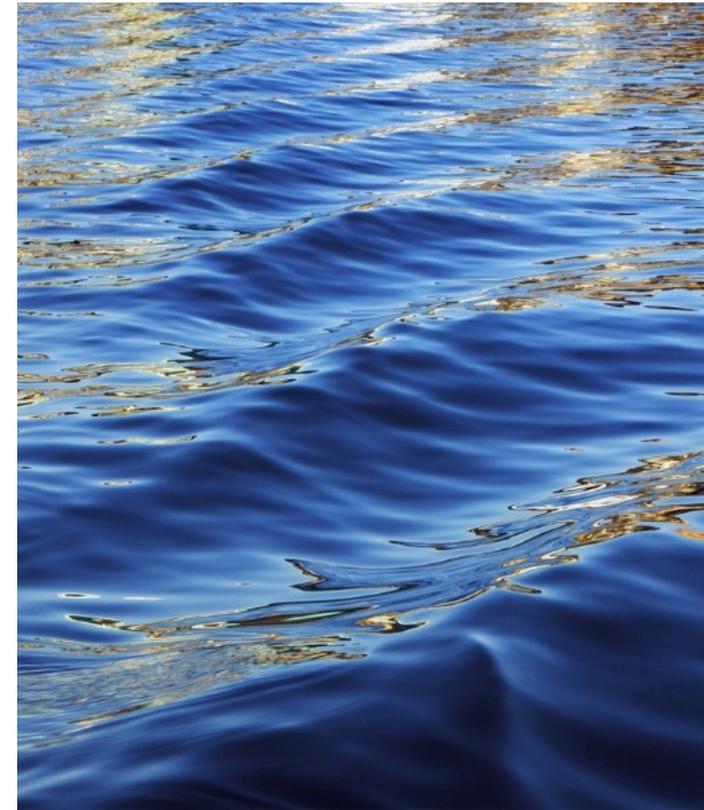


# Habitat Conditions in the Lower Snoqualmie, Tolt, and Raging Rivers

Science Seminar  
November 2018

Water and Land Resources Division



**King County**

Josh Kubo  
Environmental Scientist

# Snoqualmie River & Salmon Conservation



King County

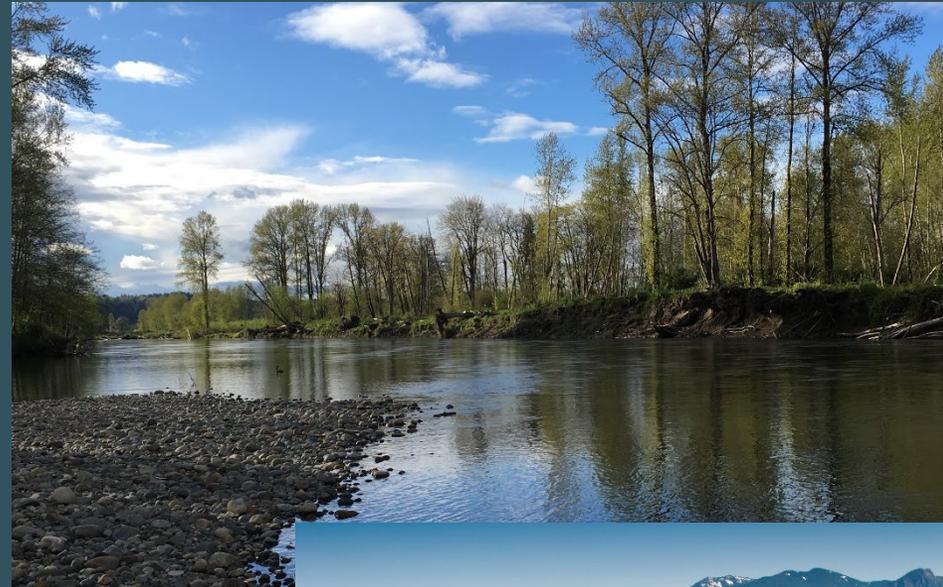


Photo: Mountains to Sound Greenway

# Snoqualmie River & Salmon Conservation



King County



Chinook  
Salmon

# Snoqualmie River & Salmon Conservation



King County



**SNOHOMISH BASIN  
SALMON RECOVERY FORUM**

*Snohomish River Basin Salmon  
Conservation Plan*



JUNE 2005

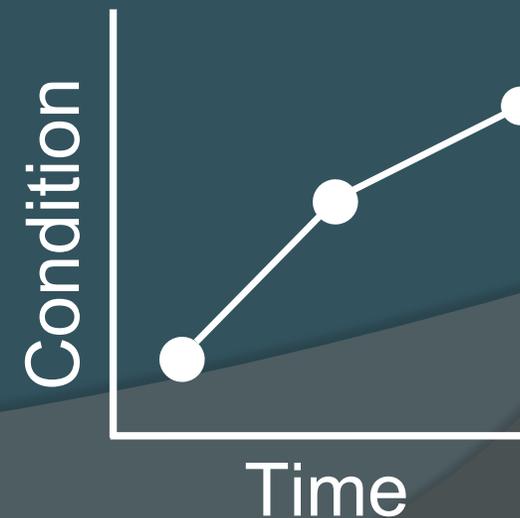
# Snoqualmie River & Salmon Conservation



King County



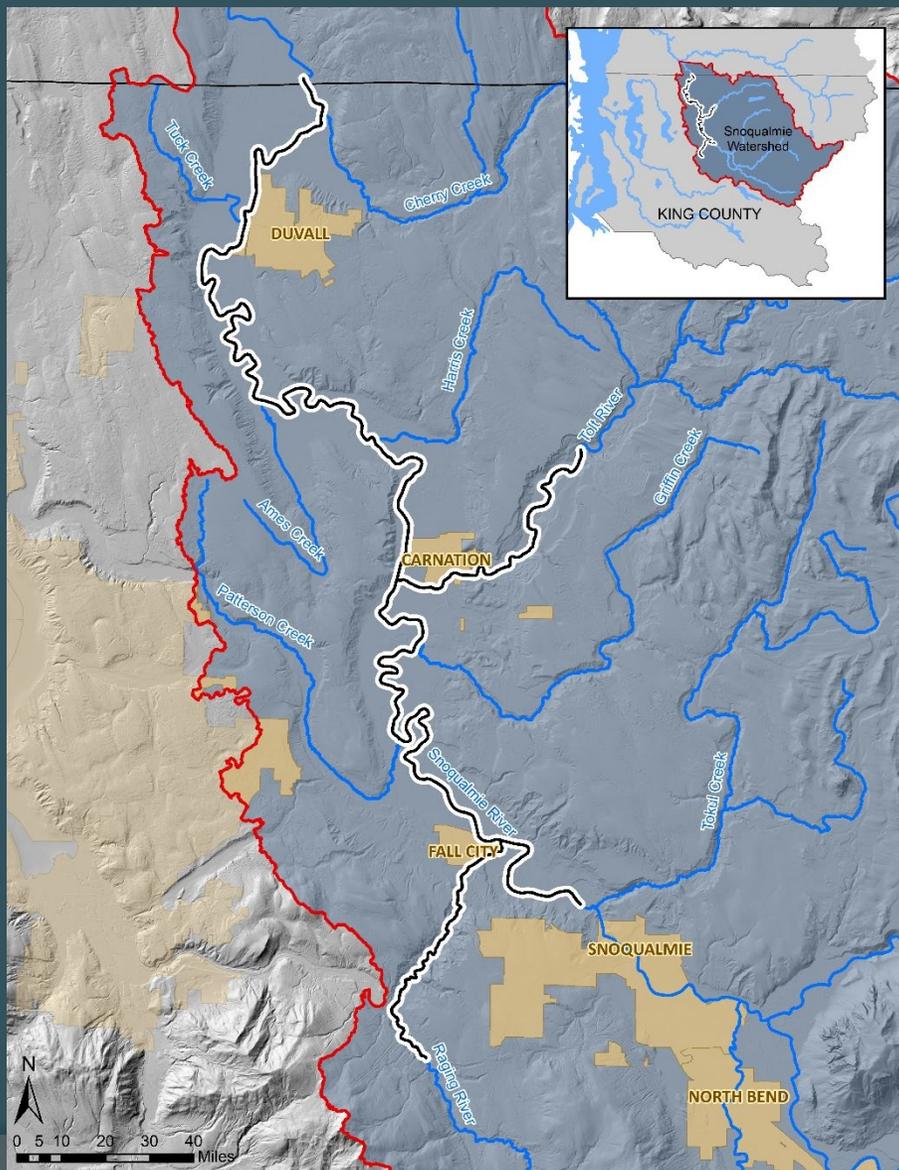
- Status = current habitat conditions
- Trends = changes since the 2005 Salmon Plan
- Effectiveness of restoration and conservation strategies



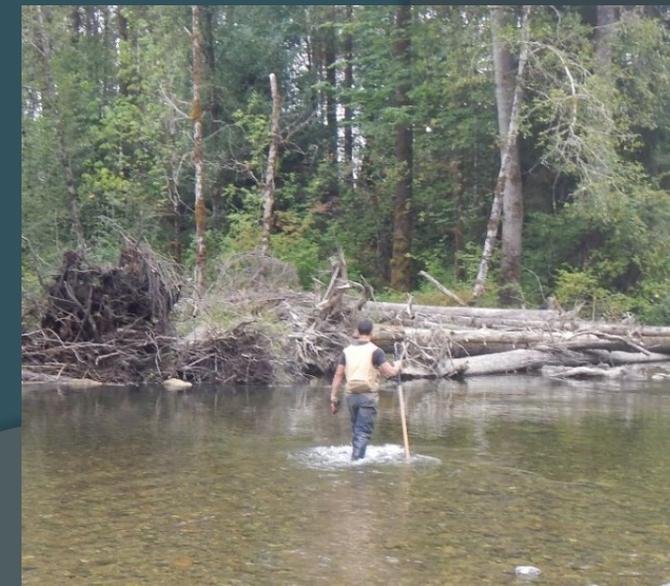
# 2017 Habitat Surveys



King County



- Snoqualmie River (RM 5.3 - 37.8)
- Tolt River (RM 0 - 6)
- Raging River (RM 0 - 6)



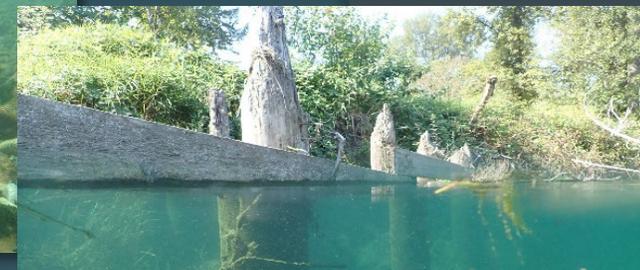
# Surveyed Attributes



King County

## Field Surveys

- Bank conditions
- Large woody debris
- Instream habitats and floodplain features
- Channel and floodplain modifications



## Desktop Evaluation

- Riparian conditions



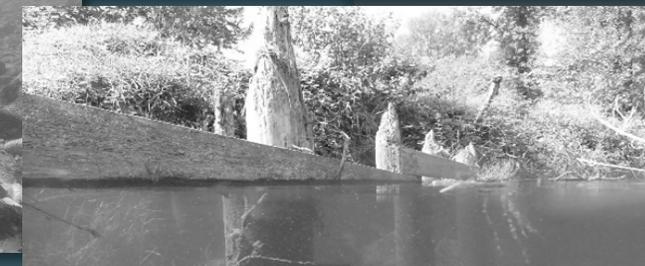
# Surveyed Attributes



King County

## Field Surveys

- Bank conditions
- Large woody debris
- Instream habitats and floodplain features
- Channel and floodplain modifications



## Desktop Evaluation

- Riparian conditions



# Evaluating Progress



King County

---

## SNOQUALMIE WATERSHED AQUATIC HABITAT CONDITIONS REPORT: SUMMARY OF 1999-2001 DATA

---

November 2002

Fran Solomon and Melissa Boles

## *Snohomish River Basin Salmon Conservation Plan*



JUNE 2005

During preparation of this plan, Mark Sollitto, City of North Bend, and Terry Williams, The Tulalip Tribes, served as Chair and Vice-Chair of the Snohomish Basin Salmon Recovery Forum, respectively. Martha Neuman, Snohomish County Department of Public Works, Surface Water Management Division, served as project manager, editor, and lead staff to the Forum.

Special thanks are given to members and alternates of the Snohomish Basin Salmon Recovery Forum, staff from Snohomish County Department of Public Works, Surface Water Management Division, and King County Department of Natural Resources and Parks, the Snoqualmie Watershed Forum and the Snohomish Basin Salmonid Recovery Technical Committee. EnviroIssues assisted with plan preparation and public involvement. EcoPlan International provided support for developing alternatives and decision-making.

## 2005 Salmon Plan

50yr goal

10yr goal

Progress

Progress provided by the  
Snoqualmie Watershed Forum

# Stream Bank Conditions



# Stream Bank Conditions



King County

## Armored Banks

- Snoqualmie River = 40%
- Tolt River = 30%
- Raging River = 40%



# Stream Bank Conditions



King County

## Armored Banks

- Snoqualmie River = 40%
- Tolt River = 30%
- Raging River = 40%

## Since Adoption of 2005 Salmon Plan

-  Armor = Upper Carlson, Stillwater, Camp Gilead, Chinook Bend, Lower Tolt
-  Armor = SE David Powell Rd, near Neal Rd, near Griffin Creek



Upper Carlson Restoration Project

# Stream Bank Conditions



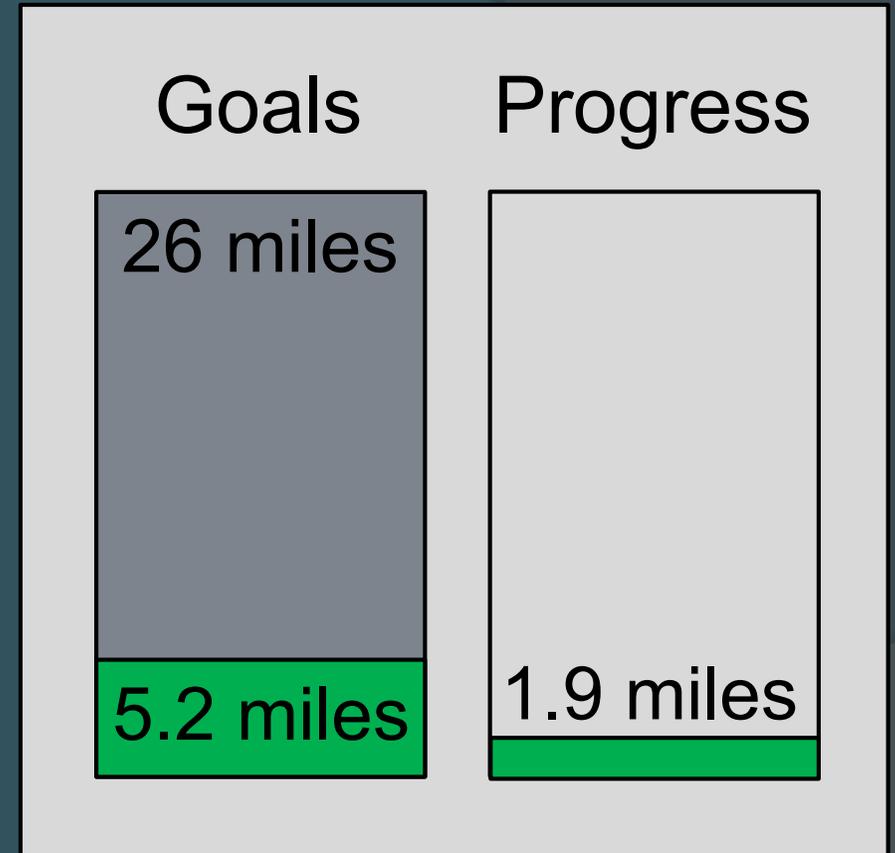
King County

## Armored Banks

- Snoqualmie River = 40%
- Tolt River = 30%
- Raging River = 40%

## Since Adoption of 2005 Salmon Plan

-  Armor = Upper Carlson, Stillwater, Camp Gilead, Chinook Bend, Lower Tolt
-  Armor = SE David Powell Rd, near Neal Rd, near Griffin Creek



# Large Woody Debris



# Large Woody Debris (LWD)



King County

## LWD Abundance (pieces per mile)

- Snoqualmie River = 41.4
- Tolt River = 159.7
- Raging River = 76.8





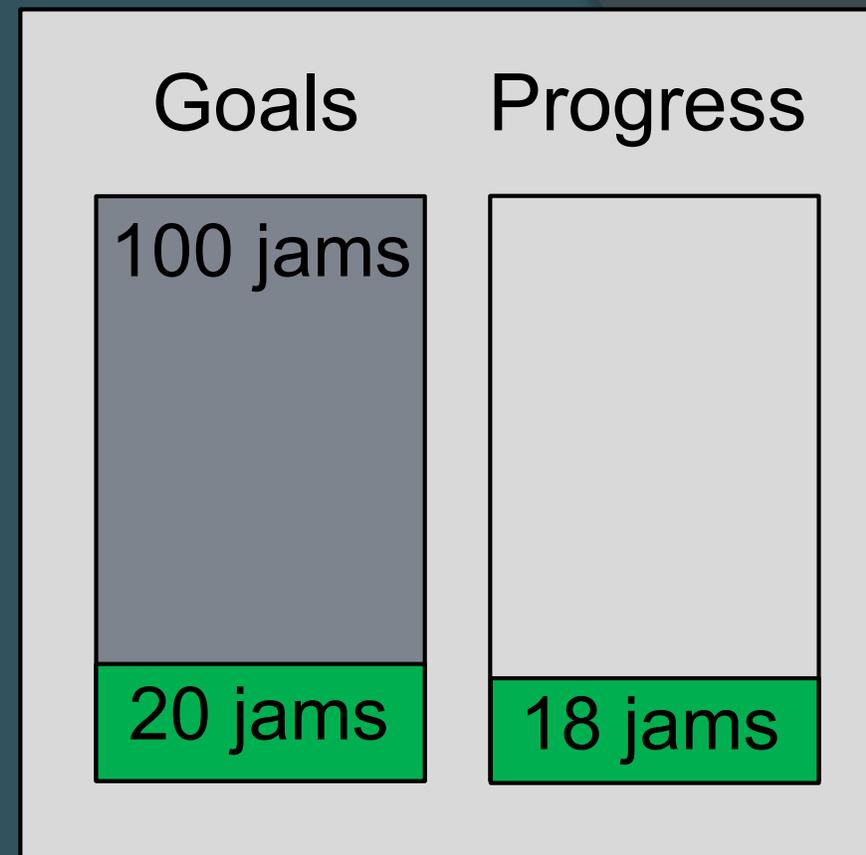
# Large Woody Debris (LWD)

## LWD Abundance (pieces per mile)

- Snoqualmie River = 41.4
- Tolt River = 159.7
- Raging River = 76.8

## Since Adoption of 2005 Salmon Plan

-  in wood abundance
-  in wood jam abundance



# Large Woody Debris (LWD)



King County

## LWD Abundance (pieces per mile)

- Snoqualmie River = 41.4
- Tolt River = 159.7
- Raging River = 76.8

## Regional LWD Abundance Standards



# Large Woody Debris (LWD)

	Key-LWD/mile	LWD/100m
• Snoqualmie River =	80	57
• Tolt River =	80	57
• Raging River =	80	29

## Regional LWD Abundance Standards

- Standard for coastal rivers (NMFS 1996)
- Standard for unmanaged forested basins (Fox and Bolton 2007)



# Large Woody Debris (LWD)

	Key-LWD/mile	LWD/100m
• Snoqualmie River =	3 - 18%	1 - 6%
• Tolt River =	9 - 84%	9 - 48%
• Raging River =	15 - 23%	15 - 23%

## Regional LWD Abundance Standards

- Standard for coastal rivers (NMFS 1996)
- Standard for unmanaged forested basins (Fox and Bolton 2007)

# Riparian Conditions



*Snoqualmie Valley Historical Society*



*Puget Sound River History Project*

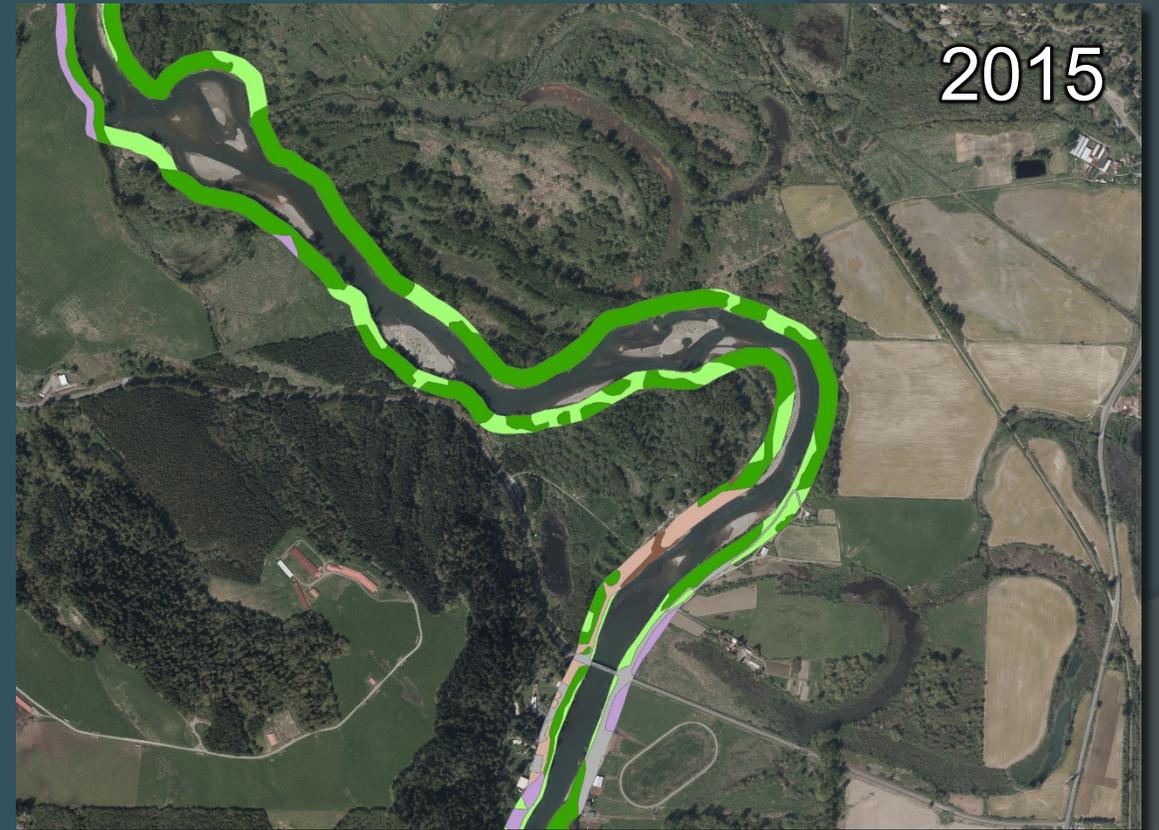
# Riparian Conditions



King County

Prior to 2005 Salmon Plan

Current Land Cover



150-ft wide riparian corridor

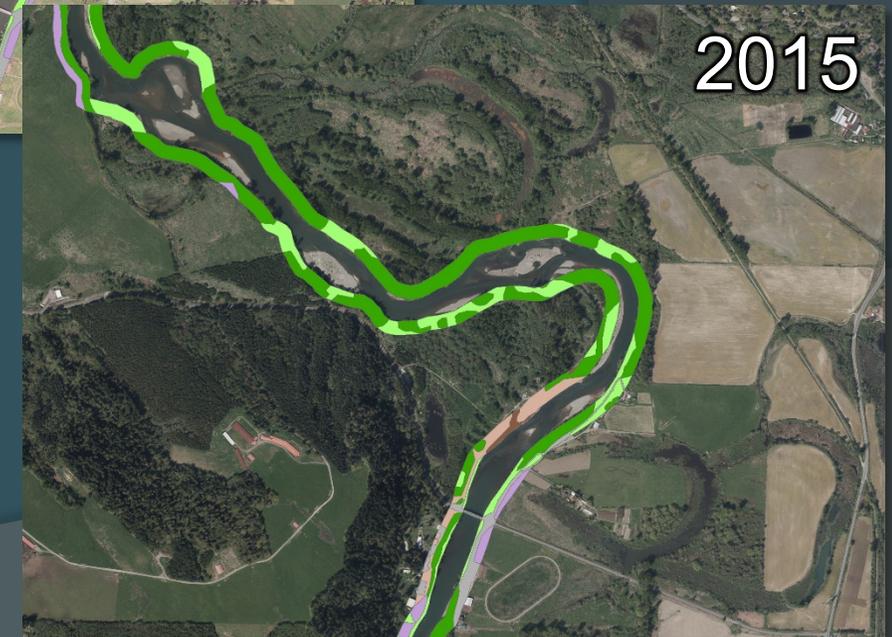
# Riparian Conditions



King County

## Riparian Land Cover

- Trees
- Shrubs
- Agriculture (farm fields, pasture, crops, etc.)
- Impervious surfaces
- Bare ground
- Other (water, lawns, rocks, vegetated gravel bars, etc.)



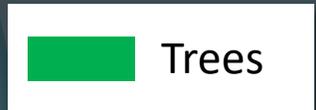
# Riparian Conditions



King County

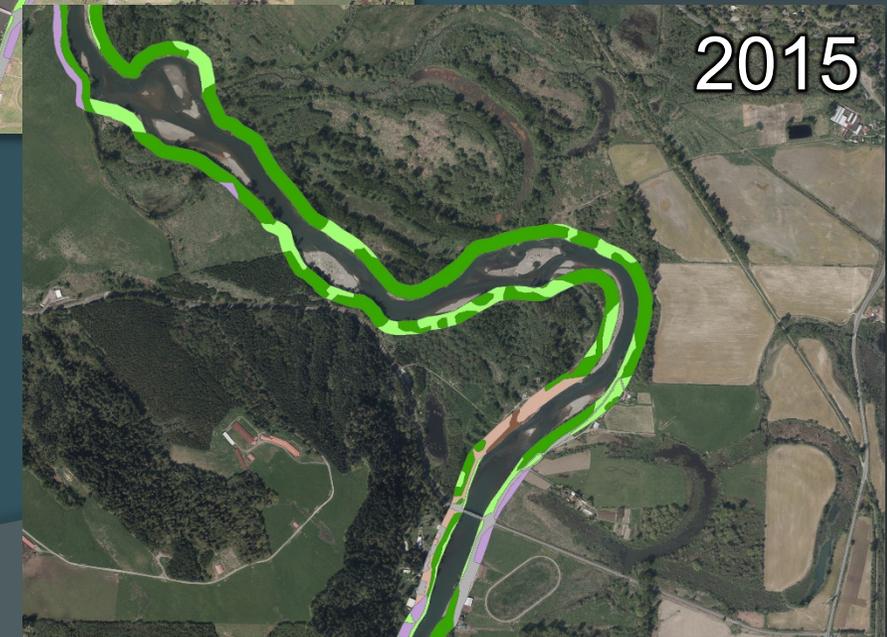
## 2015 Tree Coverage

- Snoqualmie River = 40.4%
- Tolt River = 85.7%
- Raging River = 70.6%



## Since Adoption of 2005 Salmon Plan

-  tree coverage in Snoqualmie (4.1%) and Tolt (11.8%), no increase in Raging



# Riparian Conditions



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## Specific Land Cover Changes

### Snoqualmie River

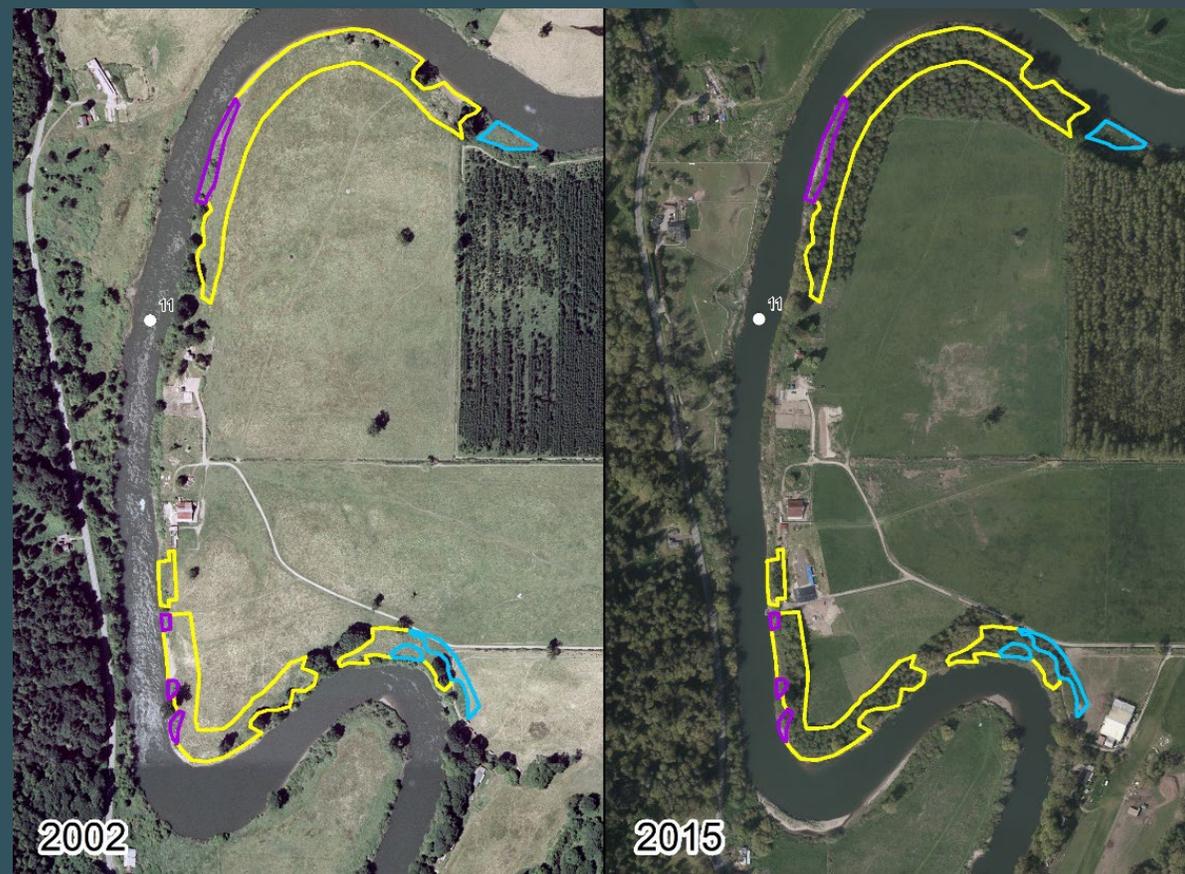
- Agriculture to Shrubs & Trees
- Shrubs to Trees

### Tolt River

- Shrubs & Bare Ground to Trees

### Raging River

- Shrubs to Trees



	Agriculture to Shrubs
	Agriculture to Trees
	Shrubs to Trees



# Riparian Conditions

## Specific Land Cover Changes

### Snoqualmie River

- Agriculture to Shrubs & Trees
- Shrubs to Trees

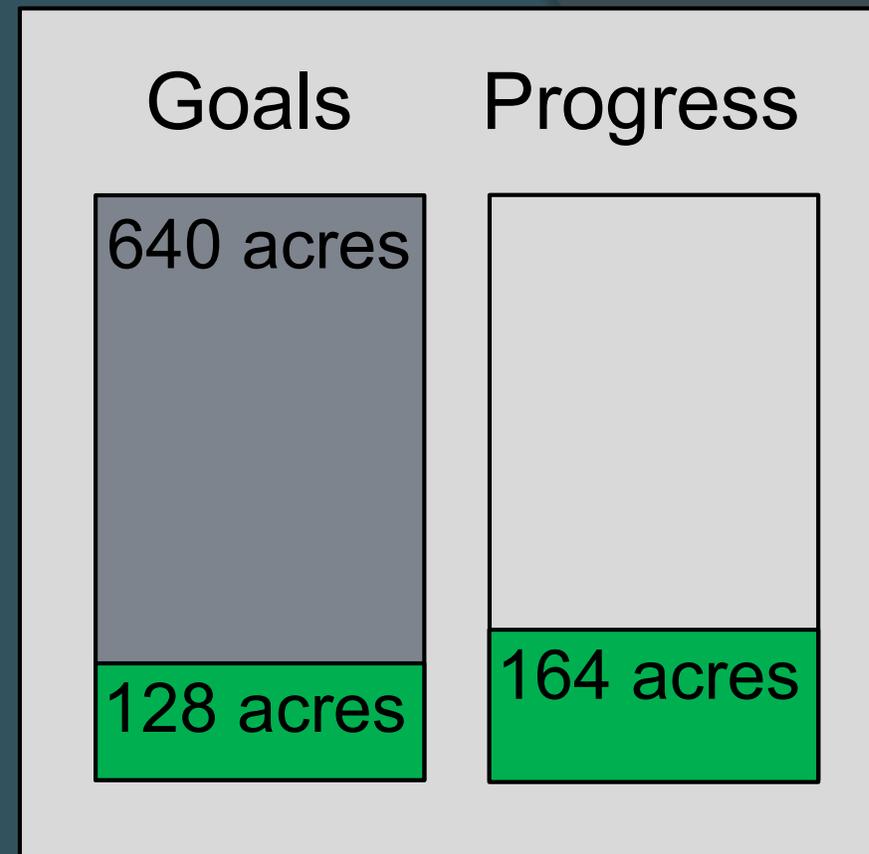
### Tolt River

- Shrubs & Bare Ground to Trees

### Raging River

- Shrubs to Trees

Various cover → shrubs & trees





King County

# Conclusions

## Bank Conditions



- 1.9 miles restored
-  &  in armor
- Extensive bank degradation

## Large Woody Debris



- 18 LWD jams
-  large wood abundance
- Still well below standards

## Riparian Conditions



- 164 acres planted
-  shrubs & trees
- Reached 10yr goal
- Continued restoration & protection

# Special Thanks



King County

- Snoqualmie Watershed Forum
- King County Flood Control District Cooperative Watershed Management Grant

## King County Staff

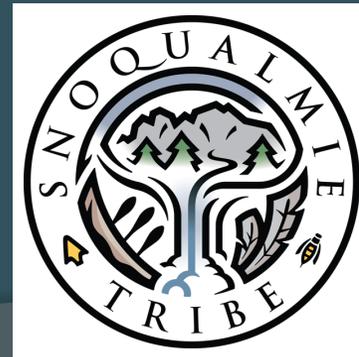
- Josh Baldi
- Chris Gregersen
- Kollin Higgins
- Dan Lantz
- Beth leDoux
- Kate O'Laughlin
- Elissa Ostergaard
- Ken Rauscher
- Dave White
- Jo Wilhelm

## Snoqualmie Tribe Staff

- Matt Baerwalde
- Angela Dillon
- Heather Minnella

## Snohomish River Basin Partners

- Brian Footen
- Gretchen Glaub
- Frank Leonetti
- Morgan Ruff
- Mike Rustay
- Colin Wahl





**King County**



Thank you.

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King County Department of Natural Resources and Parks

