

An underwater photograph of several salmon swimming in a stream. The fish are in various stages of spawning, with some showing bright red and green colors. The water is clear, and the rocky bottom is visible. A large, dark, semi-transparent diagonal shape is overlaid on the right side of the image, containing the title text.

**Watershed Management  
for Salmon Recovery:**  
*A Reference Guide*



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## Executive Summary

- Water quality and quantity are important to **humans** and wildlife.
- Salmon are valuable to us but are in danger of being lost forever in 3/4 of the state.
- Habitat is the largest limiting factor.
- Salmon need cold, clean, clear, complex, and connected water in which to develop.
- Land use policy decisions **could play a larger role** in protecting existing habitat, restoration of lost habitat, and preservation of water conditions crucial to salmon.
- Public compensation for private landowner losses and regulation are often necessary to achieve conservation goals.
- Recovery plans and **solutions exist** but are failing to meet their goals due to resource limitations and lack of policy support.



## *What is the Problem?*

Salmon runs are a fraction of historic levels and populations throughout the state continue to decline.



## *Why is that a Problem?*

Salmon are an integral part of Washington's ecology, economy, recreation, and culture. They are an indicator of other problems, such as habitat loss and degraded water quality.



## *What is the Cause of the Problem?*

The problem is primarily diminished and degraded habitat—the fish do not have safe places to live and grow.



## *What Happened to the Habitat?*

Development and growth from humans has occurred in areas critical for salmon. Barriers to fish passage have increased. Traditional strategies for enhancing drainage and reducing flood risk have changed the way rivers function and altered salmon habitat. Excess nutrients and contaminants in our waterways have also degraded water quality.



## *What is the Solution?*

First, there needs to be awareness of the severity of the problem, its causes, and the solutions.

Second, there needs to be a collaborative effort to implement restoration projects that benefit landowners, salmon, and environmental health. A number of innovative, voluntary compliance incentive programs and market-based solutions have enabled recovery groups to work together with agriculture, forestry, and private landowners.



## *How Can You Help?*

Support and defend salmon recovery for its merits—recovery efforts create jobs, reduce flood risk, improve habitat for fish and wildlife, and improve the value of land. Support policies and budgets that will improve water quality, habitat diversity, and the health of our watersheds.







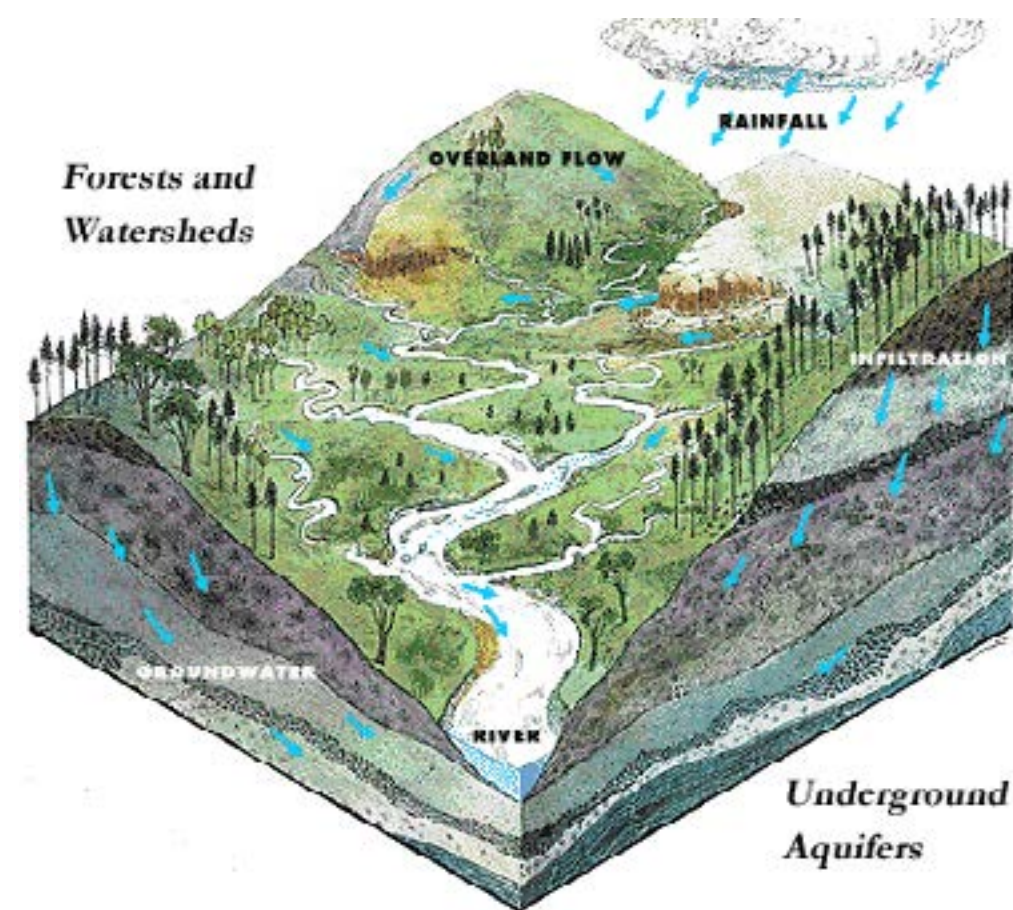
Salmon Habitat



## Watersheds



*WRIA 8 Watershed Map*



### *Watershed*

A watershed is a basin-shaped area that drains to a central point where it enters a river, lake or ocean. It can include surface water, groundwater, and salt water like Puget Sound. Watersheds can encompass small areas draining to a stream and also be part of much larger areas, spanning multiple counties, like the Lake Washington/Cedar/Sammamish Watershed.

What happens on the land in a watershed, especially human activities, dictates the health of the aggregate waterbodies within that larger watershed. Every single activity that takes place in a watershed affects the health --good or bad--of all the water downstream. Contaminated stormwater can significantly affect watershed health and salmon. **Stormwater** is water that runs off impervious surfaces, such as roads, rooftops, parking lots, etc., when the rainwater cannot be absorbed into the built environment. This water collects whatever is in the watershed, and carries it all, via storm drains, directly into nearby waterbodies often **without treatment**.



## Salmon Habitat Requirements

Salmon need water that is:

**Clean:** Pollution and other contaminants can harm salmon and other aquatic life

**Clear:** Water that is too turbid, or has too many suspended solids, is detrimental to salmon, particularly juveniles

**Cold:** Salmon are cold-blooded and need cold water to function properly; water that is too warm will kill them

**Connected:** Fish passage barriers, like culverts, dams, poorly made bridges, and other human infrastructure can prevent salmon from reaching their spawning streams

**Complex:** Properly functioning riparian habitats have diverse native tree and shrub species; natural river meanders, side channels, wetlands, and oxbows; and contain rocks and log jams to provide in-stream habitat for salmon during all stages of their life cycle



*Excellent Habitat*



*Poor Habitat*





Salmon Biology



## Pacific Salmon Species

There are five species of Pacific salmon, and each species has multiple common names. They are all anadromous, hatching out of eggs in freshwater, migrating to saltwater to grow, then returning as an adult to their natal stream to create the next generation. There are also three species of Pacific trout that are very closely related to the five salmon species, and are also anadromous. All of these salmonid species are in the genus *Oncorhynchus*, which means hooked nose.

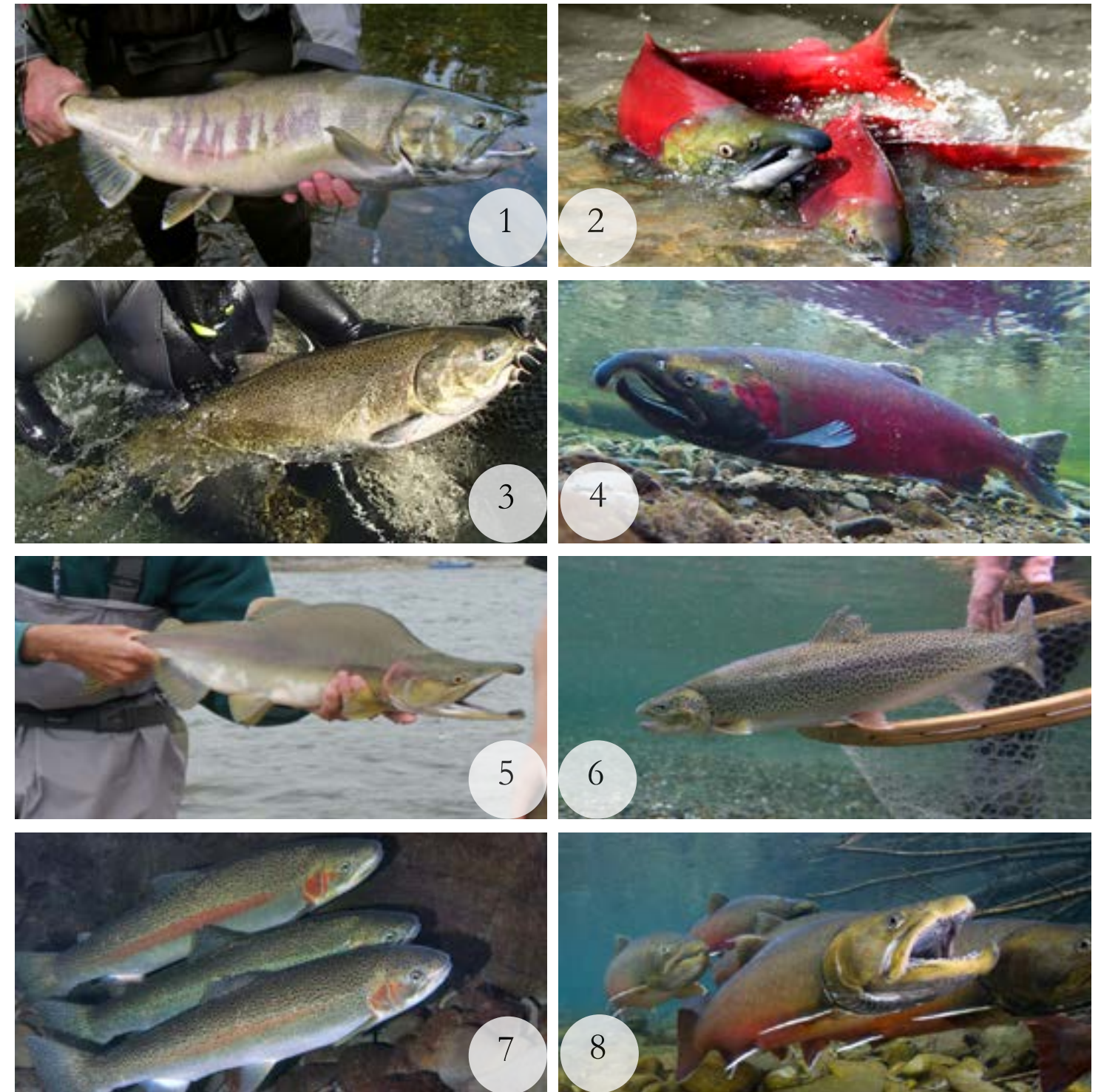
Species of Pacific Salmon (the two most often used common names):

1. Chum = Dog
2. Sockeye = Red
3. Chinook = King (Puget Sound population is threatened)
4. Coho = Silver (Puget Sound population is a species of concern)
5. Pink = Humpie

Species of Pacific Trout:

6. Cutthroat Trout
7. Steelhead (Puget Sound population is threatened)
8. Bull Trout (Puget Sound population is threatened)

## *Photos of Pacific Salmonid Species*





# Life Cycle

## *Pacific Anadromous Salmonids*

- Salmon move from freshwater streams, out to sea, and return back to the same freshwater system to spawn over a period of 2-8 years depending on the species. Species that move from freshwater, to saltwater, and back to fresh are called anadromous.
- Salmon spend the first part of their lives in freshwater. Pink and Chum remain in freshwater only a few days before going to the estuary, where they remain for longer; estuary and nearshore habitats are crucial for these species.
- Chinook, Coho, Sockeye, Steelhead, Cutthroat, and Bull Trout rear in freshwater for much longer amounts of time. They are more sensitive to poor water quality and degraded freshwater habitat. The populations of these salmonid species are struggling more, likely due to river conditions that are unfavorable for salmon.

Life Stage	Description
Egg	Fertilized egg develops and incubates under gravel.
Alevin	Egg hatches, alevin lives under gravel and continues to develop by consuming yolk sack.
Fry	Juvenile emerges from gravel when the yolk sack is consumed, and looks for insects to eat. Some species remain in freshwater, others head to the estuary, feeding and hiding from predators. Have parr markings, the stripes/dashes along the spine.
Smolt	Once in the estuary, the body of the fish goes through smoltification to be able to live in salt water. Very vulnerable stage.
Ocean Rearing/Adult	After smoltification, fish swims out to the ocean to eat and grow for 1 to 7 years (varies by species & population).
MigratingAdult	After growing is complete, salmon heads back to the stream where it was born (natal stream). Salmon do not eat during this phase.
Spawner	Fish find a mate(s), spawn, and die, starting the cycle once again and providing marine derived nutrients into the freshwater ecosystem.

## *Life Cycle Stages*







## Role of Salmon in Ecosystems

### *Keystone Species*

- Play a critical role in maintaining the structure of ecological communities
- Contributions are large compared to species prevalence in the habitat
- Disappearance would start a domino effect with other species in the habitat subsequently disappearing and becoming extinct.

### Why are salmon an *Indicator Species*?

They:

- Require clean, cool water to survive
- Have relationships with 137 other species<sup>1</sup>
- Are a “canary in a coal mine” for a healthy watershed and related species

And they:

- Are an icon of the region
- Are important to many residents
- Are important to Washington’s economy

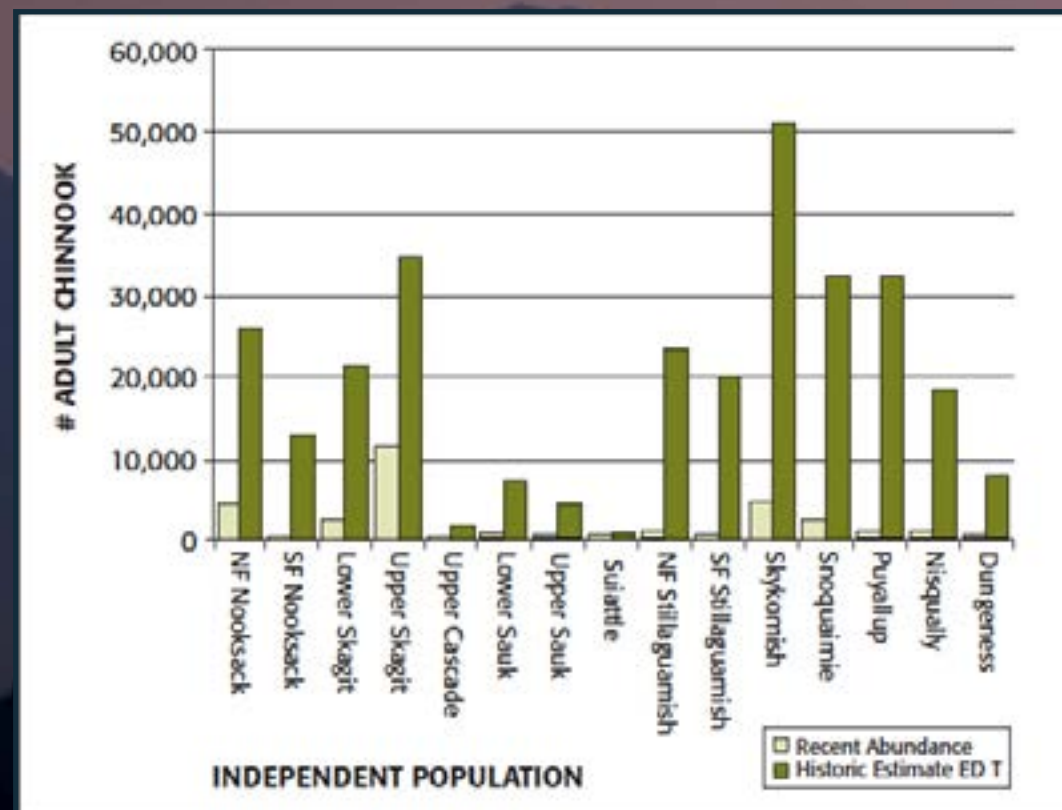
1. Cederholm et al. 2000. Pacific Salmon and Wildlife - Ecological Contexts, Relationships, and Implications for Management. Special Edition Technical Report, WDFW, Olympia, Washington.



## How are the salmon runs doing?

### In Washington

- Salmon across  $\frac{3}{4}$  of the state are in danger of being lost forever.<sup>1</sup>
- In 1999, salmon in Washington were already extinct in as much as 40% of their former spawning areas.<sup>1</sup>
- Some threatened fish populations are increasing but most populations are decreasing or experiencing no change.



A comparison of 5-yr (2000-2004) average Puget Sound Chinook salmon populations to historical estimates (EDT estimates). Graph courtesy of NOAA, 2007.

### In Lake Washington/Cedar/Sammamish Watershed (WRIA8)

- **Fish** - Abundance of **adult** Chinook salmon in Cedar and Sammamish watersheds showing signs of improvement but still below 50 yr goals for the watershed.<sup>2</sup>
- 50 yr goal for **juvenile** productivity is partly being met.<sup>2</sup>
- **Water quality** continues to be a concern, especially summer stream temperatures.<sup>2</sup>
- **Wood volume** continues to be poor.<sup>2</sup>



Water Quality Index scores (by water year) for priority WRIA 8 streams. Source: King County Science and Technical Support Section.





## Human Impacts



## How has land use

*changed the landscape?*

Housing is one land use affecting water quality and quantity in neighboring streams.

Development reduces tree cover and increases polluted stormwater.

Population of the Puget Sound Region is expected to reach 5 million by 2040.

Using Low Impact Development (LID) techniques, adverse effects can be reduced.



*Cottage Lake near Woodinville, 1936*



*Cottage Lake near Woodinville, 1996*

Areas of rapid urban growth tend to occur near water resources. A high value is placed on land with proximity to water resources and the terrain is easier to develop.

These lowland areas provide a majority of the freshwater and marine/estuarine habitat available to salmonids.

Development in these areas can result in a dramatic loss of habitat.





## What are the impacts of *urban development?*



### Impact

road building and culverts

absent and/or decreased buffers

stormwater runoff

shoreline armoring

decreased tree canopy

warmer surface water & land temps

illegal dumping

dominance of impervious surfaces

marinas

### Solution

passable culverts

permit adequate buffers, urban forestry

Low impact development (LID), other  
Best management practices (BMP)

bulkhead removal

tree ordinances, urban forestry

urban forestry

culverts

LID, urban forestry, buffers

salmon safe certification

## What are the impacts of *stormwater runoff?*



### Impact

impervious surfaces greatly increase  
stormwater runoff

combined sewer outflows (CSO's)

heavy metals, oil, & other  
pollutants in watersheds

malfunctioning septic

bank erosion

loss of stream habitat

### Solution

LID, pervious pavement,  
adequate vegetative buffers  
("green infrastructure")

LID, water conservation, re-di-  
rection outflows & pipes to  
stormwater management areas

natural yardcare, car maintenance,  
pick up pet waste, reduce use of fer-  
tilizers and pesticides at home

repair assistance, incentive programs

vegetative buffers, LID

buffers, urban forestry (con-  
servation vs. reforestation)



## What are the impacts of *shoreline development?*



### Impact

malfunctioning septic tanks  
increased stormwater runoff  
decreased habitat for forage fish & other wildlife  
decreased buffers  
feeder bluff sediment transport blockage  
shoreline railroads  
marinas

### Solution

repair assistance  
LID, public education, incentive programs  
full or partial bulkhead removal, natural shoreline installation (“soft shore protection”)  
planting and restoration  
bulkhead removal, beach nourishment  
beach nourishment  
salmon safe certification

## What are the impacts of *fishing industry?*



### Impact

overharvest  
bycatch  
illegal fishing  
Tribal fishing rights  
loss of jobs with declining fish stocks  
fish farms

### Solution

population-based catch limits  
ethical fishing methods (pole caught)  
stricter enforcement, public education  
public education  
conservation jobs  
focus on sustainable wild populations





## Major Conservation Laws





*Cuyahoga River fire, 1969*

## Clean Water Act

- Enacted in 1972 by bipartisan majority in Congress after a massive oil spill at sea and a river caught fire in Ohio.
- Goal: to “restore and maintain chemical, physical and biological integrity of the Nation’s waters.”



## *How it works*

- Washington State administers National Pollution Discharge Elimination System (NPDES) Permits to limit discharge of 126 priority pollutants.
- Phase I and Phase II local governments must obtain/renew NPDES Permits every 5 years.
- Point sources now responsible for only 10% of violations, non-point (such as stormwater) **47%**.<sup>1</sup>
- **NPDES Stormwater Permits** mandate pollution prevention plans including public education and outreach, maintenance and inspection.
- WA Dept. of Ecology monitors water quality and requires local government to do more to address other hydrologic changes caused by land development.
- If a water quality standard is not met, Ecology must set allowable limits for discharge of that pollutant into the waterbody.

1. US EPA 2006 Introduction to the Clean Water Act





## Endangered Species Act

- In 1973, a nearly unanimous Congress passed the ESA because “[existing laws] did not provide the kind of management tools needed to act early enough to save a vanishing species.” -Richard M. Nixon
- Goal is to eliminate **risk of extinction** for listed species (111 fish species listed as endangered in the US).



*The bald eagle was declared an endangered species in 1967. It has subsequently recovered; it was removed from the endangered species list in 1995 and from the threatened list in 2007.*

## *How it works*

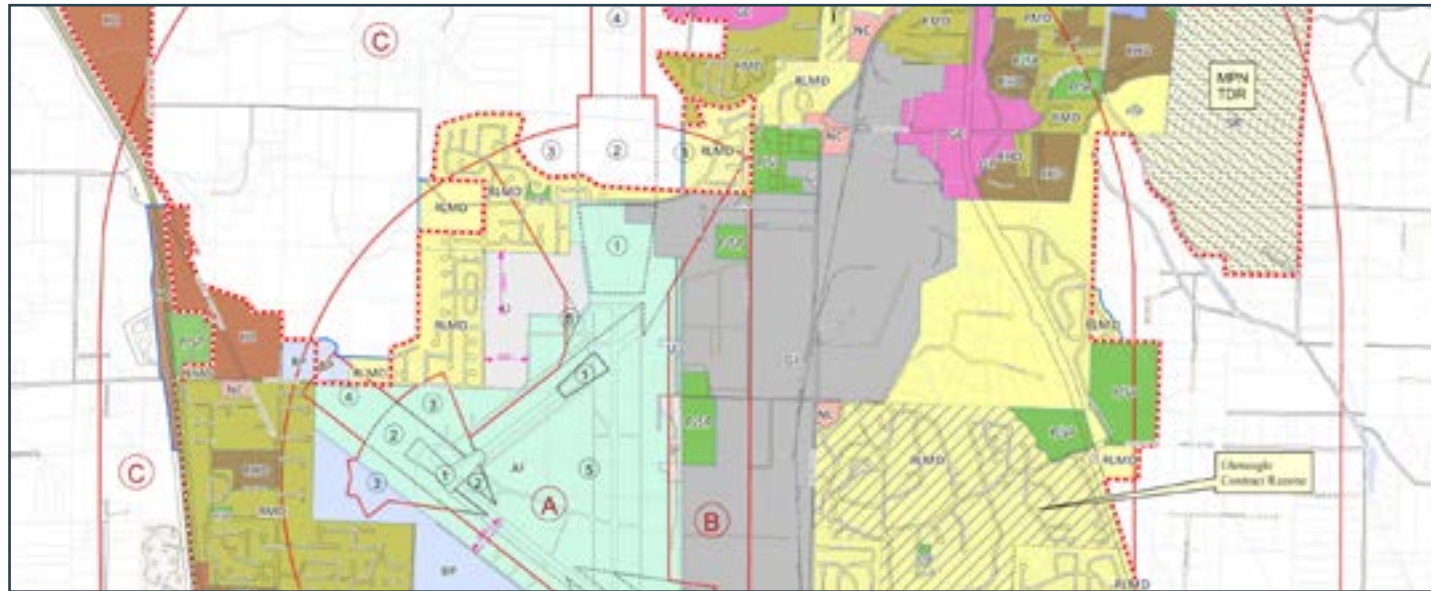
Conservation through:

- Listings
- Critical habitat conservation
- Recovery plans
- Species recovery grants  
(e.g., Salmon Recovery Funding Board, Puget Sound Acquisition and Restoration Fund, Pacific Coastal Salmon Recovery Fund)

Recovery plans for all **5 endangered and 23 threatened** distinct population segments of salmonids

Habitat conservation required under ESA implementation





## Growth Management Act

1990 Law responding to loss of natural resources due to difficulty controlling urban sprawl.

Requires local governments to create and follow consistent **comprehensive plans** to address 14 areas:

- |                            |                                 |
|----------------------------|---------------------------------|
| 1. Urban Growth            | 8. Property Rights              |
| 2. Reduced Sprawl          | 9. Permits                      |
| 3. Housing                 | 10. Natural Resource Industries |
| 4. Public Facilities       | 11. Historic Preservation       |
| 5. Citizen Involvement     | 12. Environment                 |
| 6. Regional Transportation | 13. Open Space and Recreation   |
| 7. Economic Development    | 14. Shoreline Management        |



### *How it works*

- Encourages dense development within defined **urban growth boundaries**
- Requires designation and regulations for critical areas and resource lands based on “best available science.”
- Authorizes excise **taxes** and impact **fees**
- Noncompliance can result in **loss of revenue** from state sources

### *Importance of GMA to salmon*

As human population grows, critical areas and supporting natural resource lands are conserved to promote water quality and provide the resources salmon and other aquatic life require.





## Treaty Rights

### *Point No Point and Point Elliot Treaties*

Under the 1855 treaties of Point No Point and Point Elliot, tribes ceded ownership of land in exchange for small reservations and hunting and fishing rights. “The right of taking fish at all usual and accustomed grounds and stations is further secured to said Indians, in common with all citizens of the United States.”



### *Boldt Decision*

- In the 1974 landmark Boldt Decision, Judge George Hugo Boldt interpreted “*in common with* all citizens of the United States” to mean a right to 50% of the harvestable catch
- Established tribes as “co-managers” of all fishing resources including those outside of reservations
- Upheld by U.S. Supreme Court in 1979
- This right is subverted if stocks dwindle
- In 1994 treaty harvest right extended to public and private tidelands except for shellfish contained in artificial beds. Upheld by U.S. Supreme Court in 1999
- The tribes believe their rights are still at risk due to federal inaction on recovery<sup>1</sup>

1. Treaty Rights at Risk: A Report from the Treaty Indian Tribes in Western Washington, 2011





## Forest Practices Act

- Passed in 1974 to **protect fish, wildlife** and **clean water** on 9.3M acres of state and private forest land and 60,000 miles of streams.
- In 1987, a **collaborative process** led to the Timber Fish and Wildlife agreement, and again, in 1999, the Forest and Fish Law. Both were incorporated into the Forest Practices Act.
- The act demonstrated that collaborative regulatory processes between industry, government, tribal and environmental stakeholders are more productive than litigation.
- A similar process has not been undertaken for agriculture.

## *How it works*

Forestry operations require a permit and must adhere to **Best Management Practices** such as:

- Forested buffers along streams and wetlands
- Improved road construction and maintenance
- Other harvest, planting and maintenance practices

Goals of the Forest and Fish Law:

- Compliance with Federal Endangered Species Act
- Restore and maintain fish habitat to support harvestable supply of fish
- Meet requirements of Federal Clean Water Act
- Keep the industry economically viable





## Critical Areas Ordinance

- Under the Growth Management Act, all cities and counties in Washington State are required to identify, designate, and protect critical areas found in their local area
- Once lost, the functions and values of critical areas can be costly or even impossible to replace
- Critical areas include but are not limited to fish and wildlife habitat conservation areas, wetlands and frequently flooded areas



## *How it works*

- Designed to protect functions and values of critical areas
- Required to include best available science in developing policies and development regulations
- **No net loss:**
  - Local governments have discretion to adopt critical areas regulations that may result in local impacts upon some critical areas, or even the loss of some critical areas--but there must be **no net loss** of the structure, value, and functions of the natural systems constituting the protected critical areas





## Hydraulic Project Approval (HPA)

- Passed in 1943 by the Washington State Legislature, the Hydraulic Code was specifically designed to protect fish life. Any form of work that uses, diverts, obstructs, or changes the natural flow or bed of any fresh water or saltwater of the state requires a Hydraulic Project Approval (HPA).
- Washington Department of Fish and Wildlife (WDFW) administers HPA program under state Hydraulic Code



## *How it works*

- Any person, organization, or government agency planning certain construction projects or activities in or near state waters is required to obtain an HPA permit
- Examples of activities HPA's are issued for include work on bulkheads, piers, docks, culverts, bridges and sediment dredging projects
- Prevents fish habitat being damaged or destroyed
- Ensures projects meet state conservation standards for fish and their aquatic habitat
- WDFW habitat biologists available to assist with application process





## Shoreline Management Act (SMA)

- Passed by the State Legislature in 1971
- Three basic policy areas:  
shoreline use, environmental protection, and public access
- Goal is to prevent inherent harm in an uncoordinated and piecemeal development of state's shorelines



### *How it works*

#### Shoreline Master Program (SMP)

- Each city and county with “shorelines of the state” must prepare and adopt a Shoreline Master Program, a shoreline-specific combined comprehensive plan, zoning ordinance, and development permit system
- Local governments may amend SMP’s to reflect changing local circumstances, new information, or improved shoreline management approaches and are effective after Ecology approval
- No net loss: WAC 173-26-186(8) directs that master programs “include policies and regulations to achieve no net loss of those ecological functions”
- No net loss standard designed to halt the introduction of new impacts to shoreline ecological functions resulting from new development





## State Environmental Policy Act (SEPA)

- Enacted in 1971, SEPA helps state and local agencies in Washington identify possible environmental impacts that could result from governmental decisions such as:

issuing permits for private projects

construction of public facilities

adopting regulations, policies, or plans



### *How it works:*

- Project proponents usually asked to complete environmental checklist
- Checklist asks questions about the proposal and its potential impacts on the environment
- Lead agency issues a determination of non-significance (DNS) or requires that a third party prepare an environmental impact statement (EIS)
- EIS needs to include evaluation of alternatives to the proposal and measures that would reduce or eliminate likely environmental impacts
- SEPA gives state and local agencies the authority to require conditions to offset any identified adverse environmental impacts





The Road to Recovery



# Recovery

*What does the term “Recovery” mean?*

“A regaining of something lost; a return to health; a regaining of balance, etc.”

Webster’s New World Dictionary

*What does recovery look like?*

Self-sustaining levels of Puget Sound Chinook numbers, distribution, and diversity

Agriculture, development and aquatic life coexist with functioning buffers

Water is clean, cool and sufficient for people and aquatic life

Flood damage is reduced

Parents can take their children to see the salmon return

Improved bird watching opportunities

Aesthetically pleasing connected green belts





## Protection

*maintains the status of a functioning ecosystem*



## Restoration

*seeks to restore functions that once existed*



## Pressures on Recovery

### *The 4 H's*



*Habitat*

Salmon need rivers that are cool, clear, clean, connected, and complex. Impaired habitat can cause salmon eggs, juveniles, and even spawning adults to perish. Urban and rural development put high pressure on riparian ecosystems.



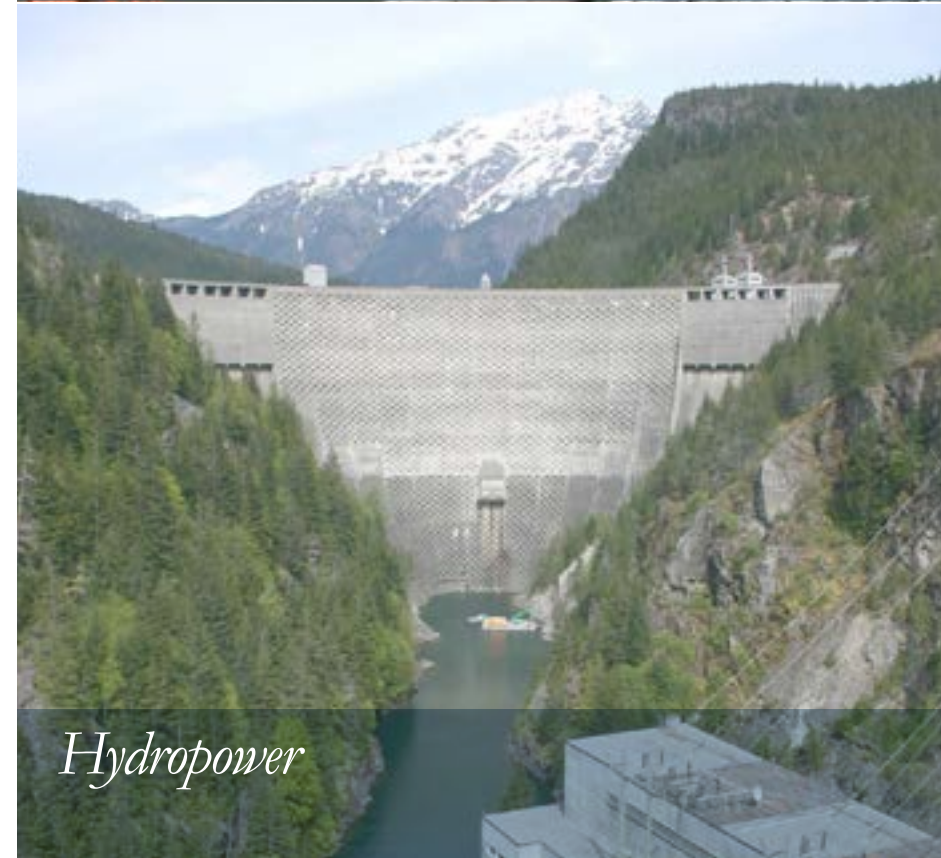
*Harvest*

Commercial, recreational, and tribal fishers must harvest salmon in a manner that allows salmon to reproduce at a rate to increase --not decrease-- populations. Salmon stocks continue to decline despite harvest regulations.



*Hatcheries*

Hatcheries can support salmon recovery by producing juvenile fish at a higher volume than would occur in the wild. However, genetic diversity is decreased, and hatchery-raised salmon also cannot survive without adequate habitat. Overreliance on hatcheries has negative repercussions on wild fish.



*Hydropower*

Dams inhibit migration of anadromous fish both to and from spawning grounds. Juveniles are blocked by dams and killed by turbines and higher water temperatures in reservoir lakes.



# Key Challenges to Salmon Recovery in WRIA 8

## KEY CHALLENGES

## EXPLANATION

## SOLUTION

**Population growth and land use pressure**

By 2040, King and Snohomish Counties are projected to be home to an additional 404,000 and 244,000 people respectively. As population grows, land use pressures continue to threaten quality and function of remaining salmon habitat.

Urban planning, Growth Management Act, transfer of development rights, mitigation banking, easements. Expansion of programs and incentives for developers that reward use of sustainable materials, reduced water use, and innovative stormwater management.

**Stormwater management**

Stormwater has been directly linked to salmon mortality. 75% of toxic chemicals entering Puget Sound are from stormwater.

Through the National Pollutant Discharge Elimination System (NPDES) permit requirements, local governments are taking actions to manage stormwater more effectively. Stormwater managers should give greater consideration to salmon recovery objectives in their management decisions. Low impact development solutions such as rain gardens, permeable pavement, rain barrels, and filtration wetlands are examples of methods that directly address stormwater.

**Lack of awareness about water quality and salmon**

Personal behaviors can negatively impact water quality.

Education and outreach, school programs, community engagement.

**Climate change**

Anticipated effects of climate change include reduced stream and river flows and increased water temperatures.

Healthy functioning ecosystems are more resilient to climate change, hence the importance of WRIA 8 strategies of habitat protection and restoration, including restoring stream corridors and lakeshores and reconnecting floodplains. Better understanding and assessment coupled with adaptive management will be needed to address anticipated effects of climate change.

**Funding**

Maintaining long term support for salmon recovery funding.

Support from local leaders, state, and federal lawmakers in championing restoration and protection projects. Grant based work has proven successful in implementing projects. Supporting an increase in funding from grant programs including Washington State Salmon Recovery Funding Board (SRFB), Pacific Coastal Salmon Recovery Fund (PCSRF), and Puget Sound Acquisition and Restoration (PSAR).



## Watershed Recovery Plans

When Chinook salmon were listed as threatened under the Endangered Species Act (ESA) in 1999, Federal, state, tribal and local governments, along with various industries collaborated to develop a long-term plan for salmon recovery in Puget Sound. 14 watershed councils, each serving a specific Watershed Resource Inventory Area (WRIA), were tasked with creating Chinook Recovery Plans

The plans:

- Reviews properties of the watershed
- Analyzes Chinook populations and factors affecting them
- Defines recovery targets
- Lays out strategies for improving negative factors
- Sets measurable goals
- Defines monitoring and adaptive management strategy

## Lead Entities

In 1999 the Washington State Salmon Recovery Act (RCW 77.85) established 25 “lead entities,” including 14 in Puget Sound. Lead entities perform an essential role in salmon recovery in Washington State. They are local and watershed-based. They develop local salmon habitat recovery strategies and then recruit organizations to do habitat protection and restoration projects that will implement the strategies.

Lead entities consist of:

- A coordinator (usually a county, conservation district or tribe)
- A committee of local, technical experts
- A committee of local citizens
- A grant administrator (usually county, conservation district, tribe, or regional organization)

Science-based and citizen-supported, lead entities identify salmon recovery projects, develop strategies that guide where state and federal money will be spent, and prioritize projects to maximize the public’s investment.



## How is the WRIA 8 Salmon Recovery Plan doing (2006-2015)?

### The plan's focus:

habitat protection and restoration, land use and planning, outreach and education.

- 24% of habitat and restoration projects on the Ten-Year Start List were completed in the first ten years, an additional 33% began advancing towards implementation.<sup>1</sup>
- Implementation has proceeded more slowly than envisioned largely due to inadequate funding and complexities of implementing habitat protection and restoration projects, especially in an urbanized watershed.<sup>1</sup>
- Property acquisition still a priority, now focused on streamside parcels with efforts to reconnect rivers and streams to floodplains.<sup>1</sup>
- Example project: Rainbow Bend - Levee Removal and Floodplain Restoration along the Cedar River.



Historic flooding of Cedar Grove Mobile Home Park at Rainbow Bend on the Cedar River. Photo courtesy: Floodplains by Design.

Since 2005:

1,547 acres      76.6 acres

protected through acquisition, conservation easement, or some other protective mechanism

of floodplain reconnected to river/stream

11.8 miles      0.9 miles

of streambank protected

of levee removed or set back

6,580 linear feet

of lakeshore armoring removed

510 acres

of riparian areas treated for invasive species removal



# Direct and Indirect Benefits of Salmon Recovery Funding

**Salmon Recovery Funding Board** - created in 1999

by the Washington State Legislature, disperses grant funding for salmon recovery projects throughout Washington state.

Some accomplishments from investments from 1999-2012 include:

- Restored 446 miles of habitat, and nearly 14,000 miles of river bank
- Removed 466 barriers preventing fish from migrating
- Restored more than 3,500 acres of estuarine and wetland habitat
- Conserved more than 34,000 acres of critical salmon habitat<sup>1</sup>



## Salmon Recovery Funding Board

WASHINGTON STATE  
RECREATION AND CONSERVATION OFFICE

# \$641M

Has been invested in recovery (including \$261M in state funding)

# \$1M

Spent on restoration results in:  
15-33 new or sustained jobs  
\$2.2-\$2.5 million in total economic activity generated<sup>1</sup>

# \$219M

Funding recipients contributing \$219M of matching funds<sup>1</sup>

# 90%

Money invested into restoration stays local – 90% of funds stay within the state, 80% stay within the county where a project is located<sup>2</sup>

# 3.2x

Money invested into restoration creates 3.2x more jobs than money invested into the oil and gas sector. (restoration: 17-33 jobs/\$1M oil and gas sector: 5 jobs/\$1M, road construction 7 jobs/\$1M)<sup>2</sup>

# 16,374 JOBS

Commercial and recreational fishing in Washington supports 16,374 jobs and produces \$540M in personal income annually<sup>3</sup>

1. RCO. Statewide Funding by Source. <https://data.wa.gov/dataset/Statewide-Funding-by-Source-Total-860-414-379-elic/7iey-mut7> Accessed 11/3/14  
 2. NOAA. Table 2- Job Creation per \$1 million dollar investment, <http://www.habitat.noaa.gov/about/habitat/habitatconservationjobs.html> Accessed 11/3/14  
 3. WDFW. Economic Analysis of the Non-Treaty Commercial and Recreational Fisheries in Washington State, <http://wdfw.wa.gov/publications/00464/wdfw00464.pdf> Accessed 11/3/14





## REGIONAL FISHERIES COALITION

### Regional Fisheries Enhancement Groups (RFEG's)

- A statewide network of 14 non-profit community-based enhancement organizations
- Program created in 1990 by Washington State Legislature to involve local communities, citizen volunteers, and landowners in the state's salmon recovery efforts
- RFEG's share unique role of working within their own communities to recover salmon
- Create dynamic partnerships with local, state and federal agencies, Native American tribes, local businesses, landowners, and community members
- Help lead their communities in successful restoration, education, and monitoring projects
- Today RFEG projects are often large-scale, complex projects involving multiple private landowners and intergovernmental relationships on public lands

## OUR 25 -YEAR IMPACT

# 7:1

“Boots on the ground model” stretches every dollar of public investment. Over the last 25 yrs RFEG's have leveraged base funding at a rate of at least 7:1

# 3,831

salmon projects completed

# 661

miles of habitat restored

# 1,118

Miles of stream reopened

# 856

fish passage projects completed

# 78,025,471

fish released





Recovery Solutions



## How do we ensure *private property rights are protected?*

### Considerations:

- Private property rights are guaranteed by the U.S. Constitution and other laws
- The results of conservation benefit **everyone**
- The **costs** fall unduly on some landowners
- Many **landowners** are unaware of land-use restrictions
- Critical Areas are sometimes misidentified

### Solutions:

- Landowner and regulator **education**
- **Partner** with willing landowners on stewardship projects
- **Acquire** lands for protection or restoration
- Public compensation for lost commercial value of private land
- Conservation Reserve Enhancement Program (CREP)
- **Market-based** programs
  - Transfer of Development Rights
  - Purchase of Development Rights
  - Mitigation Banking



## Floodplains by Design (FbD)

- Collaborative partnership led by Department of Ecology, The Nature Conservancy and Puget Sound Partnership.
- Public/private collaborative partnership integrating flood risk reduction with habitat protection and restoration.
- Multiple benefits driven approach with longer design time that will:
  - Reduce flood hazards
  - Restore salmon populations
  - Increase agricultural viability
  - Improve water quality
  - Enhance outdoor recreation
- Washington State Legislature provided nearly \$80M to support 29 FbD project in three years.
- WRA 8 project funded in 2013 - Lower Cedar River Integrated Floodplain Restoration



**Floodplains by Design**

• REDUCING RISK, RESTORING RIVERS •



## Low Impact Development & Green Infrastructure

Low Impact Development (LID) is an approach to land development (or re-development) that works with nature to **manage stormwater as close to its source** as possible.

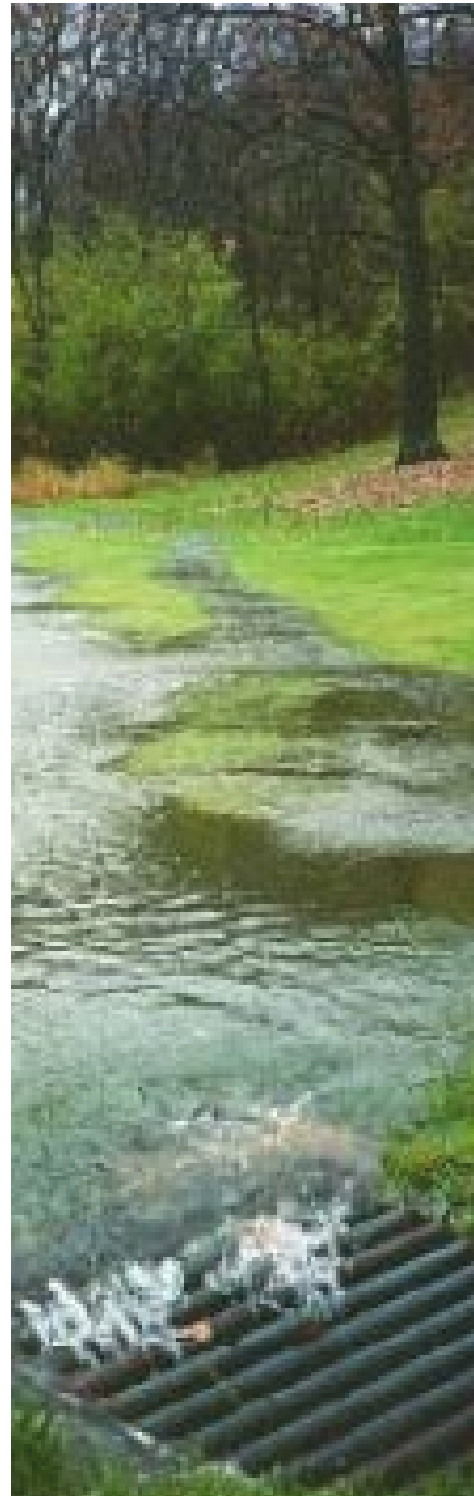
LID serves two main purposes:

1. reduces the **quantity** of runoff
2. improves the water **quality** of runoff

Green Infrastructure (GI) refers to the management of wet weather flows using LID techniques.

LID employs principles such as preserving and recreating natural landscape features and **minimizing impervious surfaces** to improve drainage.<sup>1</sup>

Implementing LID is a **requirement** (where feasible) of the new NPDES stormwater permits in Western Washington.



1. EPA <http://www.ecy.wa.gov/polwaste/green/index.cfm>

### Examples of LID

Rain Gardens

Pervious Pavement

Green Roofs

Rain Water Harvesting

### Benefits of LID

Reduces flashy storm events and subsequent flood risk

Reduces costs of stormwater management and flood control

Improves water quality

Improves ground water recharge resulting in higher midsummer river flows

Visually attractive, so increases property values





## Trees & Water Quality

### Trees:

- **provide shade** keeping water cool
- **reduce erosion** - roots hold soil in place. Less erosion results in clearer and colder water
- **provide leaf litter input** - leaf litter supports stream bugs and the fish that feed on those bugs
- **provides woody debris** - by eventually falling into the river, **woody debris** creates complexity in streams by creating deep pools and places for rearing salmon to avoid predators



## Trees Further Away From Streams

Functioning forest areas create water quality benefits as well.

In a functioning forest more water is absorbed and recharges aquifers than in other landscapes.

Aquifers feed streams in late summer helping keep flow levels up and streams cool at a critical period for fish rearing.





## Mitigation Banking

*Mitigation banking is an innovative, market-based solution that assists developers and replaces impacted habitat with high-quality habitat.*



## Example:

1. A restoration company constructs a 200 acre wetland on their property in the Snoqualmie valley.
2. A developer wants to build a housing development in Everett that impacts 10 acres of wetlands. They are required to find a way to mitigate for the impacts of construction in order to build.
3. The restoration company offers credits for sale through the mitigation bank.
4. The developer buys a 10 acre wetland credit from the mitigation bank to offset their impact.
5. As a result, the new development does not cause a net loss of habitat quality or quantity.

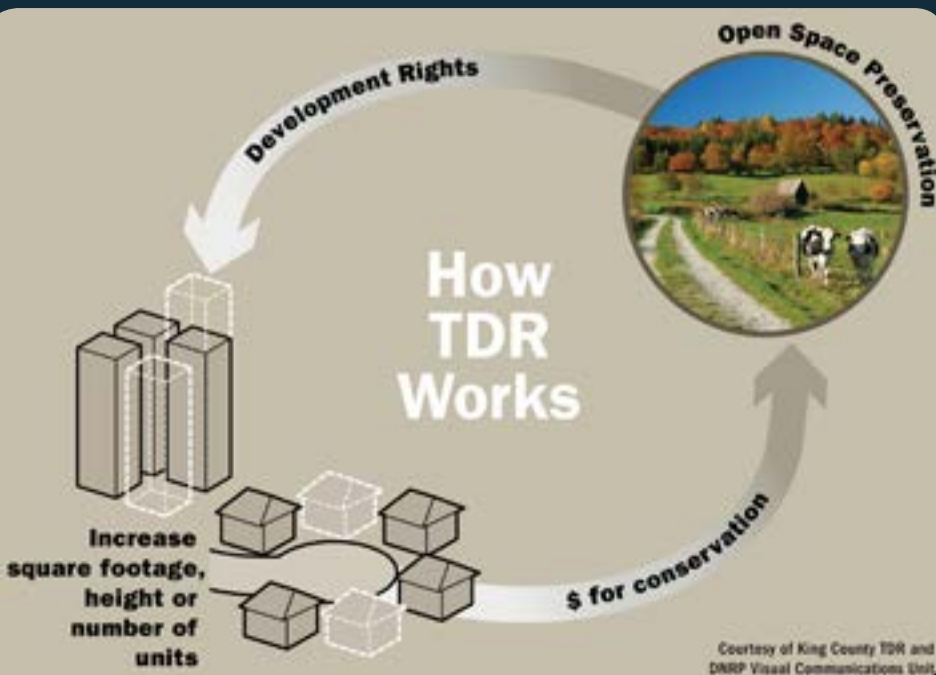
## Benefits of Mitigation Banking:

- Allows developers to easily **offset their impacts** on habitat by purchasing credits.
- Does not necessarily require public funding.
- Banking systems can be set up so that development increases the overall amount of habitat.
- Mitigation habitat created by banks is **higher quality** and provides more water quality benefits than mitigation projects created by developers.
- Mitigation wetlands can be created **preemptively** and **start providing benefits** before their mitigation credits are sold.
- Associated negative consequence: bank can be in a different basin. This allows some areas to deteriorate to the benefit of other areas.



## Transfer of Development Rights

*Transfer of Development Rights is a market-based strategy for promoting growth and conserving land.*



## How it works:

- A developer can purchase development rights from agricultural lands and working forests. These rights permit the developer to build to greater intensity.
- In return, a conservation easement is placed on the areas selling the development rights. The landowner retains ownership and resource uses, but the land cannot be developed or subdivided.

## Benefits of TDR:

TDR is good for:

- developers, because they are able to achieve **more value** from projects.
- landowners, because it respects property rights and puts **money in their pockets** now while allowing them to **continue farming or forestry**.
- the community, because it is a market-based solution which **does not require public funding**.
- the community, because the conservation easements placed on properties ensure that lands critical for properly functioning **watersheds and ecosystems are protected**. The easement also works to maintain local agriculture, forestry, or habitat.



A person is fishing in the ocean at sunset. The sun is low on the horizon, creating a golden glow over the water. In the background, a city skyline is visible across the water. The person is silhouetted against the bright light of the sun.

## Resources for Continued Salmon Recovery

- *Sustainable Funding:* The long-term nature of salmon recovery requires dedicated, predictable funding.
- *Increased Funding for Grant Based Work:* Grants are a key funding source for habitat protection and restoration projects. Local, state, and federal grants are vital sources of funds but none are guaranteed. Support for grant funding programs is essential. Local jurisdictions can use utility and surface water management fees to leverage grants.
- *Adequate Staffing:* Need to appropriately build human infrastructure that supports effective project development and management. Many local governments and other partners lack capacity to develop projects when funding opportunities arise.
- *Measuring Success:* To support and inform project implementation and incorporate lessons learned, monitoring project effectiveness and trends in salmon and habitat health are essential.
- *Communicating Regional Benefits:* Education and outreach programs that demonstrate the connection between salmon recovery benefits and other regional priorities and that promote habitat restoration are vital.



## Conclusion

- 86% of Puget Sound residents agree that clean up and protection of Puget Sound is an appropriate use of tax dollars<sup>1</sup>.
- Salmon are valuable to us but are already in danger of being lost forever across 3/4 of the state.
- Diminished and degraded habitat, water quality and quantity are the primary limiting factors for salmon recovery.
- Awareness of the severity of the problem and its causes is essential in working towards solutions.

- Collaborative efforts implementing restoration projects benefit landowners, salmon, human and environmental health.
- Recovery efforts create jobs, reduce flood risk, improve habitat for fish, wildlife and humans, and improve land value.
- Recovery plans and **solutions exist** but are failing to meet their goals due to resource limitations and lack of policy support.
- Land use policy decisions **could play a larger role** in protecting existing habitat, restoration of lost habitat, and preservation of water conditions crucial to salmon.





# WRIA 8 Salmon Recovery Council Membership 2017

Organization	Name	Title	Email/Phone
Town of Beaux Arts Village	Vacant, Delegate	Councilmember	
City of Bellevue	John Stokes, Vice-Chair, Delegate	Mayor	jstokes@bellevuewa.gov
City of Bothell	Andy Rheume, Chair, Delegate/James McNeal, Alternate	Mayor/Councilmember	andy.rheume@bothellwa.gov/james.mcneal@bothellwa.gov
City of Clyde Hill	Bruce Dodds, Delegate	Councilmember	Council5@clydehill.org
City of Edmonds	Diane Buckshnis, Delegate/Kristiana Johnson	Councilmember	diane.buckshnis@edmondswa.gov/kristiana.johnson@edmondswa.gov
Town of Hunts Point	Ted Frantz, Delegate	Councilmember	council3@huntspoint-wa.gov
City of Issaquah	Eileen Barber, Delegate	Councilmember	citycouncil@issaquahwa.gov
City of Kenmore	Allan VanNess, Delegate/David Baker, Alternate	Deputy Mayor/Mayor	avanness@kenmorewa.gov/dbaker@kenmorewa.gov
City of Kent	Vacant, Delegate/Mike Mactutis, Staff Alternate	Councilmember/Environmental Engineering Manager	/253-856-5000
King County	Rod Dembowski, Delegate/Jeanne Kohl-Welles, Alternate/Garrett Holbrook, Staff Alternate	Councilmember/councilmember/Legislative Aide	Rod.Dembowski@kingcounty.gov/Jeanne.Kohl-Welles@kingcounty.gov/
City of Kirkland	Jay Arnold, Delegate	Deputy Mayor	jarnold@kirklandwa.gov
City of Lake Forest Park	Mark Phillips, Delegate/Tom French, Alternate	Councilmember/Councilmember	mphilips@cityoflfp.com/tfrench@ci.lake-forest-park.wa.us
City of Maple Valley	Dana Parnello, Delegate/Bill Allison, Alternate	Deputy Mayor/Councilmember	dana.parnello@maplevalleywa.gov/bill.allison@maplevalleywa.gov
City of Medina	Vacant, Delegate/Ryan Osada, Staff Alternate	Councilmember/Public Works Director	/rosada@medina-wa.gov
City of Mercer Island	Dave Wisenteiner, Delegate/Bruce Bassett, Alternate	Councilmember/Mayor	david.wisenteiner@mercergov.org/bruce.bassett@mercergov.org
City of Mill Creek	Sean Kelly, Delegate/Vince Cavaleri, Alternate/Marci Chew, Staff Alternate	Councilmember/Councilmember/Surface Water Specialist	skelly@cityofmillcreek.com/vcaveleri@cityofmillcreek.com/marci@cityofmillcreek.com
City of Mountlake Terrace	Doug McCardle, Delegate	Councilmember	Dmccardle@ci.mt.wa.us
City of Mukilteo	Vacant, Delegate	Councilmember	
City of Newcastle	Allen Dauterman, Delegate/Audrie Starsy, Staff Alternate	Councilmember/Surface Water Program Manager	allend@ci.newcastle.wa.us/audries@newcastlewa.gov

Organization	Name	Title	Email/Phone
City of Redmond	Hank Myers, Delegate	Councilmember	hmyers@redmond.gov
City of Renton	Ryan McIrvin, Delegate	Councilmember	council@rentonwa.gov
City of Sammamish	Tom Odell, Delegate/Don Gerend, Alternate	Councilmember/Mayor	todell@sammamish.us/dgerend@sammamish.us
City of Seattle	Kshama Sawant, Delegate/Cyndy Holtz, Staff Alternate 1/Alex Chen, Staff Alternate 2	Councilmember/Major Watersheds Business Area Manager/Director, Water Planning @ Program Management	kshama.sawant@seattle.gov/cyndy.holtz@seattle.gov/chenA@seattle.gov
City of Shoreline	Jesse Solomon, Delegate/Keith Scully, Alternate	Councilmember/Councilmember	jsalomon@shoreline.wa.gov/kscully@shorelinewa.gov
Snohomish County	Brian Sullivan, Delegate/Robert Knoll, Staff Alternate	Councilmember/Council Staff	Brian.Sullivan@co.snohomish.wa.us/Robert.Knoll@co.snohomish.wa.us
City of Woodinville	Paula Waters, Delegate/Susan Boundy-Sanders, Alternate	Councilmember/Councilmember	pwaters@ci.woodinville.wa.us/sboundy-sanders@ci.woodinville.wa.us
Town of Woodway	Carla Nichols, Delegate	Mayor	cnichols@townofwoodway.com
Town of Yarrow Point	Carl Scandella, Delegate	Mayor Pro Term	425-454-6994
Alderwood Water & Wastewater District	Mike Dixon, Delegate	Commissioner	commissioner@awwd.com
The Boeing Company	Nancy Eklund, Delegate	Representative	
Cedar River Council	Charles Ruthford, Delegate	Representative	206-477-4654
Forterra	Judy Blanco, Delegate	Director of Riparian Restoration	jblanco@forterra.org
Friends of the Issaquah Salmon Hatchery (FISH)	Richard Sowa, Delegate	Director, Board of Directors	425-392-1118
King Conservation District	Bill Knutsen, Delegate	Supervisor, Board of Supervisors	Bill.Knutsen@kingcd.org
Long Live the Kings	Jacques White, Delegate/Susan O'Neil, Alternate	Executive Director/Senior Conservation Planning Manager	jwhite@lltk.org/soneil@lltk.org
Mid Sound Fisheries Enhancement Group	Noel Gilbrough, Delegate/Jeanette Norner, Alternate	Vice President, Board of Directors/Executive Director	gilbrough@comcast.net/jeanette@midsoundfisheries.org
Mountains to Sound Greenway Trust	Tor Bell, Delegate	Field Programs Director	tor.bell@mtsgreenway.org
National Oceanic and Atmospheric Administration (NOAA) Fisheries	Mike Grady, Delegate	WA Transportation Senior Resource Manager	michael.grady@noaa.gov
Sno-King Watershed Council	Eric Adman, Delegate/David Bain, Alternate	Board President/Representative	Snokingwatershedcouncil@gmail.org
U.S. Army Corps of Engineers (Corps)	Vacant, Delegate		



# WRIA 8 Salmon Recovery Council Membership 2017

Organization	Name	Title	Email/Phone
Washington Association of Sewer and Water Districts (WASWD)	Gery Schulz, Delegate	Commissioner, Skyway Water & Sewer District	staff@waswd.org
WA State Department of Ecology	Joan Nolan, Delegate/Ralph Svrjcek, Alternate	Water Cleanup Specialist/Water Cleanup Specialist	jnol461@ecy.wa.gov/rsvr461@ecy.wa.gov
WA State Department of Fish & Wildlife	Stewart Reinbold, Delegate/Bob Everitt, Alternate	Southern District Team Supervisor/Regional Director	Stewart.Reinbold@dfw.wa.gov/Bob.Everitt@dfw.wa.gov
WA State Department of Natural Resources	Vacant, Delegate	Representative	
Water Tenders/ Trout Unlimited	Gary Smith, Delegate/Terry Lavender, Alternate	Representative/Citizen Representative	

## Glossary

### *Federal & State*

#### Glossary 1

BUFFER	Vegetated strip of land separating land uses
CRITICAL AREA	An area requiring special protection under land use laws e.g., wetlands, habitat areas, geologically hazardous areas
ECOSYSTEM	An environment of physical characteristics and organisms occurring in a given area
ESTUARY	An ecosystem where fresh and salt water mix
INDICATOR SPECIES	A species whose presence reflects the health of its ecosystem
LID	Low Impact Development e.g., rain gardens, pervious surfaces
NON-POINT SOURCE	Pollution coming from a large number of locations e.g., automobiles
POINT SOURCE	Pollution coming from a single location e.g., effluent pipe from sewage treatment
PROTECTION	Maintaining a functioning ecosystem by restricting use
RESTORATION	Re-establishing the function of a non-functioning ecosystem
RIPARIAN ZONE	Areas bordering rivers and other bodies of surface water

#### Glossary 2

RUNOFF	Flow of surface water from the place it is deposited by rain
STORMWATER	Runoff from rain and snowmelt and often deposited into waterbodies without treatment
TDR	Transfer of Development Rights – A market-based tool for concentrating development in urban areas and maintaining rural areas
WATERSHED	An area whose surface water eventually flows into a given water body
WETLAND	An area with wet soil conditions most of the time

#### Federal Regulatory

BOLDT DECISION	1974 federal court decision upholding tribal treaty rights
CWA	Clean Water Act
NPDES	National Pollution Discharge Elimination System
ESA	Endangered Species Act


#### State Regulatory

FOREST & FISH LAW	Regulates private forest land
GMA	Growth Management Act
HPA	Hydraulic Project Approval
SEPA	State Environmental Policy Act
SMA	Shoreline Management Act









**Watershed Management  
for Salmon Recovery:  
A Reference Guide**

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