WASHINGTON STATE
Recreation and
Conservation Office

2010 State of Salmon in Watersheds

Contents

1 EXECUTIVE SUMMARY

8 VISION, GOALS, AND STRATEGIES

9 INTRODUCTION

15 TRACKING OUR PROGRESS STATEWIDE AND REGIONALLY

16 STATEWIDE OVERVIEW

22 PUGET SOUND SALMON RECOVERY REGION

34 HOOD CANAL SALMON RECOVERY REGION

42 WASHINGTON COAST SALMON RECOVERY REGION

50 LOWER COLUMBIA RIVER SALMON RECOVERY REGION

62 MIDDLE COLUMBIA RIVER SALMON RECOVERY REGION

72 UPPER COLUMBIA RIVER SALMON RECOVERY REGION

82 SNAKE RIVER SALMON RECOVERY REGION

92 NORTHEAST WASHINGTON SALMON RECOVERY REGION

98 OVERARCHING THREATS TO SALMON RECOVERY

102 KEY GAPS IN INFORMATION

106 END NOTES

111 ACKNOWLEDGEMENTS

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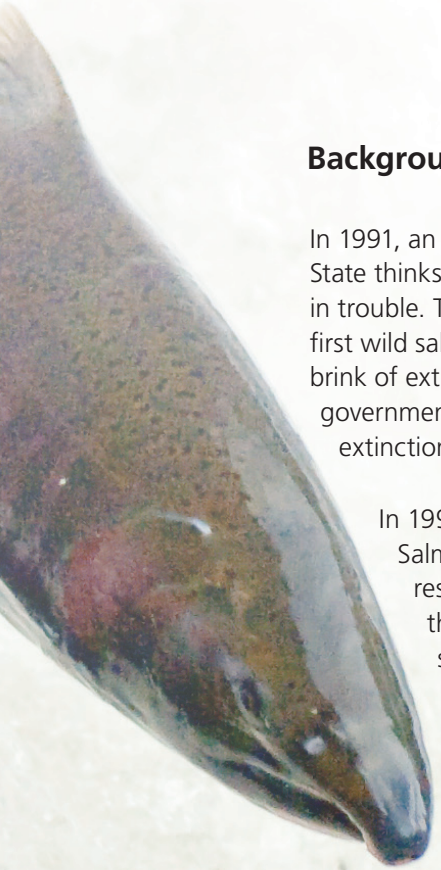
Executive Summary

Washington State initiated a grassroots approach to salmon recovery in 1998 that was unique in the nation. This biennial "State of Salmon in Watersheds" report takes a look at the state's more than 10 years of experience to identify trends, call out gaps in knowledge, and discern a path forward to accomplish the State's vision of restoring salmon, steelhead, and trout to healthy, harvestable levels and to improve the habitats on which they rely.



Background

In 1991, an alarm sounded that changed the way Washington State thinks about salmon. The cultural icon of the state was in trouble. That year, the federal government declared the first wild salmon, Snake River sockeye, as endangered, on the brink of extinction. By the end of that decade, the federal government had named 16 more species of salmon at-risk of extinction, covering three-quarters of the state.

In 1998, the state Legislature passed Washington's Salmon Recovery Act, declaring that it wanted to retain responsibility for managing its natural resources rather than abdicate it to the federal government. The act set in motion one of the most comprehensive and complicated recovery planning efforts in the United States.

Salmon recovery efforts bloomed on many levels. School children planted trees along creeks in the name of salmon recovery. Local communities formed citizen committees to write detailed salmon recovery plans and start restoration projects. Regional organizations formed to organize and guide recovery work. State and federal agencies provided funding, guidance, and monitoring.

By the start of the new millennium, the state had a plan for recovering salmon. Today, more than 10 years later, Washington State has come a long way in its fight to save salmon. The questions this report tries to answer are how far along are we? Are our recovery efforts working?

Statewide Overview

Washington is beginning to see a return on the time, money, and resources it has invested in salmon recovery and watershed health. The statistics collected in this report show progress, and they also reveal just how much work still lies ahead.

Are Salmon Increasing in Numbers?

The number of wild salmon returning to rivers to spawn appears to be increasing for some species, moving closer to recovery goals. Of the listed species, one appears to be near its spawner recovery target, four are on the rise, three are stable, two are decreasing, and two are unclear.

The number of juveniles heading to the ocean, except for steelhead in the upper Columbia River, has not increased. The data, however, doesn't cover enough years to see clear trends in most cases.

ARE WILD SALMON INCREASING IN NUMBERS?

Approaching Goal	On the Rise	Stable	Decreasing	Unclear
Summer chum in Hood Canal	Chinook in Puget Sound	Chinook in the upper Columbia River and Snake River	Steelhead in Puget Sound	Chinook and coho in the lower Columbia River
	Steelhead in the lower, middle, and upper Columbia River	Steelhead in the Snake River	Chum in the lower Columbia River	

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Is Habitat Improving to Support Salmon?

Over their life, salmon migrate from freshwater streams where they were born, through many types of environments, before returning to their home streams to spawn the next generation of fish. Many things affect their survival along the way, such as what kind and how much food is available, what predators will eat them, how warm the water is, and whether there is good habitat for them to spawn when they return from their time at sea. Salmon need enough cool, clean water for migrating, spawning, and rearing. Important questions are whether habitat is adequate for them during their life cycles and if the condition of habitat is improving.

- Habitat - In the face of our considerable recovery efforts, in the four salmon recovery regions for which there is data, development continues to gobble up more land than is being protected and restored. The increase in developed land from 2001 to 2006 ranged from about 1 percent along the coast to about 3 percent surrounding Puget Sound. Although the numbers are small across the region, effects are concentrated in local areas important to salmon.
- Water quality - Statewide, the number of monitoring sites with poor water quality appears to have decreased.
- Water quantity - The state's watershed planning efforts have served to protect the amount of water flowing in streams for fish, irrigation, and recreation.

Are Recovery Plans Being Implemented?

Our recovery partners continue to make progress in restoring and protecting priority habitat, improving hatcheries, and making dams more fish friendly. Implementation of some plans is further along than others, but all are making good progress in addressing habitat factors limiting salmon recovery.

Of all the habitat actions on a statewide basis, recovery partners have made the greatest progress fixing barriers to fish passage. They have made the least amount of progress in the more expensive projects to reconnect floodplains with river channels to improve conditions for salmon.

How Has the Money Been Spent?

Recovering salmon takes resources in many forms – community support, funding, changes in law, political support, and raw muscle power.

Salmon recovery funding from state, federal, and local sources administered by the Salmon Funding Recovery Board has totalled $788 million since 1999. It topped $110 million in 2008 and has remained relatively steady, averaging $63 million a year.

Since 1999, the Salmon Recovery Funding Board has awarded nearly $420 million in grants from its primary state and federal sources. The majority of that funding has been for restoration projects to repair damaged habitat, followed by projects to protect more pristine areas used by salmon.

Our Regional Approach to Salmon Recovery

Washington's grass roots strategy for recovering salmon puts much of the work to develop recovery plans and complete projects in the hands of regional and local agencies and community groups. Locally developed and federally adopted recovery plans have been completed in seven of Washington's salmon recovery regions, and organizations are in place to implement the projects identified in those plans.

The variety of organizations and complexity of issues that regional recovery organizations face varies across the state. They have different species of salmon, different geography and weather, different political concerns, different funding levels, and different partnerships to foster and maintain.

While this diversity makes salmon recovery complex, it also gives it its richness. There is not a one-size-fits-all approach to salmon recovery in Washington. It's that very fact that ensures that a variety of technical experts, government representatives, businesses, farmers, and citizens remain involved and committed to salmon recovery.

In the context of this richness, here are some general observations about each salmon recovery region.

Puget Sound Salmon Recovery Region

- The majority of the people in the state live in this region, which presents major challenges for salmon due to development pressures and human infrastructure needs.
- A Chinook salmon recovery plan is in place, and the status of the fish appears to be improving, but is still well below its recovery goals.
- Listed steelhead appear to be declining, and a recovery plan for them is being developed.
- The plan being put in place to recover the Puget Sound ecosystem will benefit listed and unlisted salmon.

Hood Canal Salmon Recovery Region

- This salmon recovery region, encompassed by the broader Puget Sound region, is the only region-within-a-region in Washington.
- Summer chum salmon are the emphasis of recovery efforts by the salmon recovery organization, and although the numbers of spawning summer chum salmon appear to be approaching recovery goals, much remains to be done so that the fish will persist over the long term.

Washington Coast Salmon Recovery Region

- The health of salmon in this region is better than anywhere else in the state. The only listed species is Lake Ozette sockeye.
- The recently formed salmon recovery organization is developing a coast-wide, regional plan for the long-term protection and restoration of wild salmon across the area.

Columbia River Basin

Five salmon recovery regions exist in the Columbia River basin, four of which are affected by issues in the mainstem of the Columbia River, such as operation of the federal hydropower system, predation on fish as they pass through the lower Columbia River estuary on their way to and from the ocean, and complex harvest and hatchery activities involving our neighboring states. The fifth region exists above Grand Coulee Dam.

Lower Columbia River Salmon Recovery Region

- The region is complex and contains the largest number of listed species in the state. Recovery plans are being implemented for all of the listed species.
- Although the abundance of listed species appears to be stable or on the rise in most cases, limitations in the available data hamper our understanding of the true status of wild fish in some cases.

Middle Columbia River Salmon Recovery Region

- The region faces challenges associated with water storage and agricultural diversions that affect fish passage.
- Implementation of the recovery plan for listed steelhead and bull trout in the region is underway, with the greatest progress having been made in improving conditions for fish passage.
- Efforts to recover middle Columbia River steelhead are shared with the Snake River Salmon Recovery Region, where the Walla Walla portion of the middle Columbia River steelhead reside.

Upper Columbia River Salmon Recovery Region

- Spring Chinook and steelhead are listed in this region, and their numbers appear to be increasing since listing, particularly steelhead.
- Implementation of actions to restore habitat is progressing, with the greatest extent of progress in addressing stream flow and fish passage issues.

Snake River Salmon Recovery Region

- Listed spring and summer Chinook, and steelhead, appear to be below their recovery goals, although spring and summer Chinook have increased modestly since listing.
- Implementation of habitat recovery actions is progressing, with the greatest progress in addressing sediment and fish passage issues.

Northeast Washington Salmon Recovery Region

- A final federally adopted recovery plan is not in place for the listed bull trout in the region, and a regional salmon recovery organization has not formed.
- Work to improve bull trout is underway. Habitat actions to address factors for the decline of bull trout are being implemented by a lead entity operating in a portion of the region.

Threats to Salmon Recovery

Salmon populations didn't decline overnight; they declined over 150 years. The U.S. Fisheries Commissioner reported decreases in Columbia River salmon as far back as 1894. Recovering salmon is hard work, and work that most believe will take decades, if not centuries, to accomplish.

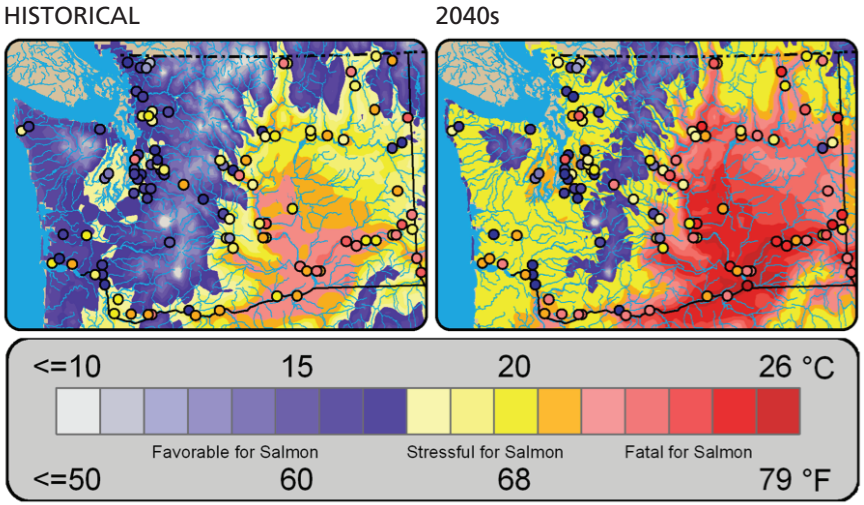
In the late 1800s, the U.S. Fisheries Commissioner identified the biggest human-caused threats to salmon as overfishing, dams, and habitat degradation. Harvest treaties and improvements to dams that enable fish to pass through more easily have changed the primary threats. Today, climate change, habitat degradation from the effect of a growing human population, and uncertain long-term funding for recovery are seen as the primary threats to salmon recovery.

Climate Change

Climate change is projected to affect the Pacific Northwest by raising the average annual temperature by 3 degrees by 2040. The warmer climate will mean more winter rain, instead of snow, which in turn will mean faster running rivers and more flooding in the winter. With less snowmelt to fill streams in the summer, salmon will experience warmer and drier conditions in the summer. These conditions will degrade habitat quality and quantity for wild salmon and impair their ability to survive.

A warmer climate also impacts oceans, affecting the food web. Warmer temperatures inhibit nutrients from deeper, colder ocean depths from rising to the surface. This affects how much food is available for salmon. Warmer ocean temperatures also mean warm-water predators will expand their range into the Pacific Northwest coastal waters. The combination of reduced food, increased predators, and more competition historically has caused salmon to die in the ocean at higher rates. Salmon recovery efforts will need to anticipate and adapt to the effects of climate change.

AUGUST SURFACE MEAN AIR TEMPERATURE AND MAXIMUM STREAM TEMPERATURE



This figure illustrates how summer air and stream temperatures may change from the recent past (1970-1999) to the 2040s. The areas with favorable temperatures for salmon are projected to substantially decrease in western Washington, and in many parts of eastern Washington, temperature conditions are projected to transition from stressful to fatal for salmon.

More People

Salmon habitat is affected by many factors, but primarily by human population growth. The state's population is projected to increase by 1.6 million people by 2030. As Washington's population increases, more of the resources salmon rely on are used up. More land is converted to houses and businesses, more water is used, and more electricity produced by dams is needed. Between 45-62 percent of Washington's estuaries have been lost to diking, channelizations, dredging, and filling, while more than 90 percent of the wetlands in urban areas have been lost. Salmon recovery efforts will need to be prioritized to minimize the effects of population growth.

Uncertain Long-Term Funding

Salmon recovery isn't easy work and it requires many resources, especially funding. Currently, the funding comes from many state, federal, and local sources. Sustaining that funding over a century is challenging and will require communities statewide to continue to prioritize salmon recovery as important work.

Gaps in Information

The ability to track and report progress of salmon recovery depends on the availability of information on a wide range of topics from many sources over time. In most instances, data was available for this report, but had been collected to meet a variety of management needs or legal requirements. In addition, with few exceptions, data emphasized state agency activities. Considerable data exist from other sources that, if available for inclusion in a manner consistent with statewide reporting needs, could enhance future reports.

The data in the report varied greatly across regions, depending on species, local conditions, and available resources to monitor and compile the data. In a statewide context, important gaps exist. Data on numbers of fish tended to be most abundant while data on habitat quality and quantity were least abundant. Gaps in fish data, particularly juveniles, are being addressed consistent with the statewide integrated fish and habitat monitoring framework adopted by the Forum on Monitoring Salmon Recovery and Watershed Health. Similarly, watershed health data should improve in the future, as results from the recently implemented statewide habitat status and trends monitoring program become available. To delist species in the future, sufficient data over time will be needed. We must show improvement, stability, and sustainability of wild salmon and the habitat they depend on.

Conclusions

Washington State has taken a unique approach to salmon recovery – one that involves many people across the state. With 12 years of work behind us, the efforts of Washingtonians are just beginning to reveal trends that could prove promising. The vision in 1998 was that people living near salmon understood best what it would take to restore places for them. And that if we fix habitat and the living conditions of salmon, we are fixing it for many other species of plants and animals, including humans. Salmon are ingrained in Washington's culture and economy. To lose them would be to lose a piece of ourselves. Salmon recovery is important work, that if done well, will benefit not only salmon, but the people who call Washington home.

Our Vision

To restore salmon, steelhead, and trout to healthy harvestable levels and improve habitats on which fish rely.

Goals and Strategies[1]

Wild salmon populations will be productive and diverse.

- Sustain salmon productivity by providing wild spawner escapement, conserving genetic diversity, and meeting basic needs of salmon for spawning, rearing, and migration in watersheds and ecosystems. Stewardship of salmon will be the first priority in managing the resource.
- Meet the goal of the Endangered Species Act to return endangered and threatened species to the point where salmon no longer need the statute's protection.

We will have coordinated, science-based salmon recovery efforts.

- Achieve cost-effective salmon recovery and use government resources efficiently.
- Use the best available science and integrate monitoring and research with planning and implementation.
- Ensure that citizens, salmon recovery partners, and state employees have timely access to the information, technical assistance, and funding they need to be successful.

Our habitat, harvest, hatchery, and hydropower activities will benefit wild salmon.

- Freshwater and estuarine habitats are healthy and accessible.
- Rivers and streams have flows to support salmon.
- Water is clean and cool enough for salmon.
- Hatchery practices meet wild salmon recovery needs.
- Harvest management actions protect wild salmon.
- Compliance with resource protection laws is enhanced.

Citizens and salmon recovery partners are engaged.

- Create partnerships among governments and citizens.
- Provide leadership, coordination, and technical assistance to create agreements on salmon recovery decision-making frameworks and recovery plans.
- Integrate scientific data with local knowledge and build in local flexibility and control.
- Inform, build support, involve, and mobilize citizens to assist in restoration, conservation, and enhancement of salmon habitat.

We will meet Endangered Species Act and Clean Water Act requirements.

- Strengthen land, water, and fishery management policies, programs, and activities to avoid, minimize, and mitigate human impacts on salmon populations and their habitat.
- Seek Endangered Species Act compliance for state guidelines, regulations, and plans; permitting activities; funding of projects and activities; and state lands, facilities, and infrastructure.

Introduction

Welcome to the sixth in the series of biennial "State of Salmon in Watersheds" reports. The purpose of these reports is to provide regular, concise summaries of high level information that tracks progress toward salmon recovery across Washington State.

Much progress has been made in salmon recovery across the state since passage of the Salmon Recovery Act in 1998. During the past 12 years, "State of Salmon in Watersheds" reports have documented how Washingtonians have responded to the challenges of protecting and restoring salmon and steelhead to healthy status. State, federal, and tribal agencies worked with local citizens and other partners to develop salmon recovery plans that have been adopted by the federal government. They continue to implement those plans by putting needed actions into place, and building better ways to document results.

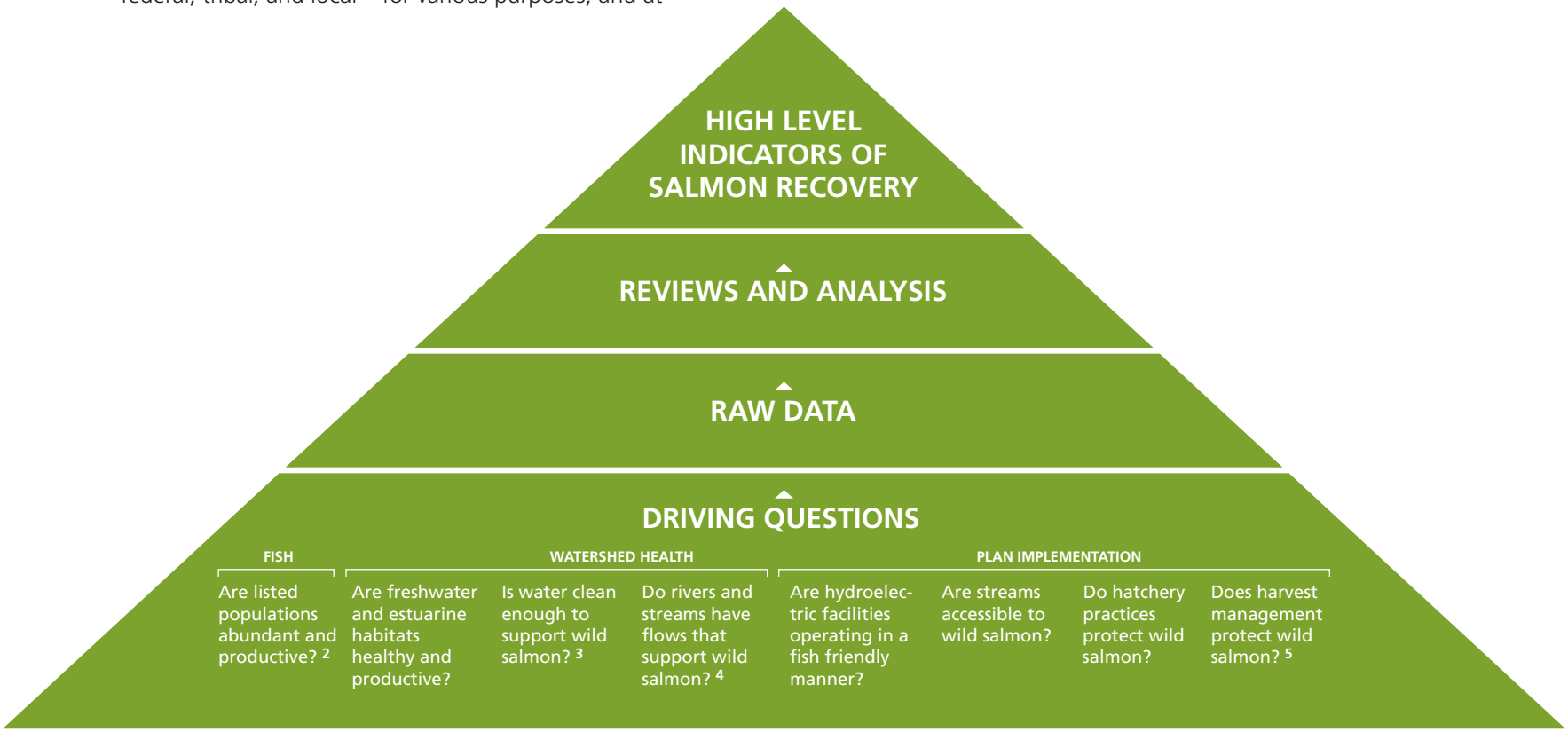
This is the first "State of Salmon in Watersheds" report prepared by the Washington State Recreation and Conservation Office, into which the Governor's Salmon Recovery Office was integrated by the Legislature in 2009. This report builds on the solid foundation of past reports, but is different in several important ways.

- It consolidates information from the Salmon Recovery Funding Board, the Forum on Monitoring Salmon Recovery and Watershed Health (Forum), and watershed planning efforts across the state.
- It has fewer statewide summary charts.
- It places more emphasis at the salmon recovery region scale – that is the scale at which listings and eventual de-listings can occur.
- It provides more information on trends in fish, watershed conditions, and recovery actions over time.
- It identifies overarching threats to the long-term success of recovery.

We are committed to communicating the status of salmon and the health of our watersheds to the Governor, legislators, Congress, and the public. All recovery partners must work on ways to better share information and to track and report progress. We must identify and address key data gaps that hinder our ability to manage our collective efforts along the long road to recovery.

The high level questions of most interest to decision-makers drive what information is compiled for this report. The questions resulting from the work of the Joint Natural Resources Cabinet in 2000, are reflected in Washington's "Statewide Strategy to Recover Salmon," and are consistent with the state's "2002 Comprehensive Monitoring Strategy."

The pyramid below places high level questions at the base. Complex raw data are collected from many sources – state, federal, tribal, and local – for various purposes, and at multiple scales – watershed, salmon recovery region, and statewide to help answer those questions. After being organized and analyzed, and included in technical or management reports, the information is then compiled into the indicators reported here. High level indicators are short and easy-to-understand, and sit at the top of the pyramid – they are simple, brief, and clear ways to track progress of salmon recovery.



Strategic Approach to Fish and Watershed Health Monitoring

We have made much progress in focusing on the most important monitoring needs across the state. Washington's "Comprehensive Monitoring Strategy and Action Plan" identified high priority statewide monitoring actions. In addition, the Forum has been working for a number of years with state, federal, tribal, local, and regional recovery organizations. It has made significant strides to improve coordination and efficiencies among disparate monitoring programs.

New Salmon, Watershed Health, and Implementation Indicators

This report is focused on indicators that address questions in three general categories – fish, watershed health, and plan implementation. While much remains to be done, the report reflects significant progress in our strategic approach to tracking progress in all three categories. The most important influence on that progress has been the Forum.

Telling the salmon recovery and watershed health stories in meaningful but simple ways is challenging. To address those challenges in 2009, in response to legislative direction, the Forum adopted the small set of high level indicators for salmon recovery and watershed health that are listed below.

In 2010, the Forum also adopted technical protocols for the collection of data on each of its salmon and watershed health indicators. Information on these protocols can be found on the Forum's Web site. Future "State of Salmon in Watersheds" reports will track state agency use of those protocols. As always, the underlying information on all indicators is accessible from data sources identified throughout this report.

To know if progress is being made, it is important to track implementation of recovery actions. This report tracks a smaller set of implementation indicators at the regional scale, some of which also are rolled up and reported at the statewide scale.

High Level Indicators Adopted by the Forum[6]

Salmon

- Adult spawners
- Adults harvested
- Juvenile out-migrants (smolts)

Watershed Health

- Land use and land cover
- Biological health (in-stream)
- Stream physical habitat
- Riparian condition
- Water quality
- Water quantity (stream flow)

Implementation Indicators

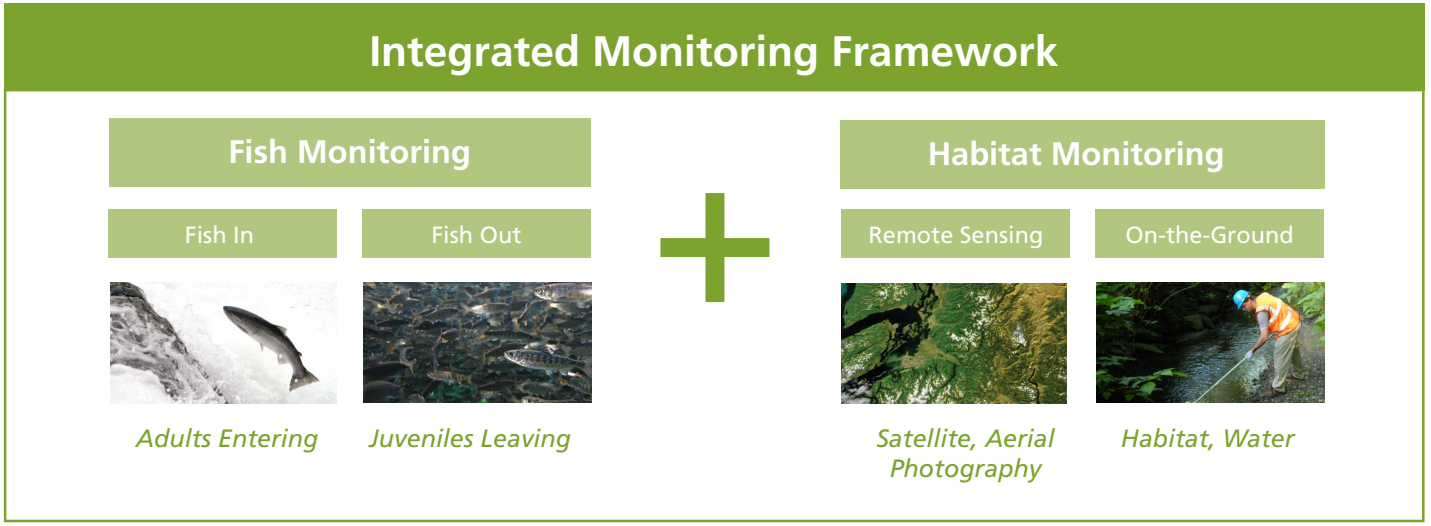
- Plan implementation progress
- Funding
- Fish-friendliness of hydropower projects
- Barriers to fish passage
- Hatchery practices meeting scientific standards
- Watershed cleanup plans
- In-stream flows and flow augmentation

A New Monitoring Approach: Integrated Statewide Monitoring Framework[7]

In 2007, the Forum completed an integrated statewide framework for monitoring of listed salmon and their habitat. Statewide implementation of the framework began in the Puget Sound salmon recovery region in 2009 with the collection of a limited set of habitat data. Similar data will be collected in all other regions, and then rotated over time to get trend information. This information will be contained in future reports. Importantly, the framework also provides a way for statewide watershed condition data to be incorporated with finer scale (e.g., local watershed) data, and vice versa. The key will be use of design and sampling protocols that are consistent with those adopted by the Forum. When implemented over time, the framework will provide information on trends in Forum-adopted indicators at regional and statewide scales. That information will address high-level questions such as:

- What are the trends in salmon populations?
- What are the trends in watershed health and habitat condition?

The framework calls for simultaneous and continuous monitoring of juvenile and adult salmon in at least one primary population per major population group for all listed species statewide. Habitat monitoring will efficiently complement the fish monitoring, to better understand how fish are responding to our recovery actions.



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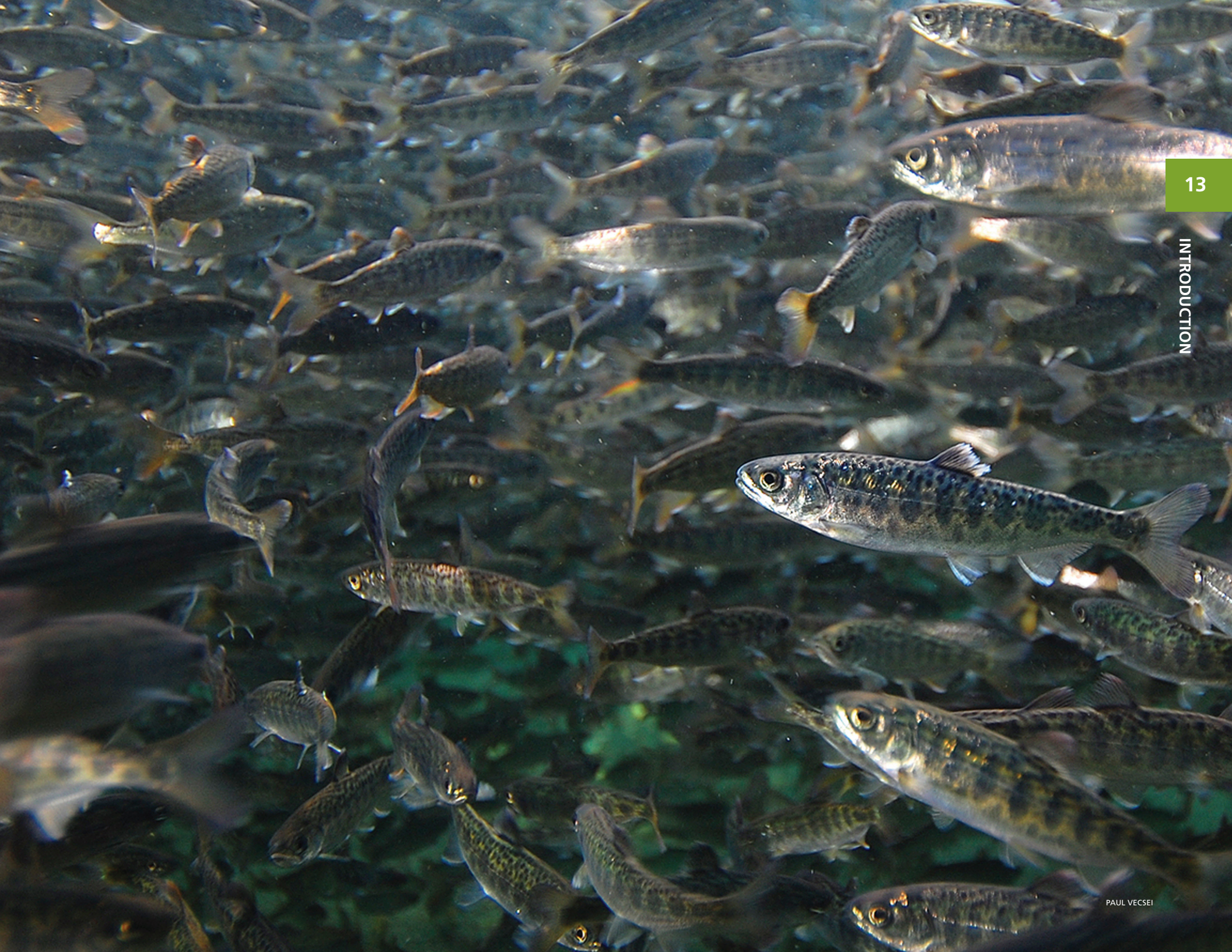
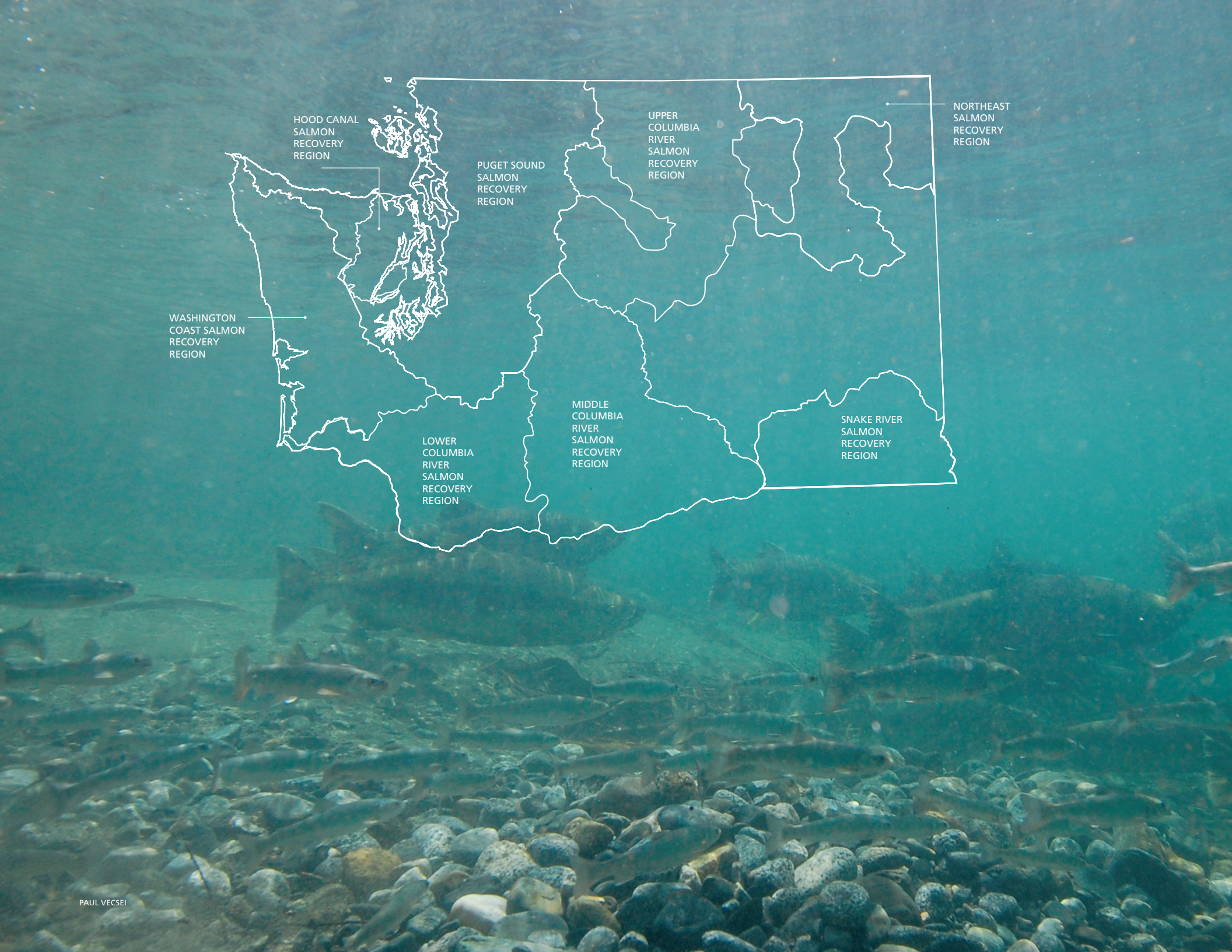


PAUL VECSEI


HOOD CANAL SALMON RECOVERY REGION
PUGET SOUND SALMON RECOVERY REGION
UPPER COLUMBIA RIVER SALMON RECOVERY REGION
NORTHEAST SALMON RECOVERY REGION
WASHINGTON COAST SALMON RECOVERY REGION
LOWER COLUMBIA RIVER SALMON RECOVERY REGION
MIDDLE COLUMBIA RIVER SALMON RECOVERY REGION
SNAKE RIVER SALMON RECOVERY REGION

PAUL VECSEI

Tracking Our Progress: Statewide and Regionally

Salmon recovery involves many people – scientists, representatives of government, tribes, and the public. In one form or another, all seek information on how the fish and habitat are doing, whether recovery plans are being implemented, and how effectively we are meeting our goals. This section contains the "results" of efforts to date, with overviews of how recovery is coming along across Washington at two scales – statewide and regional.

The statewide overview contains information on indicators of fish, watershed health, and implementation of recovery actions. Regional overviews contain more detail on these three categories of indicators.

Recovery plans were developed and are being implemented at the regional scale with partners in individual watersheds. Each plan must be responsive to different species and ecological conditions, limiting factors that need to be addressed, threats to recovery, and implementation opportunities and constraints. It is at the regional or Evolutionarily Significant Unit scale that species are listed under the Endangered Species Act, and it is that scale at which salmon and habitat must be improved for eventual delisting and recovery. High level summaries on the status of watershed planning are found in each regional section.

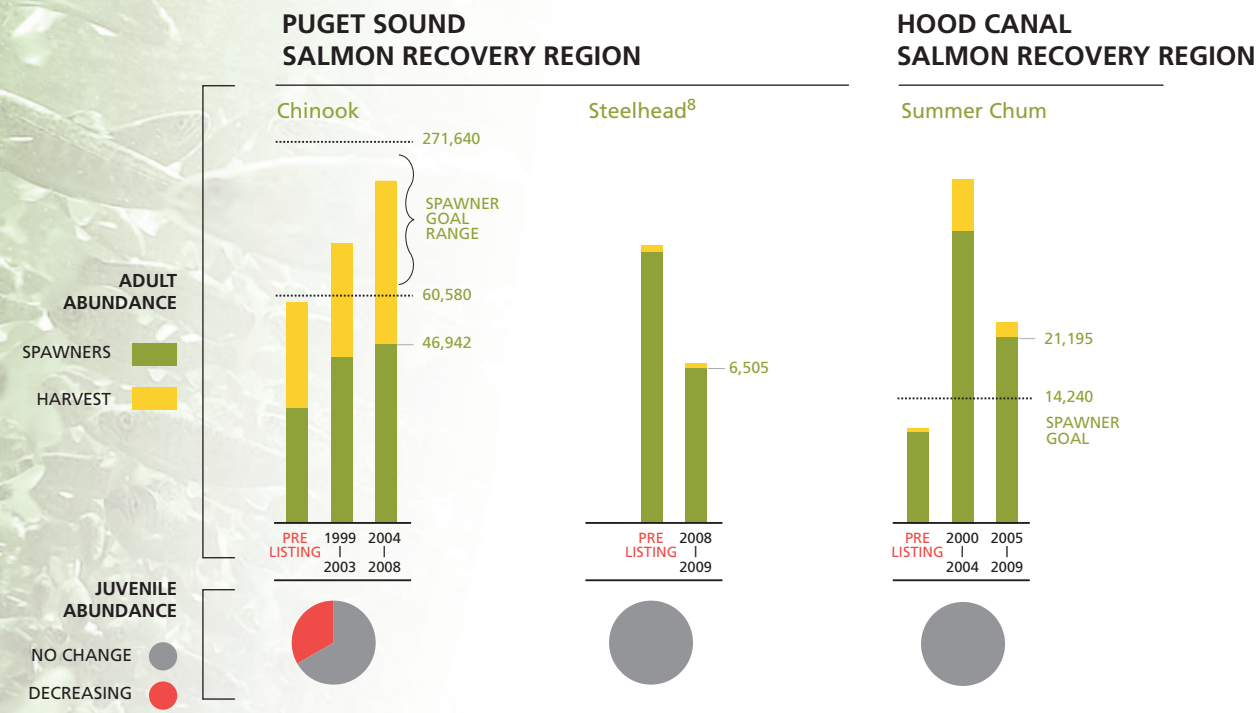
FISH

ABUNDANCE TRENDS AT-A-GLANCE

Where possible, graphics show wild fish abundance data for species at the Evolutionarily Significant Unit (ESU) and Distinct Population Segment (DPS) scale. This is the scale at which species are listed and de-listed under the federal Endangered Species Act. In some cases data are for one or more Major Population Groups (MPGs) within an ESU or DPS that is shared with neighboring states.

- Bar charts show the returning number of wild adult fish, separated by what was harvested and what returned to spawn.
- Pie charts show the percentage of juvenile sampling locations where trends have increased, decreased, or not changed. Juvenile data generally are not available (N/A) for all populations of each species.
- More detail can be found in individual regional overview sections

DATA SOURCES: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE AND TRIBES



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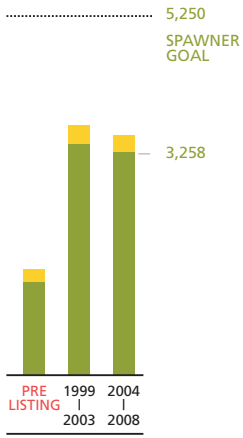
LOWER COLUMBIA RIVER SALMON RECOVERY REGION

ADULT ABUNDANCE
SPAWNERS
HARVEST
JUVENILE ABUNDANCE
NO CHANGE
DECREASING

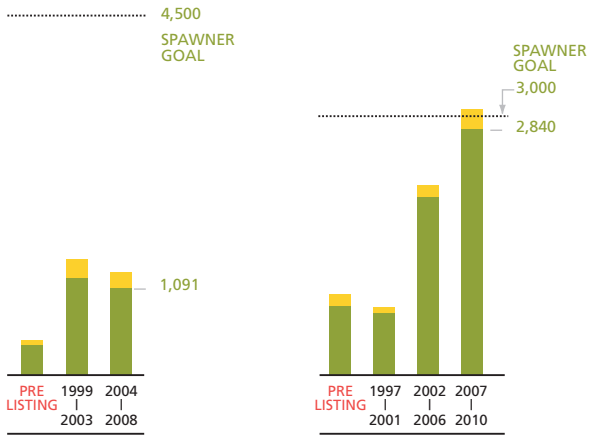
MIDDLE COLUMBIA RIVER SALMON RECOVERY REGION

ADULT ABUNDANCE
SPAWNERS
HARVEST
JUVENILE ABUNDANCE
NO CHANGE
INCREASING

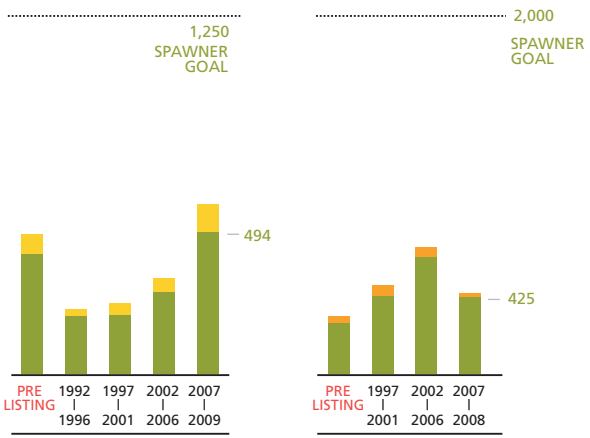


N/A

UPPER COLUMBIA RIVER SALMON RECOVERY REGION



SNAKE RIVER SALMON RECOVERY REGION



Are listed populations abundant and productive?

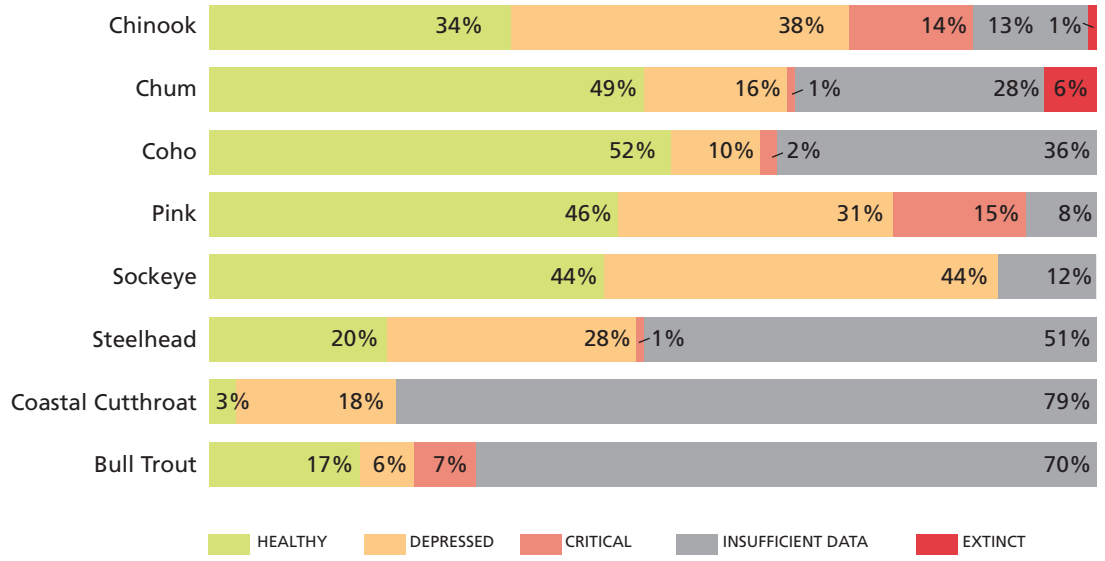
FISH

STATUS SUMMARY

- 2010 status ratings are determined by the Washington Department of Fish and Wildlife and tribes.
- Includes listed and non-listed species.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

PERCENT OF STOCKS BY STATUS RATING



Are freshwater and estuarine habitats healthy and productive?

WATERSHED HEALTH

LAND USE AND LAND COVER[9]

- Developed land includes any land with a significant portion consisting of human-made structures. Impervious surfaces are mainly artificial structures that are covered by impermeable materials like pavement, rooftops, and soils compacted by urban development.
- Percentages are based on the total areas of the salmon recovery regions, including uplands, mountainous terrain, and other lands unlikely to be developed. Development and impervious surfaces typically are concentrated in lowlands (<1,000 feet elevation), and along coastlines and river valleys.
- Data are averages of western Washington salmon recovery regions only, from the Coastal Change and Analysis Program (CCAP).
- Data are averages of western Washington salmon recovery regions only.

DEVELOPED LAND (ACRES)	
PERCENTAGE INCREASE FROM 2001 TO 2006	PERCENTAGE OF TOTAL ACRES THAT ARE DEVELOPED (2006)
2.1%	4.9%

IMPERVIOUS SURFACE (ACRES)	
PERCENTAGE INCREASE FROM 2001 TO 2006	PERCENTAGE OF TOTAL ACRES THAT ARE IMPERVIOUS (2006)
0.4%	1.8%

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

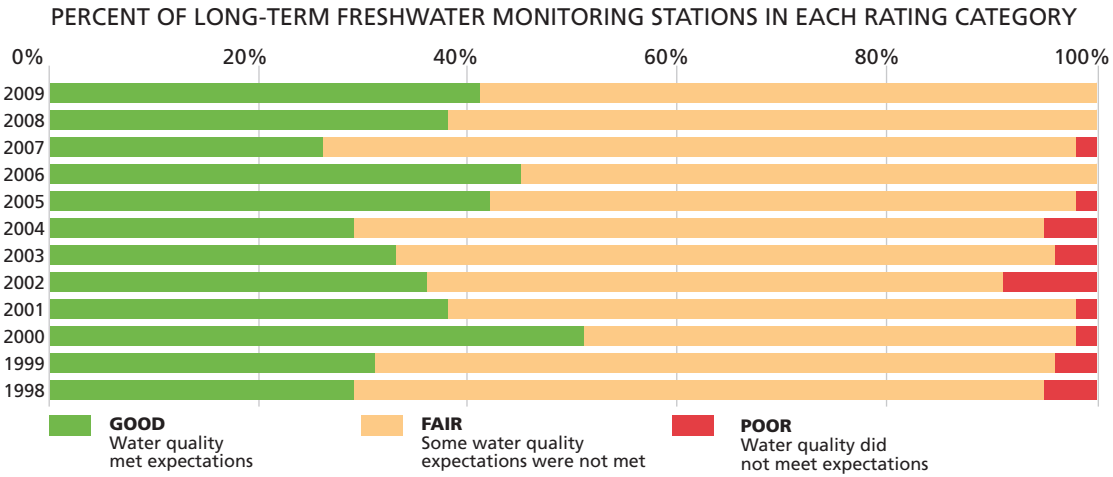
Is water clean enough to support wild salmon?

WATERSHED HEALTH

WATER QUALITY

- Water quality is measured by a Water Quality Index. This is a number that aggregates water quality data at a monitoring station for temperature, acidity, fecal coliform bacteria, dissolved oxygen, nutrients, and sediments from October 1 until September 30.
- 55 sampling stations are monitored statewide in 39 watersheds.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY



What are trends in salmon funding?

PLAN IMPLEMENTATION

FUNDING

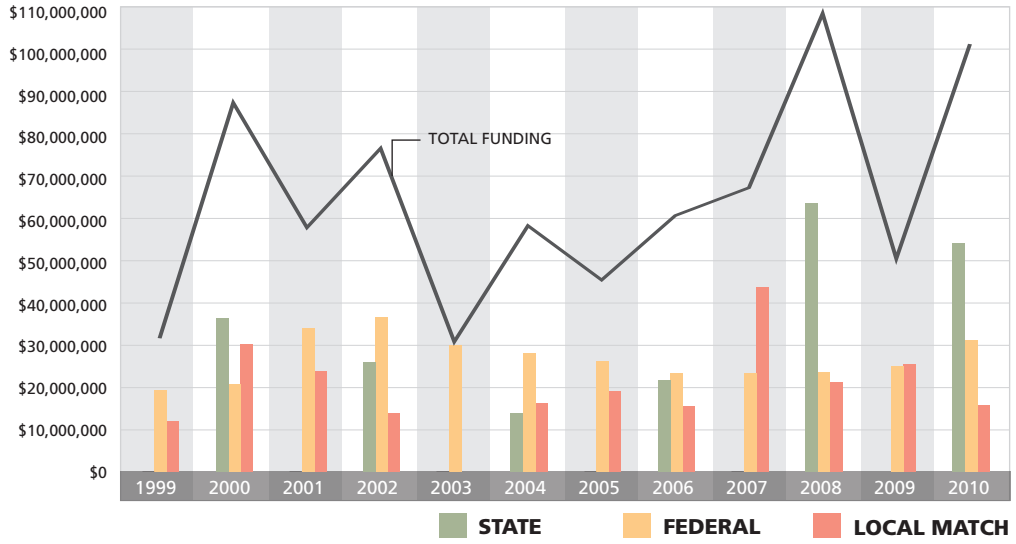
- Total Salmon Recovery Funding Board-related funding was $788 million in state, federal, and local match from 1999-2010. 2010 data are preliminary.
- Charts to the right reflect all money administered by the Salmon Recovery Funding Board through the Pacific Coastal Salmon Recovery Fund, salmon recovery fund (state match), Puget Sound Acquisition and Restoration fund, Family Forest and Fish Passage Program, Estuary and Salmon Restoration Program, Pacific States Marine Fisheries Commission, federal Puget Sound Chinook critical stock program, and hatchery reform. Salmon recovery fund (state match) dollars reflect biennial time frames, unlike the regional overviews in this report that reflect annual time frames.
- The table of percentages below reflects funding from the Pacific Coastal Salmon Recovery Fund and salmon recovery fund (state match) only – the two primary funding sources for grants through the Salmon Recovery Funding Board. The large statewide monitoring projects funded by the board are reflected in the statewide funding overview, not in individual regional overviews.

DATA SOURCE: WASHINGTON RECREATION AND CONSERVATION OFFICE

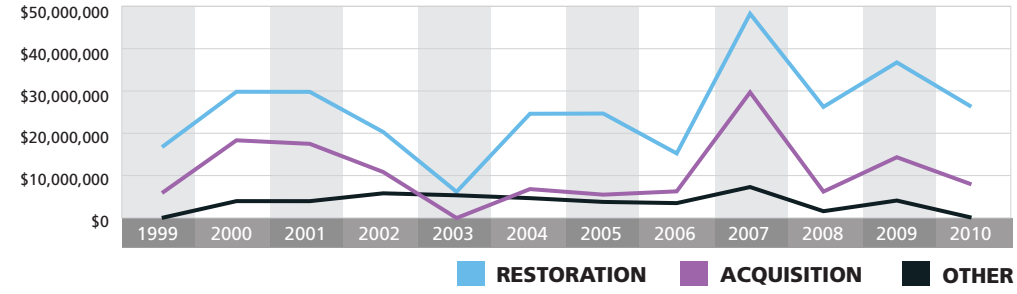
DISTRIBUTION OF PACIFIC COASTAL SALMON RECOVERY FUND AND SALMON RECOVERY FUND (STATE MATCH) BY CATEGORY[10]

	PROJECTS	ADMIN.	MONITORING	TOTAL
1999	75%	22%	4%	$30,930,649
2000	100%	0%	0%	$52,295,814
2001	98%	0%	2%	$42,849,411
2002	83%	15%	3%	$44,214,530
2003	34%	44%	25%	$16,920,294
2004	98%	1%	0%	$33,071,654
2005	84%	12%	4%	$34,782,436
2006	89%	2%	5%	$24,706,767
2007	82%	12%	5%	$48,580,395
2008	90%	6%	1%	$28,339,217
2009	75%	20%	2%	$36,100,513
2010	97%	1%	1%	$27,011,066

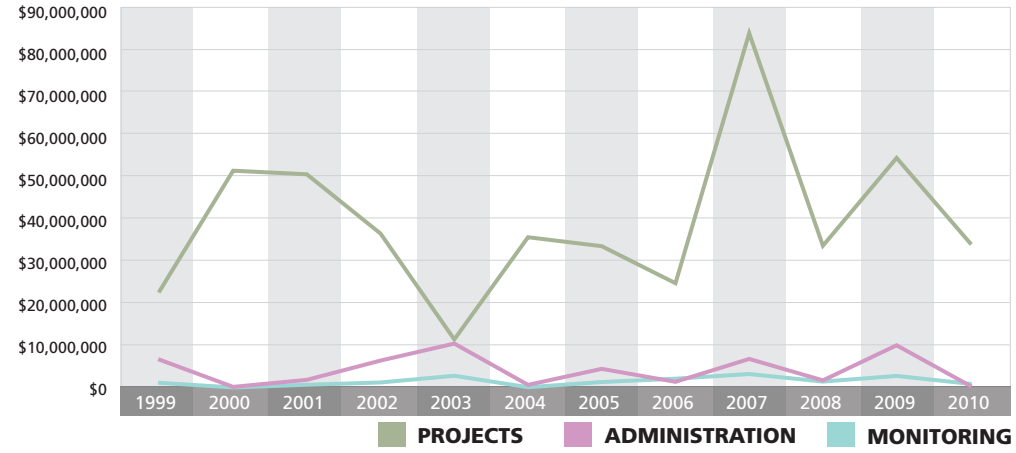
TOTAL FUNDING BY SOURCE *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



TOTAL FUNDING BY PROJECT TYPE *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



TOTAL FUNDING BY CATEGORY *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*

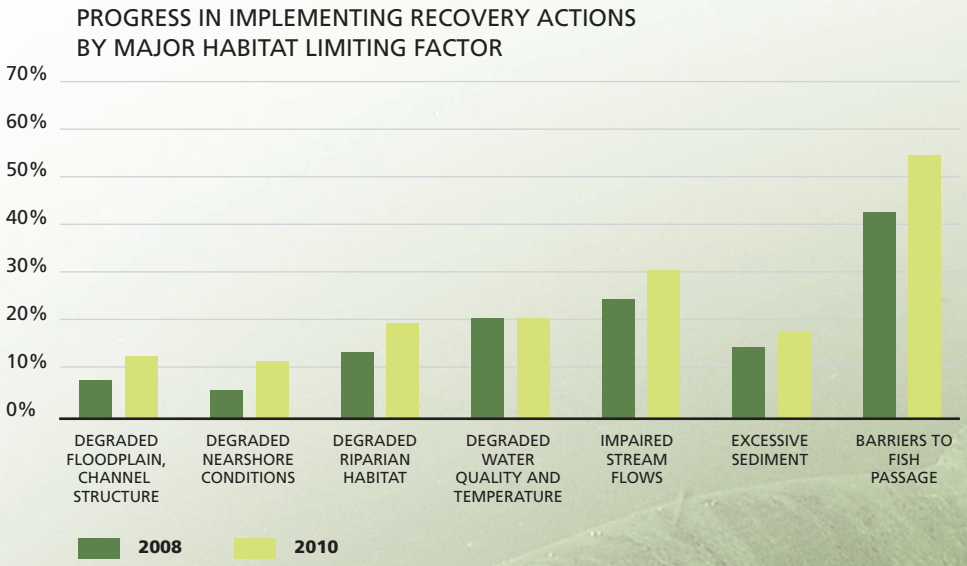


PLAN IMPLEMENTATION

RECOVERY PLAN IMPLEMENTATION[11]

- Percentages are statewide averages of progress toward implementing actions addressing each major habitat limiting factor. They do not reflect the biological response of fish.
- Major limiting factors are identified in recovery plans, and are based on federal listing determinations. These are the main habitat factors that must be addressed for recovery.
- Only Evolutionarily Significant Units with recovery plans are addressed in this figure.
- Estimates of progress are based on best professional judgement.
- Recovery plan implementation is relatively recent—from 4 to 6 years.

DATA SOURCE: REGIONAL SALMON RECOVERY ORGANIZATIONS



PAUL VECSEI

Puget Sound Salmon Recovery Region

At 16,000 square miles, the Puget Sound Basin, between the Cascade and Olympic Mountains in Northwest Washington, is the second largest estuary in the United States. Twenty percent of the area is land, with a diversity of farms, forests, parks, small towns, and busy cities. The remainder is freshwater, estuarine, and marine waters; more than 20 major river systems and their tributary creeks drain mountain elevations of 7,000 feet or more and drop to sea level within 50 to 70 miles. Puget Sound is home to two-thirds of the state's people.

In 2007, the Puget Sound Partnership became a state agency responsible for recovery of salmon and restoration of the Puget Sound ecosystem. In 2008, the partnership completed an action agenda for the restoration of the ecosystem, and in 2009, produced its first biennial "State of the Sound" report. There are 15 lead entities in the region.

JIM MAYFIELD, OLYMPIA

IVERSONIC - FLICKR

Listed Fish

Chinook (threatened) – 1999

Steelhead (threatened) – 2007

Bull trout (threatened) – 1999

Major Factors Limiting Recovery

- Degraded floodplain and channel structure
- Degraded nearshore, marine, and estuarine conditions
- Riparian degradation and loss of in-river woody material
- Degraded water quality and temperature
- Excessive sediment
- Impaired stream flows
- Barriers to fish passage

Recovery Plan Snapshot

- Plan Status – Chinook recovery plan: adopted by the National Oceanic and Atmospheric Administration Fisheries Service in 2006. Steelhead recovery plan: underway. Federal draft bull trout recovery plan: status review underway.
- Time frame – 50 years
- Estimated cost – $1.42 billion for first 10 years[12]

Recovery Plan Implementation

Three-year implementation schedule identifies $240 million in habitat project needs.

Regional Recovery Organization

Puget Sound Partnership

Federally Recognized Tribes

Lummi Nation, Nooksack Indian Tribe, Stillaguamish Tribe of Indians, Jamestown S'Klallam Tribe, Muckleshoot Tribe, Nisqually Indian Tribe, Port Gamble Klallam Tribe, Lower Elwha Klallam Tribe, Puyallup Tribe of Indians, Samish Indian Nation, Sauk-Suiattle Indian Tribe, Skokomish Tribe, Squaxin Island Tribe, Suquamish Tribe, Swinomish Tribe, Tulalip Tribes, Upper Skagit Indian Tribe, Snoqualmie Tribes

Counties

All or parts of Whatcom, Skagit, Island, San Juan, Snohomish, King, Pierce, Thurston, Mason, Kitsap, Jefferson, and Clallam

Threats to Salmon Recovery

Salmon recovery in Puget Sound is particularly vulnerable to threats associated with a growing human population such as urban development, land conversion, and climate change. Fish passage, water and habitat availability, water temperature, and food sources for salmon and steelhead are affected by the following:

Climate Change will increase stream temperatures, change flow patterns and ocean conditions, and change landscape habitat forming processes and habitat conditions.

Human Population Growth and Development will increase pressure for more water withdrawals and diversion; increase demand for more roads and residential, commercial, and industrial development; and challenge the adequacy, implementation, and enforcement of land use regulations.

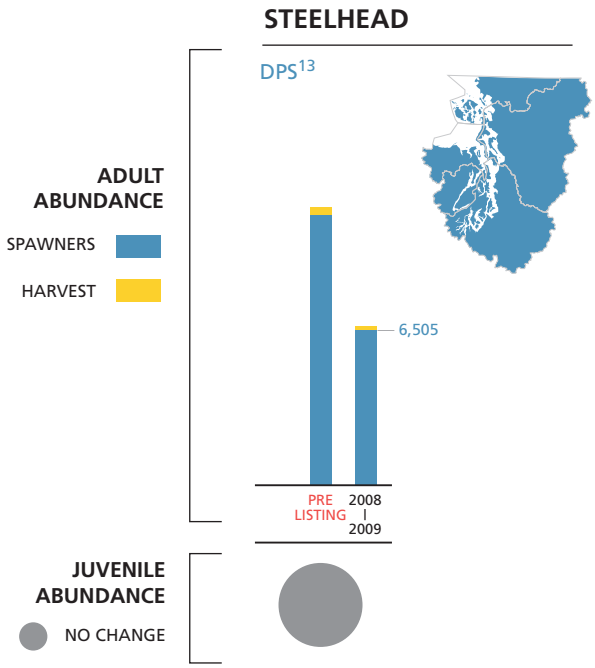
Uncertain Long-Term Funding for implementation of recovery actions (federal, state, and other sources) will challenge our ability to stay the course.

Are listed populations abundant and productive?

FISH:
ABUNDANCE TRENDS

- Graphs show wild adult and juvenile abundance data for species at the Evolutionarily Significant Unit (ESU), Distinct Population Segment (DPS), and Major Population Group (MPG) scales. ESUs and DPSs are the scale at which species are listed and de-listed under the federal Endangered Species Act.
- Bar charts show the number of returning adult wild fish, separated by what was harvested and what returned to spawn.
- Pie charts show the percentage of juvenile sampling locations where trends have increased, decreased, or not changed. Juvenile data generally are not available for all populations of each species. Trends in juvenile Chinook abundance were available for nine populations in four of the five MPGs. No data was available for the North Sound MPG. Trends in juvenile steelhead were available for five stocks (MPGs not yet identified).

DATA SOURCES: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE AND TRIBES

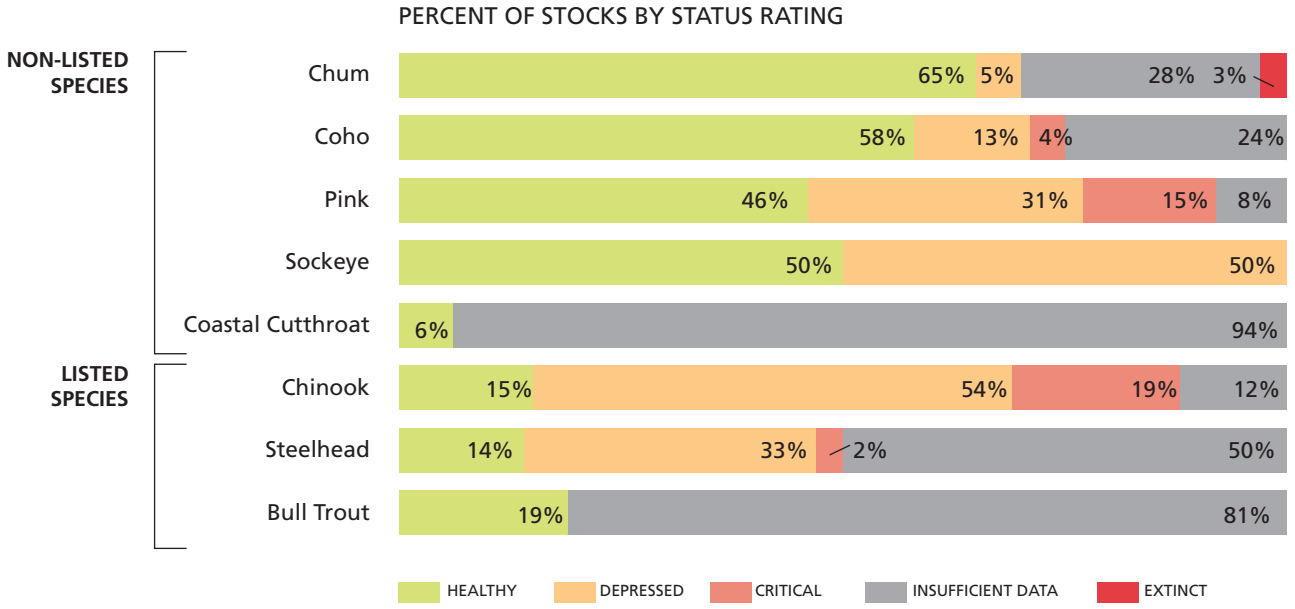


Are listed populations abundant and productive?

FISH:
STATUS SUMMARY

- 2010 status ratings are determined by the Washington Department of Fish and Wildlife and tribes.
- Includes listed and non-listed species.

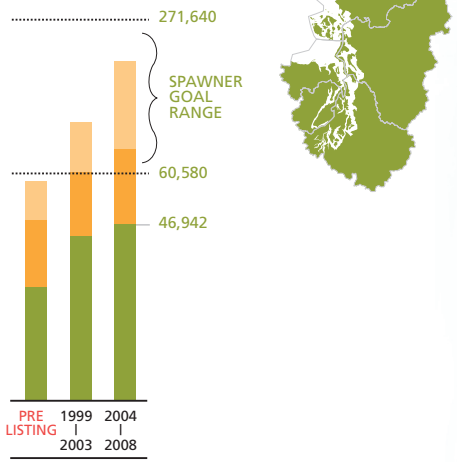
DATA SOURCE:
WASHINGTON DEPARTMENT OF FISH AND WILDLIFE



IVERSONIC - FLICKR

CHINOOK

ESU[14]



ADULT ABUNDANCE

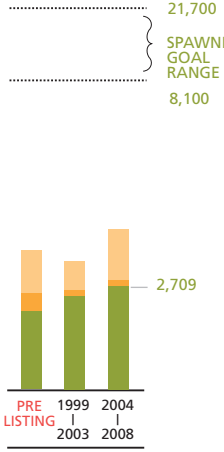
- SPAWNERS
- WASHINGTON HARVEST
- B.C./ALASKA HARVEST

JUVENILE ABUNDANCE

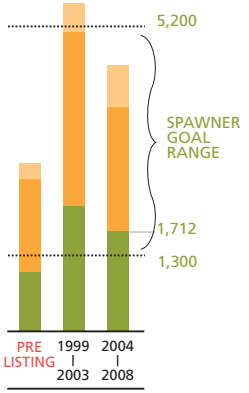
- NO CHANGE
- DECREASING

CHINOOK

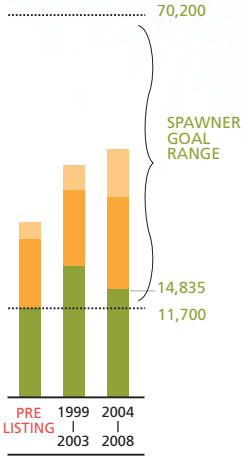
Strait of Juan De Fuca MPG



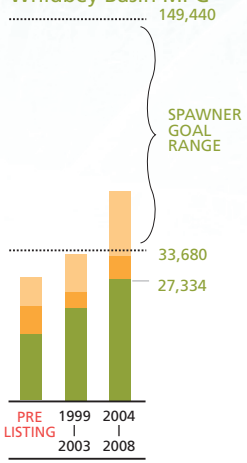
Hood Canal MPG



Central/South MPG



Whidbey Basin MPG



North Sound MPG

ADULT ABUNDANCE

- SPAWNERS
- WASHINGTON HARVEST
- B.C./ALASKA HARVEST

WATERSHED HEALTH:

LAND USE AND LAND COVER

- Developed land includes any land with a significant portion consisting of human-made structures. Impervious surfaces mainly are artificial structures that are covered by impermeable materials like pavement, rooftops, and soils compacted by urban development.
- Percentages are based on the total area of Puget Sound, including uplands, mountains, and other lands unlikely to be developed. Development and impervious surfaces typically are concentrated in lowlands (<1000 feet elevation), and along coastlines and river valleys.
- Data are from the Coastal Change and Analysis Program (CCAP).

DEVELOPED LAND (ACRES)	
PERCENTAGE INCREASE FROM 2001 TO 2006	PERCENTAGE OF TOTAL ACRES THAT ARE DEVELOPED (2006)
2.8%	9.9%

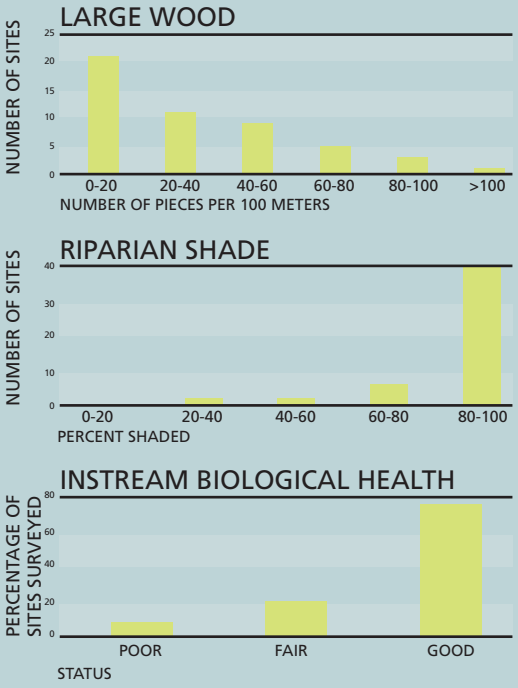
IMPERVIOUS SURFACE (ACRES)	
PERCENTAGE INCREASE FROM 2001 TO 2006	PERCENTAGE OF TOTAL ACRES THAT ARE IMPERVIOUS (2006)
0.6%	3.7%

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

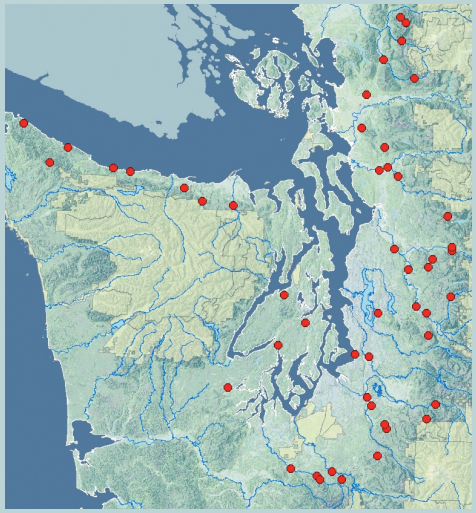
New Habitat Data is on the Way

The statewide effort to collect status and trend information on watershed condition at the regional scale began with field sampling in Puget Sound and Hood Canal in 2009. Habitat data were collected at 50 stream sites across the area, consistent with the watershed health indicators and protocols adopted by the Forum on Monitoring Salmon Recovery and Watershed Health. Sampling in Washington's other salmon recovery regions is underway. Results of that work will be included in future "State of Salmon in Watersheds" reports.

The charts to the right depict preliminary data for three Forum watershed health indicators — riparian shade, large wood, and in-stream biological health. We include them here as examples of the indicator data now being collected and analyzed. It is difficult to interpret data on individual indicators. We expect that individual watershed health indicators like these will be combined into a single, high level regional index of watershed health or habitat condition for future reports. As subsequent data are collected, it will be possible to show changes over time. Finally, to the extent it is collected on the same indicators with compatible protocols, future reports may include complementary information collected by partners at local or watershed scales.



DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY



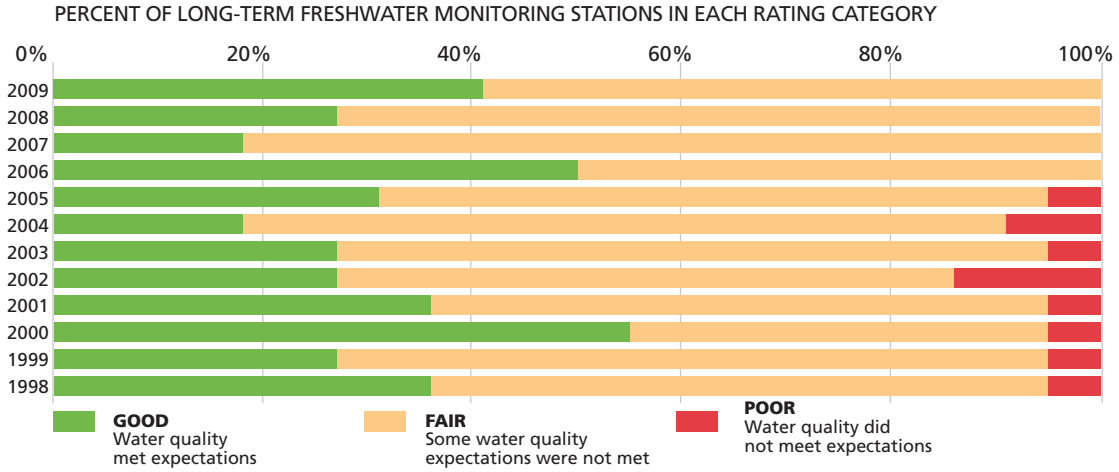
LOCATIONS SAMPLED IN 2009[15]

Is water clean enough to support wild salmon?

WATERSHED HEALTH:
WATER QUALITY

- Water quality is measured by a Water Quality Index. This is a number that aggregates water quality data at a monitoring station for temperature, acidity, fecal coliform bacteria, dissolved oxygen, nutrients, and sediments from October 1 to September 30.
- 22 sampling stations are reflected in the index.
- There are approximately 290 sites requiring management for high water temperatures.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY

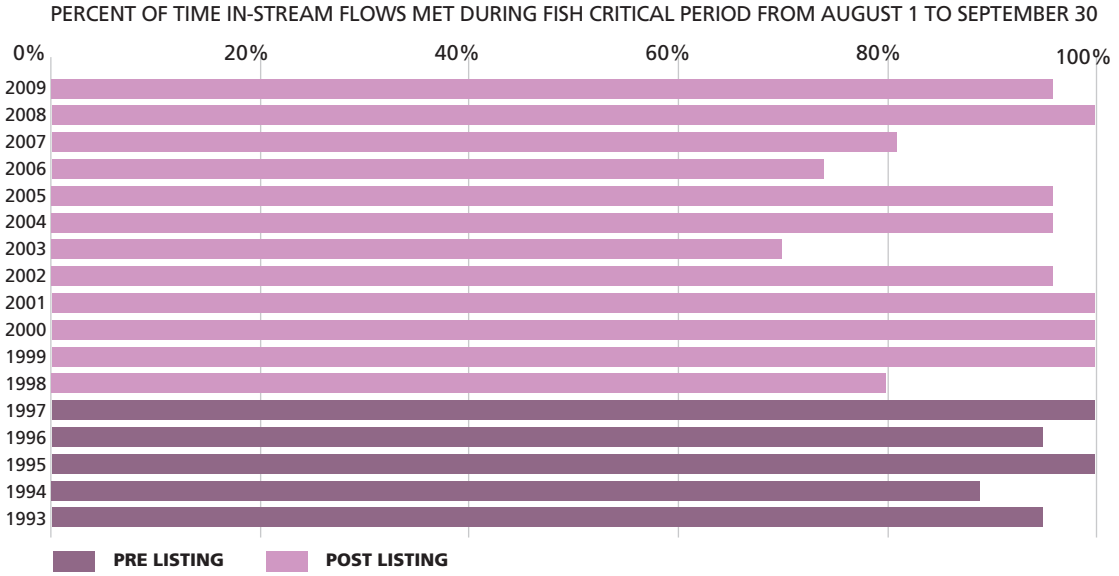


Do rivers and streams have flows that support wild salmon?

WATERSHED HEALTH:
WATER QUANTITY

- Most years based on 27 monitoring stations.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY



What are trends in salmon funding?

PLAN IMPLEMENTATION:
FUNDING

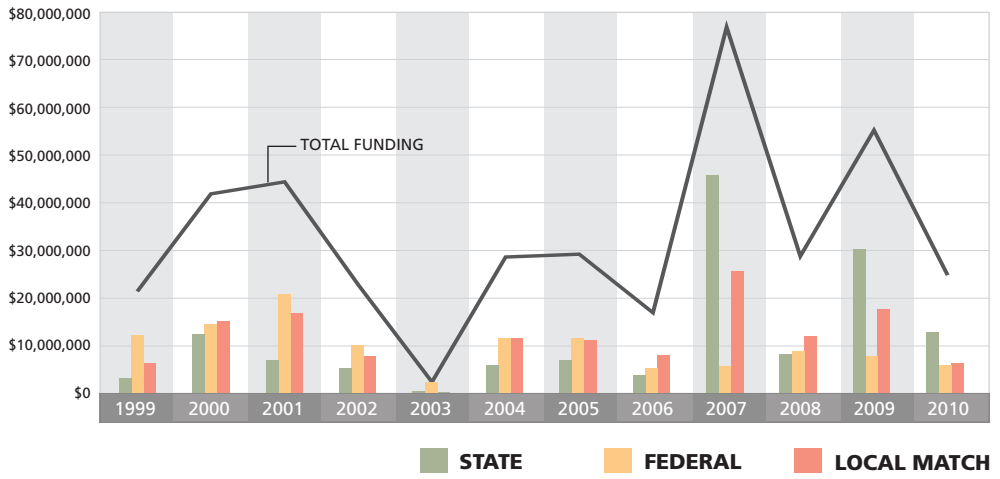
- Total Salmon Funding Recovery Board-related funding was $394 million in state and federal, and local match from 1999-2010. 2010 data are preliminary.
- Charts to the right reflect all money administered by the Salmon Recovery Funding Board through the Pacific Coastal Salmon Recovery Fund, salmon recovery fund (state match), Puget Sound Acquisition and Restoration fund, Family Forest and Fish Passage Program, Estuary and Salmon Restoration Program, federal Puget Sound Chinook critical stock program, and hatchery reform.
- The table of percentages below reflects funding from the Pacific Coastal Salmon Recovery Fund and salmon recovery fund (state match) only – the two primary funding sources for grants through the Salmon Recovery Funding Board. The large statewide monitoring projects funded by the board are reflected in the statewide funding overview, not in individual regional overviews.

DATA SOURCE: WASHINGTON RECREATION AND CONSERVATION OFFICE

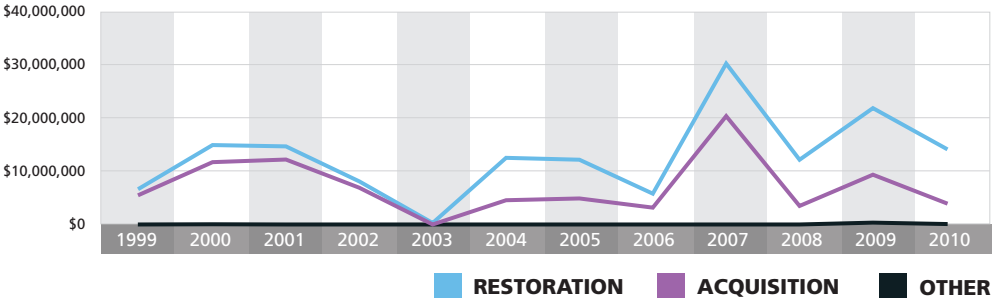
DISTRIBUTION OF PACIFIC COASTAL SALMON RECOVERY FUND AND SALMON RECOVERY FUND (STATE MATCH) BY CATEGORY

	PROJECTS	ADMIN.	MONITORING	TOTAL
1999	81%	19%	0%	$15,215,876
2000	100%	0%	0%	$26,807,276
2001	98%	0%	2%	$27,182,640
2002	0%	0%	0%	$15,027,071
2003	0%	0%	0%	$2,275,664
2004	99%	1%	0%	$16,426,922
2005	93%	7%	0%	$16,391,119
2006	100%	0%	0%	$7,516,897
2007	96%	4%	0%	$14,503,610
2008	91%	9%	0%	$9,989,747
2009	67%	30%	3%	$11,684,161
2010	99%	0%	1%	$11,310,413

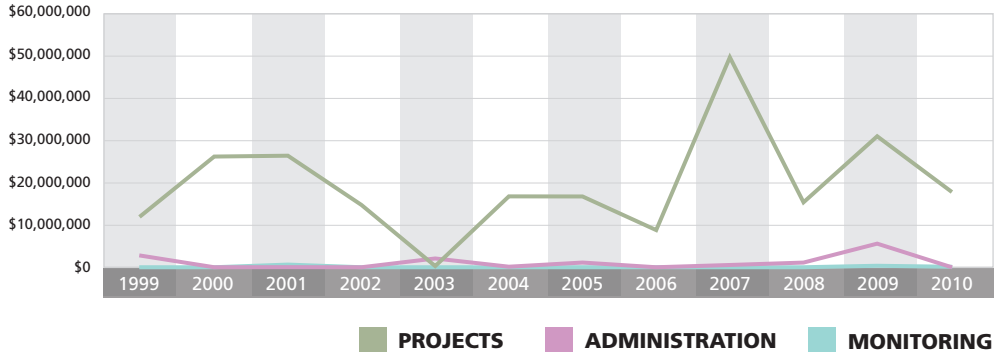
TOTAL FUNDING BY SOURCE *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



TOTAL FUNDING BY PROJECT TYPE *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



TOTAL FUNDING BY CATEGORY *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



Are public resources used cost-effectively and efficiently?

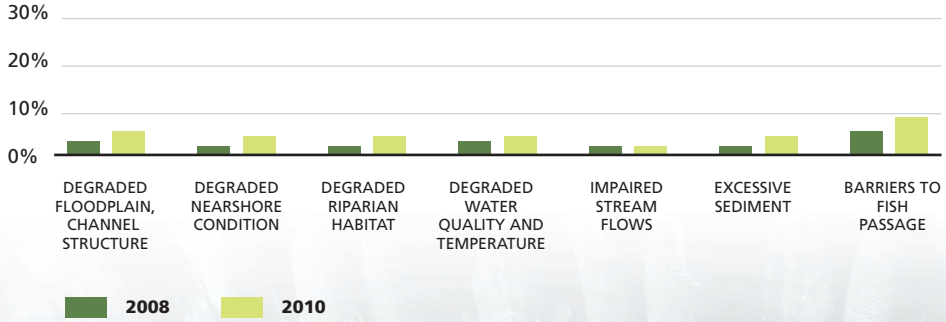
PLAN IMPLEMENTATION:

RECOVERY PLAN IMPLEMENTATION

- Major limiting factors are identified in recovery plans, and are based on federal listing determinations. These are the main habitat factors that must be addressed for recovery.
- Percentages are averages of progress toward implementing actions addressing each major habitat limiting factor. They do not reflect the biological response of fish.
- Estimates of progress are based on best professional judgement.
- Recovery plan implementation is relatively recent—from 4 to 6 years.

DATA SOURCE: PUGET SOUND PARTNERSHIP

PROGRESS IN IMPLEMENTING RECOVERY ACTIONS
BY MAJOR HABITAT LIMITING FACTOR



SOGGY DAN - FLICKR

PLAN IMPLEMENTATION:

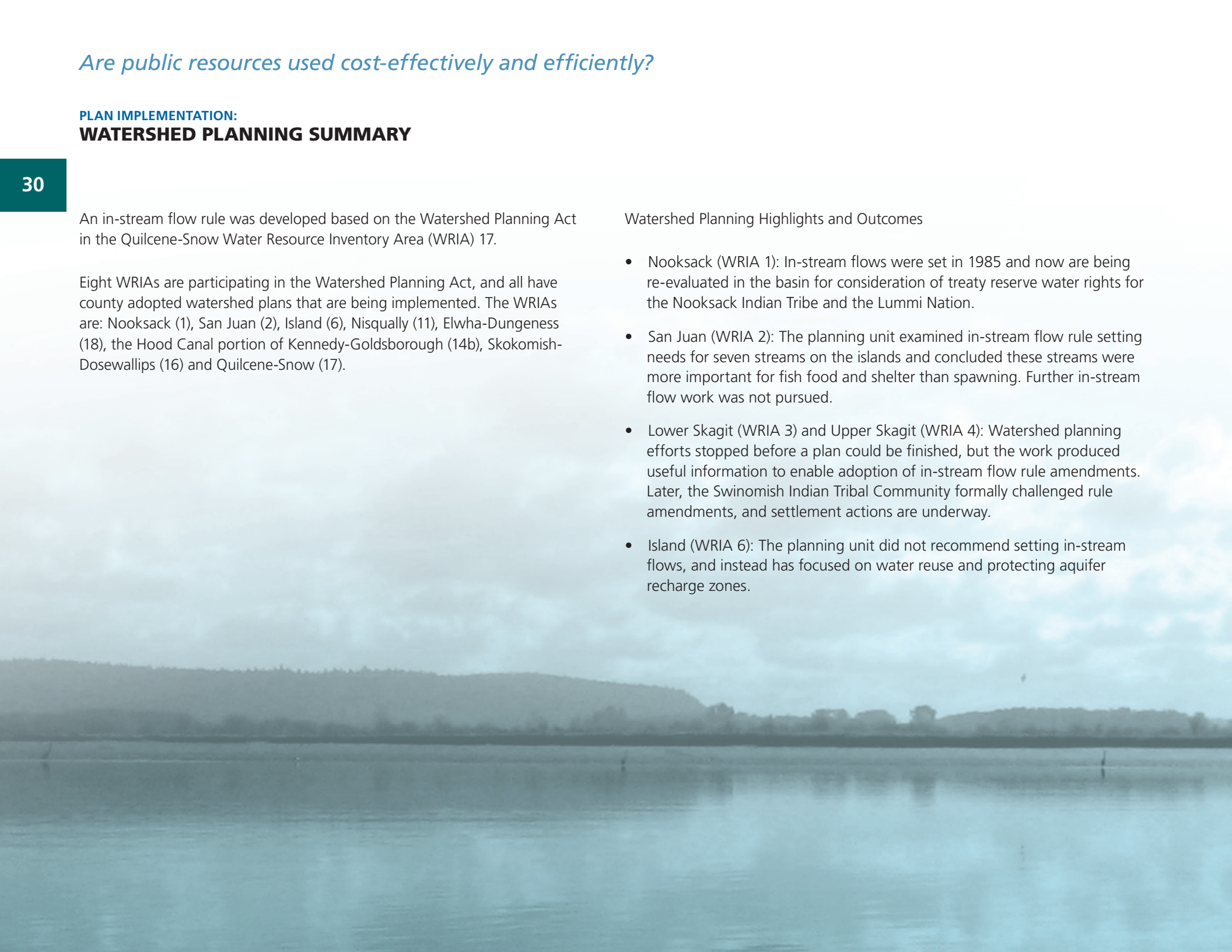
WATERSHED PLANNING SUMMARY

An in-stream flow rule was developed based on the Watershed Planning Act in the Quilcene-Snow Water Resource Inventory Area (WRIA) 17.

Eight WRIAs are participating in the Watershed Planning Act, and all have county adopted watershed plans that are being implemented. The WRIAs are: Nooksack (1), San Juan (2), Island (6), Nisqually (11), Elwha-Dungeness (18), the Hood Canal portion of Kennedy-Goldsborough (14b), Skokomish-Dosewallips (16) and Quilcene-Snow (17).

Watershed Planning Highlights and Outcomes

- Nooksack (WRIA 1): In-stream flows were set in 1985 and now are being re-evaluated in the basin for consideration of treaty reserve water rights for the Nooksack Indian Tribe and the Lummi Nation.
- San Juan (WRIA 2): The planning unit examined in-stream flow rule setting needs for seven streams on the islands and concluded these streams were more important for fish food and shelter than spawning. Further in-stream flow work was not pursued.
- Lower Skagit (WRIA 3) and Upper Skagit (WRIA 4): Watershed planning efforts stopped before a plan could be finished, but the work produced useful information to enable adoption of in-stream flow rule amendments. Later, the Swinomish Indian Tribal Community formally challenged rule amendments, and settlement actions are underway.
- Island (WRIA 6): The planning unit did not recommend setting in-stream flows, and instead has focused on water reuse and protecting aquifer recharge zones.

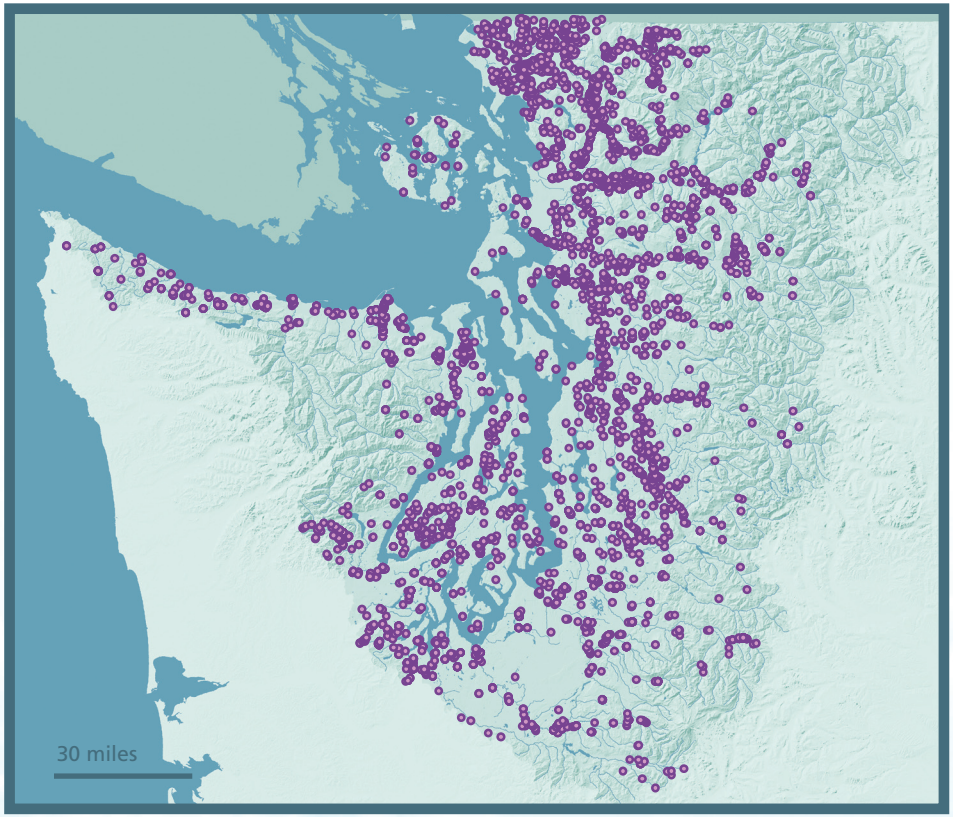


PLAN IMPLEMENTATION:

FISH PASSAGE AND HABITAT PROJECTS

- Map shows fish and habitat protection and restoration project locations from 2000 to 2010.

DATA SOURCES: WASHINGTON RECREATION AND CONSERVATION OFFICE, WASHINGTON DEPARTMENT OF FISH AND WILDLIFE, WASHINGTON DEPARTMENT OF NATURAL RESOURCES, NORTHWEST INDIAN FISHERIES COMMISSION, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, NORTHWEST FISHERIES SCIENCE CENTER, U.S. FOREST SERVICE, REGIONAL FISHERIES ENHANCEMENT GROUPS



Fish Passage and Habitat Projects

BRIAN AURICH - FLICKR

Are hydroelectric facilities operating in a fish friendly manner?

PLAN IMPLEMENTATION:

DAMS WITH FISH PASSAGE STANDARDS

- Performance standards for passage vary by dam and may be set by a Federal Energy Regulatory Commission license, a Corps of Engineers 401 water quality certification, or a Habitat Conservation Program.
- Two dams that do not provide passage are scheduled for removal (Elwha and Glines Canyon).
- Dams recently may have received new federal licenses with fish passage improvements to meet new standards, for which passage success is not yet determined.
- Many dams are operating in non-anadromous fish zones and are not included in this indicator.

	NO STANDARDS			HAVE STANDARDS			
	DON'T HAVE STANDARDS	STANDARDS UNDER NEGOTIATION	TOTAL	NOT MEETING STANDARDS	MEETING STANDARDS	CAN'T TELL IF MEETING STANDARDS	TOTAL
2008	6	2	**8**	N/A	N/A	N/A	**0**
2010	6	1	**7**	0	0	2	**2**

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

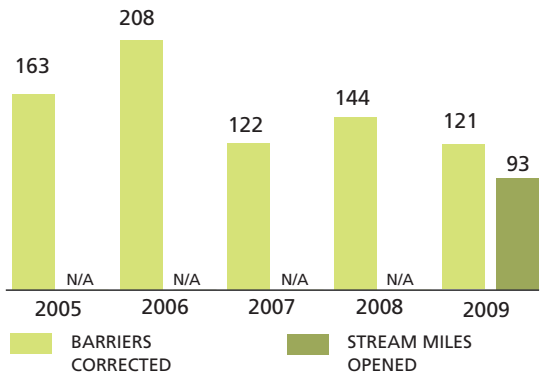
Are streams accessible to wild salmon?

PLAN IMPLEMENTATION:

FISH PASSAGE BARRIERS

- Number of barriers corrected are estimates. Because of incomplete reporting, these numbers are expected to be lower than actual values.
- Stream miles opened reflects the number of miles estimated to be opened to fish passage by year.

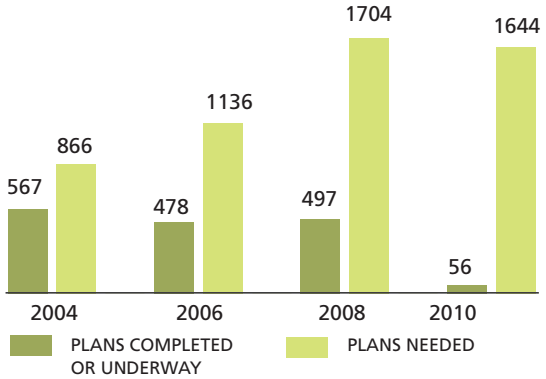
DATA SOURCES: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE, WASHINGTON DEPARTMENT OF NATURAL RESOURCES, WASHINGTON DEPARTMENT OF TRANSPORTATION, WASHINGTON RECREATION AND CONSERVATION OFFICE, FORESTS AND FISH, U.S. FOREST SERVICE, BUREAU OF LAND MANAGEMENT



Is water clean enough to support wild salmon?

PLAN IMPLEMENTATION:

WATERSHED CLEANUP PLANS



- Cleanup plans address water quality impairments covered by total maximum daily load management plans.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY

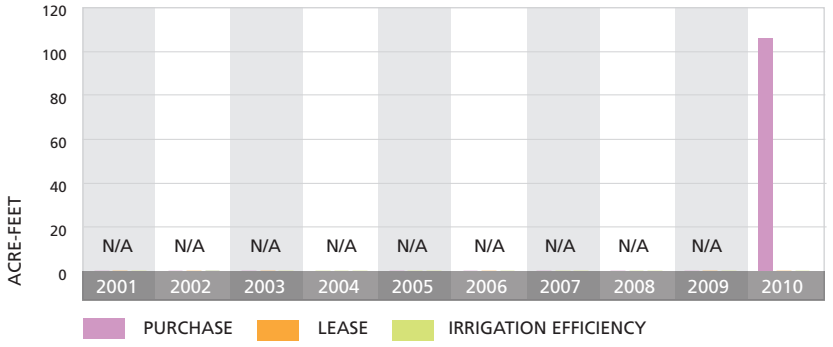
Do rivers and streams have flows that support wild salmon?

PLAN IMPLEMENTATION:

STREAMFLOW

- Water restored to streams includes water from purchases, donations, or leases. The focus is on summer low flow periods and in-stream reaches where water availability is a limiting factor for fish.
- An acre-foot is one foot of water covering one acre of land.
- 74 percent (14 of 19) of the WRIAs in the region have in-stream flows set.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY



Do hatchery practices protect wild salmon?

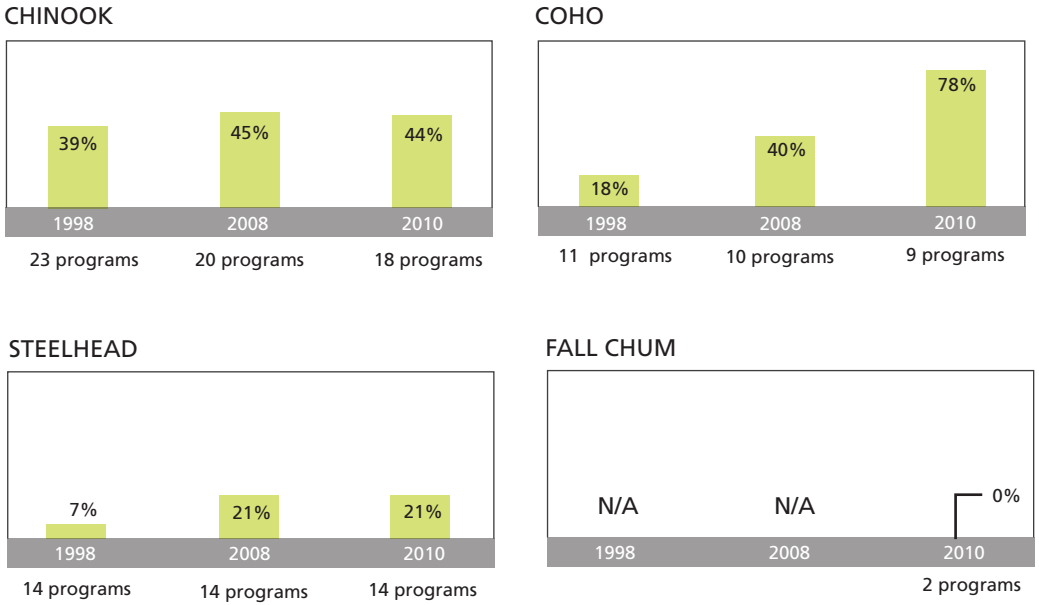
PLAN IMPLEMENTATION:

HATCHERY PROGRAMS MEETING SCIENTIFIC STANDARDS[16]

- Standards are recommendations from the Hatchery Scientific Review Group, an independent scientific panel established and funded by Congress to assemble, organize, and apply the best available scientific information for hatchery reform.
- Programs are defined as a single release or group of smolt releases, that come from the same broodstock and are released in the same watershed. Releases from a broodstock into a different watershed, are considered to be independent hatchery programs.
- Data are for Washington Department of Fish and Wildlife hatchery programs.

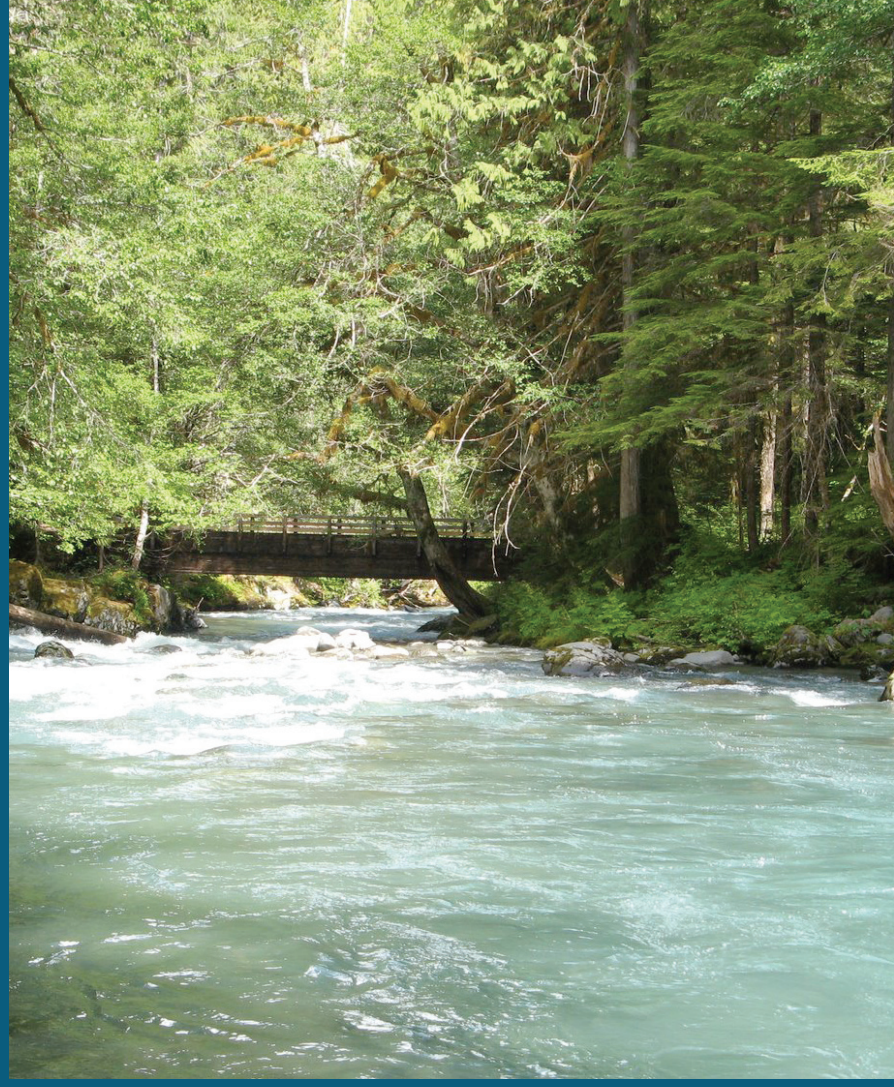
DATA SOURCE:
WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

PERCENTAGE OF HATCHERY PROGRAMS MEETING STANDARDS



Hood Canal Salmon Recovery Region

The Hood Canal recovery area for summer chum salmon includes Hood Canal and the eastern Strait of Juan de Fuca. Hood Canal is a natural, glacier-carved fjord more than 60 miles long, which forms the westernmost waterway and margin of the Puget Sound basin. Estuaries and lower river habitats are primary considerations in recovery of salmon. There are two lead entities in the region, one of which is the regional recovery organization for summer chum salmon.



DAVID ON PICASA

CHRIS - PICASA

Listed Fish

Hood Canal summer chum (threatened) – 1999

Chinook (threatened) – 1999

Steelhead (threatened) – 2007

Bull trout (threatened) – 1999

Major Factors Limiting Recovery

- Degraded floodplain and channel structure
- Degraded nearshore, marine, and estuarine conditions
- Riparian degradation and loss of in-river woody material
- Degraded water quality and temperature
- Excessive sediment
- Impaired stream flows

Recovery Plan Snapshot

- Plan status – Summer chum recovery plan: adopted by the National Oceanic and Atmospheric Administration Fisheries Service in 2007. Chinook and steelhead plans: see Puget Sound region. Federal draft bull trout recovery plan: status review underway.
- Time frame – 10 years
- Estimated cost – $252 million

Recovery Plan Implementation

Current three-year implementation schedule identifies $84 million in habitat project needs.

Regional Recovery Organization

Hood Canal Coordinating Council (summer chum)

Federally Recognized Tribes

Skokomish Tribe, Port Gamble S'Klallam Tribe, Jamestown S'Klallam Tribe, Lower Elwha Klallam Tribe, Suquamish Tribe

Counties

Parts of Mason, Kitsap, Jefferson, and Clallam

Threats to Salmon Recovery

Salmon recovery in the Hood Canal region is vulnerable to threats associated with a growing human population, development, and effects of climate change. In addition, the marine ecosystem in Hood Canal is affected by extreme events of low dissolved oxygen and nutrient loading. Habitat availability and necessary conditions for fish spawning, rearing, egg incubation, fry emergence, and fish survival are threatened by:

Climate Change will increase stream temperatures, change flow patterns, lead to a rise in sea-level, change landscape habitat forming processes and habitat conditions, and increase flooding.

Human Population Growth and Development will be focused along the Kitsap peninsula and the eastern Strait of Juan de Fuca.

Ecological Interactions will increase occurrence of invasive knotweed that will degrade riparian conditions.

Uncertain Long-Term Funding for implementation of recovery actions (federal, state, and other sources) will challenge our ability to stay the course.

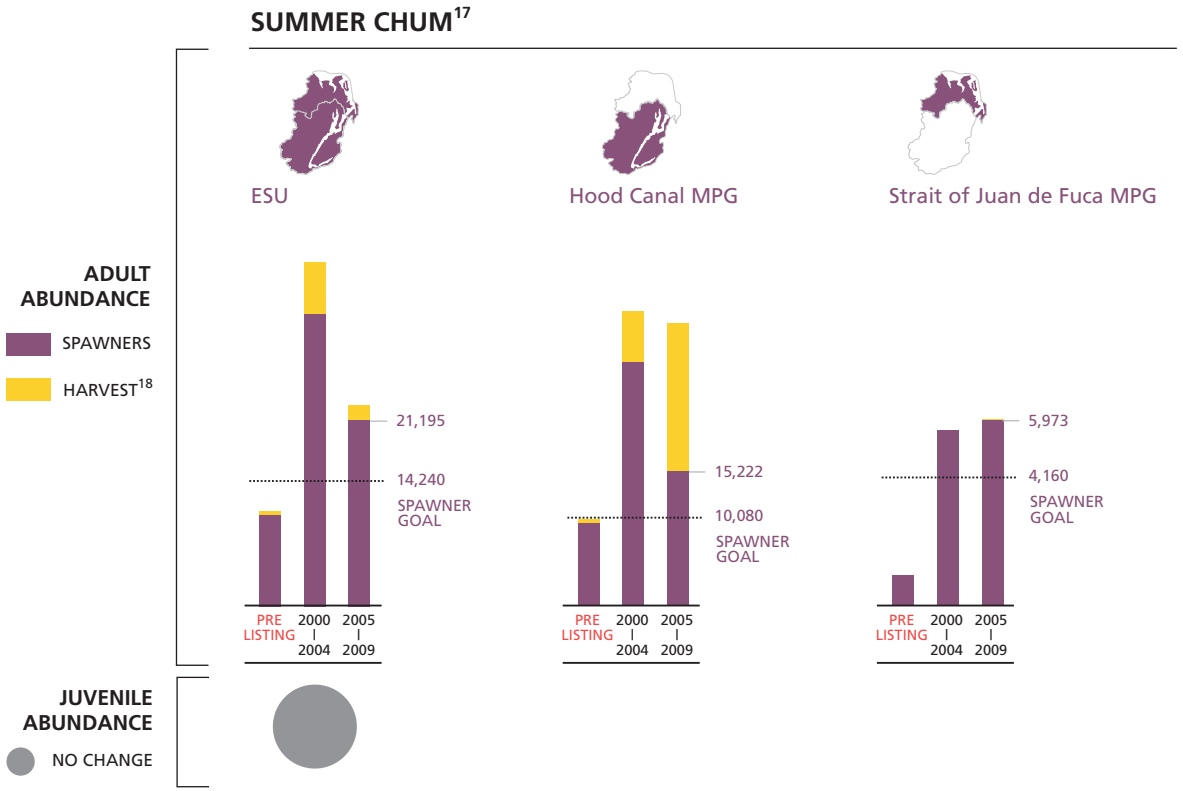
Low Dissolved Oxygen may, due to nutrient loading, lead to extreme hypoxia.

FISH:

ABUNDANCE TRENDS

- Graphs show wild adult and juvenile abundance data for species at the Evolutionarily Significant Unit (ESU), Distinct Population Segment (DPS), and Major Population Group (MPG) scales. ESUs are the scale at which species are listed and de-listed under the federal Endangered Species Act.
- Bar charts show the number of returning adult wild fish, separated by what was harvested and what returned to spawn.
- Pie charts show the percentage of juvenile sampling locations where trends have increased, decreased, or not changed. Juvenile data generally are not available for all populations of each species. Trends in juvenile data were available for one population in each MPG.

DATA SOURCES: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE AND TRIBES

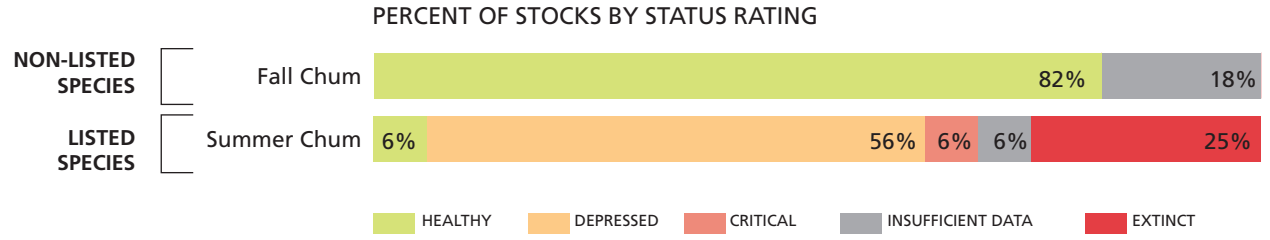


FISH:

STATUS SUMMARY

- 2010 status ratings are determined by the Washington Department of Fish and Wildlife and tribes.
- Includes listed and non-listed species.
- Coho, Chinook, steelhead, pink, sockeye, fall chum, coastal cutthroat, and bull trout status can be found in the Puget Sound Salmon Recovery Region section.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE



Are freshwater and estuarine habitats healthy and productive?

WATERSHED HEALTH:
LAND USE AND LAND COVER

- Developed land includes any land with a significant portion consisting of human-made structures. Impervious surfaces are mainly artificial structures that are covered by impermeable materials like pavement, rooftops, and soils compacted by urban development.
- Percentages are based on the total area of the Hood Canal Salmon Recovery Region, including uplands, mountains, and other lands unlikely to be developed. Development and impervious surfaces typically are concentrated in lowlands (<1000 feet elevation), and along coastlines and river valleys.
- Data are from the Coastal Change and Analysis Program (CCAP).

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

DEVELOPED LAND (ACRES)	
PERCENTAGE INCREASE FROM 2001 TO 2006	PERCENTAGE OF TOTAL ACRES THAT ARE DEVELOPED (2006)
2.6%	3.2%

IMPERVIOUS SURFACE (ACRES)	
PERCENTAGE INCREASE FROM 2001 TO 2006	PERCENTAGE OF TOTAL ACRES THAT ARE IMPERVIOUS (2006)
0.4%	1.1%

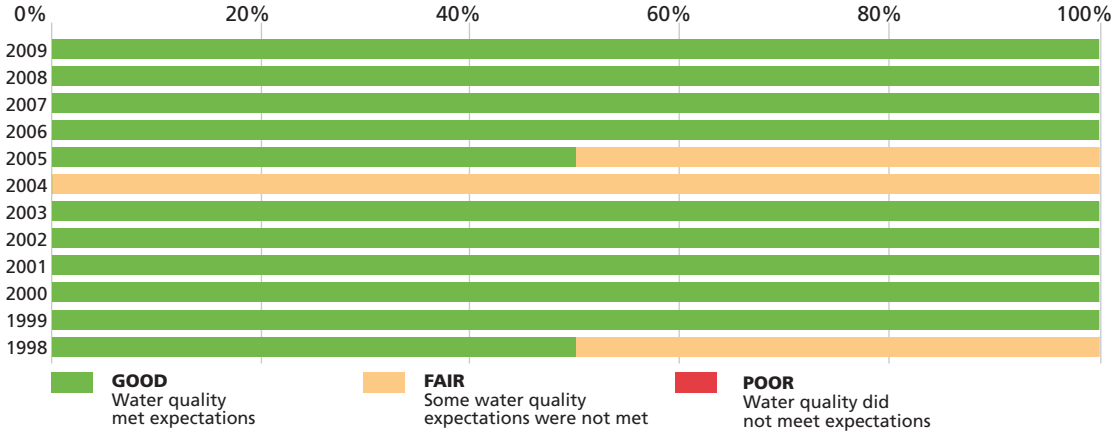
Is water clean enough to support wild salmon?

WATERSHED HEALTH:
WATER QUALITY

- Water quality is measured by a Water Quality Index. This is a number that aggregates water quality data at a monitoring station for temperature, acidity, fecal coliform bacteria, dissolved oxygen, nutrients, and sediments from October 1 to September 30.
- Only two sampling stations are reflected in the index.
- There are approximately 34 sites requiring management for high water temperatures.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY

PERCENT OF LONG-TERM FRESHWATER MONITORING STATIONS IN EACH RATING CATEGORY



What are trends in salmon funding?

PLAN IMPLEMENTATION:

FUNDING

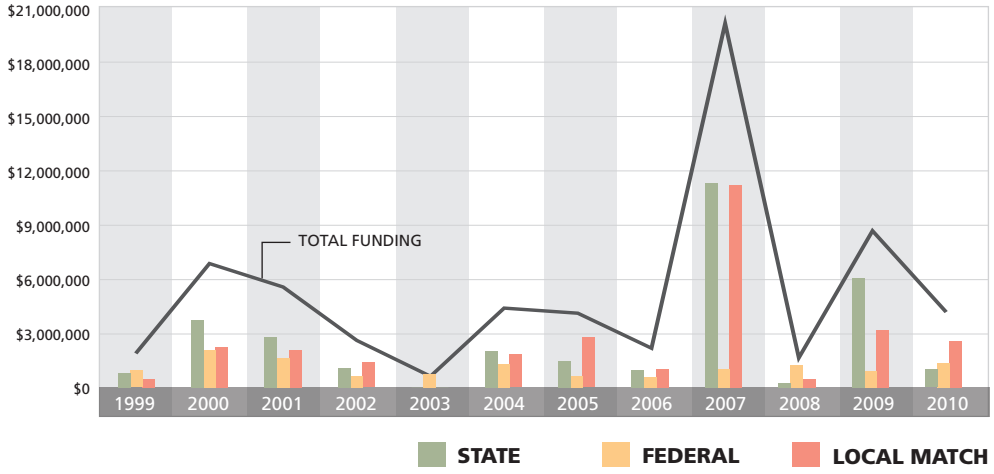
- Total Salmon Recovery Funding Board-related funding was $63 million in state and federal, and local match from 1999-2010. 2010 data are preliminary.
- Charts to the right reflect all money administered by the Salmon Recovery Funding Board through the Pacific Coastal Salmon Recovery Fund, salmon recovery fund (state match), Puget Sound Acquisition and Restoration fund, Family Forest and Fish Passage Program, Estuary and Salmon Restoration Program, federal Puget Sound Chinook critical stock program, and hatchery reform.
- The table of percentages below reflects funding from the Pacific Coastal Salmon Recovery Fund and salmon recovery fund (state match) only – the two primary funding sources for grants through the Salmon Recovery Funding Board. The large statewide monitoring projects funded by the board are reflected in the statewide funding overview, not in individual regional overviews.

DATA SOURCE: WASHINGTON RECREATION AND CONSERVATION OFFICE

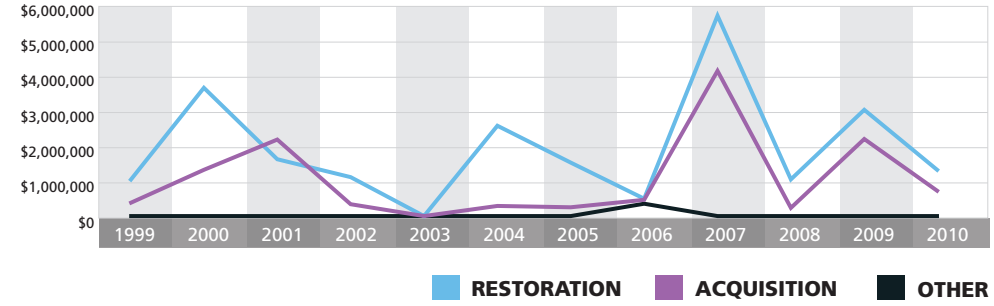
DISTRIBUTION OF PACIFIC COASTAL SALMON RECOVERY FUND AND SALMON RECOVERY FUND (STATE MATCH) BY CATEGORY

	PROJECTS	ADMIN.	MONITORING	TOTAL
1999	93%	7%	0%	$1,493,231
2000	100%	0%	0%	$4,942,557
2001	100%	0%	0%	$3,494,882
2002	100%	0%	0%	$1,439,317
2003	0%	0%	0%	$640,700
2004	100%	0%	0%	$2,546,872
2005	100%	0%	0%	$1,657,768
2006	100%	0%	0%	$1,288,249
2007	77%	23%	0%	$3,128,220
2008	100%	0%	0%	$1,093,534
2009	84%	16%	0%	$2,005,065
2010	100%	0%	0%	$1,434,601

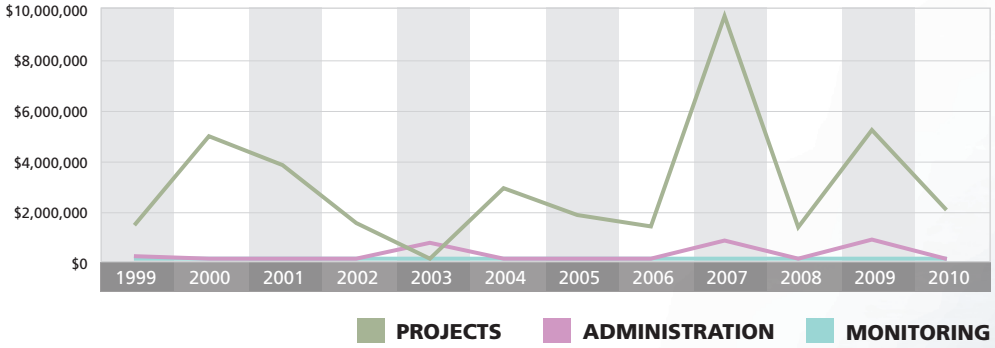
TOTAL FUNDING BY SOURCE *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



TOTAL FUNDING BY PROJECT TYPE *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



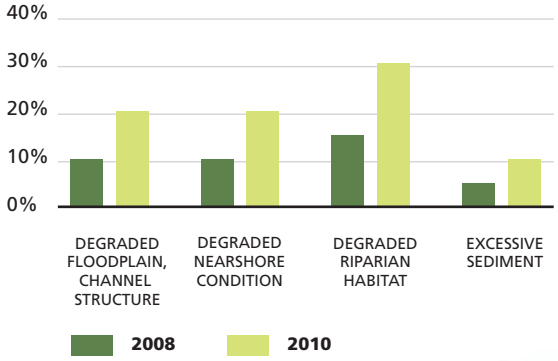
TOTAL FUNDING BY CATEGORY *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



PLAN IMPLEMENTATION:

RECOVERY PLAN IMPLEMENTATION

PROGRESS IN IMPLEMENTING RECOVERY ACTIONS BY MAJOR HABITAT LIMITING FACTOR



- Percentages are averages of progress toward implementing actions addressing each major habitat limiting factor. They do not reflect the biological response of fish.
- Major limiting factors are identified in recovery plans, and are based on federal listing determinations. These are the main habitat factors that must be addressed for recovery.
- Estimates of progress are based on best professional judgement.
- Recovery plan implementation is relatively recent—from 4 to 6 years.

DATA SOURCE: HOOD CANAL COORDINATING COUNCIL

PLAN IMPLEMENTATION:

WATERSHED PLANNING SUMMARY

An in-stream flow rule was developed based on the Watershed Planning Act in the Quilcene-Snow Water Resource Inventory Area (WRIA) 17.

Of the five WRIAs in the region, four are participating in the Watershed Planning Act, and have county-adopted watershed plans. The four are: the Skokomish-Dosewallips (16) and south shore of Hood Canal in Mason County (14b), Quilcene-Snow (17), and Elwha-Dungeness (18).

Watershed Planning Highlights and Outcomes

- Elwha-Dungeness (WRIA 18): The planning group is working on a Dungeness water management rule including water for state trust and county level water management responsibilities.
- Quilcene-Snow (WRIA 17): The planning unit is implementing a project to evaluate the potential hydrologic effects of future groundwater withdrawals from Chimacum Creek.
- Skokomish-Dosewallips and south shore of Hood Canal in Mason County (WRIAs 16 and 14b): A water quality and quantity study for freshwater streams entering Hood Canal is underway.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY

DOLANH - FLICKR

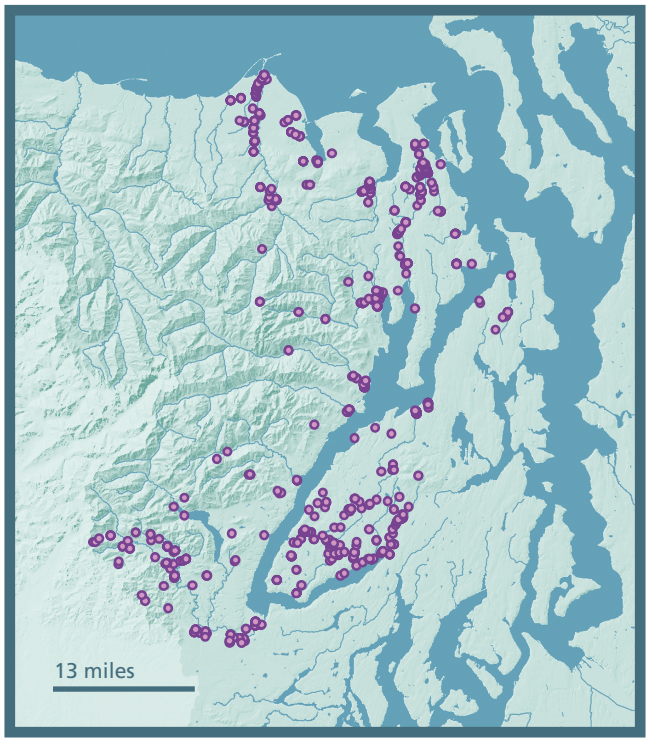
Are public resources used cost-effectively and efficiently?

PLAN IMPLEMENTATION:

FISH PASSAGE AND HABITAT PROJECTS

- Map shows fish and habitat protection and restoration project locations from 2000 to 2010.

DATA SOURCES: WASHINGTON RECREATION AND CONSERVATION OFFICE, WASHINGTON DEPARTMENT OF FISH AND WILDLIFE, WASHINGTON DEPARTMENT OF NATURAL RESOURCES, NORTHWEST INDIAN FISHERIES COMMISSION, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, NORTHWEST FISHERIES SCIENCE CENTER, U.S. FOREST SERVICE, REGIONAL FISHERIES ENHANCEMENT GROUPS



Fish Passage and Habitat Projects

Are hydroelectric facilities operating in a fish friendly manner?

PLAN IMPLEMENTATION:

DAMS WITH FISH PASSAGE STANDARDS

- Performance standards for passage vary by dam and may be set by a Federal Energy Regulatory Commission license, a Corps of Engineers 401 water quality certification, or a Habitat Conservation Program.
- Dams recently may have received new federal licenses with fish passage improvements to meet new standards, for which passage success is not yet determined.

	NO STANDARDS			HAVE STANDARDS			
	DON'T HAVE STANDARDS	STANDARDS UNDER NEGOTIATION	TOTAL	NOT MEETING STANDARDS	MEETING STANDARDS	CAN'T TELL IF MEETING STANDARDS	TOTAL
2008	0	2	**2**	N/A	N/A	N/A	**0**
2010	N/A	N/A	**0**	0	0	2	**2**

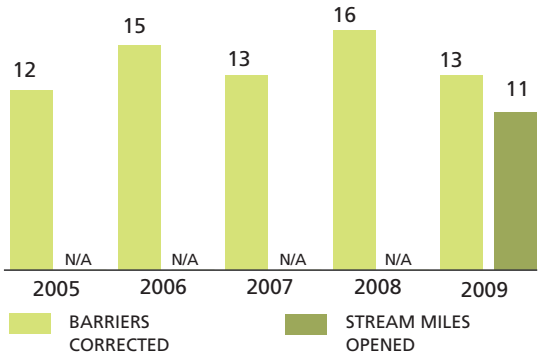
- Many dams are operating in non-anadromous fish zones and are not included in this indicator.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

Are streams accessible to wild salmon?

PLAN IMPLEMENTATION:

FISH PASSAGE BARRIERS



- Numbers of barriers corrected are estimates. Because of incomplete reporting, these numbers are expected to be lower than actual values.
- Stream miles opened reflects the number of miles estimated to be opened to fish passage by year.

DATA SOURCES: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE, WASHINGTON DEPARTMENT OF NATURAL RESOURCES, WASHINGTON DEPARTMENT OF TRANSPORTATION, WASHINGTON RECREATION AND CONSERVATION OFFICE, FORESTS AND FISH, U.S. FOREST SERVICE, BUREAU OF LAND MANAGEMENT

Do hatchery practices protect wild salmon?

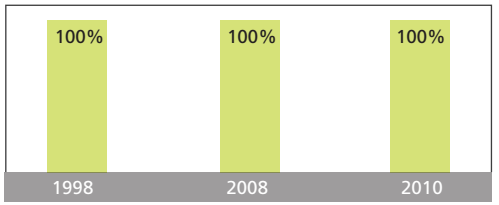
PLAN IMPLEMENTATION:

HATCHERY PROGRAMS MEETING SCIENTIFIC STANDARDS

- Standards are recommendations from the Hatchery Scientific Review Group, an independent scientific panel established and funded by Congress to assemble, organize, and apply the best available scientific information for hatchery reform.

PERCENTAGE OF HATCHERY PROGRAMS MEETING STANDARDS

SUMMER CHUM



- Programs are defined as a single release or group of smolt releases, that come from the same broodstock and are released in the same watershed. Releases from a broodstock into a different watershed are considered to be independent hatchery programs.
- Data are for Washington Department of Fish and Wildlife hatchery programs.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

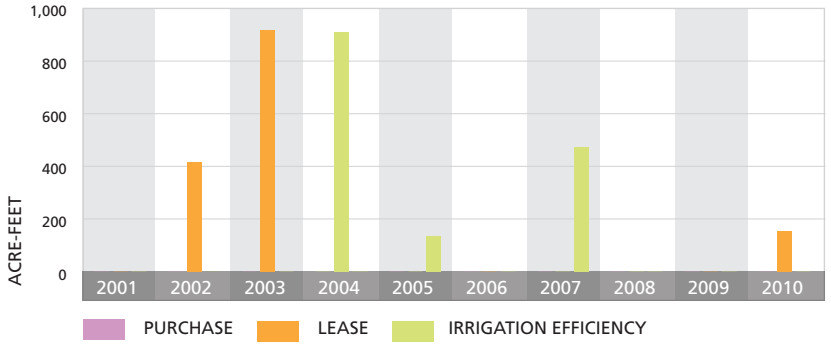
Do rivers and streams have flows that support wild salmon?

PLAN IMPLEMENTATION:

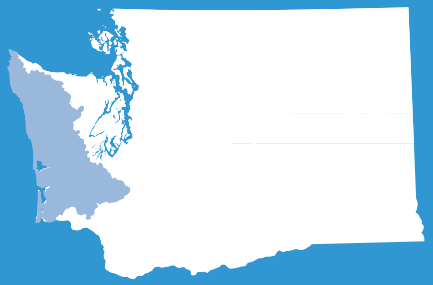
STREAMFLOW

- Water restored to streams includes water from purchases, donations, or leases. The focus is on summer low flow periods and in-stream reaches where water availability is a limiting factor for fish.
- An acre-foot is one foot of water covering one acre of land.
- 50 percent (3 of 6) of the WRIAs in the region have in-stream flows set.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY



Washington Coast Salmon Recovery Region



The Washington Coast Salmon Recovery Region includes all Washington river basins flowing directly into the Pacific Ocean from Cape Flattery to Cape Disappointment. Watersheds in the region are heavily forested, lightly populated except for parts of the Chehalis River basin, and have economies that rely upon timber, agriculture, and recreational activities.

The Washington Coast Sustainable Salmon Partnership formed in 2009 to provide a coordinated and broad based approach for addressing salmon protection and recovery. It currently is developing a regional salmon plan. There are four lead entities in the region.

INGRID S - FLICKR

SEAN MUNSEN - FLICKR

Listed Fish

Lake Ozette sockeye (threatened) – 1999

Bull trout (threatened) – 1999

Recovery Plan Snapshot

- Plan status – Lake Ozette sockeye recovery plan: adopted by the National Oceanic and Atmospheric Administration Fisheries Service in 2009. Federal draft bull trout recovery plan: status review underway
- Plan time frame – 10 years for Lake Ozette sockeye
- Estimated cost – $64.3 million for Lake Ozette sockeye

Regional Plan Implementation

$462 million in habitat project needs have been identified pending completion of the regional salmon plan.

Regional Recovery Organization

Washington Coast Sustainable Salmon Partnership

Federally Recognized Tribes

Confederated Tribes of the Chehalis Reservation, Hoh River Tribe, Makah Nation, Quileute Tribe, Quinault Indian Nation, Shoalwater Bay Tribe

Counties

Grays Harbor and portions of Clallam, Jefferson, Lewis, Mason, Pacific, and Thurston

Threats to Salmon Recovery

Threats to salmon in the Washington Coast region include disease and harvest as well as the following major threats:

Climate Change will increase sea-level, increase the acidity of ocean water, and change coastal estuarine habitats.

Low Dissolved Oxygen will increase hypoxia in marine waters.

Development will increase challenges posed by fish passage barriers, forestry, agriculture, new development, and water availability.

Ecological Interactions will include increases in invasive weed species that degrade riparian conditions.

Uncertain Long-Term Funding for implementation of recovery actions (federal, state, and other sources) will challenge our ability to stay the course.

Are listed populations abundant and productive?

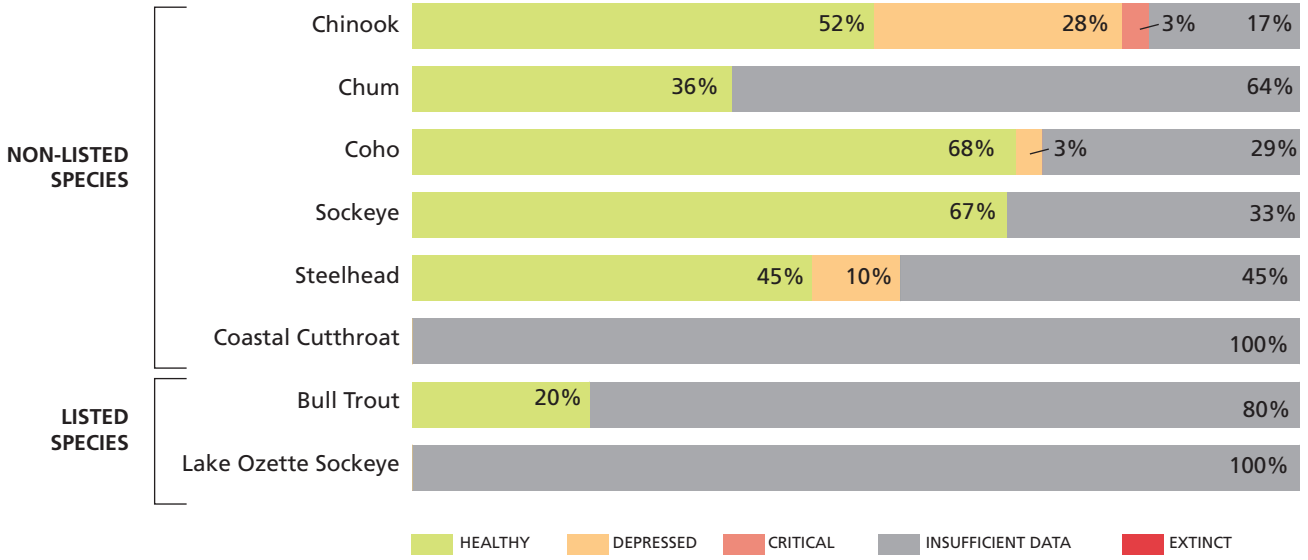
FISH:

STATUS SUMMARY

- 2010 status ratings are determined by the Washington Department of Fish and Wildlife and tribes.
- Includes listed and non-listed species.
- More data are available for Lake Ozette sockeye than is reflected in the status rating.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

PERCENT OF STOCKS BY STATUS RATING



Are freshwater and estuarine habitats healthy and productive?

WATERSHED HEALTH:

LAND USE AND LAND COVER

- Developed land includes any land with a significant portion consisting of human-made structures. Impervious surfaces are mainly artificial structures that are covered by impermeable materials like pavement, rooftops, and soils compacted by urban development.
- Percentages are based on the total area of the Washington Coast Salmon Recovery Region, including uplands, mountains, and other lands unlikely to be developed. Development and impervious surfaces typically are concentrated in lowlands (<1000 feet elevation), and along coastlines and river valleys.
- Data are from the Coastal Change and Analysis Program (CCAP).

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

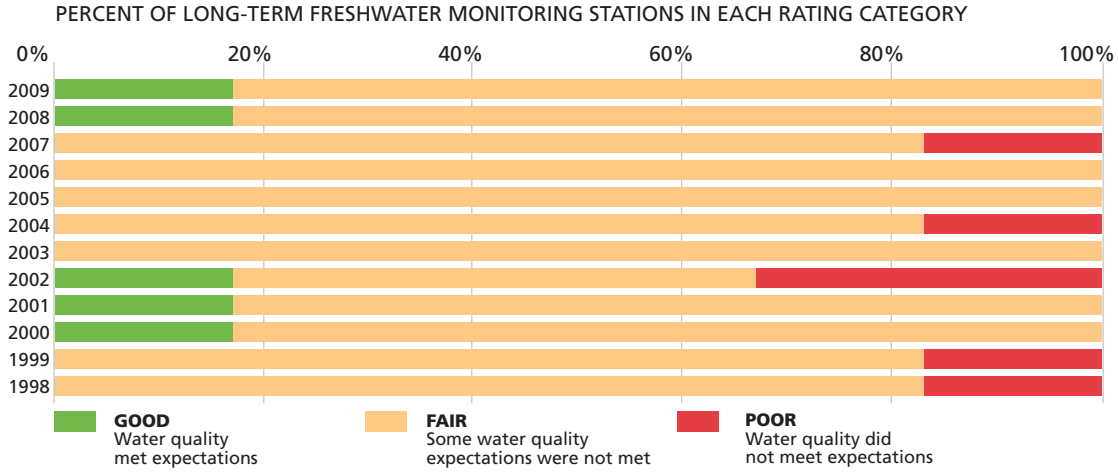
DEVELOPED LAND (ACRES)		IMPERVIOUS SURFACE (ACRES)	
PERCENTAGE INCREASE FROM 2001 TO 2006	PERCENTAGE OF TOTAL ACRES THAT ARE DEVELOPED (2006)	PERCENTAGE INCREASE FROM 2001 TO 2006	PERCENTAGE OF TOTAL ACRES THAT ARE IMPERVIOUS (2006)
1.2%	1.9%	0.1%	0.6%

Is water clean enough to support wild salmon?

WATERSHED HEALTH:
WATER QUALITY

- Water quality is measured by a Water Quality Index. This is a number that aggregates water quality data at a monitoring station for temperature, acidity, fecal coliform bacteria, dissolved oxygen, nutrients, and sediments from October 1 to September 30.
- Six sampling stations are reflected in the index.
- There are 86 sites requiring management for high water temperatures.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY

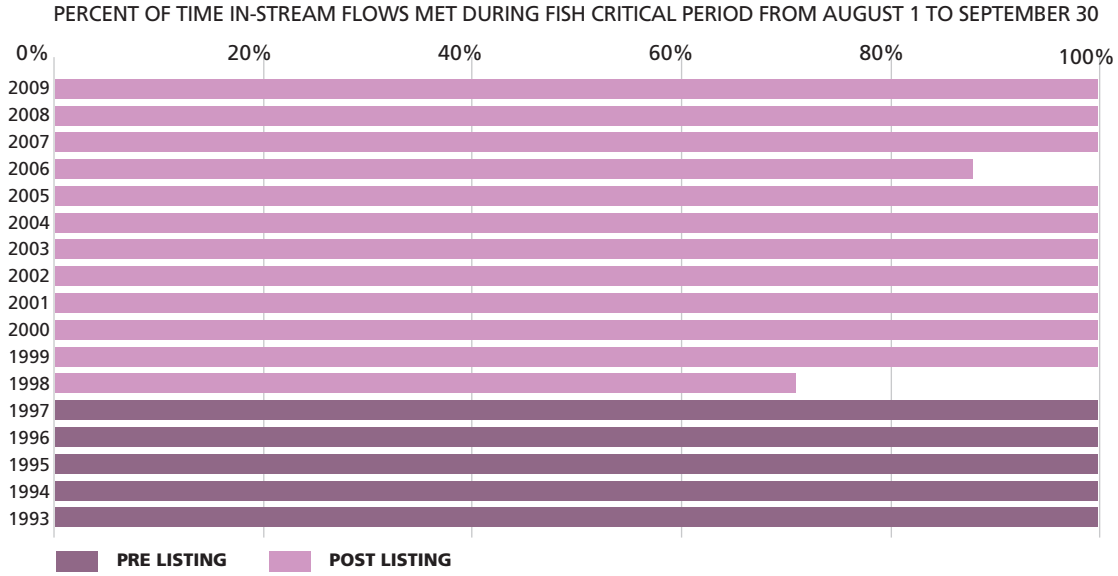


Do rivers and streams have flows that support wild salmon?

WATERSHED HEALTH:
WATER QUANTITY

- Most years based on seven monitoring stations.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY



What are trends in salmon funding?

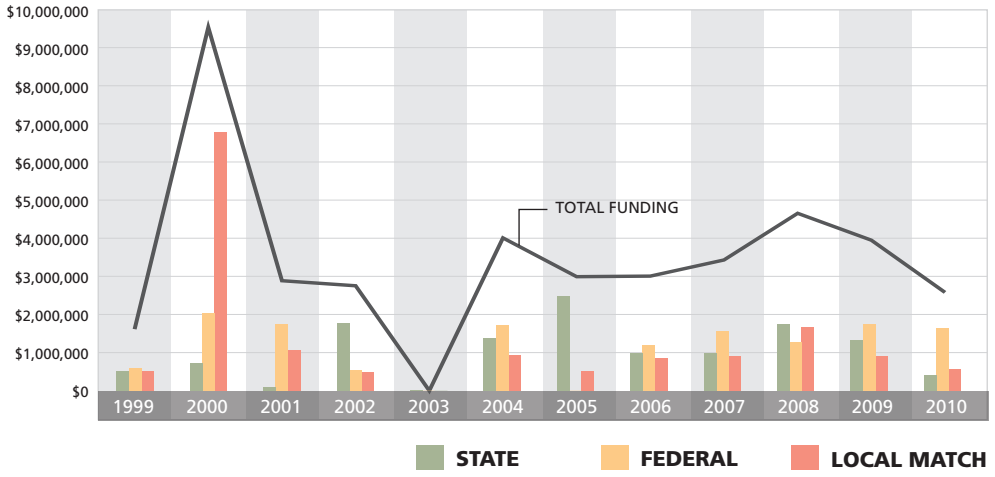
PLAN IMPLEMENTATION:

FUNDING

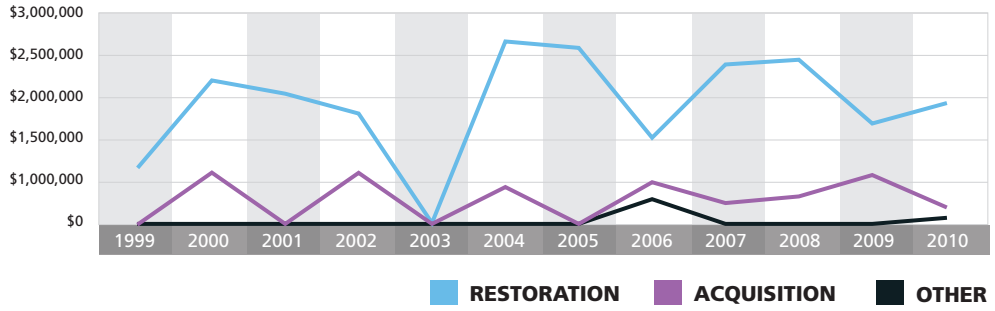
- Total Salmon Recovery Funding Board-related funding was $42 million in state and federal, and local match from 1999-2010. 2010 data are preliminary.
- Charts to the right reflect all money administered by the Salmon Recovery Funding Board through the Pacific Coastal Salmon Recovery Fund, salmon recovery fund (state match), Family Forest and Fish Passage Program, Estuary and Salmon Restoration Program, and hatchery reform.
- The table of percentages below reflects funding from the Pacific Coastal Salmon Recovery Fund and salmon recovery fund (state match) only – the two primary funding sources for grants through the Salmon Recovery Funding Board. The large statewide monitoring projects funded by the board are reflected in the statewide funding overview, not in individual regional overviews.

DATA SOURCE: WASHINGTON RECREATION AND CONSERVATION OFFICE

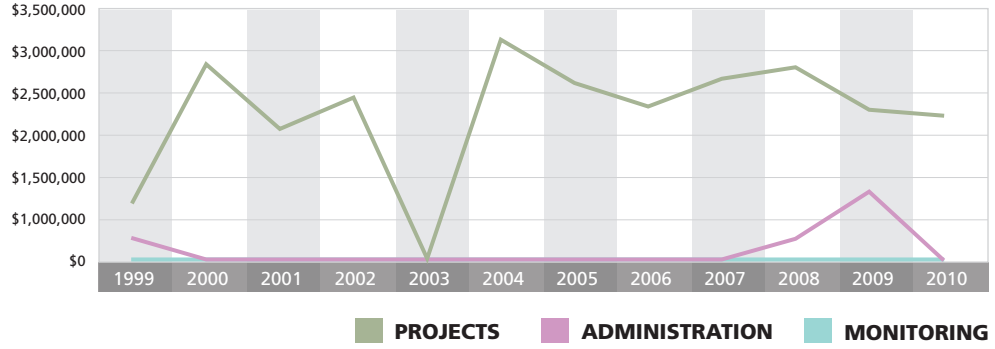
TOTAL FUNDING BY SOURCE *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



TOTAL FUNDING BY PROJECT TYPE *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



TOTAL FUNDING BY CATEGORY *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



DISTRIBUTION OF PACIFIC COASTAL SALMON RECOVERY FUND AND SALMON RECOVERY FUND (STATE MATCH) BY CATEGORY

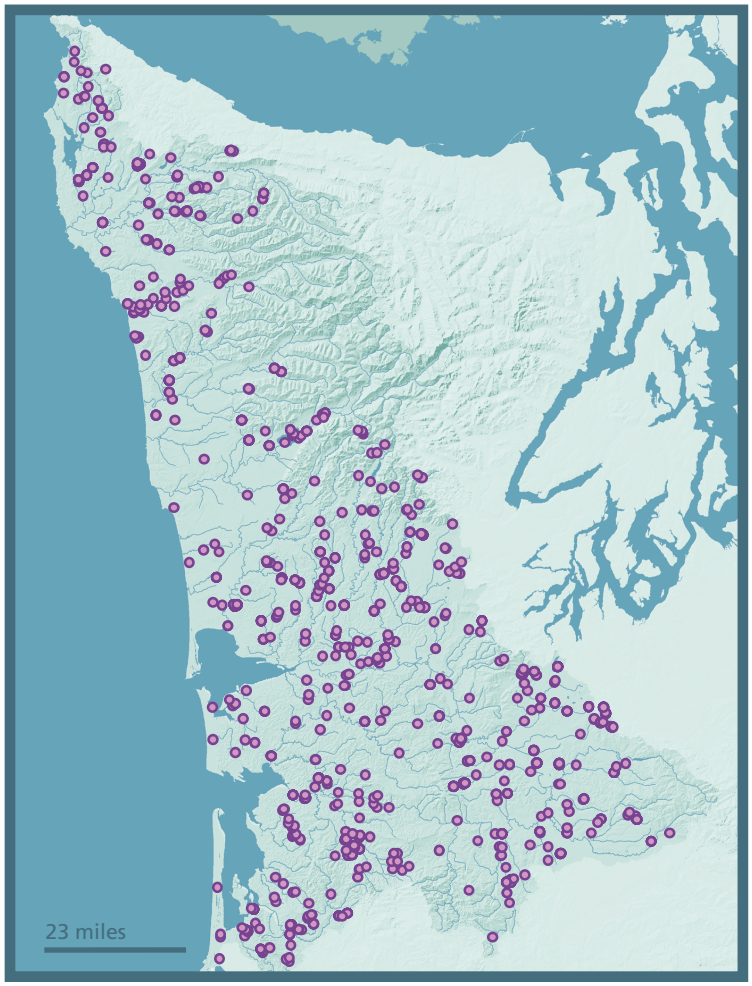
	PROJECTS	ADMIN.	MONITORING	TOTAL
1999	73%	27%	0%	$1,107,722
2000	100%	0%	0%	$2,757,910
2001	100%	0%	0%	$1,397,966
2002	100%	0%	0%	$2,286,529
2003	0%	0%	0%	$0
2004	100%	0%	0%	$2,349,690
2005	100%	0%	0%	$1,370,954
2006	100%	0%	0%	$1,603,748
2007	100%	0%	0%	$2,045,125
2008	86%	14%	0%	$2,112,926
2009	63%	37%	0%	$2,598,085
2010	100%	0%	0%	$1,789,066

PLAN IMPLEMENTATION:

FISH PASSAGE AND HABITAT PROJECTS

- Map shows fish and habitat protection and restoration project locations from 2000 to 2010.

DATA SOURCES: WASHINGTON RECREATION AND CONSERVATION OFFICE, WASHINGTON DEPARTMENT OF FISH AND WILDLIFE, WASHINGTON DEPARTMENT OF NATURAL RESOURCES, NORTHWEST INDIAN FISHERIES COMMISSION, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, NORTHWEST FISHERIES SCIENCE CENTER, U.S. FOREST SERVICE, REGIONAL FISHERIES ENHANCEMENT GROUPS



Fish Passage and Habitat Projects

PLAN IMPLEMENTATION:

WATERSHED PLANNING SUMMARY

Of the three Water Resource Inventory Areas (WRIA) participating in the Watershed Planning Act, all have county adopted watershed plans. The WRIAs are: Sol Duc-Hoh (20), Lower Chehalis (22) and Upper Chehalis (23).

Watershed Planning Highlights and Outcomes

- Upper and Lower Chehalis (WRIAs 22 and 23): Plan implementation is ongoing and the planning unit is partnering with the Chehalis River flood control groups at local, state, and federal levels.
- Sol Duc-Hoh (WRIA 20): The planning group finished its first year of implementation and produced a Detailed Implementation Plan. Work is being done on in-stream flow needs and values.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY

SAM BEEBE / ECOTRUST - FLICKR

Are hydroelectric facilities operating in a fish friendly manner?

PLAN IMPLEMENTATION:

DAMS WITH FISH PASSAGE STANDARDS

- Performance standards for passage vary by dam and may be set by a Federal Energy Regulatory Commission license, a Corps of Engineers 401 water quality certification, or a Habitat Conservation Program.
- Dams recently may have received new federal licenses with fish passage improvements to meet new standards, for which passage success is not yet determined.
- Many dams are operating in non-anadromous fish zones and are not included in this indicator.

	NO STANDARDS			HAVE STANDARDS			
	DON'T HAVE STANDARDS	STANDARDS UNDER NEGOTIATION	TOTAL	NOT MEETING STANDARDS	MEETING STANDARDS	CAN'T TELL IF MEETING STANDARDS	TOTAL
2008	3	0	3	N/A	N/A	N/A	0
2010	3	0	3	N/A	N/A	N/A	0

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

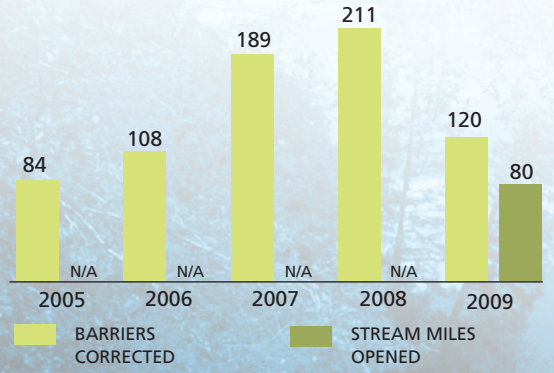
Are streams accessible to wild salmon?

PLAN IMPLEMENTATION:

FISH PASSAGE BARRIERS

- Numbers of barriers corrected are estimates. Because of incomplete reporting, these numbers are expected to be lower than actual values.
- Stream miles opened reflects the number of miles estimated to be opened to fish passage by year.

DATA SOURCES: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE, WASHINGTON DEPARTMENT OF NATURAL RESOURCES, WASHINGTON DEPARTMENT OF TRANSPORTATION, WASHINGTON RECREATION AND CONSERVATION OFFICE, FORESTS AND FISH, U.S. FOREST SERVICE, BUREAU OF LAND MANAGEMENT



ROBERT A.K.A. BOB - FLICKR

Do hatchery practices protect wild salmon?

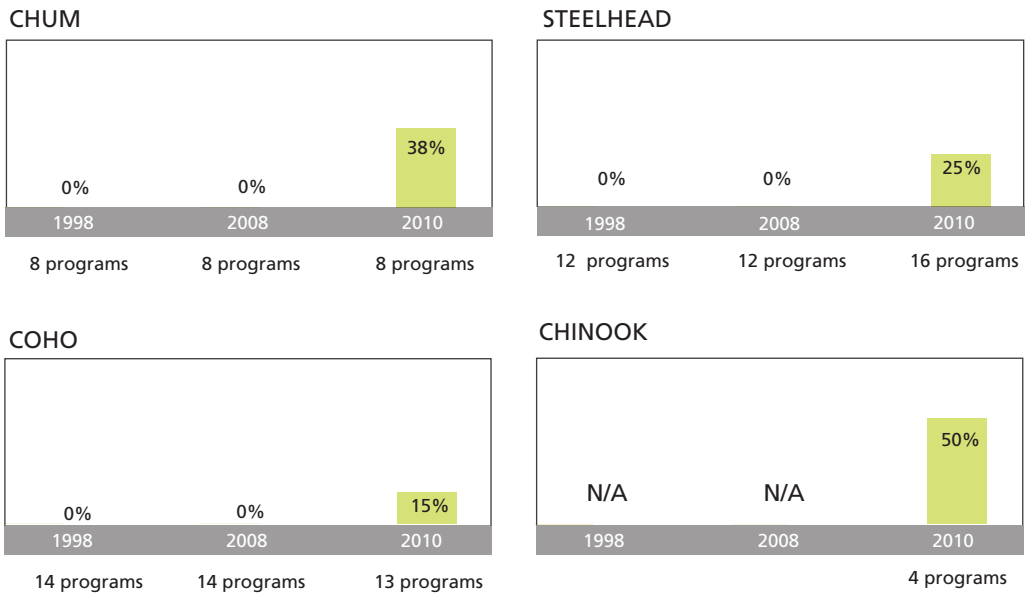
PLAN IMPLEMENTATION:

HATCHERY PROGRAMS MEETING SCIENTIFIC STANDARDS

- Standards are recommendations from the Hatchery Scientific Review Group, an independent scientific panel established and funded by Congress to assemble, organize, and apply the best available scientific information for hatchery reform.
- Programs are defined as a single release or group of smolt releases, that come from the same broodstock and are released in the same watershed. Releases from a broodstock into a different watershed are considered to be independent hatchery programs.
- Data are for Washington Department of Fish and Wildlife hatchery programs.

DATA SOURCE:
WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

PERCENTAGE OF HATCHERY PROGRAMS MEETING STANDARDS



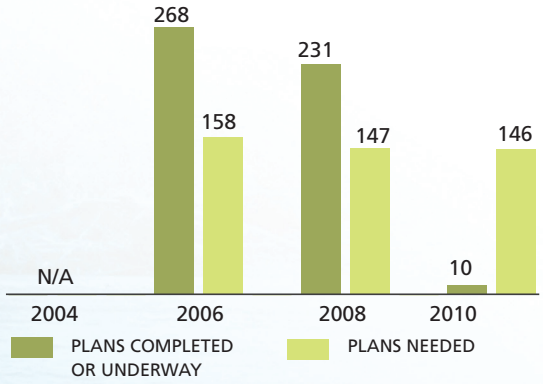
Is water clean enough to support wild salmon?

PLAN IMPLEMENTATION:

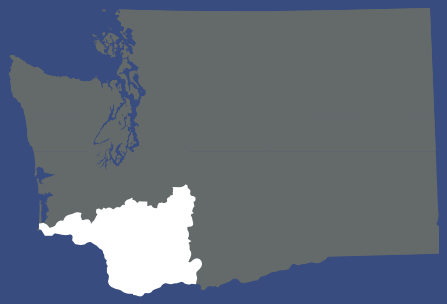
WATERSHED CLEANUP PLANS

- Cleanup plans address water quality impairments covered by total maximum daily load management plans.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY



Lower Columbia River Salmon Recovery Region



The Lower Columbia River Salmon Recovery Region extends from the coast to the Columbia Gorge, and is mainly forest and rural in nature. Human population centers are mainly along the Interstate 5 corridor and its intersection with the Columbia River. Clark County is one of the fastest growing urban areas of the state. The region encompasses 5,700 square miles. It includes the entire Washington portion of the mainstem and estuary of the lower Columbia River, as well as 18 major and a number of lesser tributary watersheds. In all, the tributaries total more than 2,200 river miles. There are two lead entities in the region, one of which is also the regional recovery organization.

DARRELL WYATT

TONY CASE / FLICKR

Listed Fish

Chinook (threatened) – 1999

Chum (threatened) – 1999

Coho (threatened) – 2005

Steelhead (threatened) – 1998

Bull trout (threatened) – 1998

Major Factors Limiting Recovery

- Degraded floodplain and channel structure
- Degraded nearshore, marine, and estuarine conditions
- Riparian degradation and loss of in-river woody material
- Degraded water quality and temperature
- Impaired stream flows
- Barriers to fish passage
- Excessive sediment
- Hatchery impacts
- Harvest impacts
- Predator harassment of juvenile and adult fish

Recovery Plan Snapshot

- Plan Status – Washington portions of chum, Chinook, and steelhead plans: adopted as interim recovery plan by the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service in 2006. Washington portions of coho recovery plans were updated and submitted to NOAA Fisheries Service in 2010. Federal draft bull trout recovery plan: status review underway.
- Time frame – 25 years
- Estimated cost – $979 million

Recovery Plan Implementation

Current six-year implementation schedule identifies $274 million in habitat project needs.

Regional Recovery Organization

Lower Columbia River Fish Recovery Board

Federally Recognized Tribes

Cowlitz Indian Tribe, Yakama Nation

Counties

Clark, Cowlitz, Lewis, Skamania, and Wahkiakum, and portions of Pacific and Klickitat

Threats to Salmon Recovery

Salmon recovery in the Lower Columbia River Salmon Recovery Region is threatened by a multitude of impacts over the near and long-term. Human population growth and associated development including hydropower projects, as well as climate change, influences from hatchery fish, and uncertainties due to insufficient monitoring capacity and coordination are a few of the major threats to recovery, outlined below:

Climate Change will lead to increased stream temperatures, changed flow regimes and flooding, increased sea level, changed habitat conditions, and decreased snowpack.

Human Population Growth and Development will be focused in Clark County and along the Interstate 5 corridor in Lewis and Cowlitz Counties, and will lead to increased residential development, hydropower projects, agriculture, and timber harvest throughout the region, and challenge the adequacy, implementation, and enforcement of land use regulations.

Hatchery Fish present risks of increased competition, disease, and genetic interactions.

Ecological Interactions associated with invasive species and predation will increase.

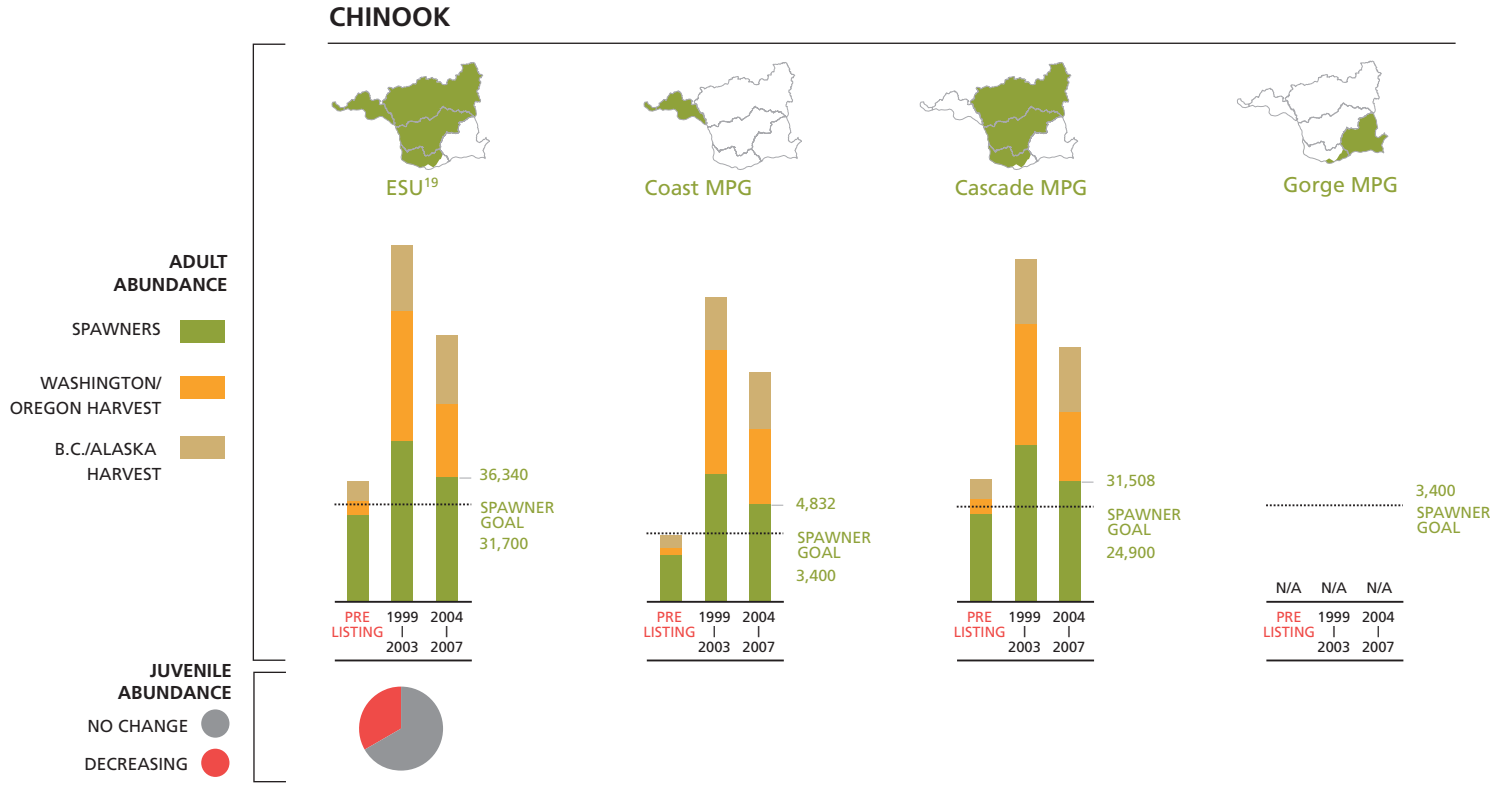
Uncertain Long-term Funding for implementation of recovery actions and associated monitoring (federal, state, and other sources) will challenge our ability to stay the course.

FISH:

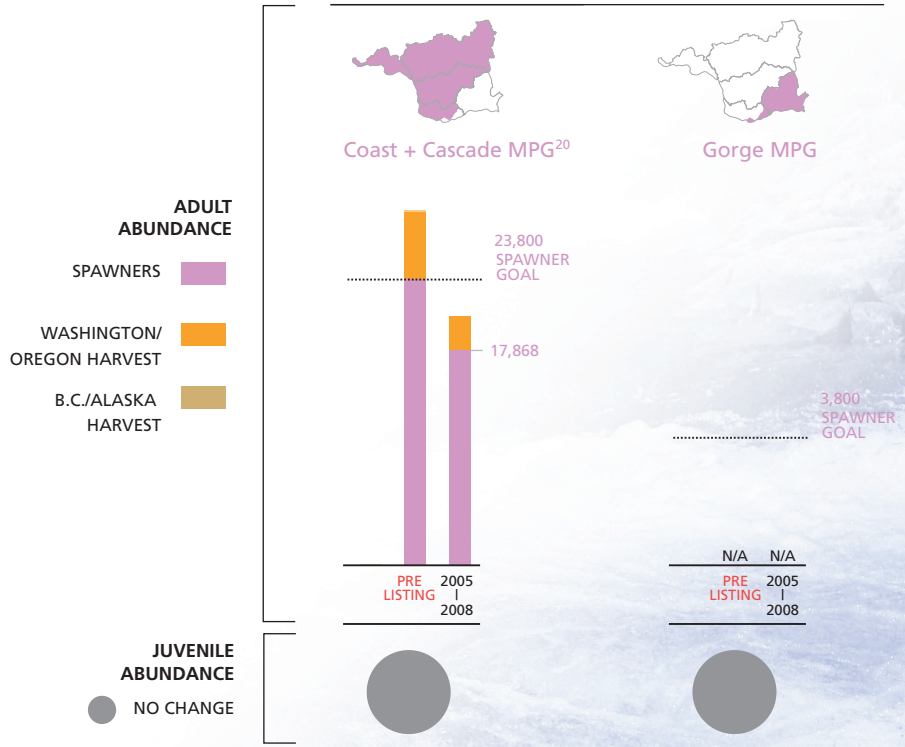
ABUNDANCE TRENDS

- Graphs show wild adult and juvenile abundance data for species at the Evolutionarily Significant Unit (ESU), Distinct Population Segment (DPS), and Major Population Group (MPG) scales. ESUs and DPSs are the scale at which species are listed and de-listed under the federal Endangered Species Act.
- In most cases, bar charts show the number of returning wild adult fish, separated by what was harvested and what returned to spawn.
- Due to the lack of data on the wild component over the long term, adult abundance for Chinook and coho reflect a mixture of hatchery and wild fish. It should not be concluded that wild spawners have met their spawner goals.
- Pie charts show the percentage of juvenile sampling locations where trends have increased, decreased, or not changed. Juvenile data generally not available for all populations of each species. Trends in juvenile Chinook data were available for one population in each of the three MPGs with primary populations. Juvenile coho data were available for four populations in two MPGs (no data for the Gorge MPG).

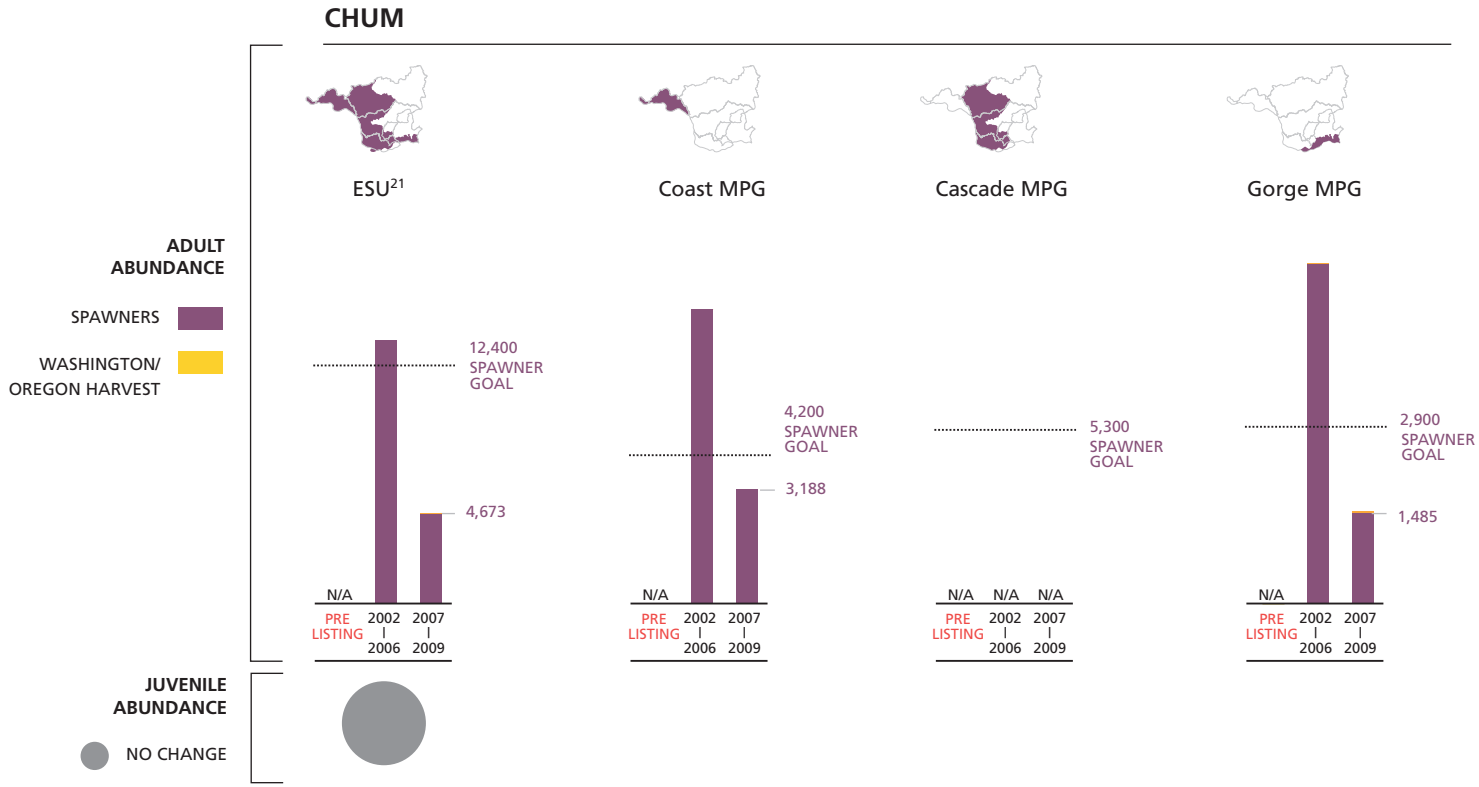
DATA SOURCES: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE AND TRIBES



COHO



DIESEL DAN - FLICKR



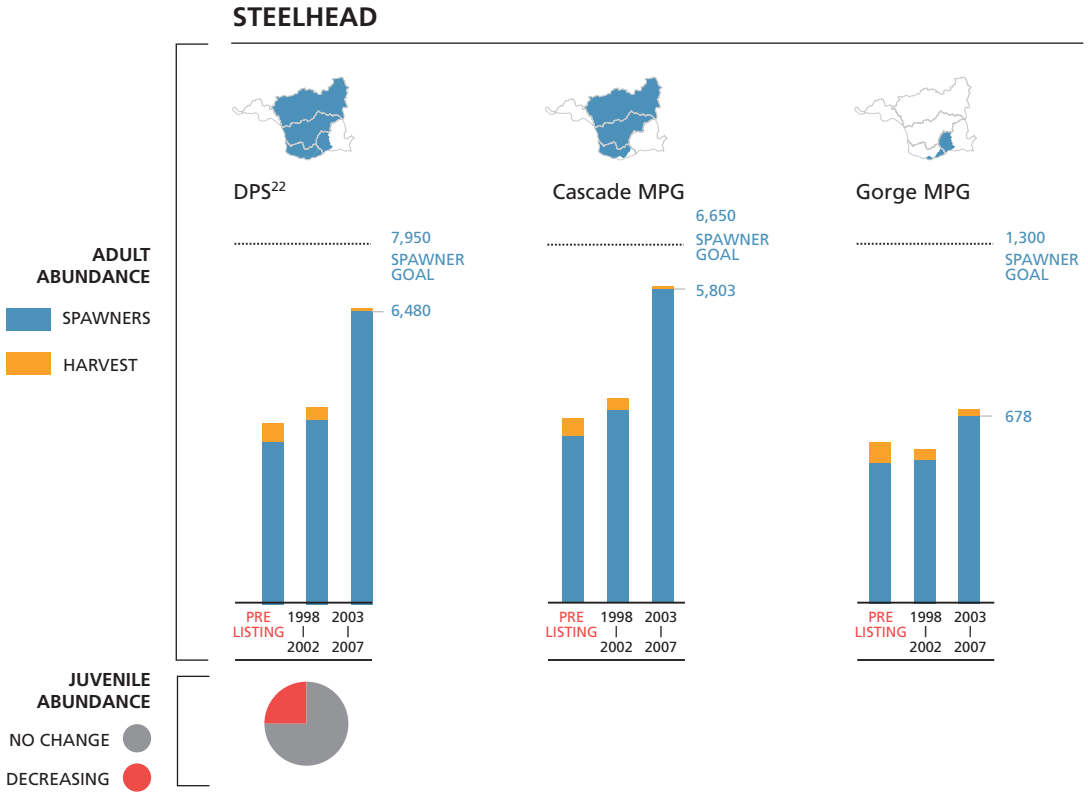
Are listed populations abundant and productive?

FISH:

ABUNDANCE TRENDS

- Graphs show wild adult and juvenile abundance data for species at the Evolutionarily Significant Unit (ESU), Distinct Population Segment (DPS), and Major Population Group (MPG) scales. ESUs and DPSs are the scale at which species are listed and de-listed under the federal Endangered Species Act.
- In most cases, bar charts show the number of returning wild adult fish, separated by what was harvested and what returned to spawn.
- Pie charts show the percentage of juvenile sampling locations where trends have increased, decreased, or not changed. Juvenile data generally are not available for all populations of each species. Juvenile chum trend data were available for one population in one MPG (no data was available for the Coast and Cascade MPGs). Juvenile steelhead data was available for three populations in one MPG and one population in the other MPG.

DATA SOURCES: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE AND TRIBES



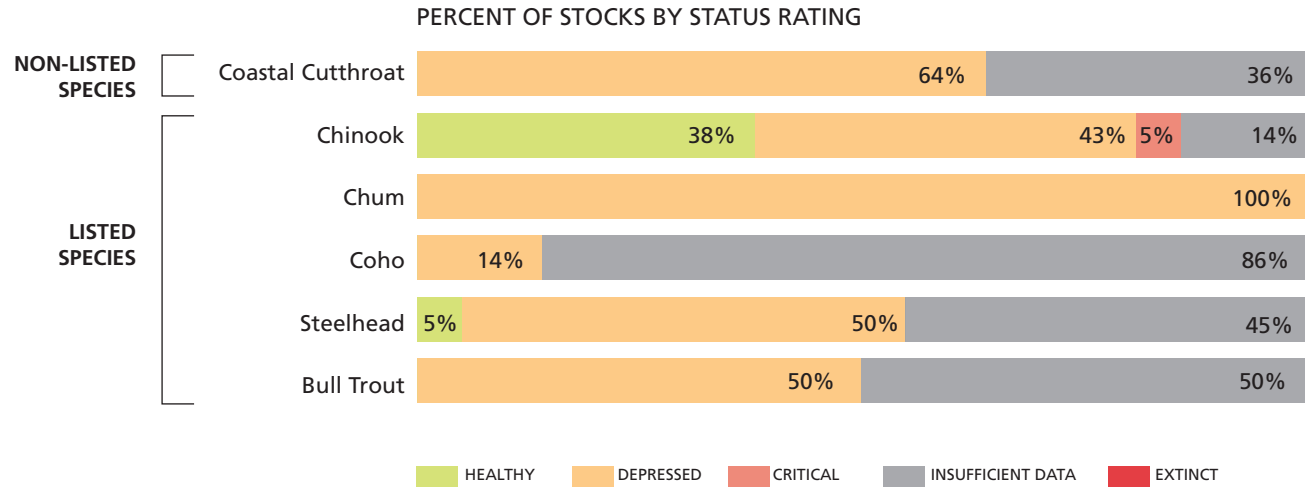
Are listed populations abundant and productive?

FISH:

STATUS SUMMARY

- 2010 status ratings are determined by the Washington Department of Fish and Wildlife and tribes.
- Includes listed and non-listed species.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

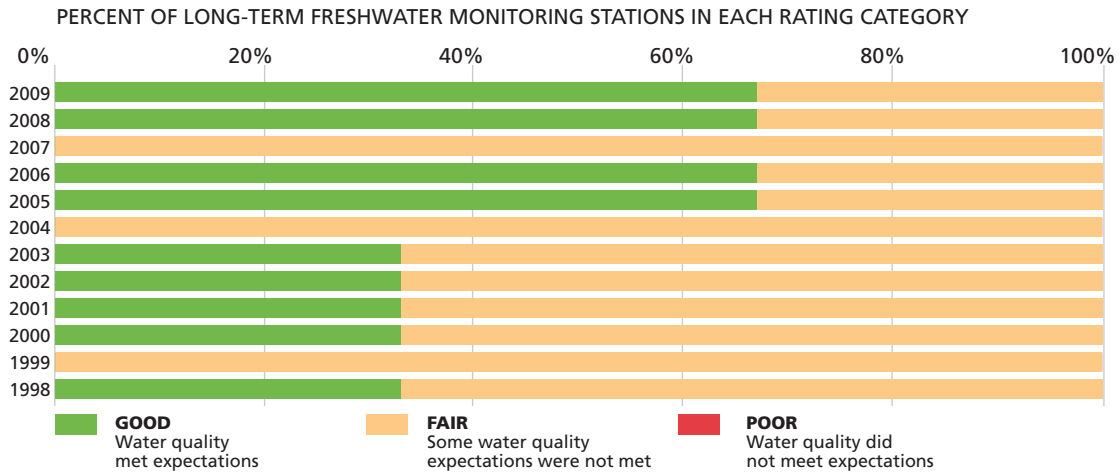


Is water clean enough to support wild salmon?

WATERSHED HEALTH:
WATER QUALITY

- Water quality is measured by a Water Quality Index. This is a number that aggregates water quality data at a monitoring station for temperature, acidity, fecal coliform bacteria, dissolved oxygen, nutrients, and sediments from October 1 to September 30.
- Only three sampling stations are reflected in this index.
- There are 174 sites requiring management for high water temperatures.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY



Are freshwater and estuarine habitats healthy and productive?

WATERSHED HEALTH:
LAND USE AND LAND COVER

- Developed land includes any land with a significant portion consisting of human-made structures. Impervious surfaces are mainly artificial structures that are covered by impermeable materials like pavement, rooftops, and soils compacted by urban development.
- Percentages are based on the total area of the Lower Columbia River Salmon Recovery Region, including uplands, mountains, and other lands unlikely to be developed. Development and impervious surfaces typically are concentrated in lowlands (<1000 feet elevation), and along coastlines and river valleys.
- Data are from the Coastal Change and Analysis Program (CCAP).

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

DEVELOPED LAND (ACRES)	
PERCENTAGE INCREASE FROM 2001 TO 2006	PERCENTAGE OF TOTAL ACRES THAT ARE DEVELOPED (2006)
1.6%	4.5%

IMPERVIOUS SURFACE (ACRES)	
PERCENTAGE INCREASE FROM 2001 TO 2006	PERCENTAGE OF TOTAL ACRES THAT ARE IMPERVIOUS (2006)
0.6%	1.6%

What are trends in salmon funding?

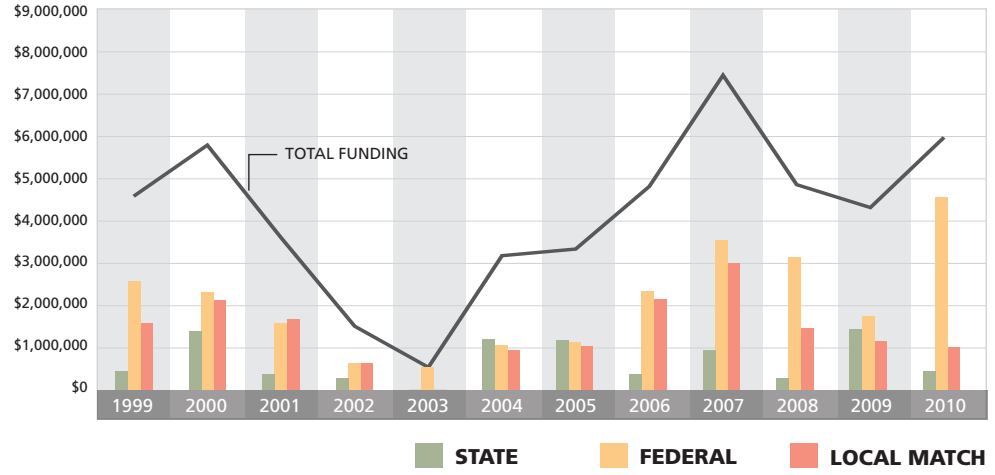
PLAN IMPLEMENTATION:

FUNDING

- Total Salmon Recovery Funding Board-related funding was $50 million in state and federal, and local match from 1999-2010. 2010 data are preliminary.
- Charts to the right reflect all money administered by the Salmon Recovery Funding Board through the Pacific Coastal Salmon Recovery Fund, salmon recovery fund (state match), Family Forest and Fish Passage Program, Pacific States Marine Fisheries Commission, and hatchery reform.
- The table of percentages below reflects funding from the Pacific Coastal Salmon Recovery Fund and salmon recovery fund (state match) only – the two primary funding sources for grants through the Salmon Recovery Funding Board. The large statewide monitoring projects funded by the board are reflected in the statewide funding overview, not in individual regional overviews.

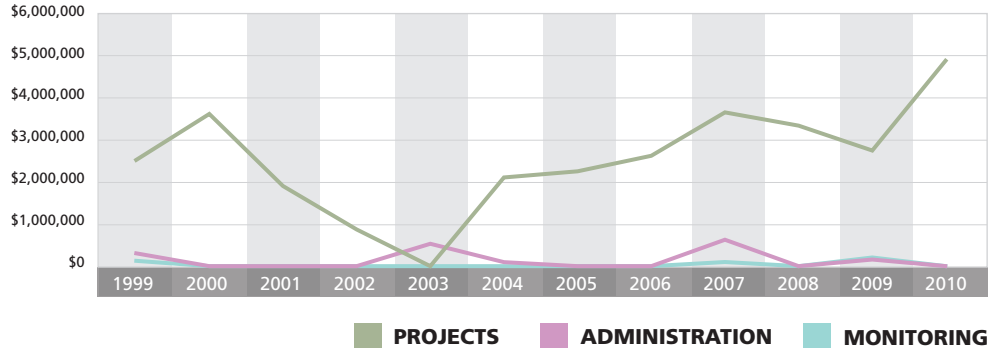
DATA SOURCE: WASHINGTON RECREATION AND CONSERVATION OFFICE

TOTAL FUNDING BY SOURCE *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



TOTAL FUNDING BY PROJECT TYPE *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*

TOTAL FUNDING BY CATEGORY *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



DISTRIBUTION OF PACIFIC COASTAL SALMON RECOVERY FUND AND SALMON RECOVERY FUND (STATE MATCH) BY CATEGORY

	PROJECTS	ADMIN.	MONITORING	TOTAL
1999	85%	10%	4%	$3,006,741
2000	100%	0%	0%	$3,685,565
2001	100%	0%	0%	$1,893,831
2002	100%	0%	0%	$889,211
2003	0%	0%	0%	$541,843
2004	94%	6%	0%	$1,727,966
2005	100%	0%	0%	$1,231,324
2006	100%	0%	0%	$2,385,957
2007	84%	16%	0%	$4,130,646
2008	100%	0%	0%	$3,178,647
2009	88%	5%	7%	$3,169,888
2010	100%	0%	0%	$4,579,730

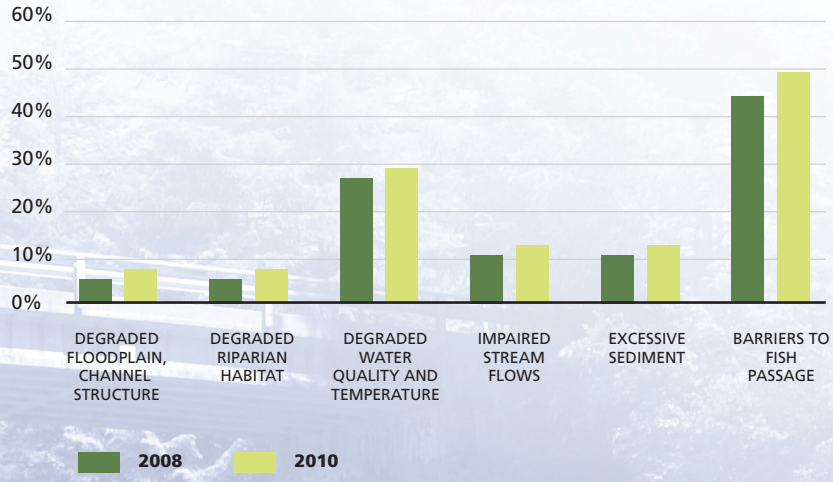
PLAN IMPLEMENTATION:

RECOVERY PLAN IMPLEMENTATION

- Major limiting factors are identified in recovery plans, and are based on federal listing determinations. These are the main habitat factors that must be addressed for recovery.
- Percentages are averages of progress toward implementing actions addressing each major habitat limiting factor. They do not reflect the biological response of fish.
- Estimates of progress are based on best professional judgement.
- Recovery plan implementation is relatively recent—from 4 to 6 years.

DATA SOURCE: LOWER COLUMBIA FISH RECOVERY BOARD

PROGRESS IN IMPLEMENTING RECOVERY ACTIONS
BY MAJOR HABITAT LIMITING FACTOR



DIESEL DAN - FLICKR

PLAN IMPLEMENTATION:

WATERSHED PLANNING SUMMARY

In-stream flow rules were developed based on the Watershed Planning Act in Lewis (27) and Salmon-Washougal (28) Water Resource Inventory Areas (WRIAs).

Rule making currently is underway in the Grays-Elochoman (25) and Cowlitz (26) areas.

Of the five WRIAs participating in the Watershed Planning Act, all have county-adopted watershed plans. The WRIAs are: Grays-Elochoman (25), Cowlitz (26), Lewis (27), Salmon-Washougal (28) and Wind (29a). Efforts in the White Salmon (29b) have organized but have not started planning Phase 2.

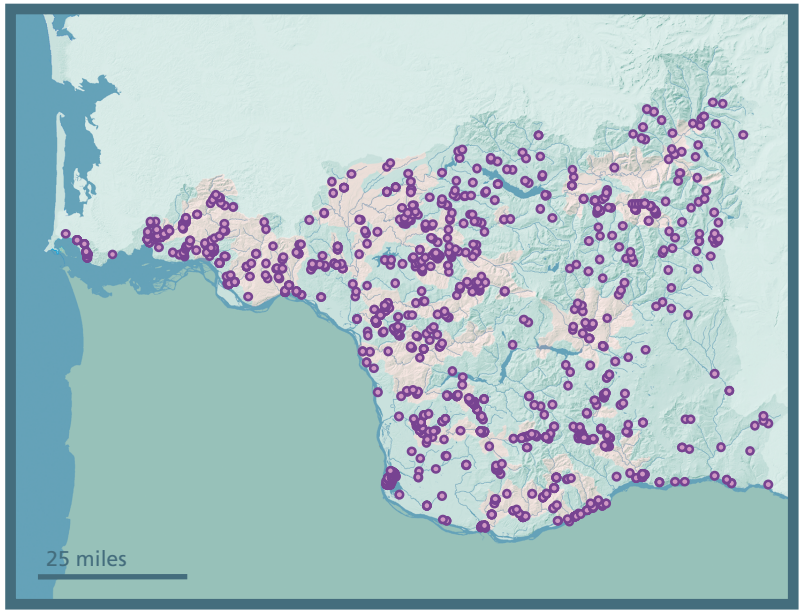
Watershed Planning Highlights and Outcomes

- Grays-Elochoman/Cowlitz (WRIAs 25 and 26): Lewis County is working on a new water utility for the south part of the county, and rule making is occurring with involvement of the planning unit.
- Lewis/Salmon-Washougal (WRIAs 27 and 28): A major municipal water supply source substitution was accomplished that will lead to increased summer flows in the Washougal River. Progress also has been made in developing regional water sources that will help protect flows in the Lewis River and Salmon Creek.
- Wind (WRIA 29a): The planning unit will start preparing its Detailed Implementation Plan as soon as a current in-stream flow study is completed.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY

PLAN IMPLEMENTATION:

FISH PASSAGE AND HABITAT PROJECTS



Fish Passage and Habitat Projects

Priority Habitat Areas

- Map shows fish and habitat protection and restoration project locations from 2000 to 2010.

DATA SOURCES: WASHINGTON RECREATION AND CONSERVATION OFFICE, WASHINGTON DEPARTMENT OF FISH AND WILDLIFE, WASHINGTON DEPARTMENT OF NATURAL RESOURCES, NORTHWEST INDIAN FISHERIES COMMISSION, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, NORTHWEST FISHERIES SCIENCE CENTER, U.S. FOREST SERVICE, BONNEVILLE POWER ADMINISTRATION, REGIONAL FISHERIES ENHANCEMENT GROUPS

Are hydroelectric facilities operating in a fish friendly manner?

PLAN IMPLEMENTATION:

DAMS WITH FISH PASSAGE STANDARDS

- Mainstem Columbia River dams are not included in this regional indicator.
- Performance standards for passage vary by dam and may be set by a Federal Energy Regulatory Commission license, a Corps of Engineers 401 water quality certification, or a Habitat Conservation Program.

	NO STANDARDS			HAVE STANDARDS			
	DON'T HAVE STANDARDS	STANDARDS UNDER NEGOTIATION	TOTAL	NOT MEETING STANDARDS	MEETING STANDARDS	CAN'T TELL IF MEETING STANDARDS	TOTAL
2008	1	0	1	3	0	4	7
2010	1	0	1	3	0	4	7

- Dams recently may have received new federal licenses with fish passage improvements to meet new standards, for which passage success is not yet determined.
- Many dams are operating in non-anadromous fish zones and are not included in this indicator.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

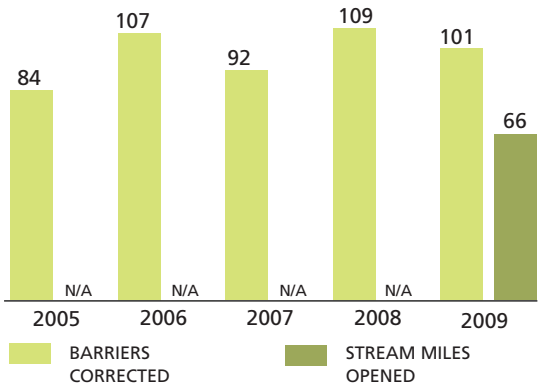
Are streams accessible to wild salmon?

PLAN IMPLEMENTATION:

FISH PASSAGE BARRIERS

- Number of barriers corrected are estimates. Because of incomplete reporting, these numbers are expected to be lower than actual values.
- Stream miles opened reflects the number of miles estimated to be opened to fish passage by year.

DATA SOURCES: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE, WASHINGTON DEPARTMENT OF NATURAL RESOURCES, WASHINGTON DEPARTMENT OF TRANSPORTATION, WASHINGTON RECREATION AND CONSERVATION OFFICE, FORESTS AND FISH, U.S. FOREST SERVICE, BUREAU OF LAND MANAGEMENT



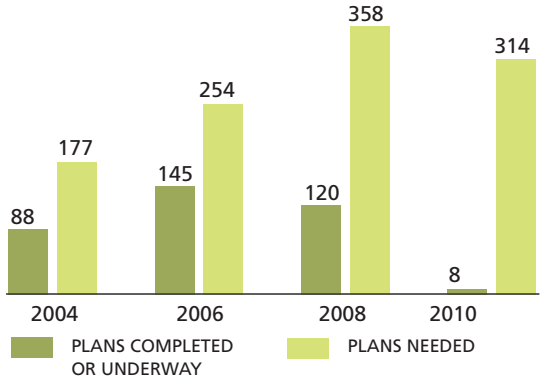
Is water clean enough to support wild salmon?

PLAN IMPLEMENTATION:

WATERSHED CLEANUP PLANS

- Cleanup plans address water quality impairments covered by total maximum daily load management plans.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY



Do hatchery practices protect wild salmon?

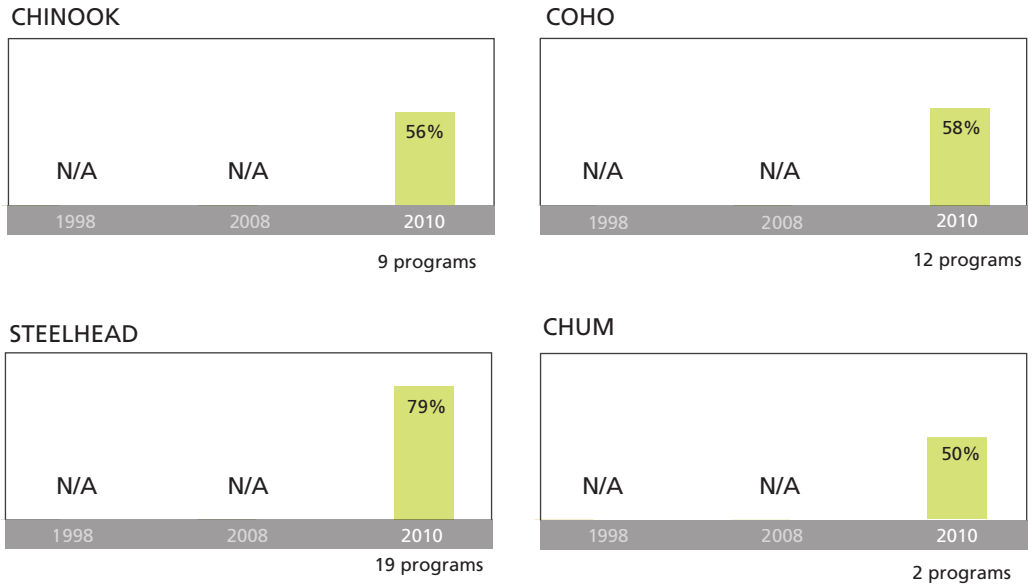
PLAN IMPLEMENTATION:

HATCHERY PROGRAMS MEETING SCIENTIFIC STANDARDS

- Standards are recommendations from the Hatchery Scientific Review Group, an independent scientific panel established and funded by Congress to assemble, organize, and apply the best available scientific information for hatchery reform.
- Programs are defined as a single release or group of smolt releases, that come from the same broodstock and are released in the same watershed. Releases from a broodstock into a different watershed, are considered to be independent hatchery programs.
- Data are for Washington Department of Fish and Wildlife hatchery programs.
- Washington Department of Fish and Wildlife data are not available at the regional scale prior to 2010.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

PERCENTAGE OF HATCHERY PROGRAMS MEETING STANDARDS



Middle Columbia River Salmon Recovery Region

The Middle Columbia River Salmon Recovery Region is in central Washington along the east slope of the Cascade Mountains. The landscape is dominated by forests and dry, shrub-steppe hills with agriculture and urban development concentrated in the valleys. The region includes the Columbia, Yakima, Klickitat, and Big White Salmon Rivers, and Rock Creek. There are two lead entities in the region.

GREG_S - FLICKR

JIKIDO-SAN - FLICKR

Listed Fish

Steelhead (threatened) – 1999

Bull trout (threatened) – 1998

Major Factors Limiting Recovery

- Degraded floodplain and channel structure
- Riparian degradation
- Degraded water quality and temperature
- Impaired stream flows in tributaries
- Excessive sediment
- Barriers to fish passage in tributaries
- Impacts of mainstem flow regulation
- Mortality from Columbia River hydropower dams

Recovery Plan Snapshot

- Plan status – Steelhead recovery plan (DPS scale): adopted by the National Oceanic and Atmospheric Administration Fisheries Service in 2009. Federal draft bull trout recovery plan: status review underway.
- Time frame – 15 years
- Estimated cost – $406 million

Recovery Plan Implementation

Current five-year implementation schedule identifies $106 million in habitat project needs.

Regional Recovery Organization

Yakima Basin Fish and Wildlife Recovery Board

Federally Recognized Tribes

Yakama Nation

Counties

Benton, Kittitas, Yakima, and Klickitat

Threats to Salmon Recovery

Recovery in the Middle Columbia River Salmon Recovery Region is vulnerable to climate change impacts and impacts of diversions, storage, and river regulation for out-of-stream water users. Complex floodplain fish habitat also has been reduced due to flow changes and development. Major threats in this region are:

Climate Change will increase stream temperatures and tributary summer and fall low flows.

Human Population Growth and Development will contribute to changes in flows in the region's rivers due to irrigation water storage and delivery for farms and towns, and change hydrology for land use and development.

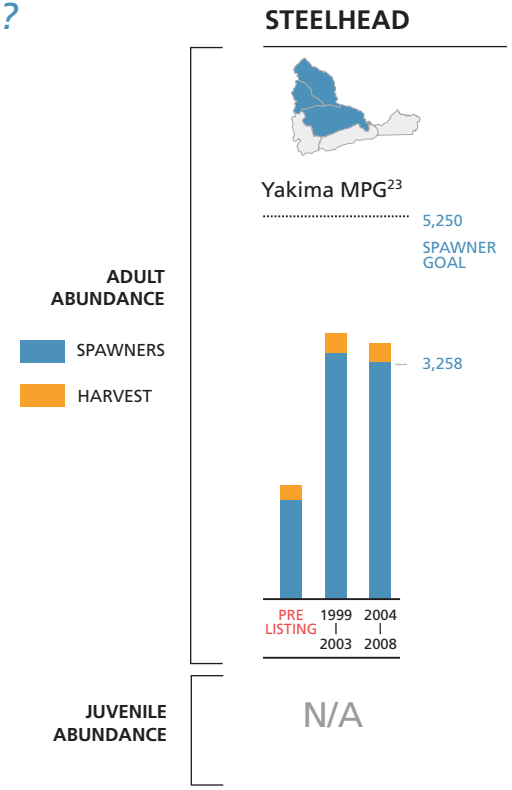
Uncertain Long-Term Funding for implementation of recovery actions (federal, state, and other sources) will challenge our ability to stay the course.

Are listed populations abundant and productive?

FISH:
ABUNDANCE TRENDS

- Graph shows wild adult and juvenile abundance data for the Yakima Major Population Group (MPG) of the Middle Columbia River's Distinct Population Segment (DPS). The DPS is the scale at which species are listed and de-listed under the federal Endangered Species Act.
- Data for the Walla Walla MPG can be found in the Snake River regional overview.
- Bar charts show the number of returning adult wild fish, separated by what was harvested and what returned to spawn.
- Juvenile data exist but are under review, and trends were not available for this report.

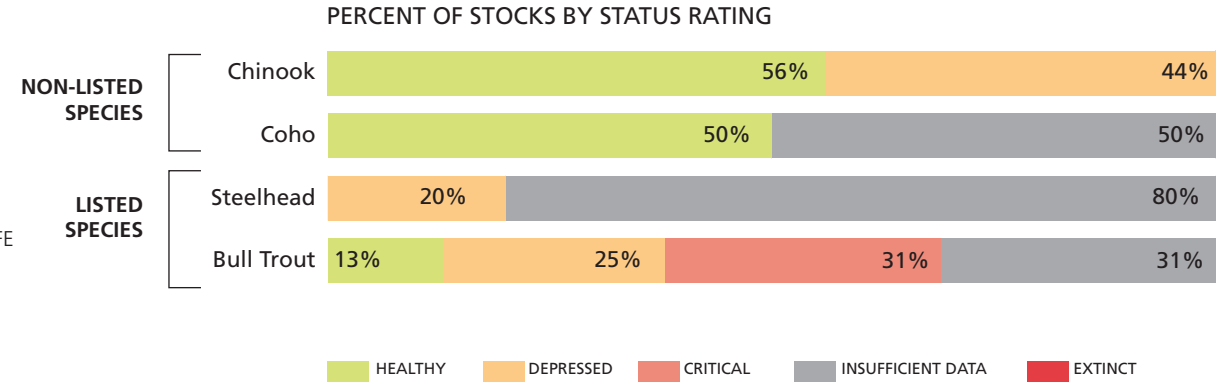
DATA SOURCES: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE AND TRIBES



FISH:
STATUS SUMMARY

- 2010 status ratings are determined by the Washington Department of Fish and Wildlife and tribes.
- Includes listed and non-listed species.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE



ARTESCIENZA - FLICKR

Is water clean enough to support wild salmon?

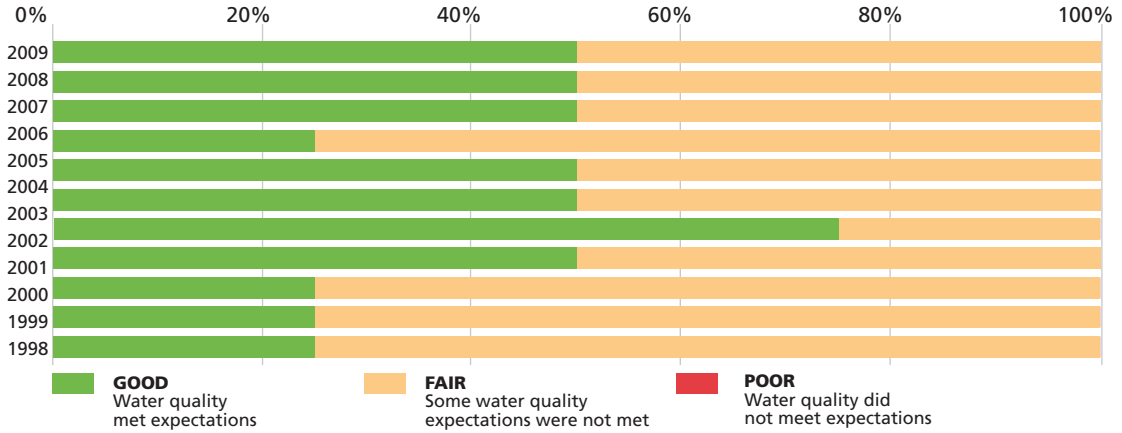
WATERSHED HEALTH:

WATER QUALITY

- Water quality is measured by a Water Quality Index. This is a number that aggregates water quality data at a monitoring station for temperature, acidity, fecal coliform bacteria, dissolved oxygen, nutrients, and sediments from October 1 to September 30.
- Only four sampling stations are reflected in this index.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY

PERCENT OF LONG-TERM FRESHWATER MONITORING STATIONS IN EACH RATING CATEGORY



What are trends in salmon funding?

PLAN IMPLEMENTATION:
FUNDING

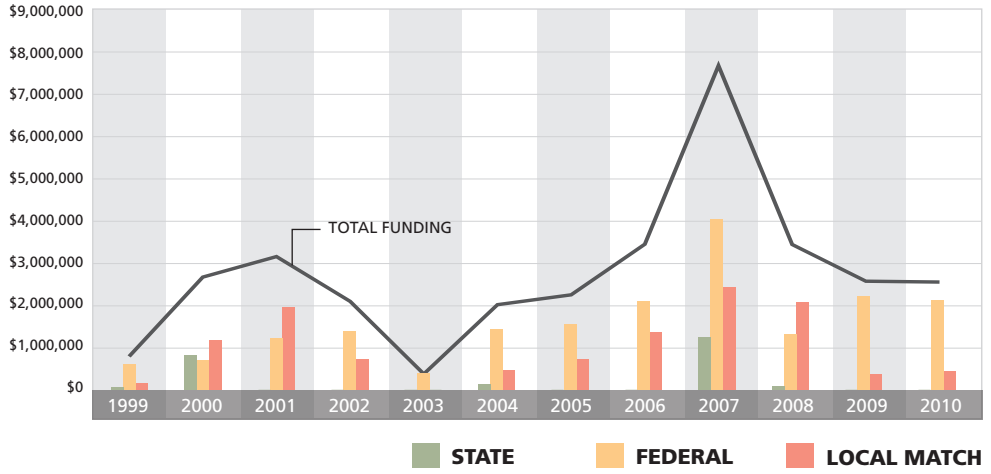
- Total Salmon Recovery Funding Board-related funding was $33 million in state and federal, and local match from 1999-2010. 2010 data are preliminary.
- Charts to the right reflect all money administered by the Salmon Recovery Funding Board through the Pacific Coastal Salmon Recovery Fund, salmon recovery fund (state match), Family Forest and Fish Passage Program, Pacific States Marine Fisheries Commission, and hatchery reform.
- The table of percentages below reflects funding from the Pacific Coastal Salmon Recovery Fund and salmon recovery fund (state match) only – the two primary funding sources for grants through the Salmon Recovery Funding Board. The large statewide monitoring projects funded by the board are reflected in the statewide funding overview, not in individual regional overviews.

DATA SOURCE: WASHINGTON RECREATION AND CONSERVATION OFFICE

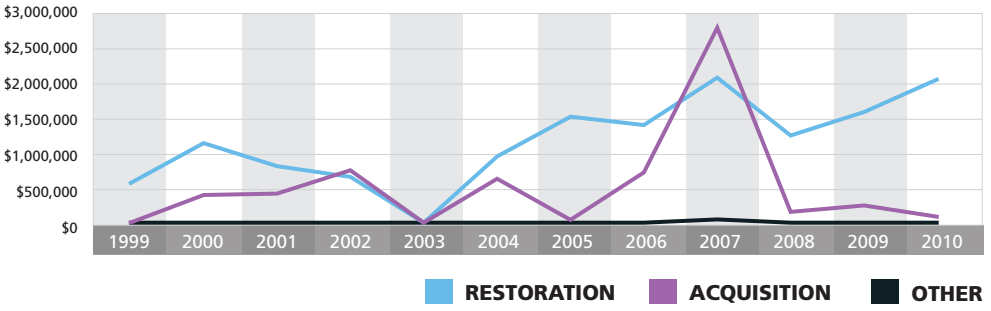
DISTRIBUTION OF PACIFIC COASTAL SALMON RECOVERY FUND AND SALMON RECOVERY FUND (STATE MATCH) BY CATEGORY

	PROJECTS	ADMIN.	MONITORING	TOTAL
1999	85%	15%	0%	$653,651
2000	100%	0%	0%	$1,518,908
2001	100%	0%	0%	$1,212,895
2002	100%	0%	0%	$1,391,281
2003	0%	0%	0%	$386,922
2004	100%	0%	0%	$1,559,588
2005	100%	0%	0%	$1,541,088
2006	100%	0%	0%	$2,094,437
2007	92%	8%	0%	$5,223,043
2008	100%	0%	0%	$1,387,975
2009	82%	18%	0%	$2,210,200
2010	100%	0%	0%	$2,114,319

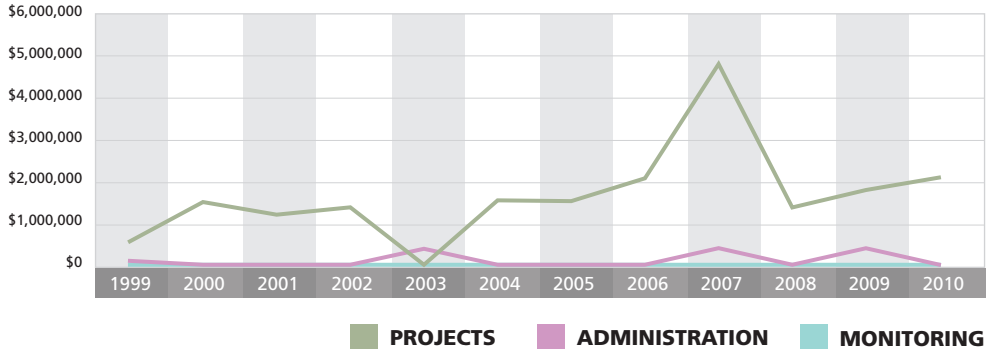
TOTAL FUNDING BY SOURCE *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



TOTAL FUNDING BY PROJECT TYPE *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



TOTAL FUNDING BY CATEGORY *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



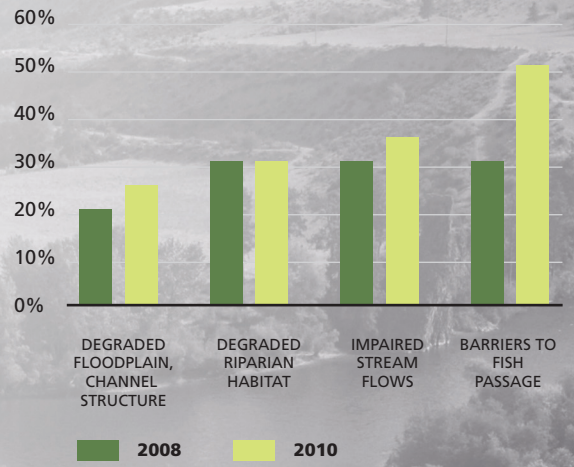
PLAN IMPLEMENTATION:

RECOVERY PLAN IMPLEMENTATION

- Major limiting factors are identified in recovery plans, and are based on federal listing determinations. These are the main habitat factors that must be addressed for recovery.
- Percentages are averages of progress toward implementing actions addressing each major habitat limiting factor. They do not reflect the biological response of fish.
- Estimates of progress are based on best professional judgement.
- Recovery plan implementation is relatively recent—from 4 to 6 years.

DATA SOURCE: YAKIMA BASIN FISH AND WILDLIFE RECOVERY BOARD

PROGRESS IN IMPLEMENTING RECOVERY ACTIONS BY MAJOR HABITAT LIMITING FACTOR



SCOTT BUTNER - FLICKR

PLAN IMPLEMENTATION:

WATERSHED PLANNING SUMMARY

Of the three full Water Resource Inventory Areas (WRIAs) and two partial WRIAs participating in the Watershed Planning Act, all have county-adopted watershed plans. The WRIAs are: Klickitat (30), Rock-Glade (31), Lower Yakima (37), Naches (38), and Upper Yakima (39 only that portion in Yakima County).

Watershed Planning Highlights and Outcomes

- Klickitat (WRIA 30): A water availability study is occurring and water budgets are being developed.
- Rock-Glade (WRIA 31): The planning unit and lead agency are conducting a water quality improvement and protection project for Rock Creek.
- Lower Yakima, Naches, and that part of Upper Yakima in Yakima County (WRIAs 37 and 39): The planning unit is not active, while other groups and entities in the basin carry on with water management work.

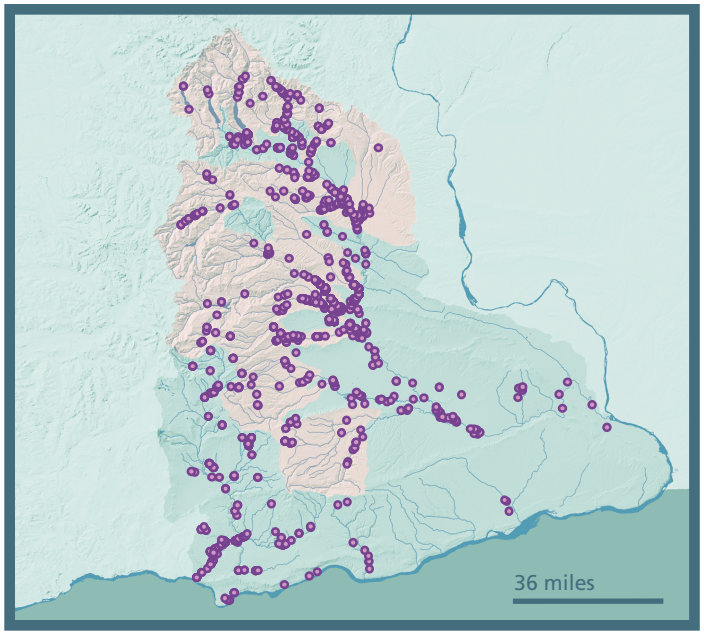
DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY

PLAN IMPLEMENTATION:

FISH PASSAGE AND HABITAT PROJECTS

- Map shows fish and habitat protection and restoration project locations from 2000 to 2010.

DATA SOURCES: WASHINGTON RECREATION AND CONSERVATION OFFICE, WASHINGTON DEPARTMENT OF FISH AND WILDLIFE, WASHINGTON DEPARTMENT OF NATURAL RESOURCES, NORTHWEST INDIAN FISHERIES COMMISSION, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, NORTHWEST FISHERIES SCIENCE CENTER, U.S. FOREST SERVICE, BONNEVILLE POWER ADMINISTRATION, REGIONAL FISHERIES ENHANCEMENT GROUPS



Are hydroelectric facilities operating in a fish friendly manner?

PLAN IMPLEMENTATION:

DAMS WITH FISH PASSAGE STANDARDS

- Mainstem Columbia River dams are not included in this regional indicator.
- Performance standards for passage vary by dam and may be set by a Federal Energy Regulatory Commission license, a Corps of Engineers 401 water quality certification, or a Habitat Conservation Program.
- Dams recently may have received new federal licenses with fish passage improvements to meet new standards, for which passage success is not yet determined.
- Many dams are operating in non-anadromous fish zones and are not included in this indicator.

	NO STANDARDS			HAVE STANDARDS			
	DON'T HAVE STANDARDS	STANDARDS UNDER NEGOTIATION	TOTAL	NOT MEETING STANDARDS	MEETING STANDARDS	CAN'T TELL IF MEETING STANDARDS	TOTAL
2008	1	0	**1**	N/A	N/A	N/A	**0**
2010	1	0	**1**	N/A	N/A	N/A	**0**

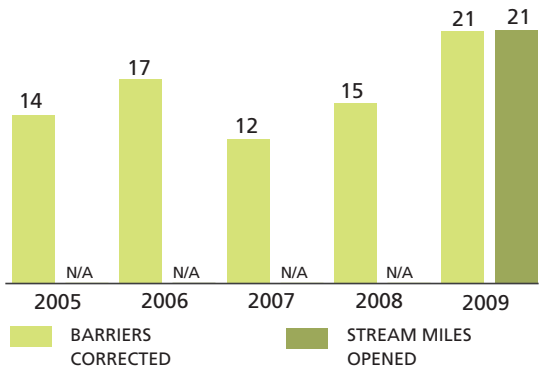
DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

Are streams accessible to wild salmon?

PLAN IMPLEMENTATION:

FISH PASSAGE BARRIERS

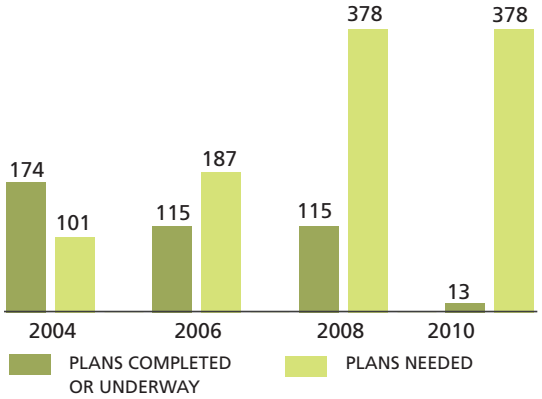
- Number of barriers corrected are estimates. Because of incomplete reporting, these numbers are expected to be lower than actual values.
- Stream miles opened reflects the number of miles estimated to be opened to fish passage by year.



DATA SOURCES: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE, WASHINGTON DEPARTMENT OF NATURAL RESOURCES, WASHINGTON DEPARTMENT OF TRANSPORTATION, WASHINGTON RECREATION AND CONSERVATION OFFICE, FORESTS AND FISH, U.S. FOREST SERVICE, BUREAU OF LAND MANAGEMENT

Is water clean enough to support wild salmon?

PLAN IMPLEMENTATION:
WATERSHED CLEANUP PLANS

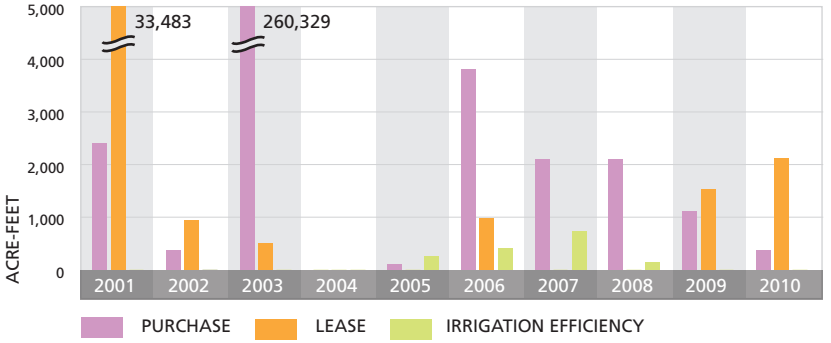


- Cleanup plans address water quality impairments covered by total maximum daily load management plans.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY

Do rivers and streams have flows that support wild salmon?

PLAN IMPLEMENTATION:
STREAMFLOW



- Water restored to streams includes water from purchases, donations, or leases. The focus is on summer low flow periods and in-stream reaches where water availability is a limiting factor for fish.
- An acre-foot is one foot of water covering one acre of land.
- 60 percent (3 of 5) of the WRIAs in the region have in-stream flows set (by the federal government).

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY

Do hatchery practices protect wild salmon?

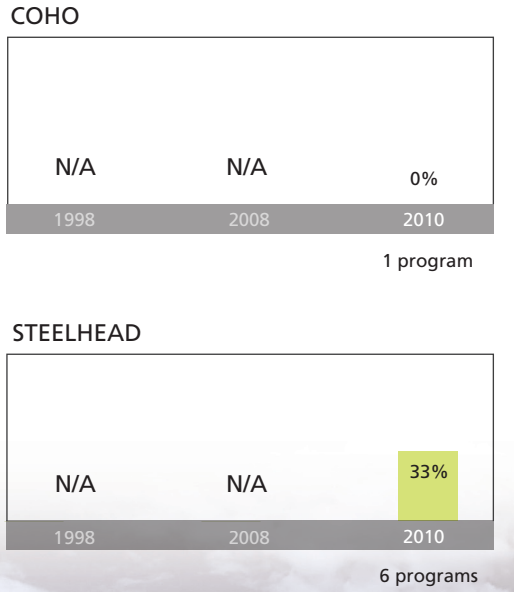
PLAN IMPLEMENTATION:

HATCHERY PROGRAMS MEETING SCIENTIFIC STANDARDS

- Standards are recommendations from the Hatchery Scientific Review Group, an independent scientific panel established and funded by Congress to assemble, organize, and apply the best available scientific information for hatchery reform.
- Programs are defined as a single release or group of smolt releases, that come from the same broodstock and are released in the same watershed. Releases from a broodstock into a different watershed, are considered to be independent hatchery programs.
- Data are for Washington Department of Fish and Wildlife hatchery programs.
- Washington Department of Fish and Wildlife data are not available at the regional scale prior to 2010.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

PERCENTAGE OF HATCHERY PROGRAMS MEETING STANDARDS



ABHINABA - FLICKR

Upper Columbia River Salmon Recovery Region

The Upper Columbia River Salmon Recovery Region in north central Washington includes the Columbia River and its tributaries upstream of the confluence of the Yakima River to the base of Chief Joseph Dam. The geography is varied and the climate includes extremes in temperatures and precipitation, with most precipitation falling in the mountains as snow. Melting snowpack, groundwater, and runoff maintain stream flows. A large portion of the land in the upper Columbia basin is in public ownership. There are three lead entities in the region.

STEVE VOGHT - FLICKR

BRAD MOHR - FLICKR

Listed Fish

Steelhead (threatened) – 1997

Spring Chinook (endangered) – 1999

Bull trout (threatened) – 1998

Major Factors Limiting Recovery

- Degraded floodplain and channel structure
- Riparian degradation
- Degraded water quality and temperature
- Impaired stream flows in tributaries
- Excessive sediment
- Barriers to fish passage in tributaries
- Harvest impacts
- Hatchery impacts
- Hydropower system mortality on Columbia River

Recovery Plan Snapshot

- Plan status – Steelhead recovery plan: adopted by the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service in 2007. Chinook recovery plan: adopted by NOAA Fisheries Service in 2007. Federal draft bull trout recovery plan: status review underway.
- Time frame – 10-30 years
- Estimated cost – $734 million over the next 10 years

Recovery Plan Implementation

Current three-year implementation schedule identifies $85 million in total habitat project needs.

Regional Recovery Organization

Upper Columbia Salmon Recovery Board

Federally Recognized Tribes

Confederated Tribes of the Colville Reservation, Yakama Nation

Counties

Chelan, Douglas, Okanogan

Threats to Salmon Recovery

Threats to salmon and steelhead recovery in the Upper Columbia River Salmon Recovery Region include climate change, the uncertainty of stable funding, and the potential challenges of coordination of activities between harvest, hatchery, hydropower, and habitat within the region and with other areas. Major threats in this region include:

Climate Change will decrease snowpack and associated flow, and increase stream temperatures.

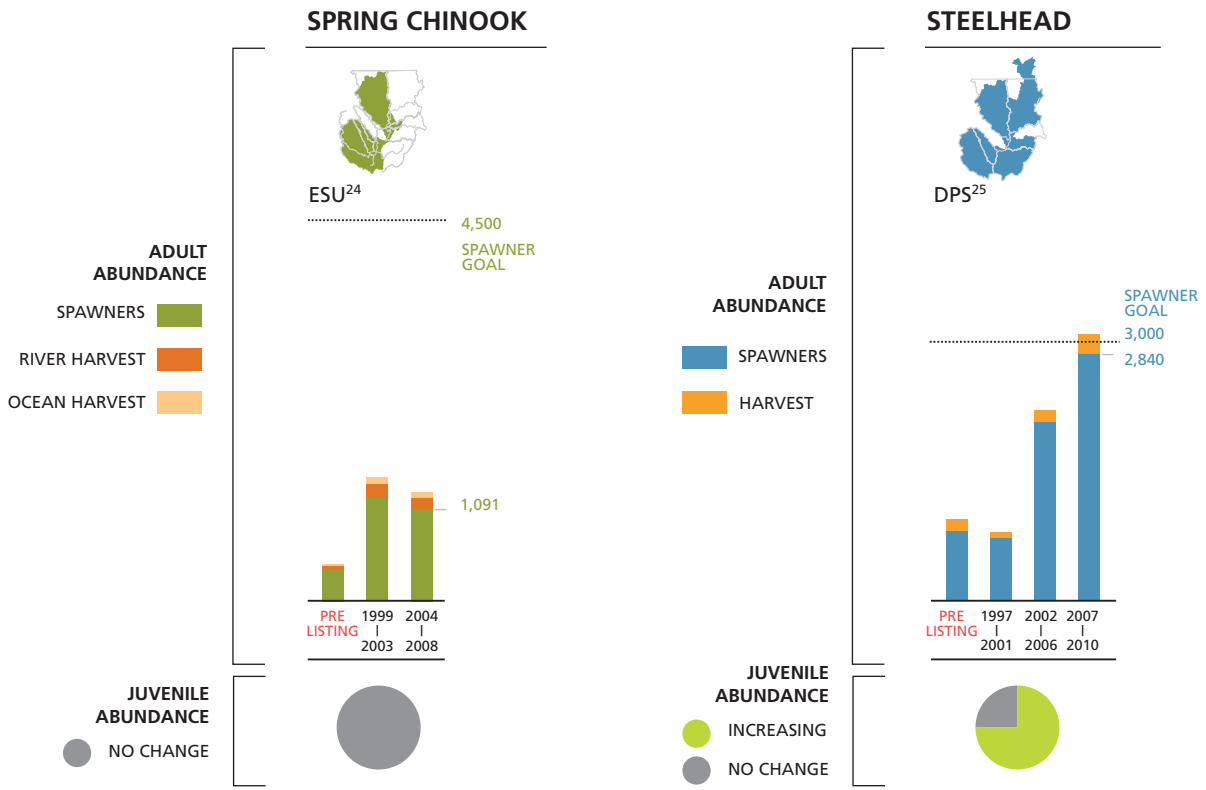
Hatchery Fish increase competition, disease, and genetic interactions with wild fish.

Uncertain Long-term Funding for implementation of recovery actions, especially larger, more complex projects (federal, state, and other sources), will challenge our ability to stay the course.

FISH:
ABUNDANCE TRENDS

- Graphs show wild adult and juvenile abundance data for species at the Evolutionarily Significant Unit (ESU) or Distinct Population Segment (DPS) scale. This is the scale at which species are listed and de-listed under the federal Endangered Species Act.
- Bar charts show the number of returning adult wild fish, separated by what was harvested and what returned to spawn.
- Pie charts show the percentage of juvenile sampling locations where trends have increased, decreased, or not changed. Juvenile data were available for all populations of each species (three for Chinook and four for steelhead) of each species.

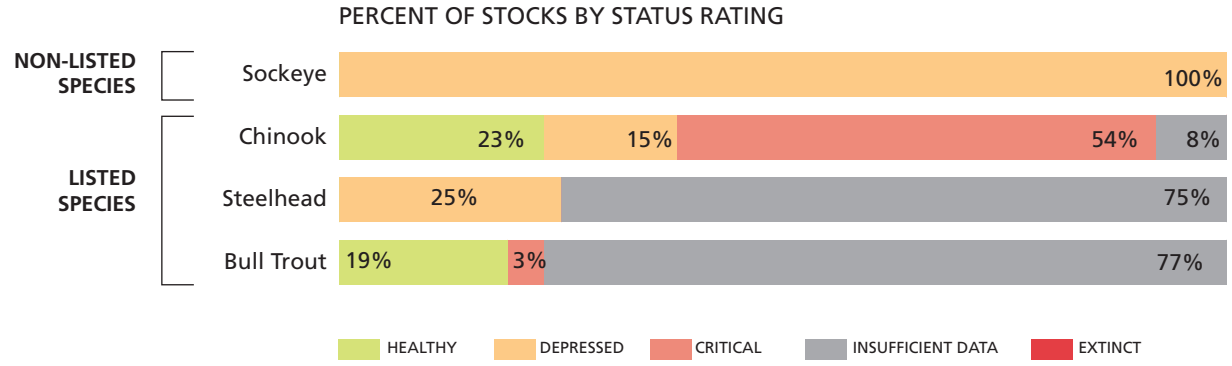
DATA SOURCES: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE AND TRIBES



FISH:
STATUS SUMMARY

- 2010 status ratings are determined by the Washington Department of Fish and Wildlife and tribes.
- Includes listed and non-listed species.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

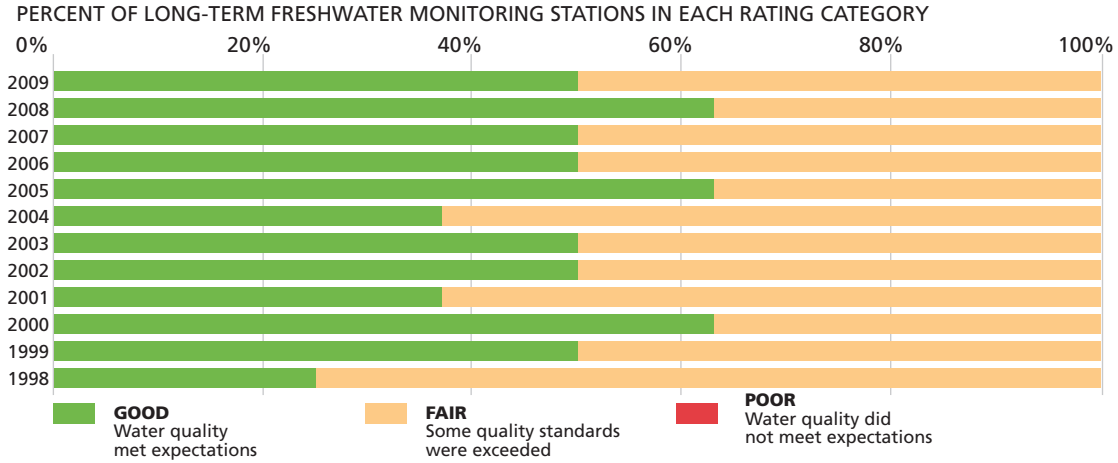


Is water clean enough to support wild salmon?

WATERSHED HEALTH:
WATER QUALITY

- Water quality is measured by a Water Quality Index. This is a number that aggregates water quality data at a monitoring station for temperature, acidity, fecal coliform bacteria, dissolved oxygen, nutrients, and sediments from October 1 to September 30.
- Eight sampling stations are reflected in this index.
- There are six sites requiring management for high water temperature.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY

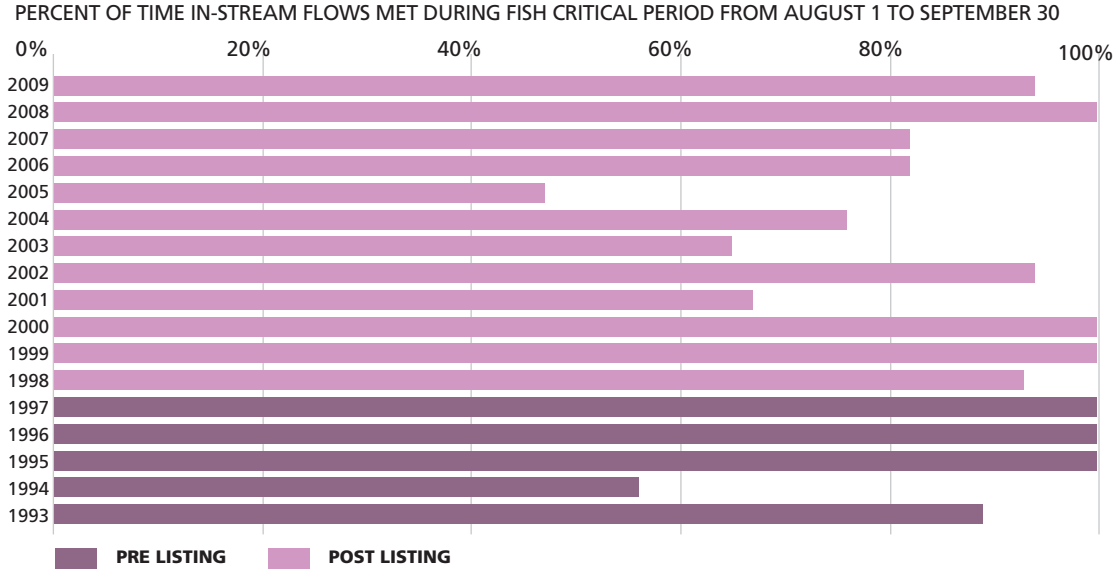


Do rivers and streams have flows that support wild salmon?

WATERSHED HEALTH:
WATER QUANTITY

- Most years based on 17 monitoring stations.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY



What are trends in salmon funding?

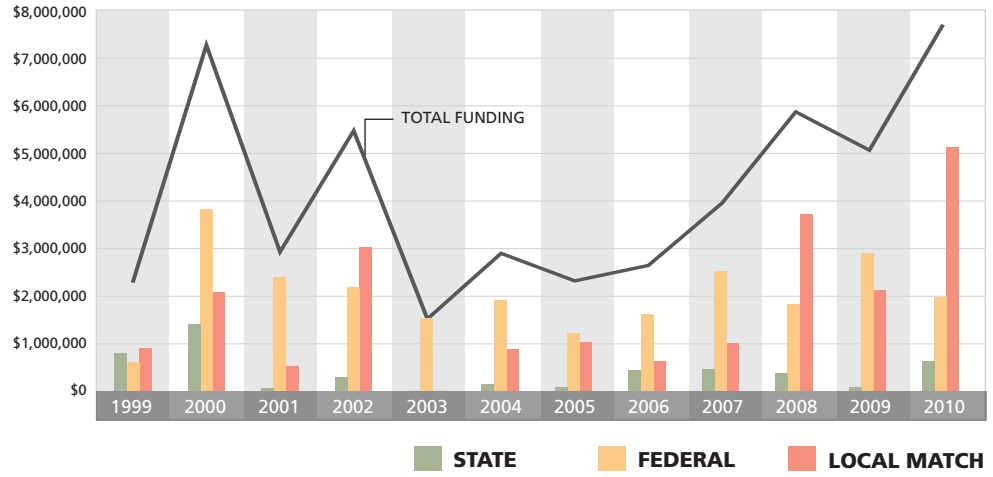
PLAN IMPLEMENTATION:

FUNDING

- Total Salmon Recovery Funding Board-related funding was $50 million in state and federal, and local match from 1999-2010. 2010 data are preliminary.
- Charts to the right reflect all money administered by the Salmon Recovery Funding Board through the Pacific Coastal Salmon Recovery Fund, salmon recovery fund (state match), Family Forest and Fish Passage Program, and hatchery reform.
- The table of percentages below reflects funding from the Pacific Coastal Salmon Recovery Fund and salmon recovery fund (state match) only – the two primary funding sources for grants through the Salmon Recovery Funding Board. The large statewide monitoring projects funded by the board are reflected in the statewide funding overview, not in individual regional overviews.

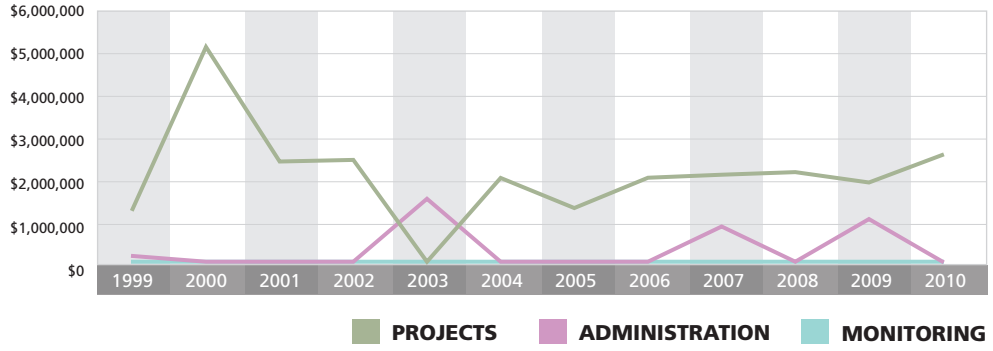
DATA SOURCE: WASHINGTON RECREATION AND CONSERVATION OFFICE

TOTAL FUNDING BY SOURCE *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



TOTAL FUNDING BY PROJECT TYPE *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*

TOTAL FUNDING BY CATEGORY *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



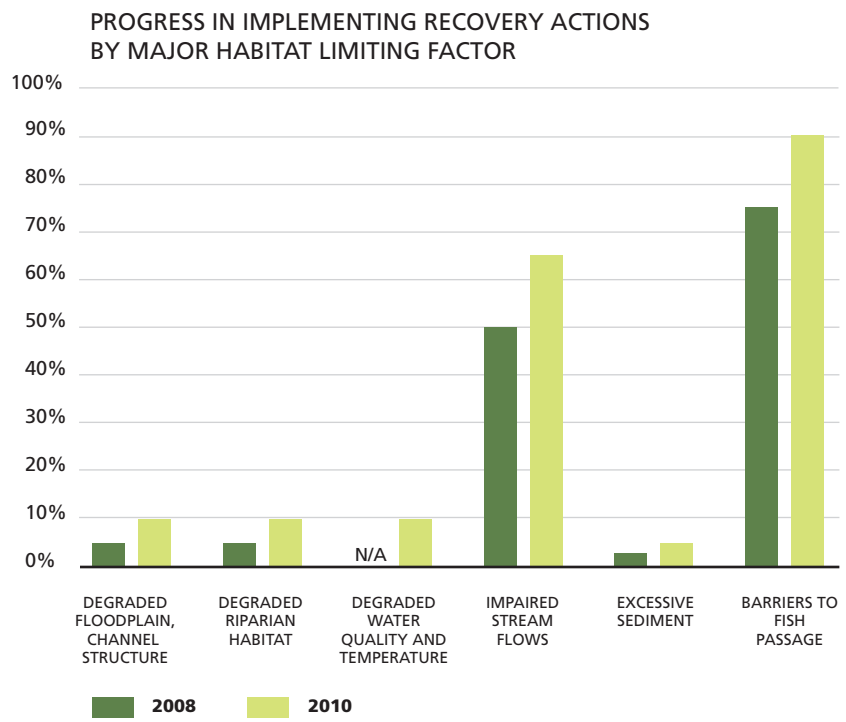
DISTRIBUTION OF PACIFIC COASTAL SALMON RECOVERY FUND AND SALMON RECOVERY FUND (STATE MATCH) BY CATEGORY

	PROJECTS	ADMIN.	MONITORING	TOTAL
1999	90%	10%	0%	$1,402,228
2000	100%	0%	0%	$5,200,665
2001	100%	0%	0%	$2,426,794
2002	0%	0%	0%	$2,466,086
2003	0%	0%	0%	$1,523,723
2004	100%	0%	0%	$1,975,693
2005	100%	0%	0%	$1,217,456
2006	100%	0%	0%	$1,741,386
2007	71%	29%	0%	$2,960,048
2008	100%	0%	0%	$2,170,000
2009	65%	35%	0%	$2,952,400
2010	100%	0%	0%	$2,589,402

Are public resources used cost-effectively and efficiently?

PLAN IMPLEMENTATION:

RECOVERY PLAN IMPLEMENTATION



- Major limiting factors are identified in recovery plans, and are based on federal listing determinations. These are the main habitat factors that must be addressed for recovery.
- Percentages are averages of progress toward implementing actions addressing each major habitat limiting factor. They do not represent the biological response of fish.
- Estimates of progress are based on best professional judgement.
- Recovery plan implementation is relatively recent—from 4 to 6 years.

DATA SOURCE: UPPER COLUMBIA SALMON RECOVERY BOARD

ELISFANCLUB - FLICKR

PLAN IMPLEMENTATION:

WATERSHED PLANNING SUMMARY

In-stream flow rules were developed based on the Watershed Planning Act in Wenatchee and Entiat Water Resource Inventory Areas (WRIA) (45 and 46).

All six Water Resource Inventory Areas in the salmon recovery region are participating in the Watershed Planning Act and have adopted plans. The WRIAs are: Moses Coulee (44), Wenatchee (45), Entiat (46), Methow (48), and Foster Creek (50). The Okanogan (WRIA 49) plan was adopted by the county but is not deemed adequate by the state.

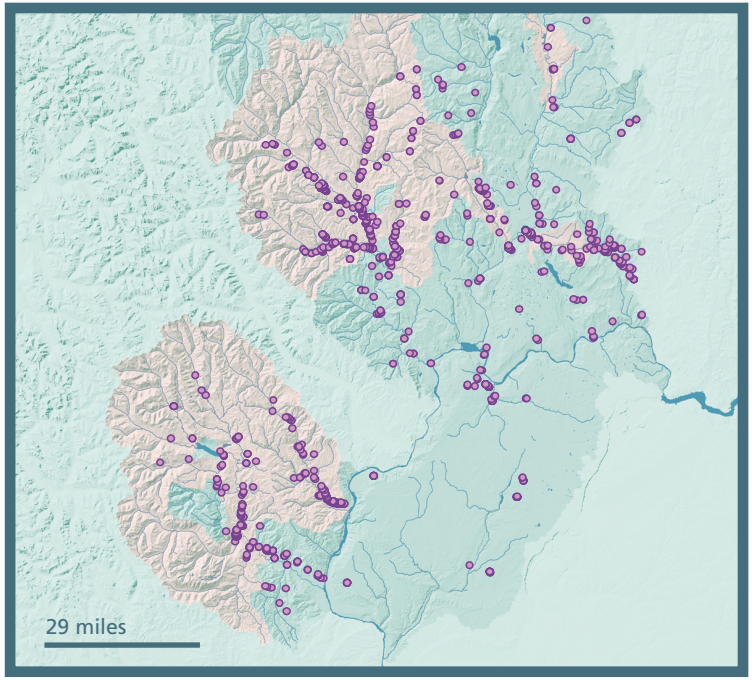
Watershed Planning Highlights and Outcomes

- Moses Coulee/Foster Creek (WRIAs 44 and 50): The watershed planning group is developing in-stream flow recommendations and conducting wetland assessments.
- Wenatchee (WRIA 45): The planning unit and lead agency are working on hydro-geologic monitoring, outreach, water quality studies, and a method to track water use held in an in-stream flow domestic water reservation system.
- Entiat (WRIA 46): The planning group is implementing its Detailed Implementation Plan with project grants.
- Methow (WRIA 48): The planning group is studying the current in-stream flow rule and developing amendment language to address a reach-by-reach domestic water use reservation system.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY

PLAN IMPLEMENTATION:

FISH PASSAGE AND HABITAT PROJECTS



- Map shows fish and habitat protection and restoration project locations from 2000 to 2010.

DATA SOURCES: WASHINGTON RECREATION AND CONSERVATION OFFICE, WASHINGTON DEPARTMENT OF FISH AND WILDLIFE, WASHINGTON DEPARTMENT OF NATURAL RESOURCES, NORTHWEST INDIAN FISHERIES COMMISSION, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, NORTHWEST FISHERIES SCIENCE CENTER, U.S. FOREST SERVICE, BONNEVILLE POWER ADMINISTRATION, REGIONAL FISHERIES ENHANCEMENT GROUPS

Are hydroelectric facilities operating in a fish friendly manner?

PLAN IMPLEMENTATION:

DAMS WITH FISH PASSAGE STANDARDS

- This indicator is intended to show large dams in tributaries requiring a Federal Energy Regulatory Commission license or other similar license or permit.
- Mainstem Columbia River dams are not included in this regional indicator.
- Many dams are operating in non-anadromous fish zones and are not included in this indicator.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

	NO STANDARDS			HAVE STANDARDS			
	DON'T HAVE STANDARDS	STANDARDS UNDER NEGOTIATION	TOTAL	NOT MEETING STANDARDS	MEETING STANDARDS	CAN'T TELL IF MEETING STANDARDS	TOTAL
2008	N/A	N/A	0	N/A	N/A	N/A	0
2010	N/A	N/A	0	N/A	N/A	N/A	0

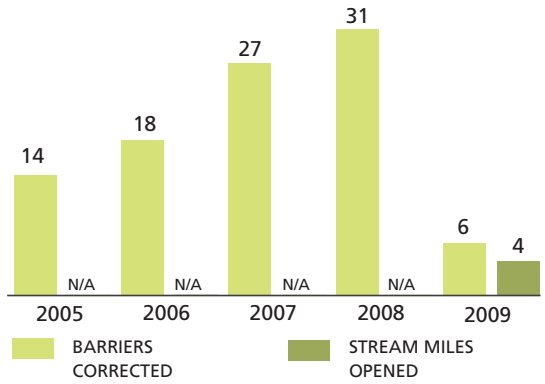
Are streams accessible to wild salmon?

PLAN IMPLEMENTATION:

FISH PASSAGE BARRIERS

- Number of barriers corrected are estimates. Because of incomplete reporting, these numbers are expected to be lower than actual values.
- Stream miles opened reflects the number of miles estimated to be opened to fish passage by year.

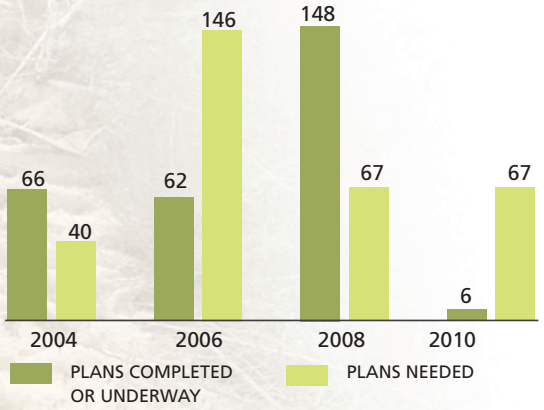
DATA SOURCES: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE, WASHINGTON DEPARTMENT OF NATURAL RESOURCES, WASHINGTON DEPARTMENT OF TRANSPORTATION, WASHINGTON RECREATION AND CONSERVATION OFFICE, FORESTS AND FISH, U.S. FOREST SERVICE, BUREAU OF LAND MANAGEMENT



Is water clean enough to support wild salmon?

PLAN IMPLEMENTATION:

WATERSHED CLEANUP PLANS



- Cleanup plans address water quality impairments covered by total maximum daily load management plans.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY

VHHAMMER - FLICKR

Do hatchery practices protect wild salmon?

PLAN IMPLEMENTATION:

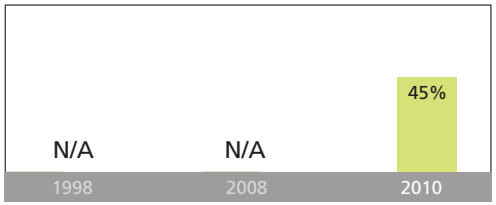
HATCHERY PROGRAMS MEETING SCIENTIFIC STANDARDS

- Standards are recommendations from the Hatchery Scientific Review Group, an independent scientific panel established and funded by Congress to assemble, organize, and apply the best available scientific information for hatchery reform.
- Programs are defined as a single release or group of smolt releases, that come from the same broodstock and are released in the same watershed. Releases from a broodstock into a different watershed, are considered to be independent hatchery programs.
- Data are for Washington Department of Fish and Wildlife programs.
- Washington Department of Fish and Wildlife data are not available at the regional scale prior to 2010.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

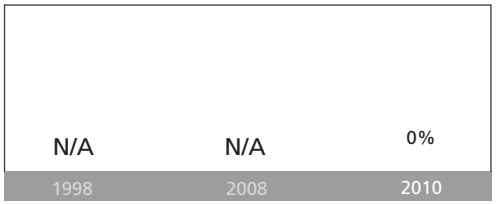
PERCENTAGE OF HATCHERY PROGRAMS MEETING STANDARDS

CHINOOK



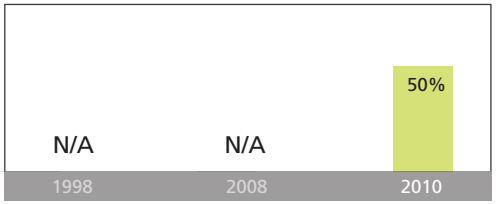
11 programs

COHO



1 program

STEELHEAD

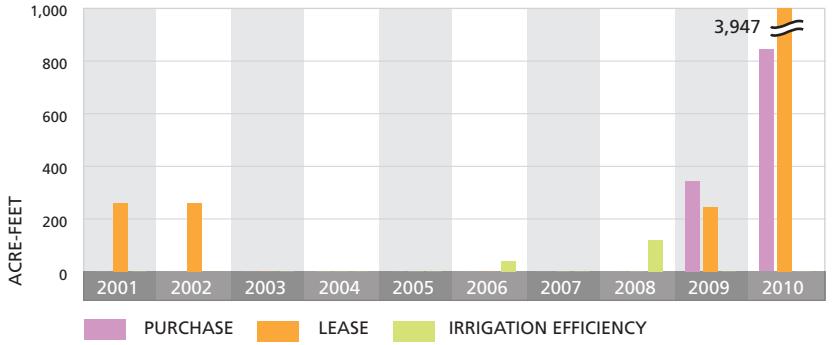


4 programs

Do rivers and streams have flows that support wild salmon?

PLAN IMPLEMENTATION:

STREAMFLOW



- Water restored to streams includes water from purchases, donations, or leases. The focus is on summer low flow periods and in-stream reaches where water availability is a limiting factor for fish.
- An acre-foot is one foot of water covering one acre of land.
- 67 percent (4 of 6) of the WRIAs have in-stream flows set.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY

Snake River Salmon Recovery Region

The Snake River Salmon Recovery Region is in the southeastern corner of Washington. Rolling, semi-arid crop and pasture lands are flanked by the forested Blue Mountains to the south. The Snake River is a major transportation corridor for many of the region's products, which are barged downstream to Columbia River ports. The recovery region is sparsely populated, with residents scattered throughout the area in communities of less than 1,000 people or clustered in a few larger cities. The recovery plan covers the Walla Walla portion of the middle Columbia River steelhead listing in Washington. There is one lead entity in the region, which is also the regional recovery organization.

SCOTT BUHNER - FLICKR

Listed Fish

Steelhead, Snake River (threatened) – 1997

Steelhead, Middle Columbia (threatened) – 1997

Sockeye (endangered) – 1991[26]

Spring Chinook (threatened) – 1992

Fall Chinook (threatened) – 1992[27]

Bull trout (threatened) – 1998

Major Factors Limiting Recovery

- Degraded floodplain and channel structure
- Riparian degradation
- Degraded water quality and temperature
- Impaired stream flows in tributaries
- Excessive sediment
- Barriers to fish passage in tributaries
- Harvest impacts
- Hydropower system fish mortality on Columbia River

Recovery Plan Snapshot

- Plan status – Washington portions of Snake River steelhead, and Chinook: adopted as interim recovery plan by the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service in 2006. Middle Columbia River steelhead (DPS scale) recovery plan: adopted by NOAA Fisheries Service in 2009. Federal draft bull trout recovery plan: status review underway.
- Time frame – 15 years
- Estimated cost – $206 million for first 10 years

Recovery Plan Implementation

Current three-year implementation schedule identifies $44 million in habitat project needs

Regional Recovery Organization

Snake River Salmon Recovery Board

Federally Recognized Tribes

Nez Perce and Confederated Tribes of the Umatilla Reservation

Counties

Walla Walla, Columbia, Garfield, Asotin, and portions of Whitman

Threats to Salmon Recovery

Recovery of Snake River salmon and steelhead is vulnerable to the loss of refuge watersheds, federal levee vegetation policies, and the dependency on cooperative agreements and fragile relationships with private landowners to implement recovery actions. Major threats in this region include:

Climate Change will increase stream temperatures and force flow changes that impact salmon.

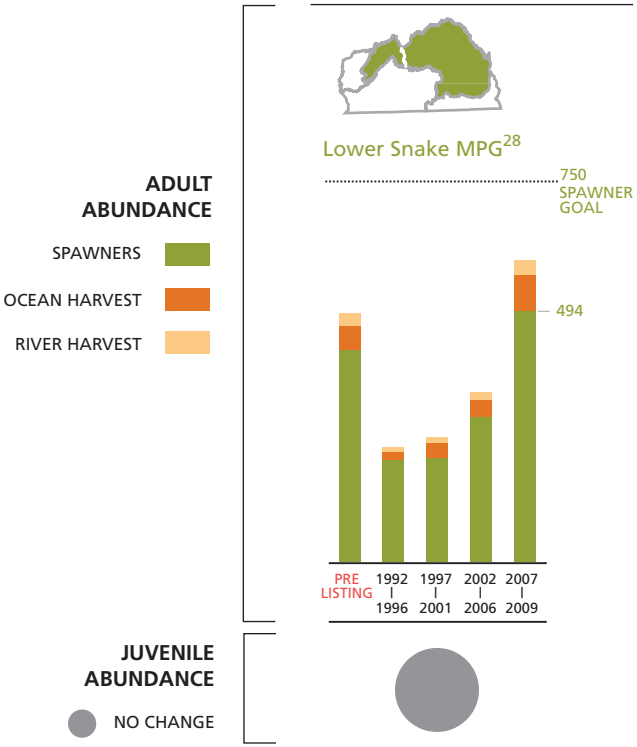
Human Population Growth and Development will lead to increased water allocations, and challenge the adequacy, implementation, and enforcement of land use regulations.

Ecological Interactions increase invasive species and predation effects on wild fish.

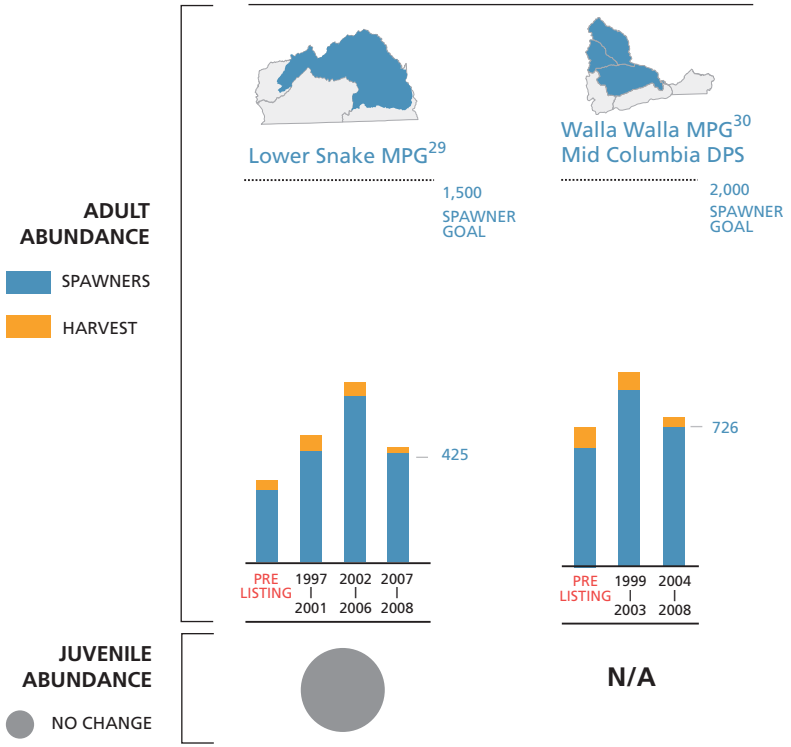
Uncertain Long-Term Funding for implementation of recovery actions (federal, state, and other sources) will challenge our ability to stay the course.

FISH: ABUNDANCE

SPRING AND SUMMER CHINOOK



STEELHEAD



- Graphs show wild adult and juvenile abundance for Major Population Groups (MPGs) for Evolutionarily Significant Units (ESU) or Distinct Population Segments (DPS). ESUs and DPSs are the scale at which species are listed and de-listed under the federal Endangered Species Act.
- Bar charts show the number of returning adult wild fish, separated by what was harvested and what returned to spawn.
- Pie charts show the percentage of juvenile sampling locations where trends have increased, decreased, or not changed. Juvenile data generally are not available for all populations of each species. Trends in juvenile Chinook data were available for two populations in the MPG. Juvenile steelhead data were available for two populations in the Lower Snake MPG. No juvenile trend data was available for steelhead in the Walla Walla MPG.

DATA SOURCES: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE AND TRIBES

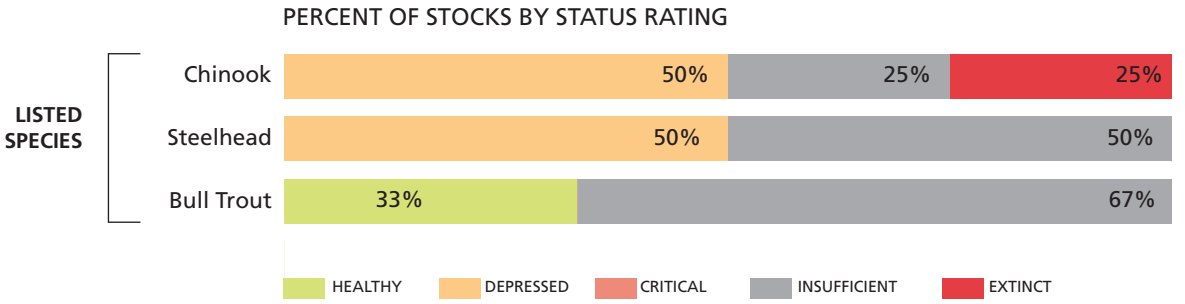
Are listed populations abundant and productive?

FISH:

STATUS SUMMARY

- 2010 status ratings are determined by the Washington Department of Fish and Wildlife and tribes.
- Includes listed and non-listed species.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE



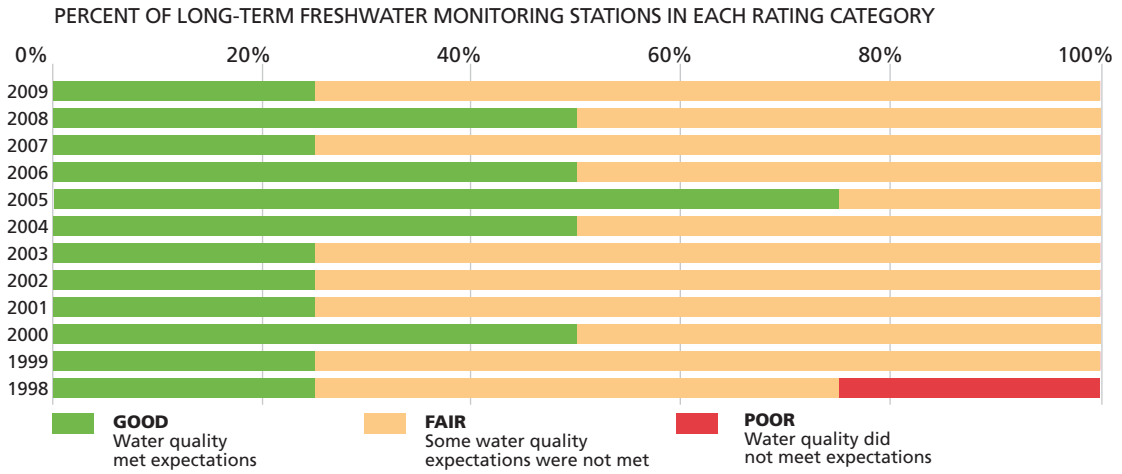
Is water clean enough to support wild salmon?

WATERSHED HEALTH:

WATER QUALITY

- Water quality is measured by a Water Quality Index. This is a number that aggregates water quality data at a monitoring station for temperature, acidity, fecal coliform bacteria, dissolved oxygen, nutrients, and sediments from October 1 to September 30.
- Only four sampling stations are reflected in this index.
- There are 67 sites requiring management for high water temperatures.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY



What are trends in salmon funding?

PLAN IMPLEMENTATION:
FUNDING

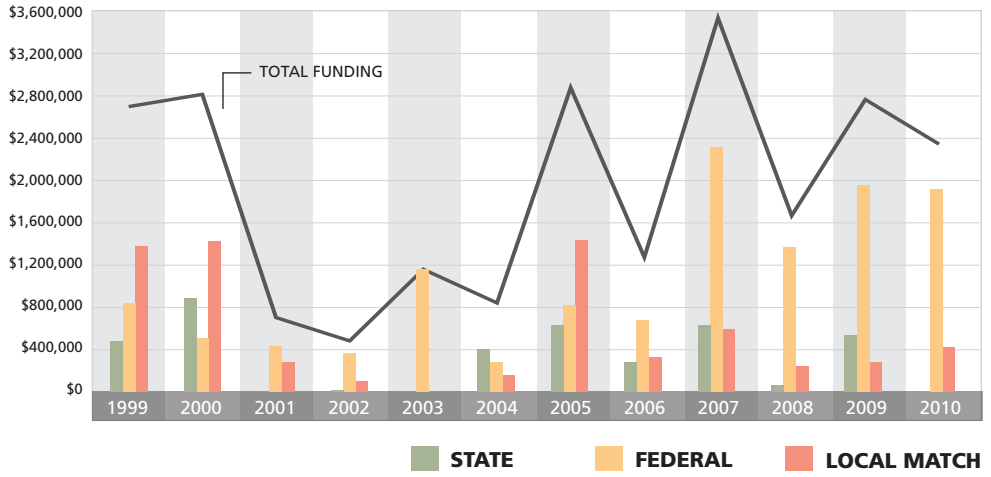
- Total Salmon Recovery Funding Board-related funding was $23 million in state and federal, and local match from 1999-2010. 2010 data are preliminary.
- Charts to the right reflect all money administered by the Salmon Recovery Funding Board through the Pacific Coastal Salmon Recovery Fund, salmon recovery fund (state match), Family Forest and Fish Passage Program, Pacific States Marine Fisheries Commission, and hatchery reform.
- The table of percentages below reflects funding from the Pacific Coastal Salmon Recovery Fund and salmon recovery fund (state match) only – the two primary funding sources for grants through the Salmon Recovery Funding Board. The large statewide monitoring projects funded by the board are reflected in the statewide funding overview, not in individual regional overviews.

DATA SOURCE: WASHINGTON RECREATION AND CONSERVATION OFFICE

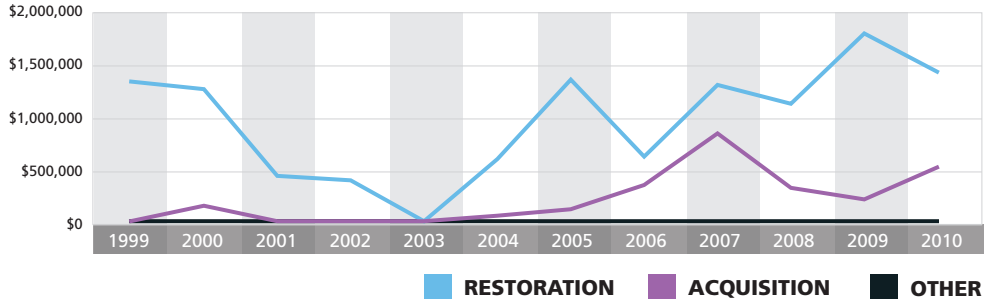
DISTRIBUTION OF PACIFIC COASTAL SALMON RECOVERY FUND AND SALMON RECOVERY FUND (STATE MATCH) BY CATEGORY

	PROJECTS	ADMIN.	MONITORING	TOTAL
1999	100%	0%	0%	$1,318,840
2000	100%	0%	0%	$1,392,613
2001	100%	0%	0%	$427,660
2002	0%	0%	0%	$386,211
2003	0%	0%	0%	$1,160,289
2004	92%	8%	0%	$562,670
2005	100%	0%	0%	$1,431,998
2006	100%	0%	0%	$812,724
2007	77%	23%	0%	$2,760,011
2008	100%	0%	0%	$1,423,693
2009	93%	7%	0%	$1,957,900
2010	100%	0%	0%	$1,919,475

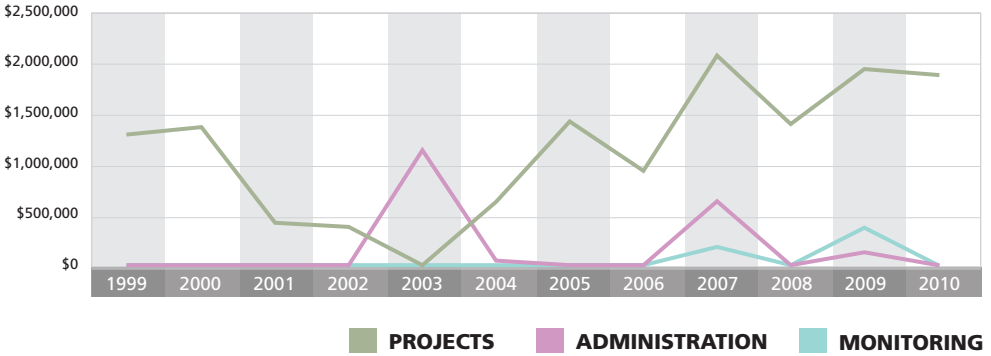
TOTAL FUNDING BY SOURCE *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



TOTAL FUNDING BY PROJECT TYPE *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



TOTAL FUNDING BY CATEGORY *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



Are public resources used cost-effectively and efficiently?

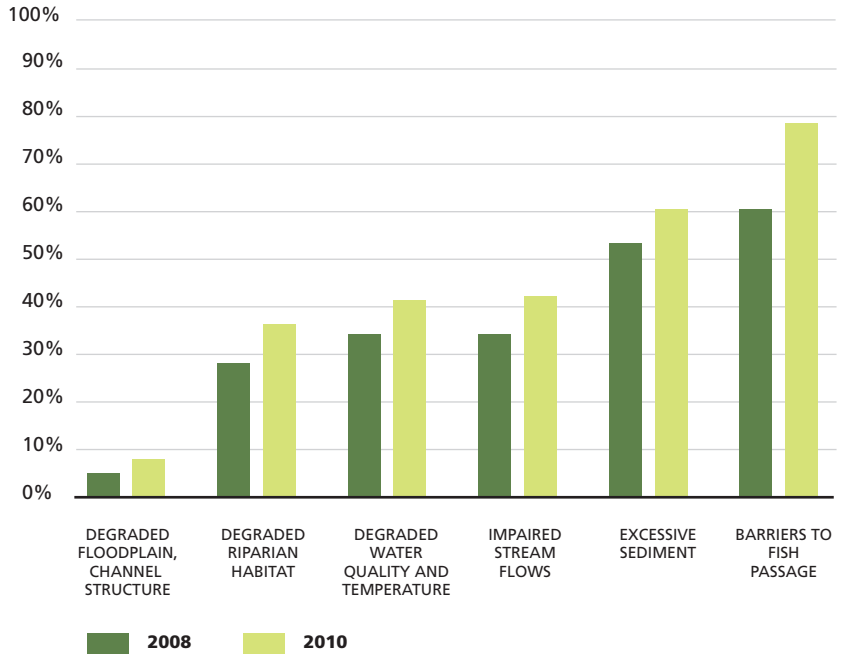
PLAN IMPLEMENTATION:

RECOVERY PLAN IMPLEMENTATION

- Major limiting factors are identified in recovery plans, and are based on the National Oceanic and Atmospheric Administration listing determinations. These are the main habitat factors that must be addressed for recovery.
- Percentages are averages of progress toward implementing actions addressing each major habitat limiting factor. They do not reflect the biological response of fish.
- Estimates of progress are based on best professional judgement.
- Recovery plan implementation is relatively recent—from 4 to 6 years.

DATA SOURCE: SNAKE RIVER SALMON RECOVERY BOARD

PROGRESS IN IMPLEMENTING RECOVERY ACTIONS
BY MAJOR HABITAT LIMITING FACTOR



Are public resources used cost-effectively and efficiently?

PLAN IMPLEMENTATION:

WATERSHED PLANNING SUMMARY

An in-stream flow rule was developed based on the Watershed Planning Act in the Walla Walla Water Resource Inventory Area (WRIA) 32.

Two WRIAs are participating in the Watershed Planning Act, and both have county-adopted watershed plans. The WRIAs are: Walla Walla (32) and Middle Snake (35).

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY

Watershed Planning Highlights and Outcomes

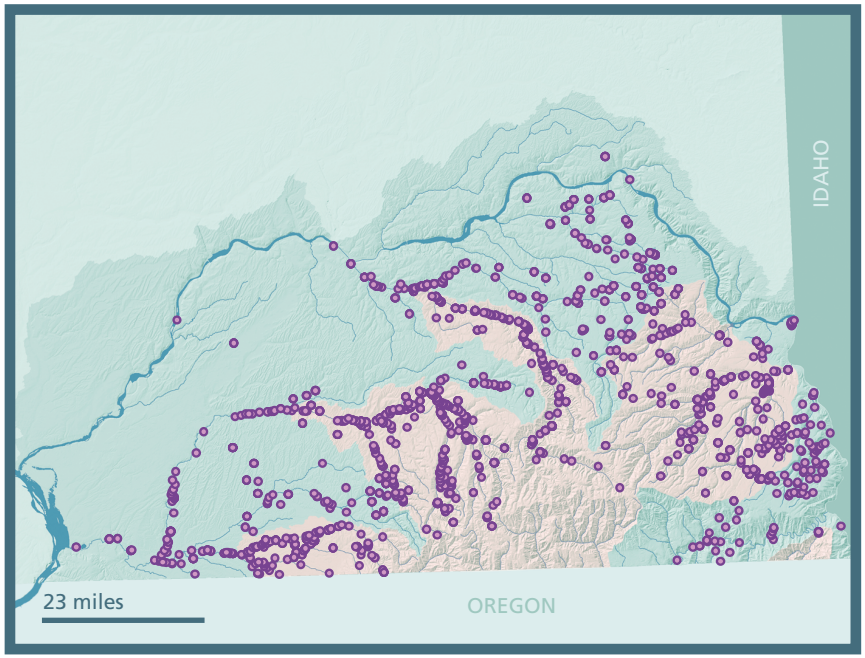
- Walla Walla (WRIA 32): The Watershed Planning Unit evolved into the Walla Walla Watershed Partnership, a separate entity that received funding to continue plan implementation.
- Middle Snake (WRIA 35): The planning group is working on in-stream flow stream discharge values for several upland tributaries.

PLAN IMPLEMENTATION:

FISH PASSAGE AND HABITAT PROJECTS

- Map shows fish and habitat protection and restoration project locations from 2000 to 2010.

DATA SOURCES: WASHINGTON RECREATION AND CONSERVATION OFFICE, WASHINGTON DEPARTMENT OF FISH AND WILDLIFE, WASHINGTON DEPARTMENT OF NATURAL RESOURCES, NORTHWEST INDIAN FISHERIES COMMISSION, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, NORTHWEST FISHERIES SCIENCE CENTER, U.S. FOREST SERVICE, BONNEVILLE POWER ADMINISTRATION, REGIONAL FISHERIES ENHANCEMENT GROUPS



Fish Passage and Habitat Projects

Priority Habitat Areas

Are hydroelectric facilities operating in a fish friendly manner?

PLAN IMPLEMENTATION:

DAMS WITH FISH PASSAGE STANDARDS

- This indicator is intended to show large dams in tributaries requiring a Federal Energy Regulatory Commission license or other similar license or permit.
- Mainstem Snake River dams are not included in this regional indicator.
- Many dams are operating in non-anadromous fish zones and are not included in this indicator.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

	NO STANDARDS			HAVE STANDARDS			
	DON'T HAVE STANDARDS	STANDARDS UNDER NEGOTIATION	TOTAL	NOT MEETING STANDARDS	MEETING STANDARDS	CAN'T TELL IF MEETING STANDARDS	TOTAL
2008	N/A	N/A	0	N/A	N/A	N/A	0
2010	N/A	N/A	0	N/A	N/A	N/A	0

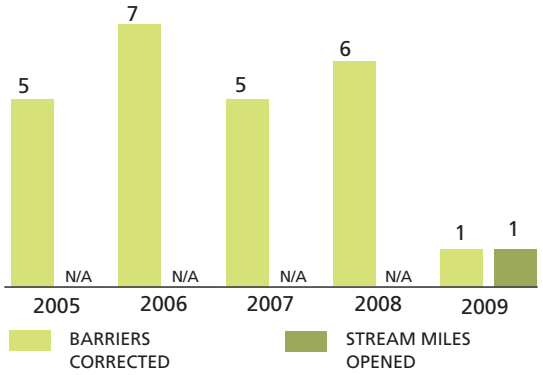
Are streams accessible to wild salmon?

PLAN IMPLEMENTATION:

FISH PASSAGE BARRIERS

- Number of barriers corrected are estimates. Because of incomplete reporting, these numbers are expected to be lower than actual values.
- Stream miles opened reflects the number of miles estimated to be opened to fish passage by year.

DATA SOURCES: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE, WASHINGTON DEPARTMENT OF NATURAL RESOURCES, WASHINGTON DEPARTMENT OF TRANSPORTATION, WASHINGTON RECREATION AND CONSERVATION OFFICE, FORESTS AND FISH, U.S. FOREST SERVICE, BUREAU OF LAND MANAGEMENT



CRUIZNBYE - FLICKR

Do hatchery practices protect wild salmon?

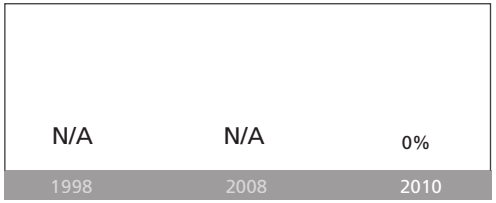
PLAN IMPLEMENTATION:

HATCHERY PROGRAMS MEETING SCIENTIFIC STANDARDS

- Standards are recommendations from the Hatchery Scientific Review Group, an independent scientific panel established and funded by Congress to assemble, organize, and apply the best available scientific information for hatchery reform.
- Programs are defined as a single release or group of smolt releases, that come from the same broodstock and released in the same watershed. Releases from a broodstock into a different watershed are considered to be independent hatchery programs.
- Washington Department of Fish and Wildlife data are not available at the regional scale prior to 2010.

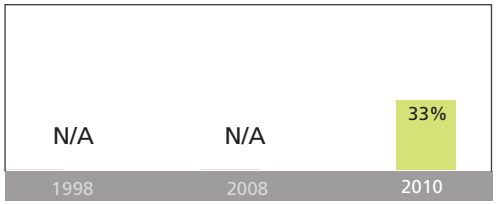
PERCENTAGE OF HATCHERY PROGRAMS MEETING STANDARDS

CHINOOK



2 programs

STEELHEAD



3 programs

- Data are for Washington Department of Fish and Wildlife hatchery programs.

DATA SOURCE:
WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

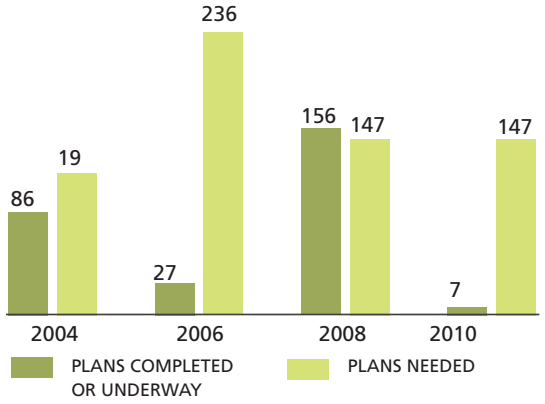
Is water clean enough to support wild salmon?

PLAN IMPLEMENTATION:

WATERSHED CLEANUP PLANS

- Cleanup plans address water quality impairments covered by total maximum daily load management plans.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY



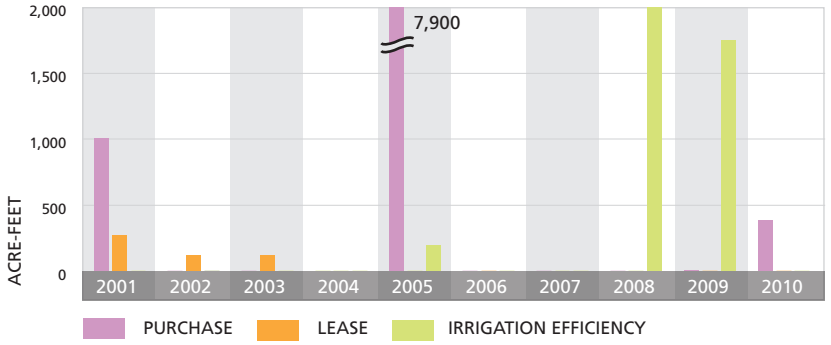
Do rivers and streams have flows that support wild salmon?

PLAN IMPLEMENTATION:

STREAMFLOW

- Water restored to streams includes water from purchases, donations, or leases. The focus is on summer low flow periods and in-stream reaches where water availability is a limiting factor for fish.
- An acre-foot is one foot of water covering one acre of land.
- 33 percent (1 of 3) of the WRIAs in the region have in-stream flows set.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY



Northeast Washington Salmon Recovery Region

The Northeast Washington Salmon Recovery Region encompasses the Columbia River and its tributaries above Chief Joseph Dam to the Canadian border, Spokane River and its tributaries upstream to Post Falls Dam, and the Pend Oreille River and its tributaries from the Canadian border upstream to Albeni Falls Dam. It includes mountain ranges with elevations from 5,000 to 7,000 feet. The Pend Oreille River is the second largest river in Washington and flows for 155 miles from its headwaters at Lake Pend Oreille to the confluence with the Columbia River in British Columbia. The region is mostly rural with large areas of forested mountains and valleys of open pasture. There is one lead entity in the region, but no regional salmon recovery organization.

DAVID B LAINE - FLICKR

Listed Fish

Bull trout (threatened) – 1998

Recovery Plan Snapshot

- Plan status – Federal draft bull trout recovery plan: status review underway.

Regional Recovery Organization

None

Federally Recognized Tribes

Confederated Tribes of the Colville Reservation, Spokane Tribe of Indians, Kalispel Tribe of Indians, Coeur d' Alene Tribe, Kootenai Tribe

Counties

Portions of Ferry, Lincoln, Okanogan, Pend Oreille, Spokane, and Stevens

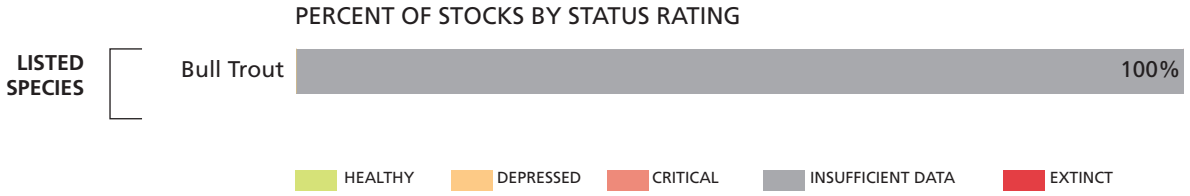
Are listed populations abundant and productive?

FISH:

STATUS SUMMARY

- 2010 status ratings are determined by the Washington Department of Fish and Wildlife and tribes.
- Includes listed and non-listed species.

DATA SOURCE: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE



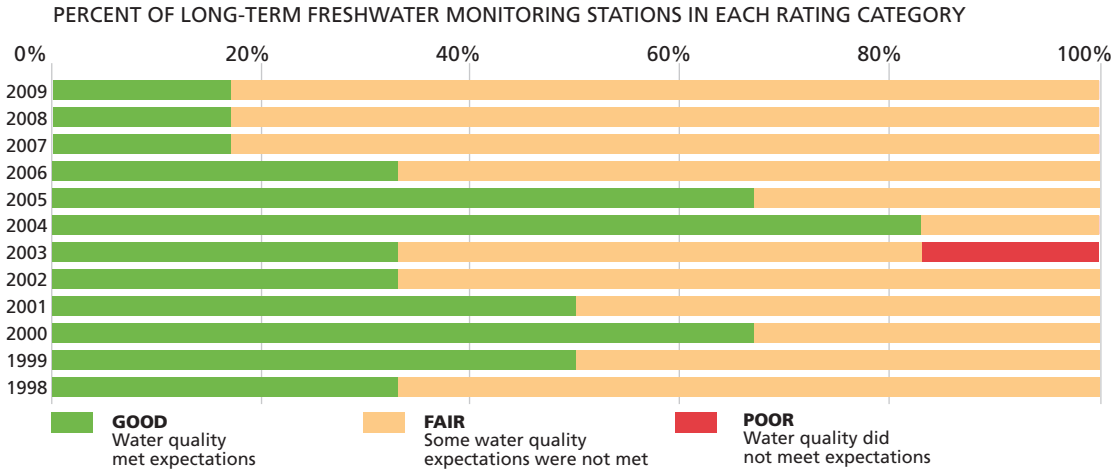
Is water clean enough to support wild salmon?

WATERSHED HEALTH:

WATER QUALITY

- Water quality is measured by a Water Quality Index. This is a number that aggregates water quality data at a monitoring station for temperature, acidity, fecal coliform bacteria, dissolved oxygen, nutrients, and sediments from October 1 to September 30.
- Six sampling stations are reflected in the index.
- There are 49 sites requiring management for high water temperatures.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY



What are trends in salmon funding?

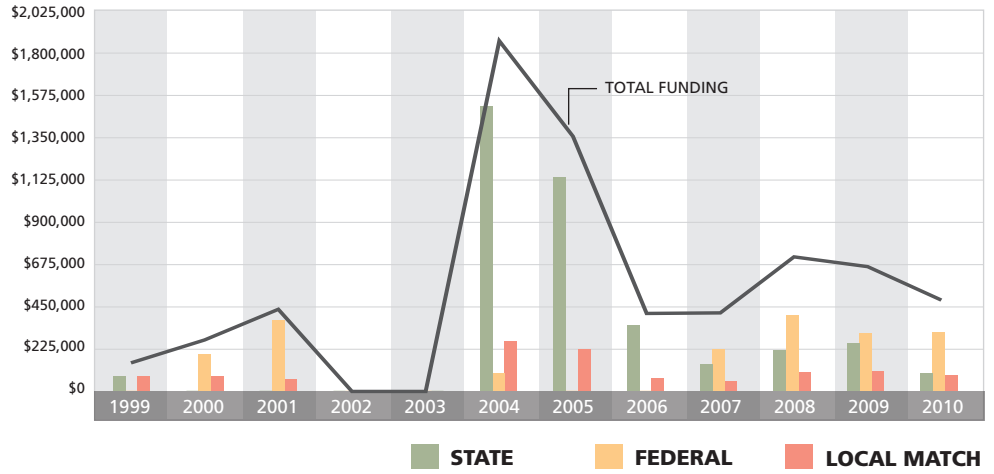
PLAN IMPLEMENTATION:

FUNDING

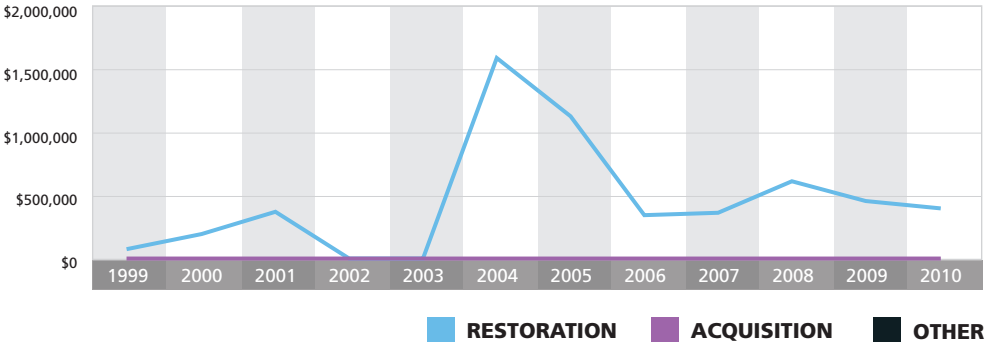
- Total Salmon Recovery Funding Board-related funding was $7 million in state and federal, and local match from 1999-2010. 2010 data are preliminary.
- Charts to the right reflect all money administered by the Salmon Recovery Funding Board through the Pacific Coastal Salmon Recovery Fund, salmon recovery fund (state match), and Family Forest and Fish Passage Program.
- The table of percentages below reflects funding from the Pacific Coastal Salmon Recovery Fund and salmon recovery fund (state match) only – the two primary funding sources for grants through the Salmon Recovery Funding Board. The large statewide monitoring projects funded by the board are reflected in the statewide funding overview, not in individual regional overviews.

DATA SOURCE: WASHINGTON RECREATION AND CONSERVATION OFFICE

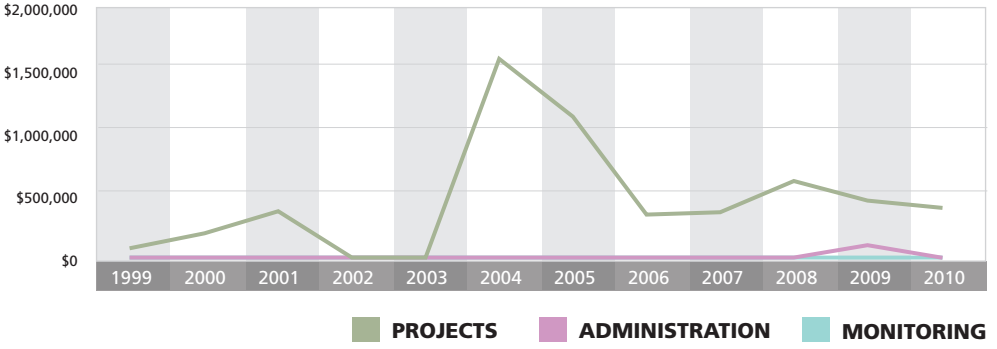
TOTAL FUNDING BY SOURCE *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



TOTAL FUNDING BY PROJECT TYPE *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



TOTAL FUNDING BY CATEGORY *(ADMINISTERED BY THE SALMON RECOVERY FUNDING BOARD)*



DISTRIBUTION OF PACIFIC COASTAL SALMON RECOVERY FUND AND SALMON RECOVERY FUND (STATE MATCH) BY CATEGORY

	PROJECTS	ADMIN.	MONITORING	TOTAL
1999	100%	0%	0%	$76,589
2000	100%	0%	0%	$196,133
2001	100%	0%	0%	$374,110
2002	0%	0%	0%	$0
2003	0%	0%	0%	$0
2004	100%	0%	0%	$1,003,476
2005	100%	0%	0%	$686,436
2006	100%	0%	0%	$329,472
2007	100%	0%	0%	$233,661
2008	100%	0%	0%	$400,000
2009	78%	22%	0%	$460,000
2010	100%	0%	0%	$402,000

PLAN IMPLEMENTATION:

WATERSHED PLANNING SUMMARY

Three Water Resource Inventory Areas (WRIAs) are participating in the Watershed Planning Act. They are: Lower Lake Roosevelt (WRIA 53), Lower Spokane (54), and Pend Oreille (62). The county has adopted plans in WRIAs 54 and 62. The Lower Lake Roosevelt plan is being developed and is due in 2012.

Watershed Planning Highlights and Outcomes

- Lower Lake Roosevelt (WRIA 53): The focus of the watershed planning group is on domestic water supply management needs.
- Lower Spokane (WRIA 54): The group has developed in-stream flow recommendations for the main stem and key tributaries, and characterized groundwater for the West Plains aquifer.
- Pend Oreille (WRIA 62): The planning focus is on public education and outreach on restoration flows and in-stream flows.

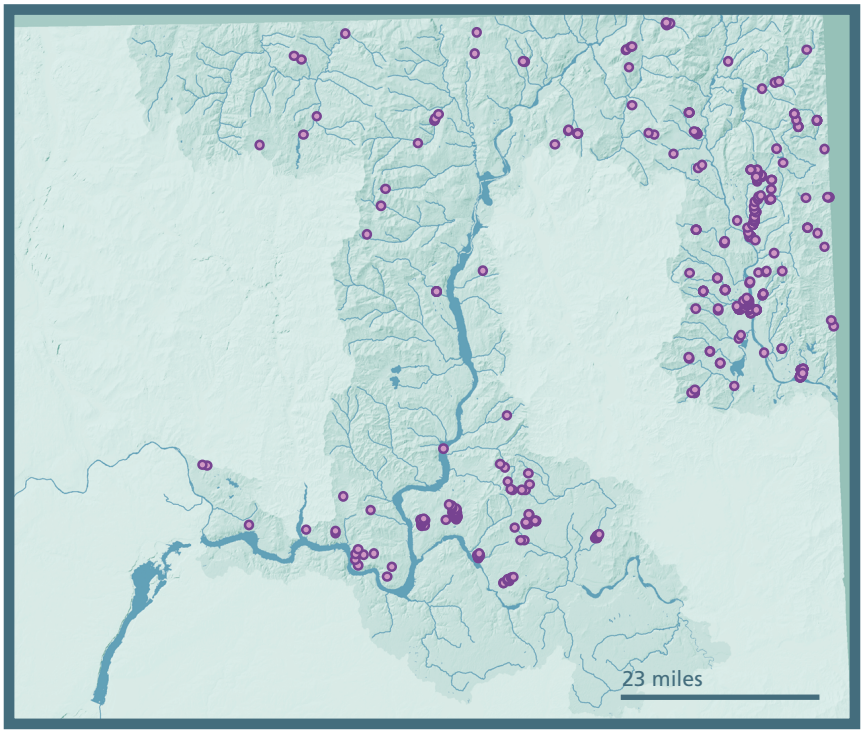
DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY

PLAN IMPLEMENTATION:

FISH PASSAGE AND HABITAT PROJECTS

- Map shows fish and habitat protection and restoration project locations from 2000 to 2010.

DATA SOURCES: WASHINGTON RECREATION AND CONSERVATION OFFICE, WASHINGTON DEPARTMENT OF FISH AND WILDLIFE, WASHINGTON DEPARTMENT OF NATURAL RESOURCES, NORTHWEST INDIAN FISHERIES COMMISSION, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, NORTHWEST FISHERIES SCIENCE CENTER, U.S. FOREST SERVICE, BONNEVILLE POWER ADMINISTRATION, REGIONAL FISHERIES ENHANCEMENT GROUPS

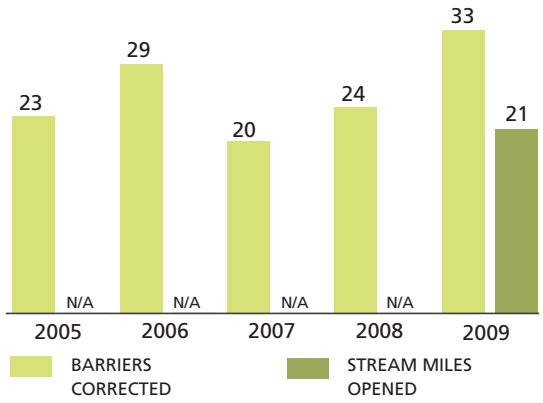


Fish Passage and Habitat Projects

Are streams accessible to wild salmon?

PLAN IMPLEMENTATION:

FISH PASSAGE BARRIERS



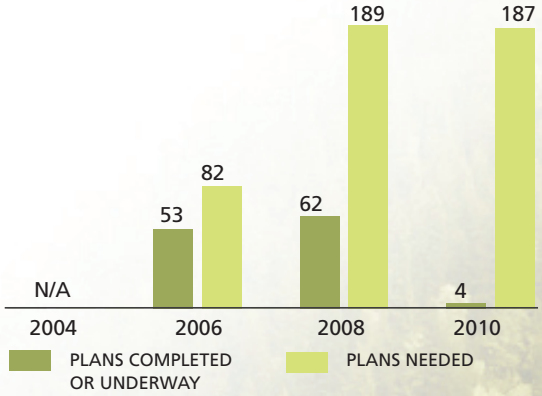
- Number of barriers corrected are estimates. Because of incomplete reporting, these numbers are expected to be lower than actual values.
- Stream miles opened reflects the number of miles estimated to be opened to fish passage by year.

DATA SOURCES: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE, WASHINGTON DEPARTMENT OF NATURAL RESOURCES, WASHINGTON DEPARTMENT OF TRANSPORTATION, WASHINGTON RECREATION AND CONSERVATION OFFICE, FORESTS AND FISH, U.S. FOREST SERVICE, BUREAU OF LAND MANAGEMENT

Is water clean enough to support wild salmon?

PLAN IMPLEMENTATION:

WATERSHED CLEANUP PLANS



- Cleanup plans address water quality impairments covered by total maximum daily load management plans.

DATA SOURCE: WASHINGTON DEPARTMENT OF ECOLOGY

CARPSLIPS - FLICKR

Overarching Threats to Salmon Recovery

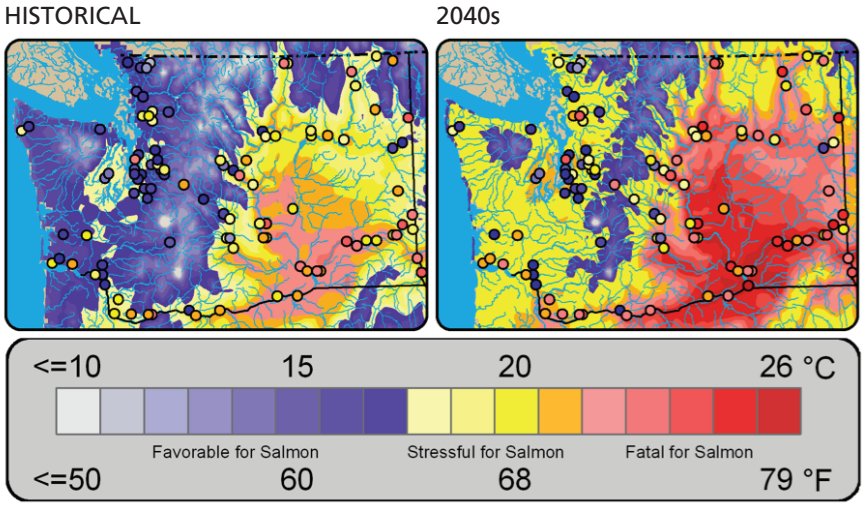
Recovery plans identify and address factors that contribute to the decline of species listed under the Endangered Species Act. We are making progress in addressing those factors by working hard to put the right actions on the ground in the right places. However, we must recognize that major overarching forces or stresses can slow down or even preclude us from reaching our recovery goals. Such stresses include the unavoidable consequences of global climate change and the more local effects of human population growth and development. Reform of hatchery practices across the state, and uncertain long-term funding (from federal, state, and other sources) for needed recovery work also pose threats to success. To the extent any of these or other threats are unaddressed or unaccounted for, the challenges of recovery will be magnified.

The effects of these threats are significant statewide, and will vary by salmon species and location. For example, the influence of climate change will be different on the west and east sides of the Cascade Mountains. Human population growth and urban development are forecasted to be most significant in Puget Sound and parts of the lower Columbia River areas. This section provides a statewide overview of some major threats to salmon recovery. Lists of threats to recovery also are shown in the regional sections of this report.

A Changing Climate

During the past century, salmon have done best when a combination of high rainfall, abundant mountain snowpack, and cool air and water temperatures existed. Forecasts of future conditions under various climate change scenarios suggest that increased winter flooding and decreased summer and fall stream flows are likely, coupled with higher summer temperatures in streams and estuaries. These conditions will

AUGUST SURFACE MEAN AIR TEMPERATURE AND MAXIMUM STREAM TEMPERATURE



This figure illustrates how summer air and stream temperatures may change from the recent past (1970-1999) to the 2040s. The areas with favorable temperatures for salmon are projected to substantially decrease in western Washington, and in many parts of eastern Washington, temperature conditions are projected to transition from stressful to fatal for salmon.[31]

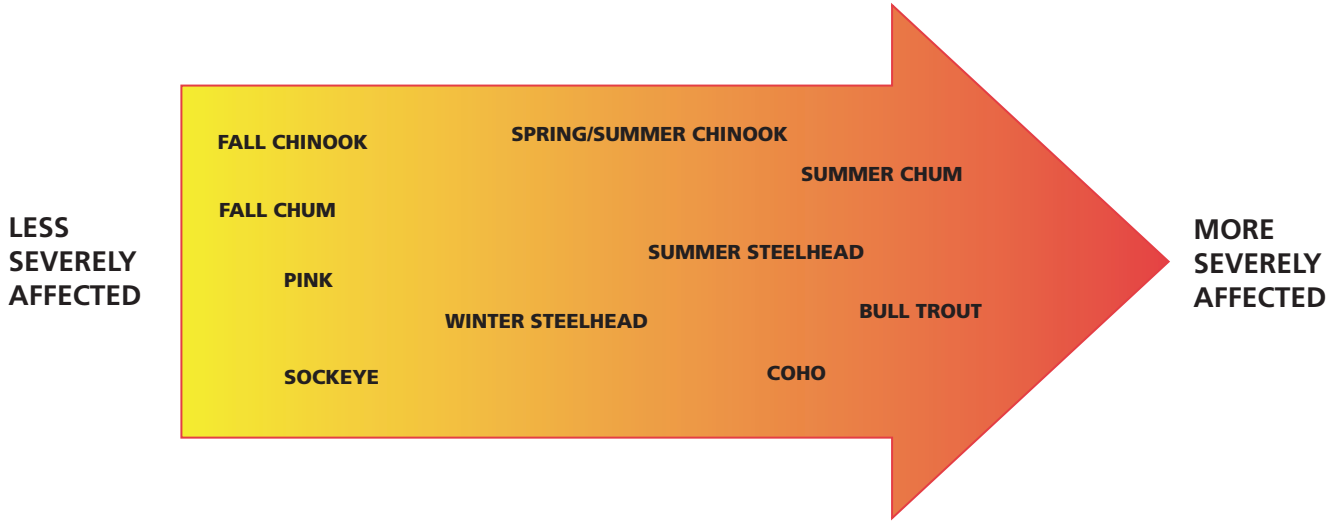
degrade habitat quantity and quality for salmon. Patterns of precipitation will shift from snow toward rain. Snow pack will diminish and stream flows and their timing will change. In western Washington, peak flows in rivers will increase, and water temperatures will rise. The extent of lower stream flows and, especially, increasing water temperatures, are expected to be most severe in eastern Washington.

Salmon species will experience changes in climate differently. Species that spend a large part of their life in freshwater will be more vulnerable to the effects of climate-related changes in freshwater habitat quantity and quality. Such species include steelhead, stream-rearing Chinook, coho, and sockeye. Those that migrate to sea at much earlier ages, including ocean-rearing Chinook, chum, and pink salmon, will be much less vulnerable.

Salmon recovery needs to acknowledge and adapt to the prospect of a changing climate. Strategies applicable to freshwater systems will be different from those appropriate to marine environments. Vulnerabilities of listed and non-listed species need to be examined and understood. Salmon recovery strategies and actions that already are in our plans will contribute to the resiliency of salmon and their ecosystems. However, salmon recovery plans may need to adapt to ensure our investments continue to make sense over time. For that to happen, questions like these must be addressed:

- How vulnerable is each listed species to climate change?
- How should recovery efforts be changed in response?
- What are the prospects for salmon that currently are not listed under the Endangered Species Act?

In 2009, the Governor signed legislation that included provisions for the completion of an integrated climate change response strategy to enable state and local agencies, businesses, non-governmental organizations, and individuals to better prepare for, address, and adapt to the impacts of climate change. The process to develop the strategy is being lead by the Washington Department of Ecology. The strategy will be developed by December 2011.



Changing Ocean Conditions

Salmon spend a large part of their lives in the ocean before returning to freshwater to spawn, and conditions in the ocean have a major influence on salmon survival. There are large-scale oceanic and atmospheric conditions that operate in the north Pacific Ocean. These are El Niño Southern Oscillation (ENSO) and Pacific Decadal Oscillation (PDO). ENSO pertains to the interaction between the atmosphere and the ocean, which changes climate as well as ocean processes such as upwelling. PDO pertains to inter-decadal variability (similar to El Niño) in climate, or in North Pacific sea surface temperatures. This type of long-term climate variability has a major effect on Pacific salmon.

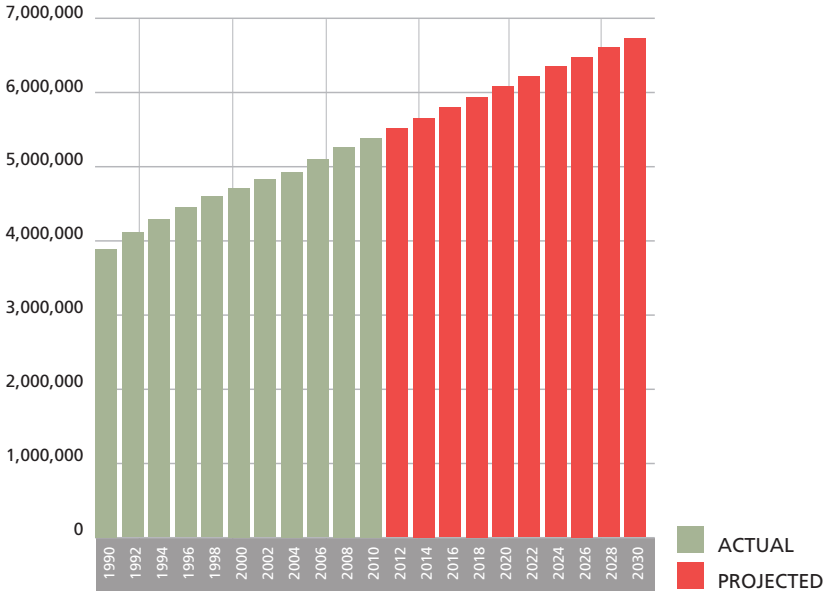
Oceans took in about half of the earth's human activity-generated carbon dioxide from the previous two centuries, increasing the acidity of the ocean. Stratification of the ocean also is changing. This is the layering that occurs in the water column where warm surface water is separated from the colder water below. Mixing of these layers by winter winds brings nutrients up from the deep. If the temperatures are too warm, this mixing cannot happen and marine organisms won't be able to feed on the nutrients from below. Changes in upwelling ultimately will affect ocean productivity and the survival of marine organisms, including salmon.

A Growing Human Population

Increases in the number of people—and development pressures to meet their needs—have had a major influence on salmon and their habitats in Washington. As shown in the graphs on the next page, population growth is projected to continue in the decades to come. This will threaten efforts to reduce freshwater, nearshore, and estuarine habitat loss and degradation, and place an increasing burden on available water and energy resources (compounded by the effects of climate change), and other ecosystem services.

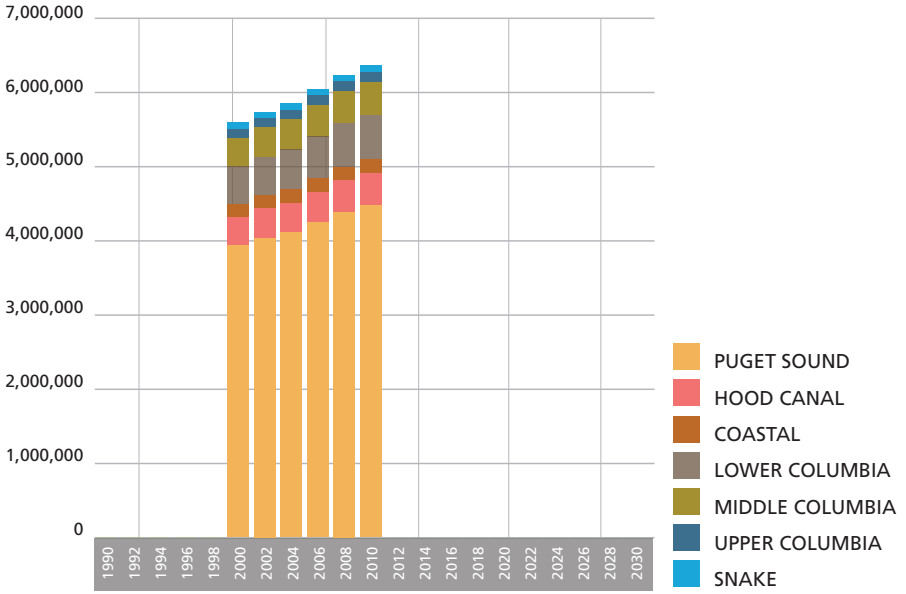
- The state's population is expected to grow by more than 1.6 million people from 2010 to 2030.
- Although rates of increase appear to be lessening, no county has experienced a decline in population.
- In 2010, the Puget Sound Salmon Recovery Region was home to more than 66 percent of the state's people.
- From 2000 to 2010, rates of increase in population were lowest in the Snake River Salmon Recovery Region (7 percent) and highest in the Middle Columbia River Salmon Recovery Region (30 percent).

STATEWIDE POPULATION TRENDS



DATA SOURCE: OFFICE OF FINANCIAL MANAGEMENT

POPULATION TRENDS BY REGION



DATA SOURCE: OFFICE OF FINANCIAL MANAGEMENT

Addressing Hatchery Practices

A very large and diverse hatchery program exists in Washington. It has provided many benefits, but also poses very significant risks to wild salmon. Risks include adverse genetic and ecological (e.g., competition for food and space) interactions, and incidental harvest of wild salmon. Comprehensive assessments of needed hatchery reform actions are available across the state. Unless needed reforms are implemented, unintended effects on listed salmonids will continue to pose a significant threat to recovery.

Staying the Course

We only can build on our collective successes and continue to progress toward healthy and harvestable salmon if commitments to action and the funding to put those actions on the ground are sustained. Recovery work is expensive. It took a long time for salmon to decline to the point that they became listed under the Endangered Species Act, and it will take continuing attention to bring them back to healthy levels. Despite the many challenges we are making progress. The salmon depend on us continuing to do so.

Key Gaps in Information

This section provides a very coarse summary of data used in this report. It is intended to show the extent to which indicator data were sufficient to at least generally characterize status and trends within and across salmon recovery regions. This information can help inform ways to better meet reporting needs and expectations over time.

It is our goal to use the best information available. The ability to track and report progress of salmon recovery depends on the availability of information on a wide range of topics from many sources over time. In most instances, data are available to us from existing programs aimed at various management needs or legal requirements. This results in data coverage and quality that vary greatly within regions and even within watersheds, depending on species, local conditions, and available resources. The data we use for reporting may or may not be adequate to meet other needs.

Observations on some key gaps are listed below.

Salmon

- Although much information is available on the abundance of wild adult salmon, data gaps exist for components of some listed species (e.g., lower Columbia coho and chum, wild lower Columbia Chinook).
- Juvenile salmon data is available to meet the minimum standard of at least one primary population per Major Population Group (MPG) for nearly all listed species. Most time series is relatively short (i.e., less than 10 years). Major Population Groups with insufficient data is Puget Sound Chinook in the North Sound MPG, Lower Columbia chum in the Coast and Cascade MPGs, and Lower Columbia coho in the Gorge MPG.
- Comprehensive information on freshwater productivity (i.e., proportion of juveniles produced per spawner) is under review and was not available for this report.

Watershed Health

- Land use and land cover data is available statewide, but comprehensive analyses of change in developed land and impervious surfaces is limited to western Washington.
- Statewide data to track Forum-adopted biological health, stream physical habitat, and riparian condition watershed health indicators is insufficient; however, comprehensive statewide data collection was initiated in 2009, starting in Puget Sound.
- Some water quality data is available statewide, but relatively few stations are sampled in some regions. Water temperature data from long-term monitoring sites is insufficient for the report.
- Water quantity information using a metric based on in-stream flow rules constrained the extent of coverage for this indicator.

Implementation

- Data on funding administered by the Salmon Recovery Funding Board is available. Data on funding administered by other sources was unavailable for this report.
- Considerable information is available on progress in implementing recovery plans, but it generally is limited to plan actions addressing habitat limiting factors.
- Information on Federal Energy Regulatory Commission-licensed hydropower facilities is sufficient to track whether standards existed, but is insufficient to track how well those standards were being met.
- Some information on fish passage barriers removed and miles opened is available but is based on incomplete reporting, and a relatively short number of years.
- Information is sufficient to track whether hatchery programs met scientific standards, but is confined to Washington Department of Fish and Wildlife hatchery facilities and programs.

Nearshore Marine and Estuary

- Data are available to depict status and trends for some biological indicators in Puget Sound, but comprehensive data were insufficient for a comprehensive statewide overview that included coastal and lower Columbia River estuaries.

Forum on Monitoring Salmon Recovery and Watershed Health Indicators

Salmon Recovery Region	Salmon [32]			Watershed Health					
	Adult spawner abundance	Adults harvested	Juvenile abundance[33]	Land use and land cover[34]	Biological health (in-stream)[35]	Stream physical habitat	Riparian condition	Water quality[36]	Water quantity[37]
Puget Sound	● ◑	● ◑	◑ ◔	●	◑	◑	◑	◑	◑
Hood Canal	●	●	●	●	◑	◑	◑	◑	◑
Washington Coast	◔	◔	◔	●	◔	◔	◔	◑	◑
Lower Columbia River	● ◑ ◔ ◔	● ◔	● ●	●	◔	◔	◔	◑	◔
Middle Columbia River	◑	◑	◔	◔	◔	◔	◔	◑	◔
Upper Columbia River	◑	◑	◔	◔	◔	◔	◔	◑	◑
Snake River	◑	◑	●	◔	◔	◔	◔	◑	◔
Northeast Washington	NA	NA	NA	◔	◔	◔	◔	◔	◔

● SUFFICIENT DATA

◑ SOME DATA

◔ NO SUFFICIENT DATA

○ NO DATA

These tables provide an at-a-glance summary of the sufficiency of information on indicators used in this report. Multiple symbols in a cell represent different species. Information on the rationale for these summaries for individual indicators can be found in the endnotes.

Salmon Recovery Region	Implementation Indicators							Nearshore Marine and Estuarine Indicators[44]		
	Plan Implementation progress[38]	Funding[39]	Hydro[40]	Fish passage barriers[41]	Hatchery practices[42]	Watershed clean-up plans	Stream flows[43]	Shoreline modification	Eelgrass	Herring spawner abundance
Puget Sound	◑	◑	◑	◑	◑	●	●	◔	◑	◑
Hood Canal	◑	◑	◑	◑	◑	●	●	◔	◔	NA
Washington Coast	◑	◑	○	◑	◑	●	◑	◔	◔	◔
Lower Columbia River	◑	◑	◑	◑	◑	●	◔	◔	NA	NA
Middle Columbia River	◑	◑	○	◑	◑	●	◔	NA	NA	NA
Upper Columbia River	◑	◑	◑	◑	◑	●	◑	NA	NA	NA
Snake River	◑	◑	◑	◑	◑	●	◔	NA	NA	NA
Northeast Washington	NA	◑	NA	◑	NA	●	◔	NA	NA	NA

End Notes

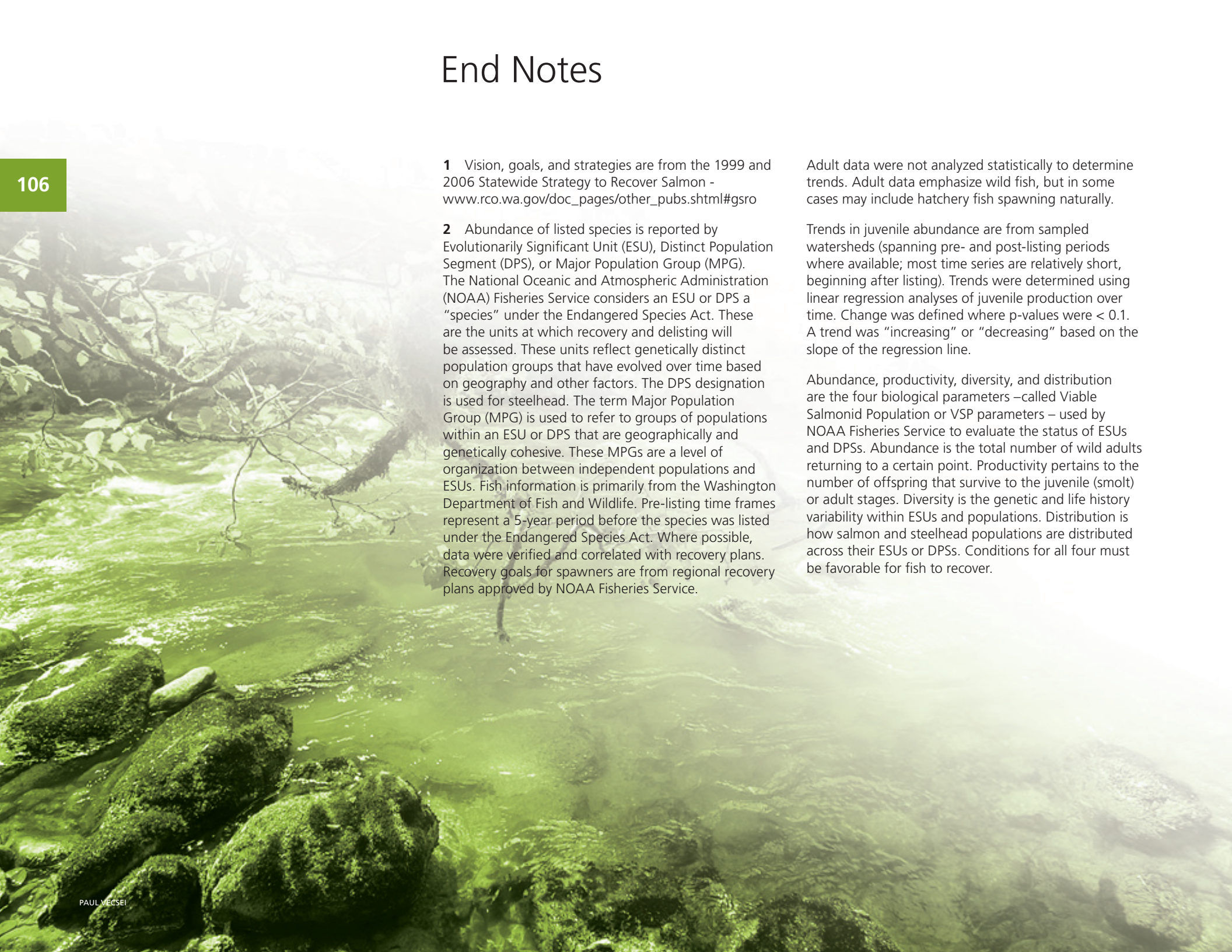
1 Vision, goals, and strategies are from the 1999 and 2006 Statewide Strategy to Recover Salmon - www.rco.wa.gov/doc_pages/other_pubs.shtml#gsro

2 Abundance of listed species is reported by Evolutionarily Significant Unit (ESU), Distinct Population Segment (DPS), or Major Population Group (MPG). The National Oceanic and Atmospheric Administration (NOAA) Fisheries Service considers an ESU or DPS a "species" under the Endangered Species Act. These are the units at which recovery and delisting will be assessed. These units reflect genetically distinct population groups that have evolved over time based on geography and other factors. The DPS designation is used for steelhead. The term Major Population Group (MPG) is used to refer to groups of populations within an ESU or DPS that are geographically and genetically cohesive. These MPGs are a level of organization between independent populations and ESUs. Fish information is primarily from the Washington Department of Fish and Wildlife. Pre-listing time frames represent a 5-year period before the species was listed under the Endangered Species Act. Where possible, data were verified and correlated with recovery plans. Recovery goals for spawners are from regional recovery plans approved by NOAA Fisheries Service.

Adult data were not analyzed statistically to determine trends. Adult data emphasize wild fish, but in some cases may include hatchery fish spawning naturally.

Trends in juvenile abundance are from sampled watersheds (spanning pre- and post-listing periods where available; most time series are relatively short, beginning after listing). Trends were determined using linear regression analyses of juvenile production over time. Change was defined where p-values were < 0.1. A trend was "increasing" or "decreasing" based on the slope of the regression line.

Abundance, productivity, diversity, and distribution are the four biological parameters –called Viable Salmonid Population or VSP parameters – used by NOAA Fisheries Service to evaluate the status of ESUs and DPSs. Abundance is the total number of wild adults returning to a certain point. Productivity pertains to the number of offspring that survive to the juvenile (smolt) or adult stages. Diversity is the genetic and life history variability within ESUs and populations. Distribution is how salmon and steelhead populations are distributed across their ESUs or DPSs. Conditions for all four must be favorable for fish to recover.



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3 Water quality and quantity data reflect Department of Ecology information only. Many local governments, federal agencies, and tribal organizations also collect water information. At this time, the data are not correlated or compared with state information so we have not included them in the report. This is an area of monitoring where information from a variety of sources exists, and future reports should bring the important aspects together for a more comprehensive picture. A water year runs from October 1 until September 30.

There are 73,886 miles of rivers and streams statewide, and 2,943 miles of marine estuaries. The number of assessed segments changed over time, so the number of Total Maximum Daily Load (TMDL) plans needed, or completed is variable.

Categories used for water cleanup plans are:

- Cleanup plans needed. These are polluted waters that require a TMDL and are part of the traditional 303(d) list of impaired water bodies. Placement in this category means that the Department of Ecology has data showing that the water quality standards have been violated for one or more pollutants and there is no TMDL or pollution control plan.
- Cleanup plans completed or underway. These include waters that have pollution problems that are being solved either through a TMDL that is actively being implemented, or a pollution control plan that is expected to solve the problems, or waters that are impaired by causes that cannot be addressed through a TMDL.

4 The Forum on Monitoring Salmon Recovery and Watershed Health adopted the "Washington Comprehensive Monitoring Strategy for Watershed Health and Salmon Recovery" (2002) recommendation for water quantity (the number of days annually during which minimum in-stream flows are met (as well as several other parameters). In-stream flows are adopted into state rule (administrative code) for a specific volume of water to be in the stream for a specific time, measured at a designated location. An in-stream flow is essentially a water right with the priority date being the date of the rule adoption. The in-stream flow would limit or constrain junior water rights (i.e., those water rights issued after the adoption date of the in-stream flow), but NOT senior water rights (those water rights issued before the adoption date of the in-stream flow). In-stream flows are sometimes not met due to natural fluctuations in stream flow. Stream flow is the amount of water you would see in a stream if you went out and looked at the stream. The two months of most salmon returns for spawning (August 1 – September 30) is used to look at whether the in-stream flow rules adopted by the Department of Ecology are met.

5 Records kept for harvest management were used in this report, but they are not easily converted to useful measures of "fish in" abundance for populations or Major Population Groups. For example, steelhead harvest data are translated from "steelhead management units" to Major Population Groups or as much as possible, but conversion errors may exist because harvest management units are not necessarily aligned with recovery units. Many times data were available for certain populations but not the entire Major Population Group, Evolutionary Significant Unit, or Distinct Population Segment.

6 The link to the high level indicators and protocols adopted by the Forum on Monitoring Salmon Recovery and Watershed Health is www.rco.wa.gov/monitoring/protocols.shtml.

7 Link to 2007 integrated statewide fish and habitat monitoring framework is www.rco.wa.gov/documents/monitoring/Framework_Document.pdf.

8 No spawner recovery goal is available, pending completion of the recovery plan for Puget Sound steelhead.

9 The Landsat satellite (http://landsat.gsfc.nasa.gov/) orbiting the Earth acquires digital data that is processed into the land cover and land use classes that were used to determine the percentage change in land cover and land use from 2001 to 2006 in this report. That analysis was based on the most recent data from the National Oceanic and Atmospheric Administration's Coastal Change Analysis Program (CCAP) (www.csc.National Oceanic and Atmospheric Administration.gov/digitalcoast/data/ccapregional/). That program provides inventories of coastal intertidal areas, wetlands, and adjacent uplands with the goal of monitoring these habitats by updating the land cover maps every five years.

The High Intensity, Medium, Low, and Open Space Developed classes from the CCAP data were combined into a single Developed class, and then segmented into four salmon recovery regions (Puget Sound, Hood Canal, lower Columbia, and coast). Geographic Information System (GIS) software was employed to calculate the total acres of developed land and those with impervious surfaces within each region for both the 2001 and the 2006 data.

Definitions:

Developed, High Intensity – Includes highly developed areas where people reside or work in large numbers. Impervious surfaces account for 80–100 percent of the total cover, and are characterized by large commercial or industrial complexes and associated parking, commercial strip development, large barns, hangars, interstate highways, and runways.

Developed, Medium Intensity – Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50–79 percent of the total cover, and are characterized by small buildings such as single family housing units, farm outbuildings, and large sheds.

Developed, Low Intensity – Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 21–49 percent of total cover, and are characterized the same as Medium Intensity Developed with the addition of streets and roads with associated trees and grasses.

Developed, Open Space – Includes areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn. Impervious surfaces account for less than 20 percent of total cover, and are characterized by parks, lawns, athletic fields, golf courses, and natural grasses occurring around airports and industrial sites.

Non-Developed – This would be all the other classes from the CCAP data, which includes Cultivated Crops, Pasture/Hay, Grassland/Herbaceous, Deciduous Forest, Evergreen Forest, Mixed Forest, Scrub/Shrub, Wetlands, Barren Land, and Open Water.

Impervious Surface – Areas consisting of mainly constructed surfaces such as rooftops, sidewalks, roads, and parking lots, covered by impenetrable materials such as asphalt, concrete, brick, and stone.

10 Statewide funding charts are Salmon Recovery Funding Board-centric and do not reflect funding from other sources, such as the Bonneville Power Administration, private foundations, or many federal agencies. In contrast, the table focuses on the two largest funding sources for the Salmon Recovery Funding Board – the federal Pacific Coastal Salmon Recovery Fund and the state match. The Project category includes restoration and acquisition projects, design projects, assessment projects, and hatchery improvement projects. The Administration category includes funding for lead entities and regions, barrier evaluations, hatchery program, the board's technical panel, early planning efforts, and other administrative functions. The Monitoring category includes funding for the board's statewide efforts to track status and trends of salmon populations, effectiveness of projects, smolt production, water quality, and a few individual monitoring projects. Most of the funding shown for monitoring is spent for large, statewide projects and was not broken down to reflect the amount spent in each region. The federal government requires that 10 percent of the Pacific Coastal Salmon Recovery Fund be dedicated to monitoring. Because the table includes both that fund and state funds, the amount shown is less than 10 percent.

11 Major limiting factors are from the National Oceanic and Atmospheric Administration's listing determinations. They are the main habitat factors that must be addressed in recovery. Percent to goal is based on time frames in recovery plans for implementation of actions intended to achieve the goal for that limiting factor. They are gross estimates based on the best professional judgment of managers and scientists involved in implementing habitat actions. Percentages represent progress in implementing actions expected to correct the habitat factors that caused fish listings, and do not reflect biological response of the species or habitat condition toward numerical recovery goals.

12 Estimated by the respective regional salmon recovery organization, based on recovery plan implementation needs.

13 Preliminary adult abundance data were used where available because steelhead populations, Major Population Groups, and recovery spawner goals have not yet been identified by the Puget Sound Steelhead Technical Recovery Team or incorporated into a draft recovery plan. Compared to other species, data are limited for wild steelhead in the Puget Sound Distinct Population Segments. Data are from areas or watersheds where co-managers have done work. Large systems predominate escapement and harvest data. Escapement surveys for wild winter steelhead are hampered due to environmental issues like glaciated rivers, high water/flood events. Escapements are often index counts only; expansions have not been done/attempted. Wild summer steelhead are not reflected. All the harvest of wild steelhead by sport anglers was halted in the early 2000s. There is little directed harvest by tribes; where it occurs it is often in pursuit of chum, spring Chinook, and sockeye. Harvest of hatchery and wild steelhead is predominately in terminal areas. Some low level harvest of hatchery steelhead may be included in wild steelhead harvest estimates because of a lack of hatchery-wild breakout.

Puget Sound steelhead juvenile production trends are based on data from Big Beef and Snow Creeks, and the Dewatto, Tahuya, and Dungeness Rivers.

14 Puget Sound Chinook juvenile production trends are based on data from the Cedar, Dungeness, Elwha, Green, Hamma Hamma, Puyallup, Skagit, and Skykomish Rivers, and Bear Creek.

15 Each dot on the map represents a site sampled in 2009, according to protocols described at www.ecy.wa.gov/programs/eap/stsmf. Sites were selected from the Washington Master Sample found at www.ecy.wa.gov/services/gis/data/enviro/mastersample.htm. The sampled area encompasses the Puget Sound Salmon Recovery Region and the Hvood Canal Salmon Recovery Region. There are 49 sites shown on the map; a 50th site was determined to be unusable. That site will be replaced with another site from the Washington Master Sample in the future.

16 The Hatchery Scientific Review Group, an independent organization authorized by Congress, has made recommendations to reduce risks and maximize benefits from hatchery programs. This indicator tracks progress by the Washington Department of Fish and Wildlife in reforming its hatchery programs to meet standards of the review group (in terms of the level of hatchery influence each population receives, as determined by things like the proportion of hatchery fish in natural spawning areas). No region-specific data are available for regions in the Columbia River before 2010.

17 The Washington Department of Fish and Wildlife and partners have undertaken summer chum supplementation and reintroduction programs in several streams using indigenous broodstocks to reduce short-term extinction risk to existing wild populations and to increase the likelihood of recovery. The escapement for pre-listing years includes conservation measures enacted in harvest reduction and early phases of a supplementation program that started in 1992 before Hood Canal summer chum were listed in 1999. Escapement would have been even lower and harvest rates higher in pre-listing years had these conservation measures not been implemented to protect and recover Hood Canal summer chum. In recent years, supplementation-origin fish have accounted for an average of 17 percent (Hood Canal Major Population Group), 24 percent (Strait of Juan De Fuca Major Population Group), and 20 percent (for Evolutionary Significant Unit) of returning adult summer chum. These supplementation-origin fish are treated no differently from natural-origin fish, meaning that they return to spawn in the wild, unlike returns to more traditional hatchery programs.

Hood Canal summer chum juvenile production trends are based on data from the Hamma Hamma River and Salmon Creek.

18 Data are not available to estimate British Columbia and Alaska portions of harvest.

19 Due to lack of long-term data on the wild component, data reflect a mixture of hatchery and wild fish. Spawner goals apply only to wild fish. Data are not available for the Gorge Major Population Group. Lower Columbia Chinook juvenile production trends are based on data from Mill/Abernathy/Germany Creeks, and upper Cowlitz/Cispus and Coweeman Rivers.

20 Due to lack of long-term data on the wild component, data reflect a mixture of hatchery and wild fish. Spawner goals apply only to wild fish.

Coho total wild run size is preliminary data from the Washington Department of Fish and Wildlife and does not include the Gorge Major Population Group.

Lower Columbia coho juvenile production trends are based on data from Mill/Abernathy/Germany Creeks, and upper Cowlitz/Cispus, Coweeman, and East Fork Lewis Rivers.

21 There is no directed commercial, tribal, or recreational harvest of lower Columbia chum in the lower Columbia River. Harvest is incidental to commercial fisheries on other species.

Lower Columbia chum juvenile production trends are based on data from Duncan Creek.

22 Lower Columbia steelhead juvenile production trends are based on data from the upper Cowlitz/Cispus, Coweeman, Kalama, and Wind Rivers.

23 Recovery efforts for the middle Columbia River steelhead Distinct Population Segment (DPS) are shared by two salmon recovery regions. The Yakima Major Population Group (MPG) is covered by the Yakima Fish and Wildlife Recovery Board, and the Walla Walla MPG is in the Snake River Salmon Recovery Region and is covered by the Snake River Salmon Recovery Board. The National Oceanic and Atmospheric Administration's National Marine Fisheries Service recently completed a recovery plan for the Klickitat MPG portion of the DPS.

Middle Columbia steelhead juvenile production data exist but estimates are being refined and trend analyses were not available.

24 Upper Columbia spring Chinook juvenile production trends are based on data from the Entiat, Methow, and Wenatchee Rivers.

25 Upper Columbia steelhead juvenile production trends are based on data from the Entiat, Methow, Wenatchee, and Okanogan Rivers.

26 Although listed in Washington, Snake River sockeye are not resident and are not covered by this report.

27 Listed wild mainstem Snake River fall Chinook benefit from changes in hatchery, harvest, and hydropower activities within and outside Washington's Snake River recovery region. In addition, the habitat actions in Washington's Snake River recovery plan for spring/summer Chinook and steelhead benefit listed fall Chinook. The abundance of natural origin adult fall Chinook counted at Lower Granite Dam has increased due to beneficial activities upstream of Lower Granite Dam, increased survival of fish in the ocean, reduced harvest outside the region, and improved mainstem habitat and passage conditions.

28 Spring Chinook harvest data was not available for Asotin Creek and the Washington portion of Wenaha River. Adult hydropower passage mortalities not included in spring Chinook total run size. Spring Chinook juvenile production trends are based on data from the Tucannon and Asotin Rivers.

29 Snake River steelhead spawner abundance data are minimums that are based on index areas, which does not reflect the total number of spawners. Steelhead juvenile production trends are based on data from the Tucannon and Asotin Rivers.

30 Juvenile production data for the Walla Walla Major Population Group of the Middle Columbia River Distinct Population Segment exist for the Touchet River, but the time series was too short for a trend assessment for this report.

31 Mantua, N.J., I. Tohver, and A.F. Hamlet. 2009. Impacts of climate change on key aspects of freshwater salmon habitat in Washington State. Chapter 6 in The Washington Climate Change Impacts Assessment: Evaluating Washington's Future in a Changing Climate, Climate Impacts Group, University of Washington, Seattle, Washington.

32 Multiple symbols in a box reflect multiple species within a region. Salmon data pertain to listed species.

For this report, sufficient data were of adequate coverage (e.g, at least one population per Major Population Group), and quality to show basic changes over time. This may or may not have included statistical analyses of trends. Some data means that there were substantial limitations in the coverage or quality of the data available for the report. No sufficient data means that although data may have existed, it was not of sufficient coverage or quality to show changes over time. No data means that no data were received for this report.

33 Juvenile abundance ratings are based on available information in the context of the Forum on Monitoring Salmon Recovery and Watershed Health's integrated salmon and habitat status and trend framework. Sufficient means data are available for at least one primary population per major population group.

34 Land use and land cover data are broadly available, but were sufficient only if results from change analysis were available.

35 The Department of Ecology began statewide collection of data on biological health (in-stream), stream physical habitat, and riparian condition watershed health indicators in 2009, starting in Puget Sound.

36 Includes water quality index and ambient temperature data. Available data are limited by the number of long-term monitoring stations in most cases, especially for water temperature.

37 Data for this indicator are constrained to Water Resource Inventory Areas in which in-stream flow rules are set.

38 Sufficient data would reflect implementation of habitat, hatchery, harvest, and other recovery actions. Data in this report pertain to habitat activities.

39 Sufficient data would reflect all sources of salmon recovery funding (e.g., all federal, local, non-governmental). Data in this report pertain to Salmon Recovery Funding Board-related funding only.

40 Data are sufficient if fish passage goals at Federal Energy Regulatory Commission-licensed projects are established, annually monitored and reported, and standards are met.

41 Data are sufficient if the number of fish passage barriers and miles opened are fully reported and estimated.

42 Data are sufficient if the extent of meeting Hatchery Scientific Review Group standards is known by species for all hatchery programs. Data in this report pertains to Washington Department of Fish and Wildlife hatchery programs.

43 Includes data on in-stream flow rules and flow augmentation. Data are sufficient if in-stream flow rules are set for Water Resource Inventory Areas and flow augmentation data are available.

44 Nearshore marine and estuarine indicators were identified in the 2002 "Comprehensive Monitoring Strategy" and introduced in the 2006 and 2008 "State of Salmon in Watersheds" reports, but comprehensive information using applicable measures and protocols are not available across the three regions. Insufficient new data were available for trends to be included in this report.

Special acknowledgements and thanks

Development of this report is not possible without the cooperation and data from many individuals across the state. Especially significant are contributions from the Department of Fish and Wildlife and Department of Ecology.

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Washington Department of Fish and Wildlife:
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