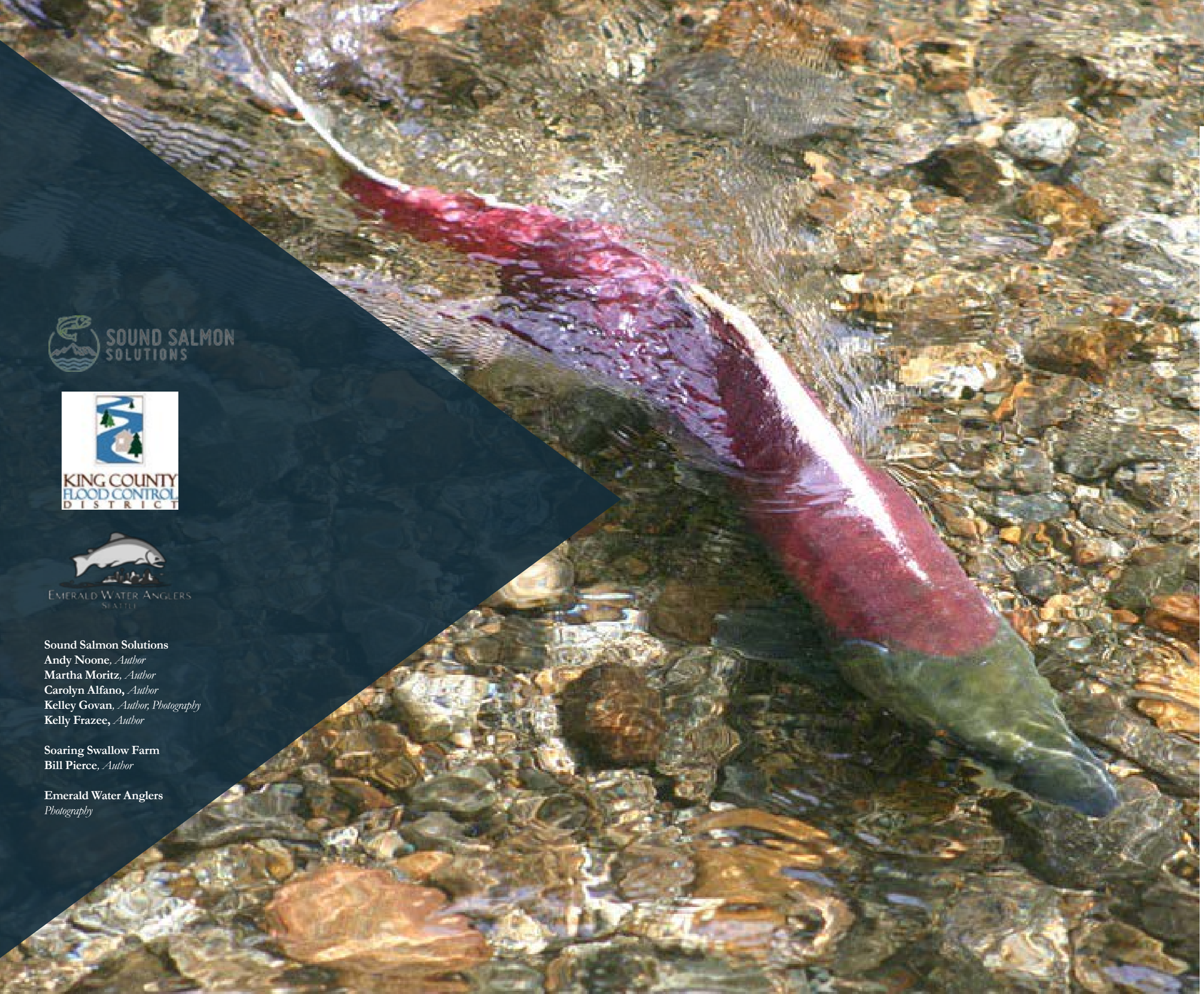
Watershed Management for Salmon Recovery:

A Reference Guide



SOUND SALMON SOLUTIONS

KING COUNTY FLOOD CONTROL DISTRICT

EMERALD WATER ANGLERS SEATTLE

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Executive Summary

- Water quality and quantity are important to **humans** and wildlife.
- Chinook in the Snoqualmie Watershed have declined to less than 10% of historic populations. Chinook, coho, and steelhead populations appear to be declining.
- Habitat is the largest limiting factor to salmon recovery.
- 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.

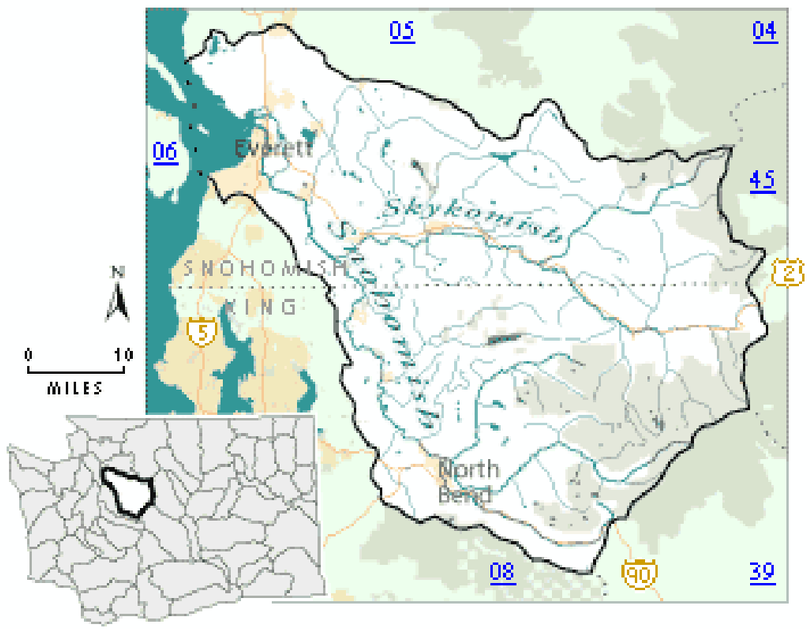
Second, there needs to be a collaborative effort to implement restoration projects that benefit landowners, salmon, and environmental health. A number of innovative, voluntary compliance incentive programs and market-based solutions have enabled recovery groups to work together with agriculture, forestry,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

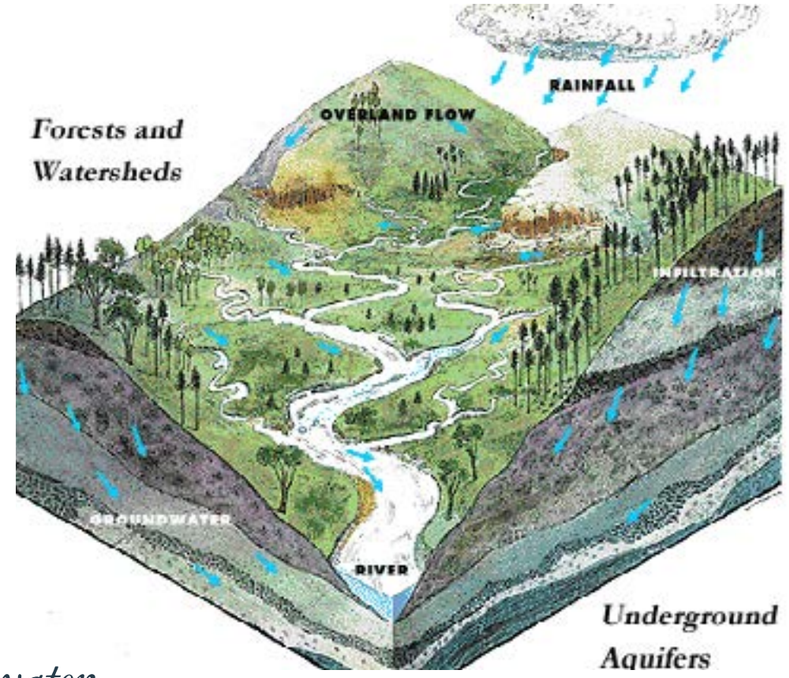


WRIA 7 Watershed Map

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 Snoqualmie/Skykomish Watershed.

What happens on the land in a watershed, especially human activities, dicates 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.



Forests and Watersheds

Underground Aquifers

Stormwater

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.**

Water Quality Factors

- **Polluted stormwater runoff** - pesticides, herbicides, fungicides, excess nutrients, sediment, oil and other chemical contaminants.
- **Quantity of runoff** - an increase in impervious surfaces and a reduction in groundwater recharge areas can lead to more erosion and flooding when stormwater from a rain event discharges into a waterbody.
- **Temperature of runoff** - contaminants and warmer stormwater can increase in-stream water temperatures

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 suspendid 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


1


2


3


4


5


6


7


8

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 relative to species prevalance 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[1]
- 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 ¾ of the state are in danger of being lost forever.

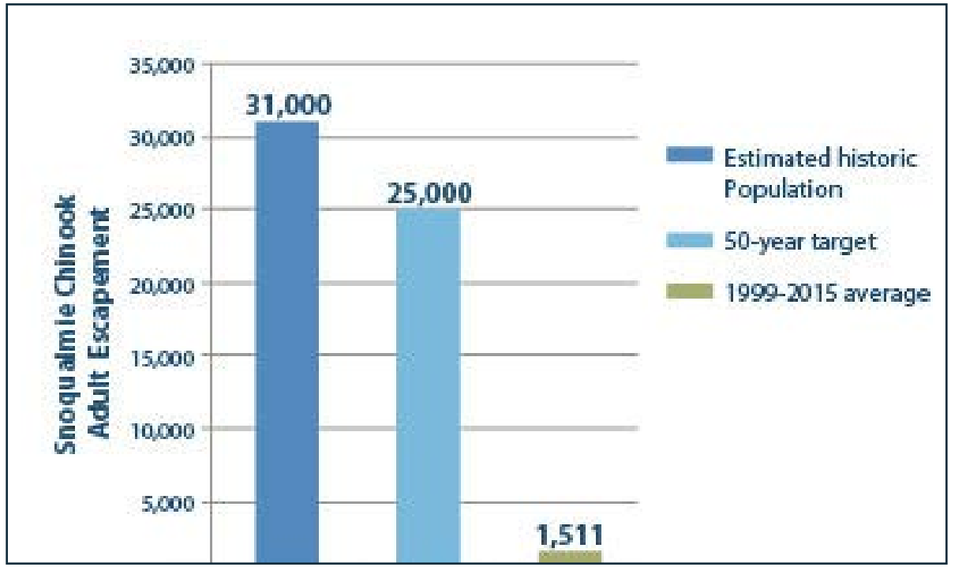
Some threatened fish populations are increasing but most populations are decreasing or experiencing no change.

In The Snoqualmie Watershed

Chinook have declined to less than 10% of historic population levels[1].

Coho and steelhead populations seem to be static or declining[1].

Snoqualmie steelhead escapement* (1998-2016)[1]



Snoqualmie Chinook escapement* and recovery benchmarks [1]

*Escapement- the number of adult salmon in a population that "escape" all other sources of mortality to return and spawn in their home stream. Used as a key measure of fish health.

1 Snoqualmie Watershed Forum Ten-Year Status Report: 2005-2015

Human Impacts

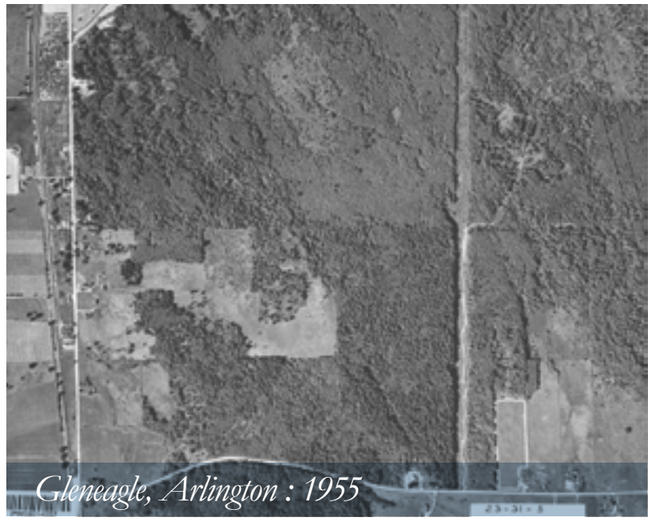
How has land use *changed the landscape?*

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

Development reduces tree cover and increases polluted stormwater.

Snohomish County must accommodate an additional 60,000 residents by 2020.

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



Gleneagle, Arlington : 1955

Gleneagle, Arlington : 2014

What are the impacts of *agriculture?*

Impact	Solution
manure runoff	livestock exclusion fencing, manure composting, targeted application
pesticide runoff	organic methods, native plant buffer
fertilizer runoff	fertility management, native plant buffer
decreased buffers	incentive programs, working buffers
converted estuary	land acquisition
reduced in-stream flows	efficient irrigation, rain water catchment

What are the impacts of *conservation?*

Impact	Solution
land out of agriculture/forestry	incentives, better markets
less water for human use	water conservation
undeveloped land	growth management, conservation easements
infringement on private property rights	land acquisition, easements, incentives
regulatory drag on economic activity	eliminate red-tape, use market-based solutions

What are the impacts of *fishing industry?*

Impact	Solution
overharvest	population-based catch limits
bycatch	ethical fishing methods (pole caught)
illegal fishing	stricter enforcement, public education
Tribal fishing rights	public education
loss of jobs with declining fish stocks	conservation jobs
fish farms	focus on sustainable wild populations

What are the impacts of *forestry?*

Impact	Solution
increased runoff	adequate vegetation buffers
decreased aquifer recharge	adequate vegetation buffers
increased sediment	road maintenance, adequate buffers
road building and culverts	passable culverts, erosion reduction methods
decreased buffer	maintain required buffers, logging setback limits

What are the impacts of *hydropower?*

Impact	Solution
complete and/or partial fish passage blockage	fish ladder, shuttle system
low in-stream flow below dam	minimum flow regulations
juvenile salmon turbine death	flow augmentation, reservoir drawdowns over spillway (with spillway deflectors), surface bypass systems
older dams not efficient for cost to run?	dam removal/breaching
cheaper, renewable energy	alternative renawable energy options

What are the impacts of *rural development?*

Impact	Solution
road building and culverts	passable culverts
decreased buffers	permit adequate buffers
animal manure	composting facilities, biodigesters
malfunctioning septic systems	repair assistance
increased runoff	adequate vegetation buffers

What are the impacts of *shoreline development?*

Impact	Solution
malfunctioning septic tanks	repair assistance
increased stormwater runoff	Low impact development (LID), public education, incentive programs
decreased habitat for forage fish & other wildlife	full or partial bulkhead removal, natural shoreline installation (“soft shore protection”)
decreased buffers	planting and restoration
feeder bluff sediment transport blockage	bulkhead removal, beach nourishment
shoreline railroads	beach nourishment
marinas	salmon safe certification

What are the impacts of *stormwater runoff?*

Impact	Solution
impervious surfaces greatly increase stormwater runoff	Low impact development (LID), pervious pavement, adequate vegetative buffers (“green infrastructure”)
combined sewer outflows (CSO’s)	LID, water conservation, re-direction outflows & pipes to stormwater management areas
heavy metals, oil, & other pollutants in watersheds	natural yardcare, car maintenance, pick up pet waste, reduce use of fertilizers and pesicides at home
malfunctioning septic	repair assistance, incentive programs
bank erosion	vegetative buffers, LID
loss of stream habitat	buffers, urban forestry (conservation vs. reforestation)

What are the impacts of *urban development?*

Impact	Solution
road building and culverts	passable culverts
absent and/or decreased buffers	permit adequate buffers, urban forestry
stormwater runoff	LID, other Best Management Practices (BMP)
shoreline armoring	bulkhead removal
decreased tree canopy	tree ordinances, urban forestry
warmer surface water & land temps	urban forestry
illegal dumping	culverts
dominance of impervious surfaces	LID, urban forestry, buffers
marinas	salmon safe certification

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%.**[1]
- **NPDES Stormwater Permits** mandate pollution prevention plans including public education and outreach, maintenance and inspection.
- WA Dept. of Ecology monitors waters 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 elminate **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.

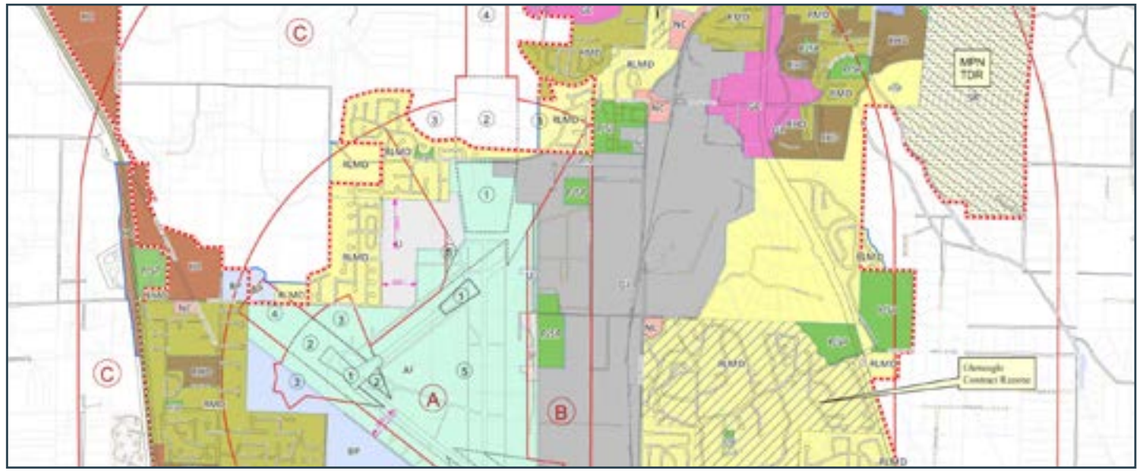
How it works

Conservation through:

- Listings
- Critical habitat conservation
- Recovery plans
- Species recovery grants
  (e.g., Salmon Recovery Funding Board, Puget Sound Aquisition 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
2. Reduced Sprawl
3. Housing
4. Public Facilities
5. Citizen Involvement
6. Regional Transportation
7. Economic Development
8. Property Rights
9. Permits
10. Natural Resource Industries
11. Historic Preservation
12. Environment
13. Open Space and Recreation
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[1]

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

Narbeck Wetland Sanctury created as a mitigation bank for new construction, Image: The Wetland Company

Crtitical 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

- 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 biologitsts available to assist with application process

Shoreline Management Act

- 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 Department of 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 it look like?

Commercial, Tribal and Recreational fishermen can rely on a local catch to sustain them (80% of historic[1])

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

1. Stillaguamish Watershed Chinook Recovery Plan, 2005

Protection

maintains the status of a functioning ecosystem

Restoration

seeks to restore functions that once existed

Pressures on Recovery

The 4 H's

Habitat

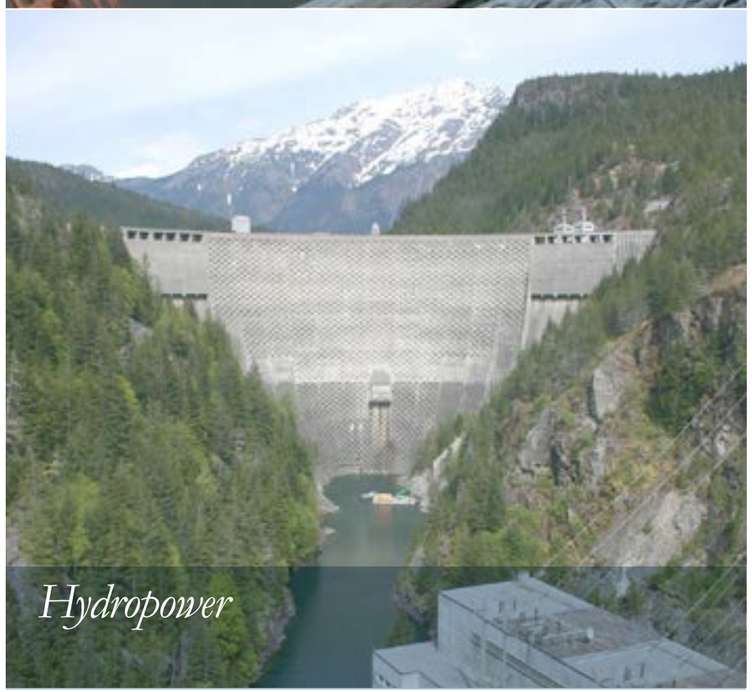
Salmon need rivers that are cool, clear, clean, connected, and complex. Impaired habitat can cause salmon eggs, juveniles, and even spawning adults to perish. Urban and rural development put high-pressure on riparian ecosystems.

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 Obstacles to Habitat Improvements

KEY OBSTACLES	EXPLANATION	SOLUTION
Development pressure, population growth	In 30 years, Snohomish County is projected to be home to an additional 285,000 people.	Urban planning, Growth Management Act, transfer of development rights, mitigation banking, easements
Limited funding	Funding level is at less than 25% estimated cost of recovery goals[1]	Maintain current funding and expand funding
Conflicting policies and goals	Agencies sometimes have rules incompatible with recovery goals (agricultural production district, diking districts).	Collaborate to decide on mutually agreeable solutions, Floodplains By Design program, increase working farmland in areas not critical to salmon populations.
Frustrated private landowners or potential landowners	Changing rules, broken promises, lengthy implementation process	Speed up project implementation process
Lack of awareness or interest in incentive programs (CREP)	Many landowners are unaware of the monetary incentives available for installing riparian buffers.	Community outreach, educational programs, social marketing, targeted messaging
State/federally funded 100' minimum buffer requirement	The restoration community is not in agreement about this rule but must follow the funding criteria. This rule places an undue burden on private landowners interested in restoring a buffer	Path to exemption from requirement, bonus for exceeding engagement
Lack of awareness about water quality and salmon	Personal behaviors can negatively impact water quality	Education and outreach, school programs, community engagement
Stormwater management	75% of toxic chemicals entering Puget Sound are from stormwater	Low impact development solutions (rain gardens, permeable pavement, rain barrels, filtration wetlands)

1. Stillaguamish 3-year work plan, 2013

Watershed Recovery Plans

When Chinook salmon were listed as threatened, watershed councils were tasked to create **Chinook Recovery Plans**.

Adoption of the Snohomish River Basin Salmon Conservation Plan in 2005 helped guide numerous salmon habitat actions in WRIA 7 including:

- Restoration and protection projects
- Salmon-friendly policies and regulations
- Watershed stewardship activities
- Landowner incentives and education
- Scientific monitoring programs

Lead Entities

In 1999 the Washington State Salmon Recovery Act (RCW 77.85) established 25 "lead entities" including 14 in Puget Sound. Lead Entities perfrom 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 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.

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[1]

Salmon Recovery Funding Board
WASHINGTON STATE
RECREATION AND CONSERVATION OFFICE

$641M

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

$1M

Spent on restorationresults in:
15-33 new or sustained jobs
$2.2-$2.5 million in total economic[1]

$219M

Funding recipients contributing $219M of matching funds[1]

90%

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

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)[2]

16,374 JOBS

Commercial and recreational fishing in Washington supports 16,374 jobs and produces $540M in personal income annually[3]

1. RCO. Statewide Funding by Source. https://data.wa.gov/dataset/Statewide-Funding-by-Source-Total-860-414-379-clic/7iey-mut7 Accessed 11/3/14
2. NOAA. Table 2- Job Creation per $1 million dollar investment, http://www.habitat.noaa.gov/abouthabitat/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 agenices, 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

Regional Fisheries Coalition 2015 Annual Report, http://wdfw.wa.gov/publications/01777/wdfw01777.pdf

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 timeline 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.
- WRIA 7 project funded in 2014 - Qwuloolt Estuary

Floodplains by Design

· REDUCING RISK, RESTORING RIVERS ·

Conservation Reserve Enhancement Program *(CREP)*

Year 1 (CREP project)

Year 7 (same project)

Actively eroding bank

- USDA Farm Bill program funding **riparian and wetland restoration** on agricultural Lands
- Provides 10-15 year contracts **paying farmers** $40 - $350 per acre per year to take land out of production for conservation
- Project assistance through Snohomish Conservation District or Conservation Service
- Currently over 13,000 acres in CREP on 735 miles of streams in WA[1]
- Monitoring shows restored buffers **are effective** at increasing vegetative cover and decreasing water temperature

1. Washington State Conservation Commission: Conservation Reserve Enhancement Program: Changing Stream Corridors throughout Washington

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:

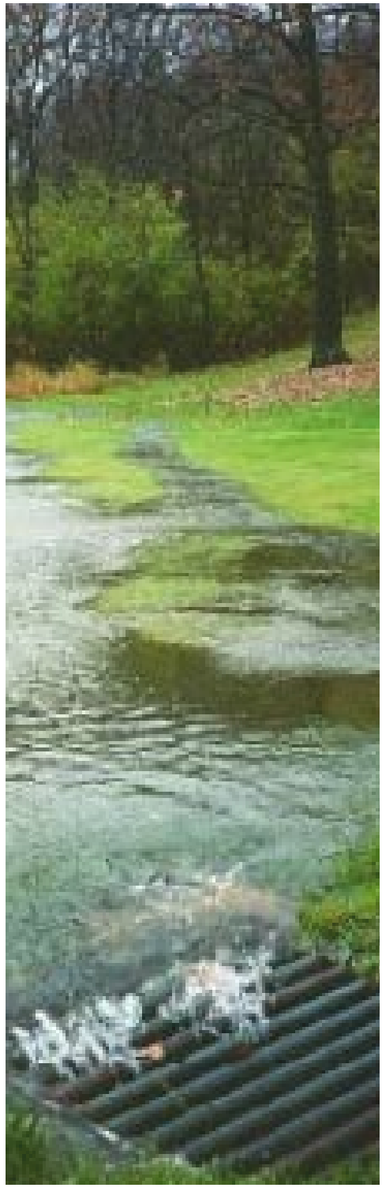
1. reduces the **quantity** of runoff
2. improves the water **quality** of runoff

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.[1]

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:

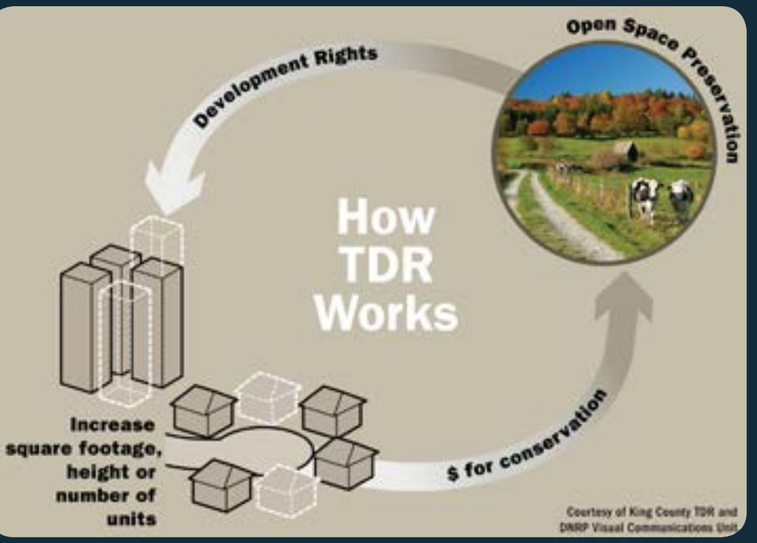
1. A restoration company constructs a 200 acre wetland on their property in the Snoqualmie valley.
2. A developer wants to build a housing development in Everett that impacts 10 acres of wetlands. They are required to find a way to mitigate for the impacts of construction in order to build.
3. The restoration 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 differnt 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.



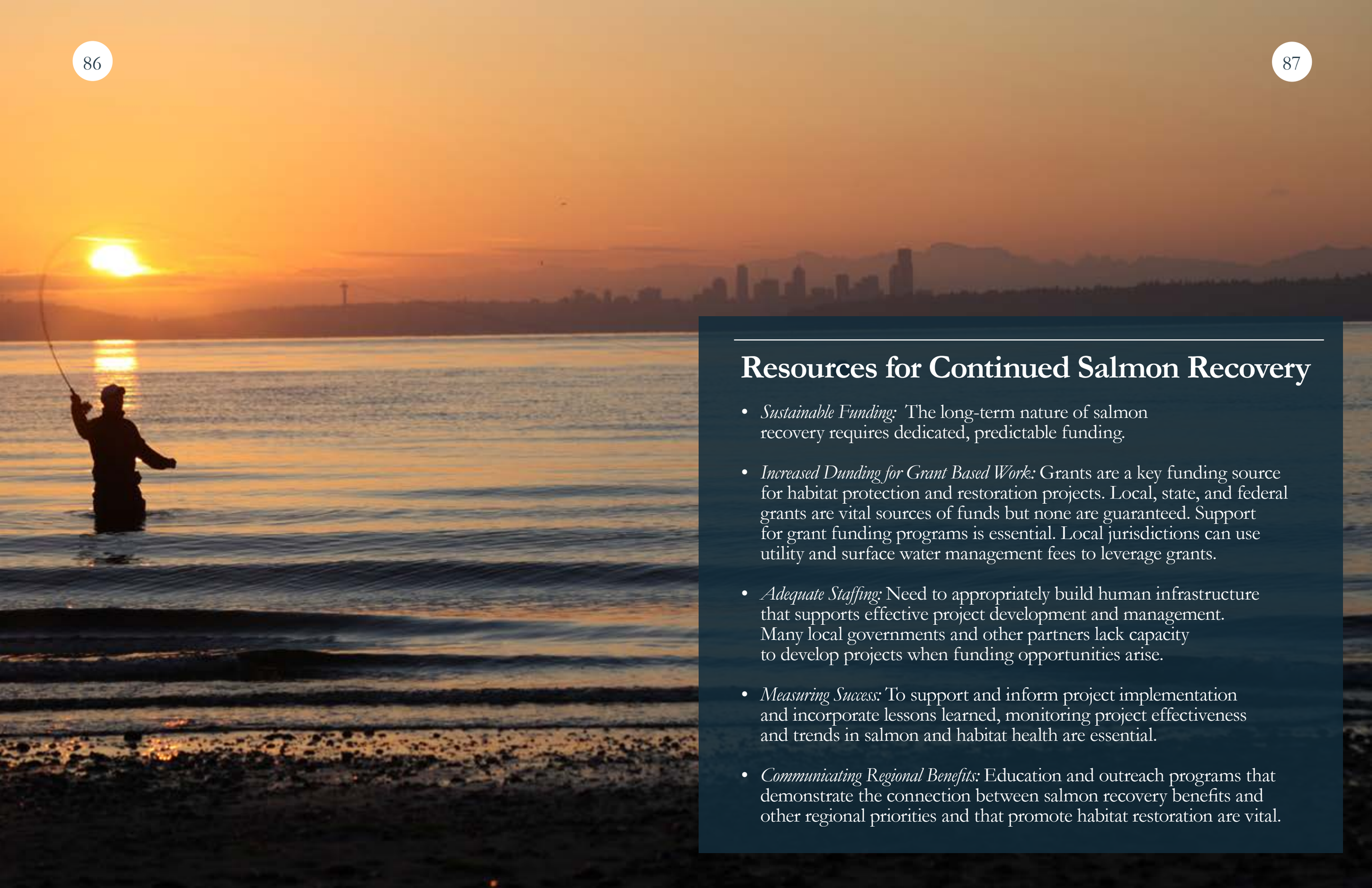
How it works:

- 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.



Resources for Continued Salmon Recovery

- *Sustainable Funding:* The long-term nature of salmon recovery requires dedicated, predictable funding.

- *Increased Dunding 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 residents agree that clean up and protection of Puget Sound is an appropriate use of tax dollars[1].
- Chinook Salmon are valuable to us but have declined to less than 10% of historic population levels in the Snoqualmie Watershed[2].
- Diminished and degraded habitat, water quality and quantity are the 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, 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.

1. Puget Sound Partnership General Public Opinion Survey, 2015.
2. Snoqualmie Watershed Forum Ten-Year Status Report, 2005-2015.

WRIA 7 Snoqualmie/Skykomish Watershed Forum Contacts

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Brian Bodenbach	Citizen, Snoqualmie Valley Govt's Association	
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Snoqualmie/Skykomish Watershed Forum: http://www.govlink.org/watersheds/7/

Glossary

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 frm 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
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

Federal Regulatory

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

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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