, assistance obtaining permits, and a portion of the required funding. Landowners and land managers also contribute funding to projects, gaining improved conditions for salmon as well as secondary benefits such as stabilized banks and erosion control. Landowners often share their new-found knowledge of salmon habitat with neighbors and friends, leading to improved stewardship and additional opportunities for habitat restoration.



- Project Types**
- Enhancement and Harvest Management
  - Habitat Protection and Restoration
  - Outreach and Education
  - Planning and Assessment
  - Research, Monitoring, and Evaluation



## ► PCSRF Lessons Learned

- The continued ability to support projects and programs through all stages of a salmon's life cycle is critical to the success of salmon conservation and recovery.
- The development and implementation of a robust performance reporting system, as well as effective monitoring approaches, are critical to assessing progress towards goals.
- Significant collaboration, coordination, political will, and technical expertise are required to develop cross-agency, cross-watershed, or cross-population measures.
- As observed by long-term monitoring, cumulative project investments over time have resulted in sustained and increased returns of salmonids and expanded distribution into habitats that populations have not occupied for decades.
- PCSRF's monitoring and assessment efforts are showing that PCSRF is making a difference in habitat and species recovery.

### Photo Credits

Inside Cover: Oregon Watershed Enhancement Board

Photo 1: Freshwater and Marine Image Bank, University of Washington

Photo 2: Oregon Watershed Enhancement Board

Photo 3: Oregon Watershed Enhancement Board

Photo 4: California Department of Fish and Game

Photo 5: California Department of Fish and Game

Photo 6: CRITFC

Photo 7: Oregon Watershed Enhancement Board

Photo 8: Oregon Watershed Enhancement Board

Photo 9: Idaho Office of Species Conservation

Photo 10: Idaho Office of Species Conservation

Photo 11: Skokomish Tribe

Photo 12: Skokomish Tribe

Photo 13: Northwest Indian Fisheries Commission

Photo 14: Northwest Indian Fisheries Commission

Photo 15: South Puget Sound Salmon Enhancement Group

Photo 16: South Puget Sound Salmon Enhancement Group

Photo 17: Alaska Sustainable Salmon Fund

Photo 18: Alaska Sustainable Salmon Fund





**National Marine Fisheries Service**

1315 East-West Highway  
SSMC 3, F/PR  
Silver Spring, Maryland 20910  
[www.nmfs.noaa.gov](http://www.nmfs.noaa.gov)

**Copies of this Report may be obtained by contacting:**

Barry Thom  
National Marine Fisheries Service  
Northwest Region  
1201 NE Lloyd Blvd., Suite 1100  
Portland, Oregon 97232  
[barry.thom@noaa.gov](mailto:barry.thom@noaa.gov)

**An online version of this Report is available at: <http://www.nwr.noaa.gov>**