

# Stream Restoration: the What, Why, & How



*Hello!*

*Tova Tillinghast, District Manager  
Underwood Conservation District*

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# What is UCD?

- ★ Underwood Conservation District (UCD) covers all of Skamania County and the western portion of Klickitat County.
- ★ Designed to be a local source of conservation assistance to landowners and farmers in order to protect and enhance natural resources.
- ★ Non-regulatory, locally-guided government agency.
- ★ 6 staff members: district manager, financial manager, 3 watershed resource technicians and a part-time forester.

# Our Roots...

Established on July 1, 1940

by orchardists and farmers from the Underwood Mountain area concerned with irrigation needs, the decline of forest productivity, soil erosion and water quality.

A 1941 Mt. Adams Sun article quoted Harry Card, then chairman of UCD, as follows:

“Many of the problems [brought to UCD], such as improvement of irrigation systems, drainage, storage or need for additional irrigation water, flood control, stream bank erosion, weed and rodent control, development of water holes on range land, and the improvement of range and woodland management practices, are **community problems** and can most efficiently be solved through coordinating community plans and action.”



UCD board of supervisors, the early days

# Today...

Underwood Conservation District (UCD) serves as

a convener for the public, landowners  
and other stakeholders,  
a clearinghouse of information, and  
a source of project support.

Locally-led

Non-regulatory

Neutral

Source of natural resource assistance for all kinds of needs: watershed health, water quality, forest health, wildfire risk reduction (Firewise), fish habitat restoration, upland habitat, native plants, noxious weeds, and more....

*Our Mission: to engage landowners and land users throughout Skamania and west Klickitat Counties in the voluntary conservation, enhancement, stewardship, and sustainable use of natural resources.*



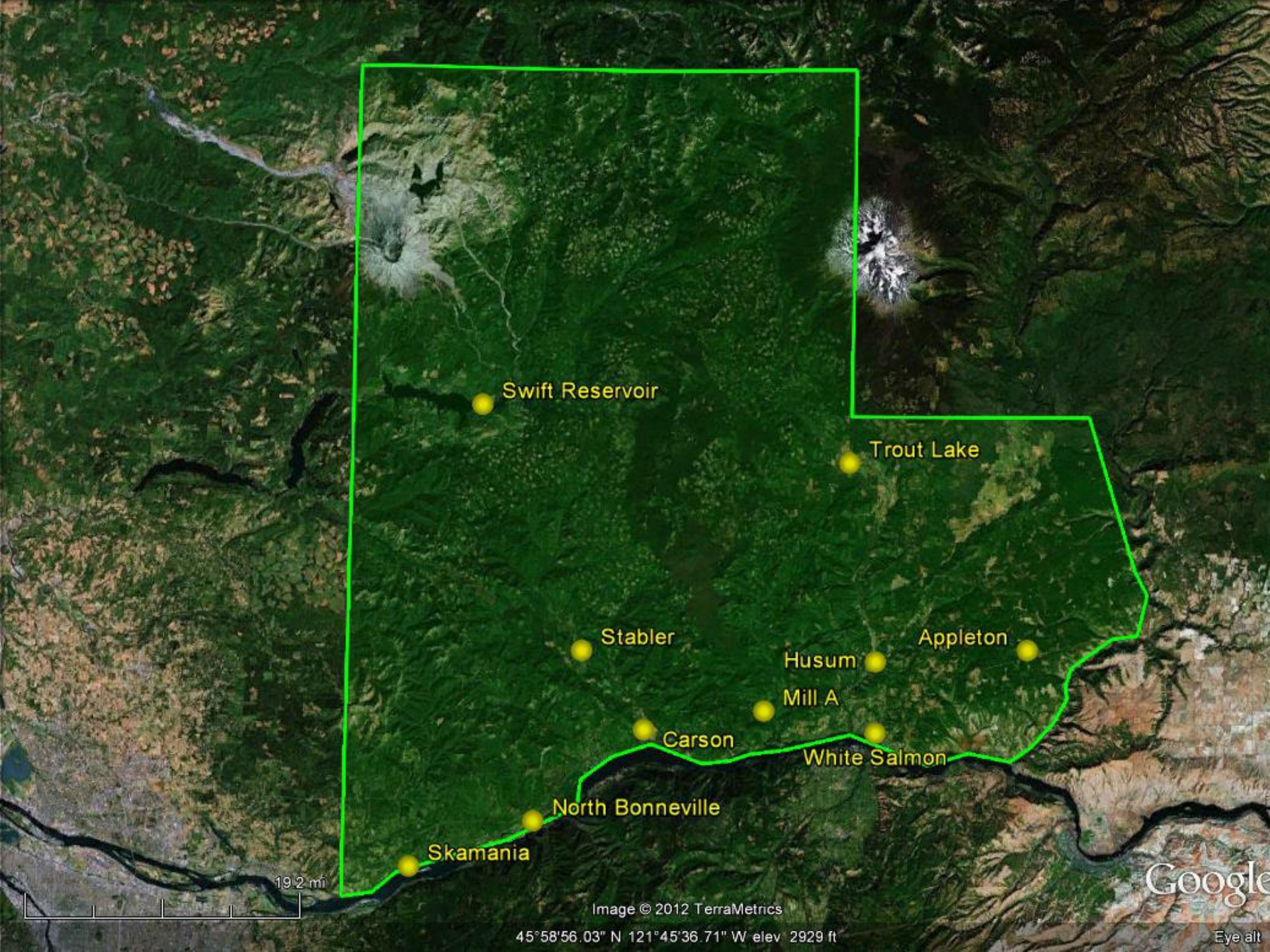
# District Programs



- \* Educational Workshops, Seminars and Field Trips
- \* On-Site Technical Assistance, Conservation Planning, Project Development and Cost-Share to:
  - \* Landowners
  - \* Small Farms, vineyards and orchards
  - \* Livestock Owners
  - \* Family Forests
  - \* Streamside landowners
- \* Native Plant Sale and Annual TreeFest
- \* Projects related to:
  - \* Soil Health
  - \* Invasive Weed Management
  - \* Integrated Beneficial Insect/Pollinator Habitat Support
  - \* Wildlife Habitat Enhancement
  - \* Fish Habitat Restoration
  - \* Fish Passage Inventories and Correction
  - \* Irrigation Improvements and Fish Screens
  - \* Water Quality and Flow Monitoring
  - \* Livestock Best Management Practices
  - \* Oak Woodland and Forest Management
  - \* Firewise

# The Only Conservation District Statewide to cross the Cascade Divide!





Swift Reservoir

Trout Lake

Stabler

Husum

Appleton

Mill A

Carson

White Salmon

North Bonneville

Skamania

19.2 mi

Image © 2012 TerraMetrics

45°58'56.03" N 121°45'36.71" W elev 2929 ft

Google

Eye alt

# We'd like to know who our audience is!

- \* Please answer one question for us....



# Why do Stream Restoration?



“Ecosystem services” such as clean water, safe and healthy river recreation

- \* Properly functioning habitat for fish and wildlife
- \* Salmon and steelhead populations are integral to a balanced food web, locally and regionally, sustaining species that depend on them such as bears, eagles, and orcas.
- \* Self-sustaining watershed processes, restoring resilient landscapes

# For those who have come before us...

- \* Salmon, and other anadromous fish including Lamprey, have been the lifeblood for native communities; both a natural resource and a cultural resource.
- \* There are 151 federally recognized tribes in the West Coast of the U.S. many involved in treaties reserving their right to traditional fishing in “usual and accustomed” fishing places.
- \* Environmental degradation has already done lasting damage to tribal fishing, forever changing a Pacific Northwest way of life.



# It's good for the economy

In many cases, salmon restoration projects also improve or repair roads, bridges, culverts, dikes and other community infrastructure.

**16.7**

new or sustained jobs  
and

**\$2.2-\$2.5  
MILLION**

in total economic activity  
for every \$1 million spent  
on watershed restoration

**80%**

of money invested in  
restoration projects

**STAYS IN THE COUNTY  
WHERE THE PROJECTS  
ARE LOCATED,**

providing needed investment  
in rural counties

**PUGET SOUND RESTORATION  
CREATES JOBS  
AND INVESTMENTS  
FOR OUR  
COMMUNITIES**



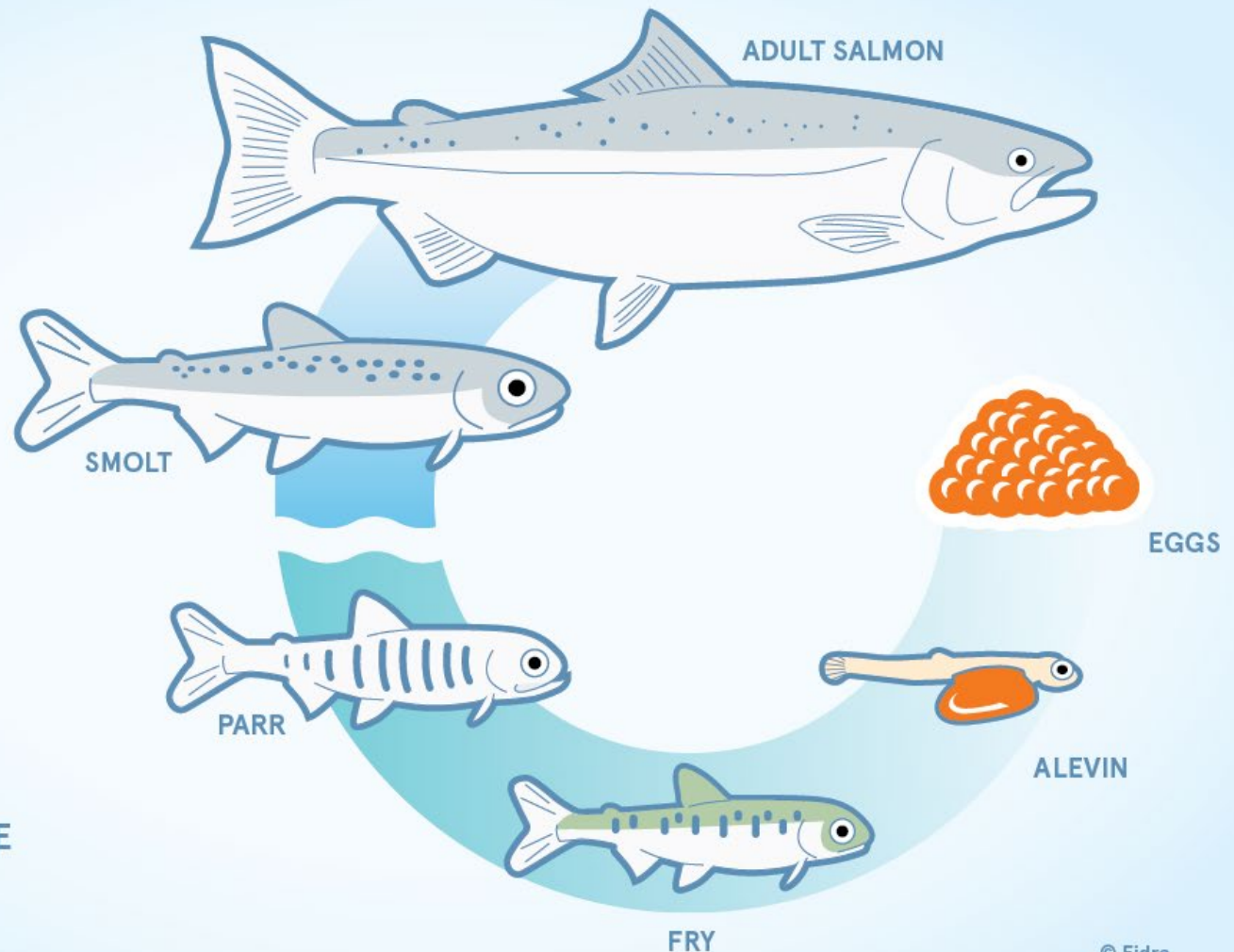
# Working to recover salmon and steelhead populations

## Salmon lifecycle

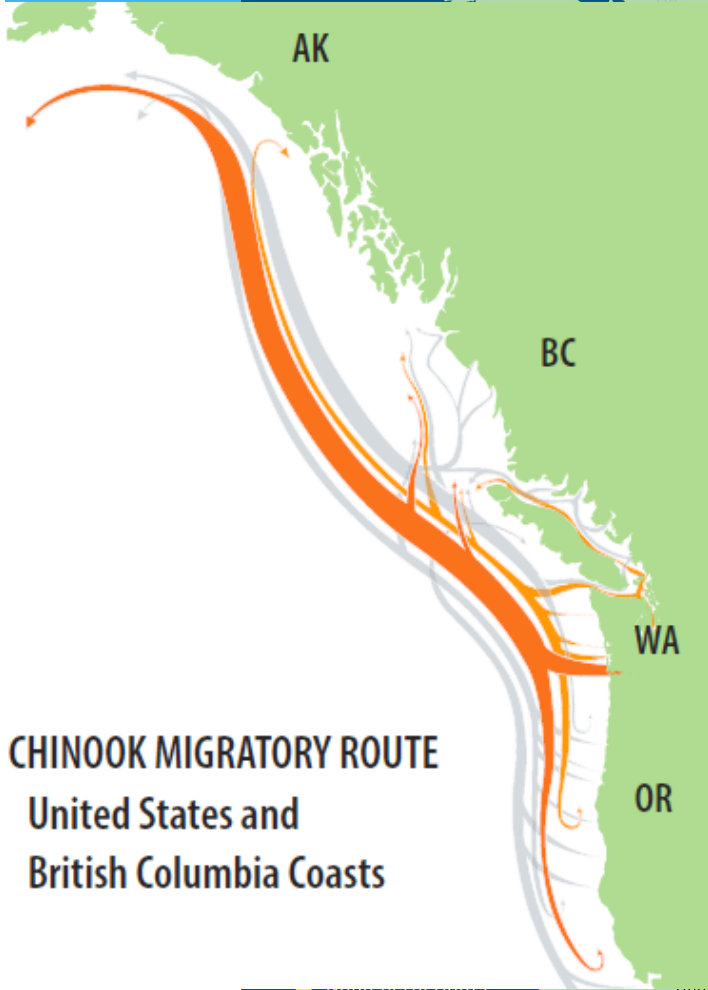
The 4 H's

- \* Harvest
- \* Hatcheries
- \* Hydropower
- \* Habitat

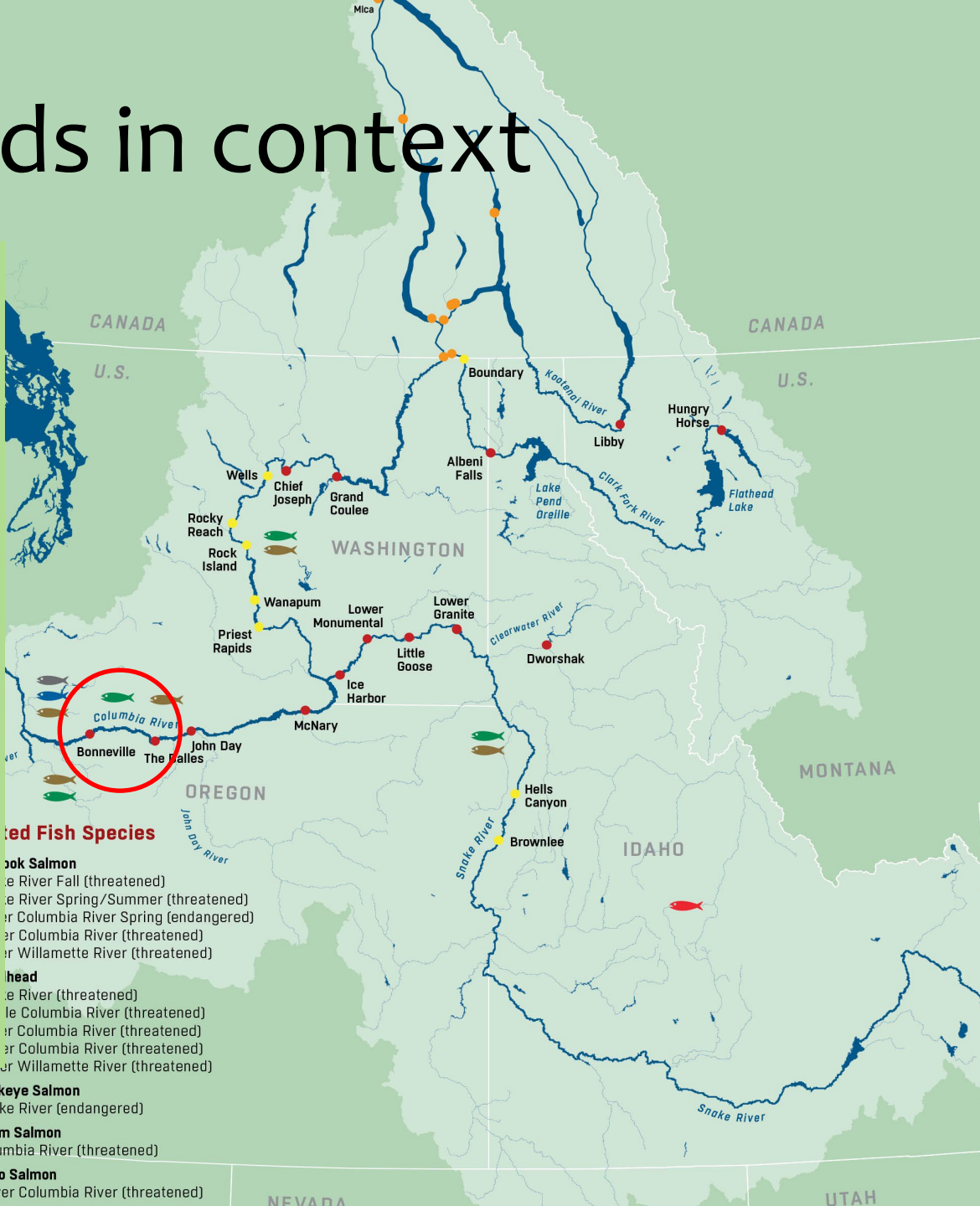
 = FRESHWATER PHASE  
 = SEAWATER PHASE



# Our watersheds in context



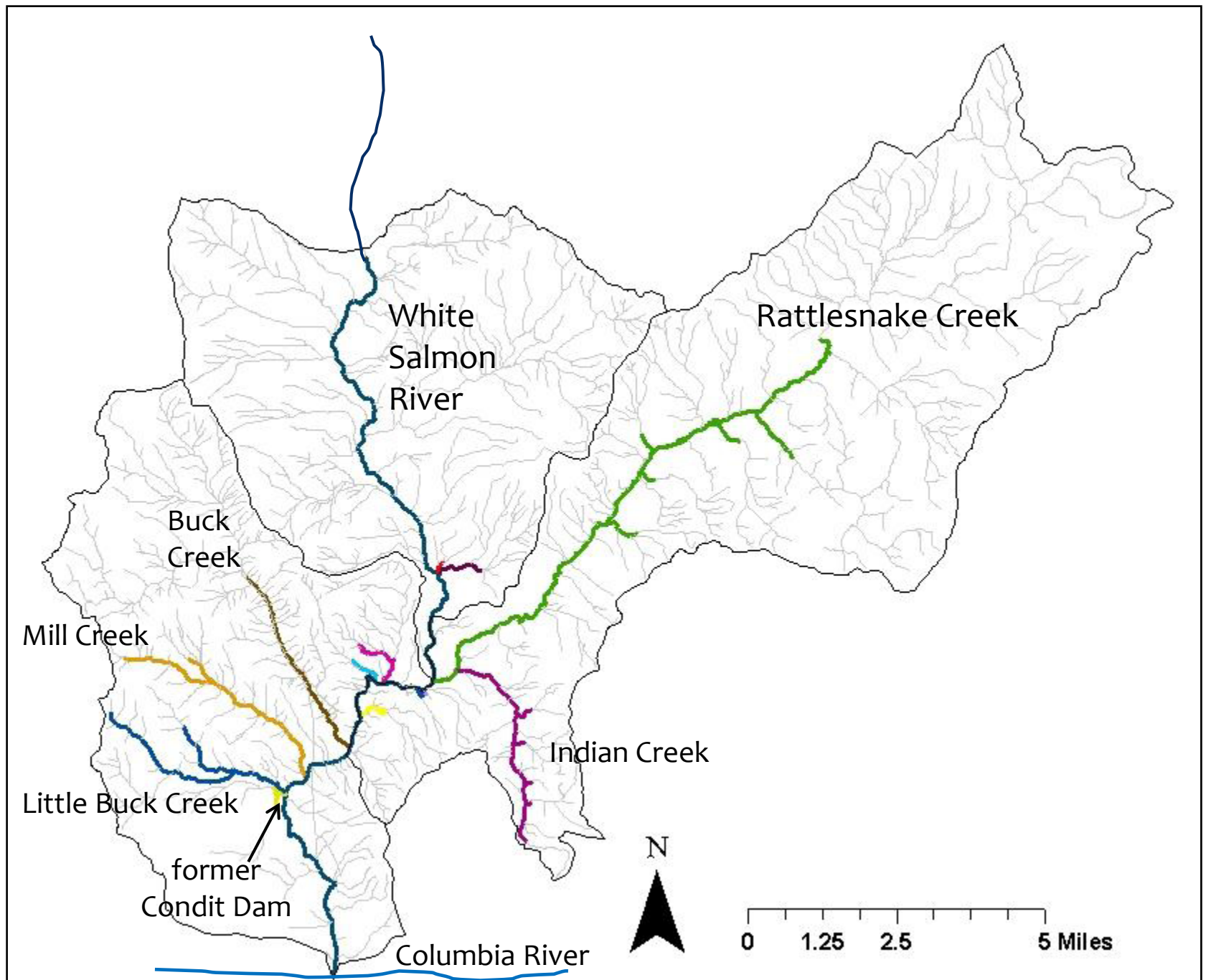
**CHINOOK MIGRATORY ROUTE**  
United States and  
British Columbia Coasts



- Threatened Fish Species**
- Chum Salmon**
    - Snake River (endangered)
    - Columbia River (threatened)
    - Columbia River (threatened)
    - Columbia River (threatened)
    - Columbia River (threatened)
  - Coho Salmon**
    - Lower Columbia River (threatened)
  - Sockeye Salmon**
    - Snake River (endangered)

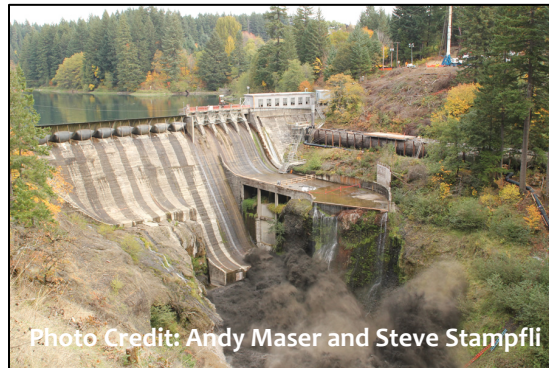
- Yellow dot: Non-federal Dams
- Orange dot: Canadian Dams

50 mi  
100 km



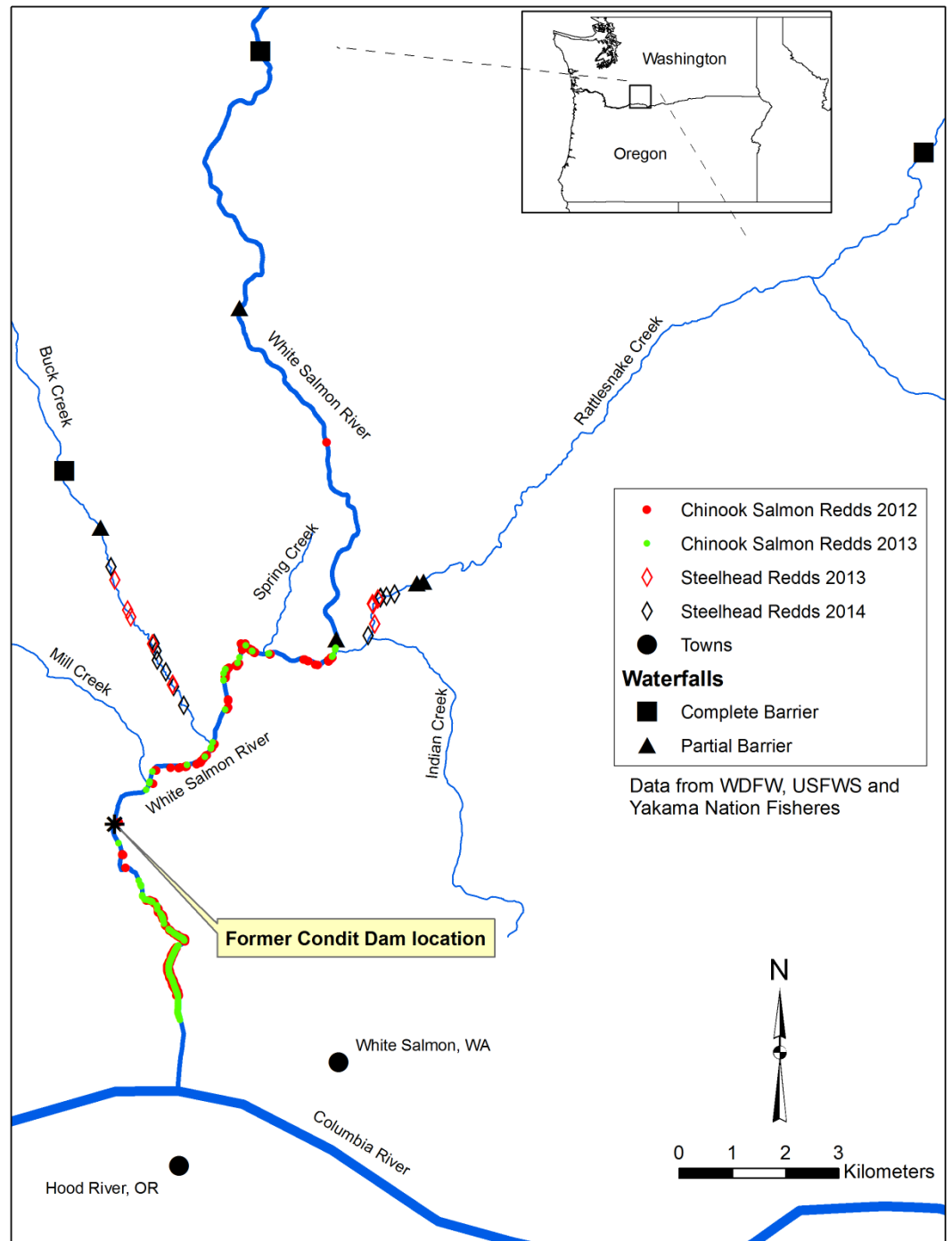
# Background

- The White Salmon River likely supported Steelhead, spring and fall Chinook Salmon, Coho Salmon, Chum Salmon, coastal Cutthroat Trout, Bull Trout.
- Condit Dam - 125 feet high. Blocked upstream fish passage for nearly 100 years.
- Breached in 2011, completely removed in 2012, opened up to 50 km of Steelhead habitat.
- Prior to dam removal, a multi-agency workgroup agreed to a natural recolonization strategy.



# White Salmon Subbasin Post-Dam Removal Monitoring

- Steelhead (tributaries)
- Spring Chinook
- Fall Chinook
- Tule and Upriver Bright
- Coho





# Fish Passage comes first



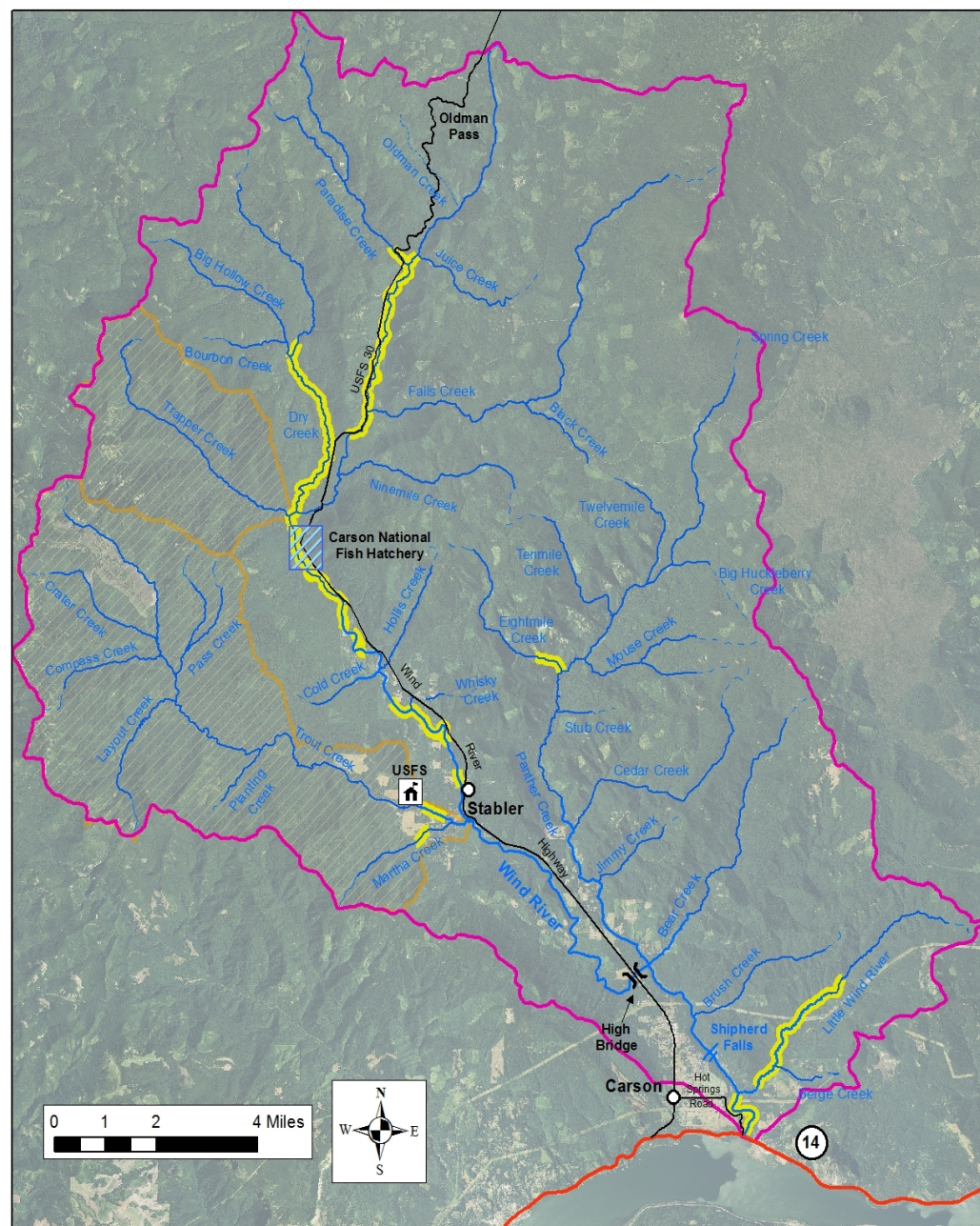
Fish Passage Opened! On the White Salmon River, in Mill Creek, Buck Creek, Rattlesnake Creek and Indian Creek

# Mill Creek Fish Passage Restored in 2016

- See video link here, and scroll down to video (2 mins.): <https://www.ucdwa.org/mill-creek-fish-passage-project>

# Wind River

- Anadromous Fish Species: wild steelhead (upstream of Shipherd Falls), Coho, Chinook, Chum and Coastal Cutthroat Trout
  - Habitat simplification
  - Lack of large woody debris
  - Floodplain disconnection, little or no off-channel habitat such as side-channels, oxbows, wetlands
  - Little or no cover or pool habitat



## Geographic Scope

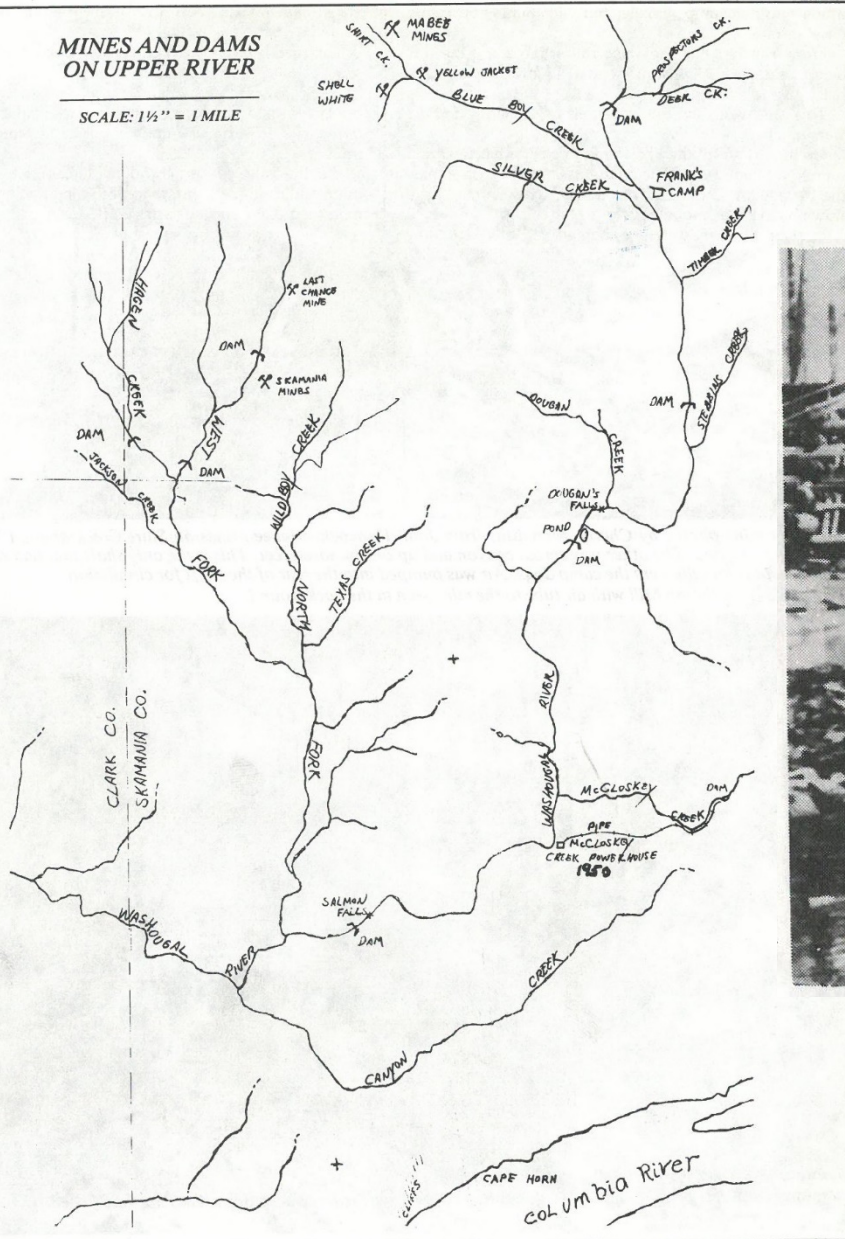
Reaches surveyed Apr-June 2016

- Wind River Watershed
- Geographic Scope for Survey
- Trout and Trapper Cr Basins - Part of existing USFS Restoration Plan

# Causes of habitat degradation

## MINES AND DAMS ON UPPER RIVER

SCALE: 1 1/2" = 1 MILE



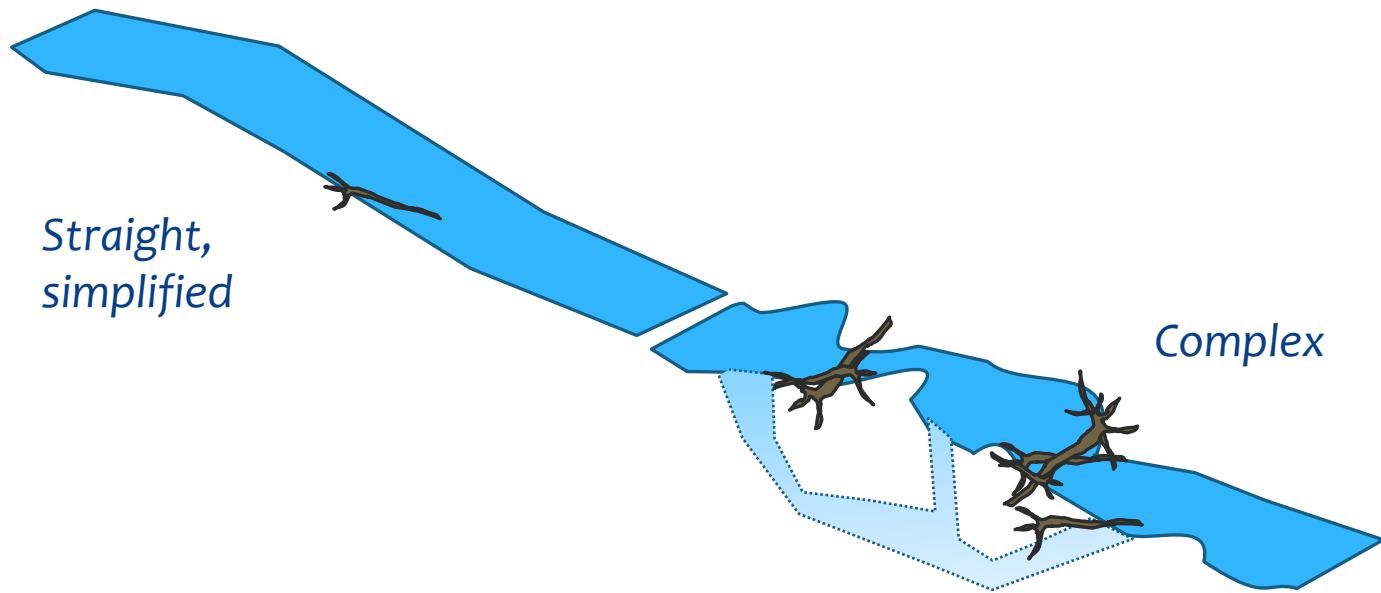
# Degraded Habitat Conditions

- Limited riparian shading and warm stream temperatures
- Very little large wood for collecting gravel, preventing channel incision or scouring pools
- Little gravel for spawning
- Large cobble riffles dominate, pools are simple and shallow, formed by bedrock
- Reduced channel complexity, limited floodplain and side channel access.



# Potential habitat improvements

**In-stream habitat complexity, floodplain and side channel reconnection, & healthy streamside vegetation**



# Potential habitat improvements

## In-stream habitat complexity & healthy streamside vegetation

*Looking for appropriate places to...*

- ☆ Re-build habitat: pools, riffles & glides
- ☆ Add engineered log-jams
  - To capture spawning gravel, create pools, provide cover
- ☆ Reconnect side channel areas
  - Flood relief, refuge, complexity, fish rearing habitat
- ☆ Planting streamside conifer trees & removal of weedy, invasive species
  - Future large wood recruitment, shading, cooler stream temperature

# Large logs = habitat complexity

Small log-jam, on Rattlesnake Creek, caught between riparian alders. Notice the pool and sediment capture: much more complex than this:





# *Example of stream habitat project:* Little Wind River



Before construction



After construction

# Hydrology and habitat



# Reconnecting floodplains



Improves stream function:

- Diffuses flood flows and reduces erosion
- Provides rearing and refuge for fish
- Helps store water

## Diverse natural resource needs and solutions in the White Salmon River basin:

- Buck Creek Fish Passage and White Salmon Irrigation District Fish Screen (2019) and multiple fish screens for individual irrigation pumps
- Mill Creek Fish Passage Project (2014-2016)
- Indian Creek Fish Passage Project (2012)
- Rattlesnake Creek: planting, instream beaver dam analogs, checkdams, and large woody debris placement
- Riparian planting throughout watershed.
- Various improvements to livestock operations: manure storage upgrades, roof runoff catchment, ditch piping, off-stream water troughs, livestock exclusion fencing along streams
- Firewise: free mobile chipper service, home hazard assessments, incentive projects to reduce wildfire fuels and improve defensible space in the 'home ignition zone' – doing this with balance
- Information & Outreach: the value of riparian vegetation, the value of instream wood, the rules and regs., the need for fish screens, irrigation efficiency, etc.



## Diverse natural resource needs and solutions in the Wind River basin:

- Hemlock Dam removal (2009) and subsequent side-channel and floodplain restoration work
- Martha Creek Dam removal (2012)
- Cannavina Fish Passage project (2016)
- Noxious weed control and riparian planting throughout watershed.
- Little Wind River habitat enhancement work (three phases, 2012-2019)
- Various improvements to livestock operations: manure storage upgrades, heavy use area protection, livestock exclusion fencing along streams
- Firewise and forest health and forest road improvements
- Information & Outreach: the value of riparian vegetation, the value of instream wood, the rules and regs., etc.



# Stewardship

- \* Don't remove wood.
- \* Keep streambank vegetation intact, and expand riparian buffers.
- \* Use established trails, and don't contribute to erosion.
- \* Help manage weeds and reduce spread of invasive plants.
- \* Clean, drain, dry all river equipment to reduce spread of aquatic invasive species.
- \* Prevent polluted runoff from reaching streams and wetlands.
- \* Leave no trace, and don't litter.
- \* Don't build "play dams" in streams.
- \* Conserve water; use less, irrigate efficiently, landscape with native and drought-tolerant plants.
- \* Let natural processes happen; floodplains and side channels, beaver, stream meandering, wood and other "messiness."
- \* Follow rules and regulations designed to protect water resources.
- \* Lead by example, teach your children, and spread the word!



See video link here (3 mins.):  
<https://vimeo.com/174849822>

# Why Do Stream Buffers Matter?

As a streamside landowner, you have the opportunity to influence the condition of the stream that runs through your property. There are also important regulations that require protection of streams and other water resources (see other side of this sheet). Conscientious stewardship of your land will help protect water quality and habitat for fish and wildlife.

Many streams in Skamania and Klickitat Counties provide habitat to salmon, steelhead, and resident fish. One of the best ways to protect and enhance fish habitat, even upstream of where these fish reside, is to maintain a functional and diverse riparian habitat.

Riparian buffers, or the plants along a stream or river, link the land and water together and have significant biological and ecological importance. Native plants protect your property by slowing runoff and allowing it to soak into the ground, recharging wells and reducing flooding. Roots help hold the soil in place and control erosion. Trees cast their shade over the water to keep it cool for fish and frogs and provide perching places for birds and bugs. Protect a diverse native buffer around streams and wetlands if you already have one, and enhance what is already there. Plants that are native to your area will create the most valuable buffers. It can take several years for plants to fill in, so start planting!

The best care for your buffer requires very little input, so resist the urge to "tidy up." A "messy"-looking stream buffer is ecologically diverse and provides good habitat. Leaf litter, pine needles, and fallen branches or logs help collect runoff and prevent erosion. If a large tree threatens to fall from a steep bank, you can cut the tree 10 feet above the ground surface and leave the root system in place. The "snag" that remains on the streamside will provide a great home for owls, bats and other wildlife.

Resources and assistance are available to help you improve your riparian buffer. Contact Underwood Conservation District to:

- purchase native, riparian plants
- plan a native planting project
- access cost-share assistance



Photo at upper right is an example of an **unhealthy riparian area**, lacking in vegetation, cover or instream habitat complexity.

Below is an example of a **healthy, functional, diverse riparian area**.

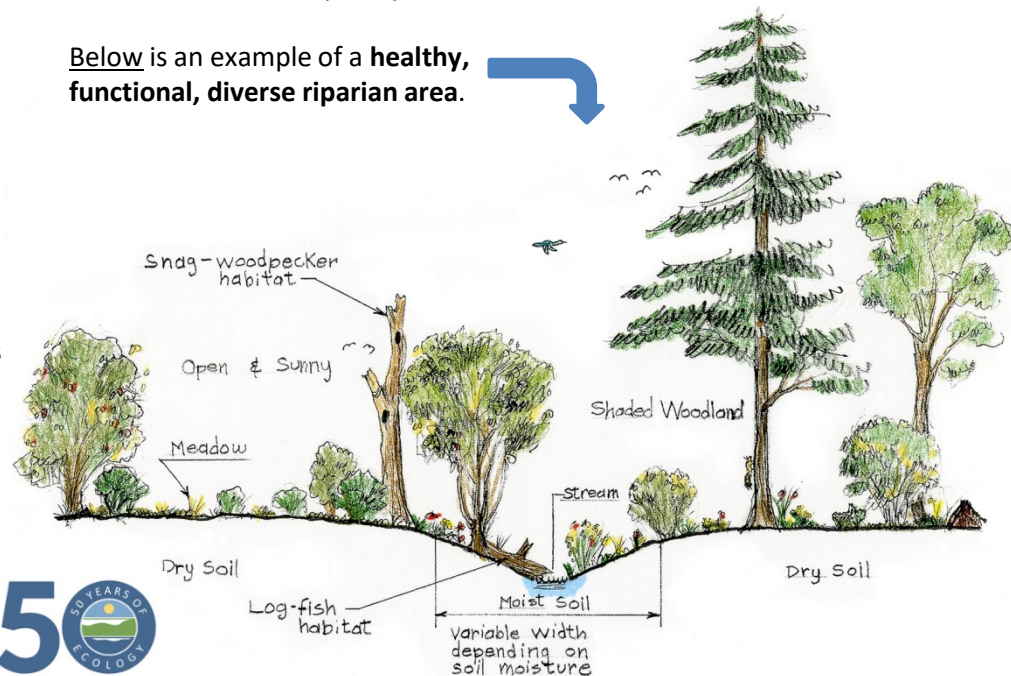


Photo and some text are from: Mid-Columbia Fisheries Enhancement Group. Landscape architecture by: Jurgen Hess. Some text is from: Connecticut River Joint Commission "Backyard Buffers" publication





# Riparian Buffers: Streamside Native Plant Communities

- Ferns (var. spp.), salal, showy milkweed
- Willows (var. spp.), Red-osier dogwood, Pacific ninebark, Salmonberry
- Western Red Cedar, Cascara, Oregon Ash, Quaking Aspen, Red Alder, Black Cottonwood

**Douglas Spirea**  
*Spiraea douglasii*  
5' x 5'

Our native spirea prefers moist soils and sun



# Conifer trees are key



- Douglas fir
- Western red cedar
- Grand fir
- Western Hemlock
- Pacific Yew
- Even Ponderosa Pine on the east side



## **Red Osier Dogwood**

*Cornus sericea*

To 15' tall

Prefers moist, well-drained  
soil and partial shade



**Serviceberry**  
*Amelanchier alnifolia*

10' tall  
Prefers sun or partial shade  
drought tolerant





## **Cascara**

*Rhamnus purshiana*

15-30' tall

Prefers moist-wet, well-drained soils, tolerates sun and dry conditions too.



## **Pacific Ninebark**

*Physocarpus capitatus*

15' tall

Prefers moist soils and sun



**Mock Orange**  
*Philadelphus lewisii*

5-10' tall

Prefers well-drained soils

Also known as Syringa,  
the state flower of Idaho





**Red Flowering Currant**  
*Ribes sanguineum*  
12' tall  
Shade and drought tolerant





## **Snowberry**

*Symphoricarpos albus*

4-7' tall

Sun, shade and drought  
tolerant

## **Nootka Rose**

*Rosa nutkana*

10' tall

Tolerant of sun, shade and drought, prefers moist soils



# PLEASE LEAVE LOGS

IN AND ALONG  
THE STREAM CHANNEL.  
THEY CREATE  
IMPORTANT HABITAT  
FOR SALMON,  
STEELHEAD AND TROUT.

WITH

WITHOUT

REMOVING WOOD REMOVES FISH!



# Questions about streams or other water resources?

## We've got you covered!

Activities with potential to disturb historic or archaeological resources require review by Washington Dept. of Archaeology and Historic Preservation and interested tribes.

Anyone can report an environmental problem or concern: 509-575-2490  
<https://ecology.wa.gov/About-us/Get-involved/Report-an-environmental-issue>

Many activities affecting natural resources in the Columbia River Gorge National Scenic Area must be reviewed by the Columbia River Gorge Commission - 509-493-3323 - in Klickitat County and by Skamania County Community Development in Skamania County - 509-427-3900

### Water Quality

Department of Ecology  
Cole Provence: 509-454-4174

Environmental Protection Agency

### Water Rights & Withdrawals

Department of Ecology  
Ryan Murphy: 509-249-6327 or 509-575-2597

confidential water right info  
WA Water Trust: 509-844-4146  
Trout Unlimited: 509-881-5464

fish screens  
Dept. of Fish & Wildlife

### Forested Lands

Department of Natural Resources  
509-493-3218

### Vegetation, Trees, Critical Areas & Wetlands

Klickitat County Planning Dept.  
Mo-chi Lindblad: 509-773-5703  
Skamania County Community Development  
Alan Peters: 509-427-3900

Dept. of Ecology  
Lori White: 509-575-2616  
Miranda Adams: 360-690-7164

### In-Water Work

Department of Fish & Wildlife  
Amber Johnson: 360-701-2738  
Sam Kolb: 360-260-6365  
Emergency Hotline: 360-902-2537

Dept. of Ecology  
Lori White: 509-575-2616  
Miranda Adams: 360-690-7164

US Army Corps of Engineers

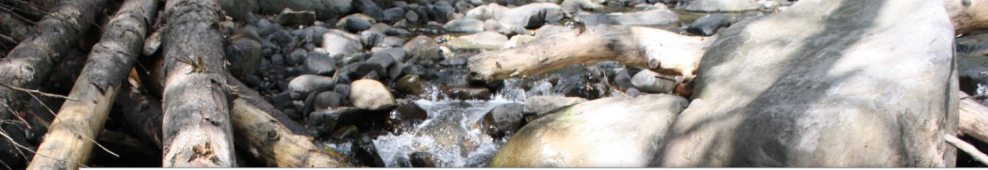
Underwood Conservation District is available to provide non-regulatory advice and assistance for a variety of natural resource questions and concerns: 509-493-1936 or [www.ucdwa.org](http://www.ucdwa.org)

# Landowner Incentives for Best Management

## Practices

- \* UCD technical assistance, cost share funding and project support for:
  - \* livestock exclusion fencing along streams
  - \* off-stream water troughs
  - \* manure management
  - \* soil health
  - \* roof runoff catchment
  - \* ditch piping and other irrigation efficiencies
  - \* riparian planting projects and invasives removal
  - \* instream habitat





# Virtual film showing...

- See video link here (8 mins.):  
<https://www.ucdwa.org/little-wind-river-habitat-enhancement-project>



BZ Falls  
White Salmon River  
July 2012

< 1 year after breach of Condit Dam

Photo: Jeanette Burkhardt, Yakama Nation Fisheries