

Regional Views: Mapping Our Progress



Salmon Recovery Planning

The 1998 Salmon Recovery Act was clear: to save salmon, local and regional activities needed to be integrated into recovery plans. Salmon recovery was defined as healthy sustainable population levels with productive commercial and recreational fisheries. And, the Governor's Salmon Recovery Office was charged with coordinating development of these plans.

Regional recovery organizations are a fundamental element of the Governor's salmon recovery strategy. In consultation with the Washington Department of Fish and Wildlife, NOAA-Fisheries, and U.S. Fish and Wildlife Service, the Governor's Salmon Recovery Office identified seven salmon recovery regions in the state. Salmon recovery region boundaries reflect salmon recovery needs within a specific geographic area, are based on Evolutionarily Significant Units (ESUs), and include federal Endangered Species Act (ESA) listings.

In 1998 the state Legislature also passed, and Governor Locke signed, a statute creating the Lower Columbia Fish Recovery Board, a partnership of Clark, Cowlitz, Lewis, Skamania, and Wahkiakum counties. The Board's mission is

to help recover steelhead and other fish listed under the ESA. Thus, they became the first regional organization created for developing salmon recovery plans.

Governor Locke adopted the *1999 Statewide Strategy to Recover Salmon: Extinction is Not an Option* as the state's recovery strategy. It outlined the concept of regional salmon recovery, and with support and encouragement from the Governor's Salmon Recovery Office an additional four regional organizations closely aligned with the

+ Local decision-making for salmon recovery creates partnerships among private and public interests, tribes, and all other levels of government.

geographic regions defined in the *Statewide Strategy* self-initiated. All five regions are actively engaged in developing recovery plans for listed salmonids. They have formed leadership organizations that include local governments, tribal governments, interested organizations, and many others as active participants. The two remaining regions have not formed regional organizations.



Northeast Washington Salmon Recovery Region

Upper Columbia Salmon Recovery Region

Snake River Salmon Recovery Region

Middle Columbia Salmon Recovery Region

Regional salmon recovery organizations are preparing recovery plans that gain regional consensus on measurable fish results, integrate actions necessary in harvest, hydropower, habitat, and hatcheries, and gain commitments to achieve results. To do this, they must coordinate many plans and actions across watersheds into one regional plan, and help connect local social, cultural, and economic needs and desires with salmon recovery science and ESA goals. They provide a forum for communities to create a local vision of the goals they are striving to achieve, and promote implementation of the plan's elements by the responsible parties.

Local decision-making for salmon recovery is an effective approach for responding to the ESA. It creates partnerships among private and public interests, tribes, and all other levels of government. It encourages local interest and creativity, and tailors actions to unique needs of each region. Local boards can actively engage the public, make access to the process easier, and promote local economic and cultural values in the products. And, very importantly, regional (i.e., ESU scale) plans will be more readily accepted by NOAA-Fisheries as part of ESA recovery plans. Because of the regional processes that are underway, the work and desires of local people is more likely to be reflected in the formal recovery plans adopted by the federal agencies.

The Search for Simplicity: Finding Indices

In the following sections we have mapped six indicators in each of the five regions writing recovery plans. This information gives us a general picture of conditions for salmon and what actions are being undertaken to address known problems. We have chosen these six indicators because they represent conditions that are directly related to our ability to recover salmon.

The concept of using broad indices to quickly assess progress, conditions, or trends is not new; the Dow Jones Industrial Average is an example of an index that dates back to the turn of the century. What is appealing about indexing is that a large number of sometimes complex factors can be assembled and shortened into a relatively easy to understand picture at a point in time.

Inherently, the simplification that occurs from indexing also can be misinterpreted. For example, where there are few data points in a set, we may draw an inaccurate picture of specific locations within an entire area. As with any generalization, the more information that goes into it the more our conclusions will be supported.

Improving these indicators will be a major focus of the Governor's Forum on Monitoring. Over the coming months the Forum will be examining the data presented here and looking for even better ways to convey progress on salmon recovery accurately and in a manner that is easy to understand.

PUGET SOUND SALMON RECOVERY REGION	28
LOWER COLUMBIA SALMON RECOVERY REGION	36
MID-COLUMBIA SALMON RECOVERY REGION	44
UPPER COLUMBIA SALMON RECOVERY REGION	52
SNAKE RIVER SALMON RECOVERY REGION	60

INDICATOR

Index of Water Quality for Salmon and Watersheds

Many Washington waters are not meeting standards for water quality. The state has embarked on development of cleanup plans for polluted water bodies, in compliance with the Clean Water Act. Surface water quality is monitored and reported in the Stream Water Quality Index (WQI). Information on twelve water quality constituents and flow is collected monthly at sixty-two stations across the state. These monitoring stations are generally located in lower reaches of major basins, and thus give only a broad representation of overall water quality of the basin. Some of the monitored components are more important for human health considerations, so for the Salmon and Watersheds Water Quality Index reported on these maps, we have selected the three components most valuable for salmon (dissolved

oxygen, pH, and temperature) and one that is primarily for people and watershed health (fecal coliform) from which to construct our index.

On our maps, a good rating means that the average Salmon and Watersheds Water Quality Index for the last five years are of the lowest concern. Waters of moderate concern are rated fair, and waters of highest concern are labeled as poor. Although the index rates overall water quality in a basin, specific locations within the basin may not be meeting one or more of these standards. (See Ecology publication 04-03-033 or visit their website at http://www.ecy.wa.gov/programs/eap/fw_riv/rv_main.html.)

And what we are doing to address the factors

Our maps show

- ▶ Clean up plans (or TMDLs for total maximum daily loads) completed or underway, as well as the remaining number needed in those watersheds as of the 2002 list.



Cedar Creek at Amboy Road downstream habitat.



INDICATOR

Index of Low Flows for Salmon

Fish need water in adequate amounts and at the right times. Natural stream flows vary greatly from year to year, seasonally, and on a daily basis. Fish have adapted over thousands of years to this natural flow regime in their individual watersheds. Natural flow conditions, however, have been affected by human activities. This has resulted in some streams being over-appropriated — that is, permission has been granted to divert or withdraw more water from a river than is actually available — and flows that are well below natural flow levels. The reduction of flows can have a direct impact not only on water quantity, but also on water quality and riparian habitat necessary to support fish. Sustained low flow conditions during juvenile life stages of fish are used to predict the number of adult fish likely to return to spawn, and flow levels affect other life stages as well.

In our maps, a “water-critical basin” is an over-appropriated watershed where more water could be withdrawn from rivers and streams in the watershed, especially in late summer and early fall when flows are naturally low, potentially leaving little water for ESA listed fish species for migration, spawning and rearing.

A “low flow” basin is one experiencing significant pressure for increased water use and rapidly declining flows for fish.

- PUGET SOUND** SALMON RECOVERY REGION 29
- LOWER COLUMBIA** SALMON RECOVERY REGION 37
- MID-COLUMBIA** SALMON RECOVERY REGION 45
- UPPER COLUMBIA** SALMON RECOVERY REGION 53
- SNAKE RIVER** SALMON RECOVERY REGION 61

And what we are doing to address the factors

Our maps show

- ▶ Where instream flow rules have already been set or watersheds are closed to further water appropriation;
- ▶ Where flows have not been set or no or limited closures to further water appropriation exist, but where instream flow rules are planned;
- ▶ Watersheds in which water was purchased, leased, or donated to restore instream flows;
- ▶ Stream gauges for flow monitoring by Ecology or the US Geological Survey; and,
- ▶ Where projects to improve irrigation efficiency have been completed.

PUGET SOUND SALMON RECOVERY REGION	30
LOWER COLUMBIA SALMON RECOVERY REGION	38
MID-COLUMBIA SALMON RECOVERY REGION	46
UPPER COLUMBIA SALMON RECOVERY REGION	54
SNAKE RIVER SALMON RECOVERY REGION	62



Erdman and Culvert Creek
Culvert Replacement

INDICATOR

Index of Stream Habitat Quality for Salmon

The 1998 Salmon Recovery Act authorized the Washington Conservation Commission to evaluate conditions that limit the ability of habitat to fully sustain populations of salmon. Known as the Limiting Factors Analyses, or LFAs, these technical evaluations were assembled by the Conservation Commission for each Water Resource Inventory Area (WRIA) in consultation with local governments, treaty tribes, and others with appropriate expertise.

Our index provides a single salmon habitat rating for each WRIA that produces salmon or steelhead. This rating is a distillation of numerous ratings in individual LFA reports for floodplain, sedimentation, riparian, and instream conditions (See <http://salmon.scc.wa.gov> for LFA reports, or www.governor.wa.gov/esa for methodology and access to data).

Clearly, as mentioned previously, a single rating does not allow for the often varying conditions found within each WRIA and between each rated category, but the single rating is useful for a broad, overall perspective on conditions for salmon spawning and rearing at a coarse scale. While federal lands were included in the original LFA reports, we have not rated them here because federal land managers may use different criteria to display habitat quality on federal lands. It is also important to note that significant progress has been made in assessing habitat limiting factors since the LFAs were completed. Many watersheds now have in-depth analyses and these assessments will be available in individual recovery plans planned for publication in June 2005.

And what we are doing to address the factors

Our maps show

- Projects funded by the Salmon Recovery Funding Board, tribes, or the US Forest Service that are intended to improve stream habitat conditions.



Gosnell Creek Culvert
and Riparian Restoration

◀ Family Forest Fish Passage Program

The 2003 Legislature created the Family Forest Fish Passage Program to provide funding for small, private forest landowners to correct barriers to fish migration. More than four million acres of forests are small, family owned operations that are often located in highly productive lower elevations. These areas are major keys to improving fish habitat and restoring salmon. The program provides family forest landowners up to 100% of the cost of fixing culverts, dams, and other artificial barriers. Since it began operations in November 2003, the program has received applications for more than 200 projects; twenty-six projects that collectively opened over forty-four miles of high quality rearing and spawning habitat have been funded.

INDICATOR

Barriers to Salmon

Impaired access to streams is one of the more significant factors limiting salmon production in many watersheds. Salmon need access to spawning and rearing habitat, and unimpeded migration to and from the ocean. Unnatural physical barriers interrupt adult and juvenile salmon passage in many streams in the state, which reduces productivity and eliminates some populations. Barriers may also cause poor water quality and unnatural sediment deposition. Unscreened or inadequately screened surface water diversions, whether associated with a physical barrier or not, are a serious source of salmon mortality and injury.

Man-made blockages to salmon can include culverts, dams, tide gates, dikes, bridges, or any blockage that prevents either adults or juveniles from moving within their stream environment. Sometimes the blockage is obvious, such as a culvert that is perched a foot above the stream bed because of erosion.

Other times it may not be readily apparent why fish are having trouble navigating; for example, a culvert may change the flow dynamics of a stream such that fish are unable to navigate as juveniles trying to return to the sea. Or, a poorly constructed screen may create velocities that impinge young fish. For whatever the causes, blockages are significant in the life cycle of fish and we have chosen to map them independent from the index of stream habitat quality.

For our maps, we depict only blockages affecting anadromous fish. We have not shown bull trout blockages because information is scarce.

PUGET SOUND SALMON RECOVERY REGION	32
LOWER COLUMBIA SALMON RECOVERY REGION	40
MID-COLUMBIA SALMON RECOVERY REGION	48
UPPER COLUMBIA SALMON RECOVERY REGION	56
SNAKE RIVER SALMON RECOVERY REGION	64

And what we are doing to address the factors

Our maps show

- ▶ Completed projects funded by the Salmon Recovery Funding Board, Washington Department of Transportation, Washington Department of Natural Resources, local governments, or US Forest Service that remove barriers for anadromous fish. The effort to document locations of fish passage barriers repaired since 1999 was just initiated this year (2004), so some projects may not be displayed on these maps. We expect ongoing mapping efforts will continue to reveal projects.

PUGET SOUND SALMON RECOVERY REGION	31, 33
LOWER COLUMBIA SALMON RECOVERY REGION	39, 41
MID-COLUMBIA SALMON RECOVERY REGION	47
UPPER COLUMBIA SALMON RECOVERY REGION	55, 57
SNAKE RIVER SALMON RECOVERY REGION	63, 65

INDICATOR

Spawner Abundance: Measuring Our Progress

Spawners are the building blocks for future fish populations. They are one of the most important indicators of our progress toward recovery. Other components important to recovery include productivity, distribution, and diversity.

Spawners have survived high seas, nearshore, and freshwater fisheries, as well as predators and other stresses they may have encountered on their long journey home. Without adequate numbers of successful spawners our streams will be unable to produce juvenile salmon whether habitat conditions improve or not.

It is difficult to get good measurements of spawner abundance, and it is expensive. We do not have the resources to measure all stocks of all species in the state. So we must make the best use of the information we have and bolster it where we can. The amount of information available varies across the state. In some salmon recovery regions

we have information for most of the stocks, and in other regions our information is limited. Whether limited or not, this information is the best representation of spawner abundance that we have.

The graphs in this section of the report show spawner abundance trends since 1991 for a composite of the listed fish species for which we have specific data. Also shown on the graphs are draft or interim recovery goals for that same composite of stocks. These recovery goals are those being developed by regional recovery organizations or NOAA-Fisheries. The recovery goals finally adopted for each region will be larger because they will include stocks that are not now monitored but are components of the ESU.

Those stocks having the greatest amount of information tend to be the strongest and largest, where historical commercial and sport fisheries have required detailed information to meet allocation requirements under various federal court rulings.

Smolt trap on Nooksack River





JEFF CEDERHOLM

INDICATOR

Index of Juvenile Salmon Freshwater Production

With information on spawners in view, it is important to gauge freshwater productivity, or how well our watersheds function to produce the next generation of salmon. The most direct measure of this is to assess freshwater production. Freshwater production is the number of juveniles produced and migrating from freshwater to saltwater. Functional freshwater habitat is critical to producing the maximum possible number of juvenile salmon from the fish that spawn.

For the first time, included here is a freshwater production index, developed to frame the information in a single assessment of freshwater juvenile production by salmon recovery region. In the past, freshwater production estimates were developed and published in annual reports on a watershed-by-watershed basis.

Just like spawner abundance, there are limits to our ability to assess freshwater production. Both technical and cost constraints exist that preclude having information from all of the stocks in the state. In this report are graphs with information from nineteen juvenile trap sites across the state. They are not necessarily representative of all stocks statewide, but provide some indication about patterns and trends in what we do know. Information from these sites has typically been used to monitor freshwater production from the individual streams, assess the influence of biological and environmental changes on salmon, and for fishery management purposes. (For the full report on spawner abundance and juvenile salmon freshwater production, see <http://www.iac.wa.gov/srfb>).

PUGET SOUND SALMON RECOVERY REGION	31
LOWER COLUMBIA SALMON RECOVERY REGION	39
UPPER COLUMBIA SALMON RECOVERY REGION	55
SNAKE RIVER SALMON RECOVERY REGION	65

- + Functional freshwater habitat is critical to producing the maximum possible number of juvenile salmon from the fish that spawn.
- + For the first time, included here is a freshwater production index, developed to frame the information in a single assessment of freshwater juvenile production by salmon recovery region.