Species and Habitat Studies: Restoration Potential Monitoring

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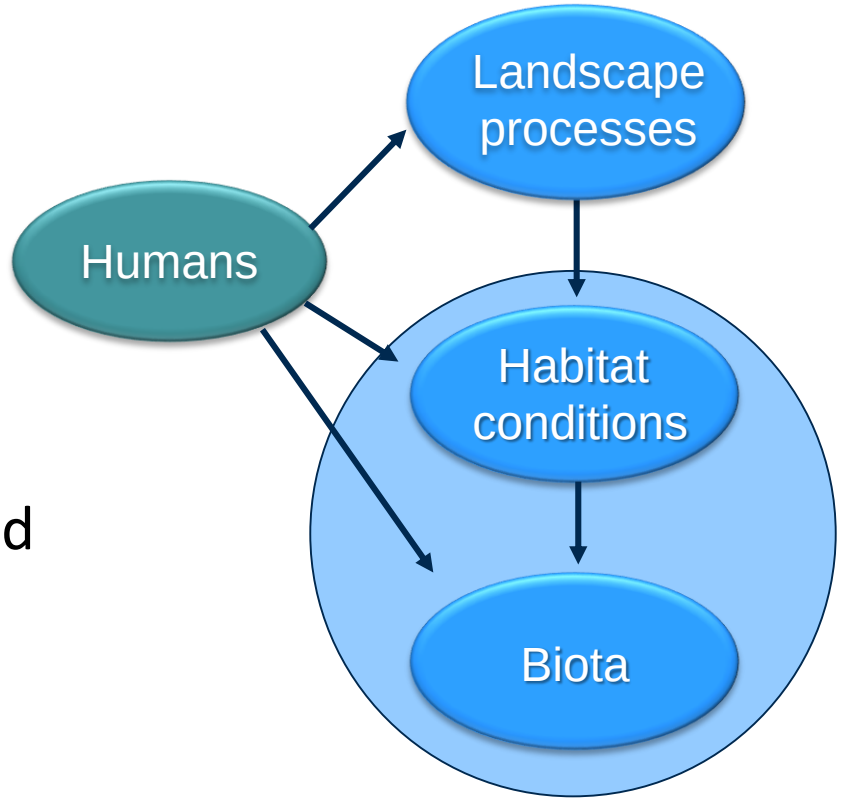
Purpose of the analysis

- Identify habitats that limit salmon population recovery
- Identify restoration scenarios that provide the largest benefit to salmon populations

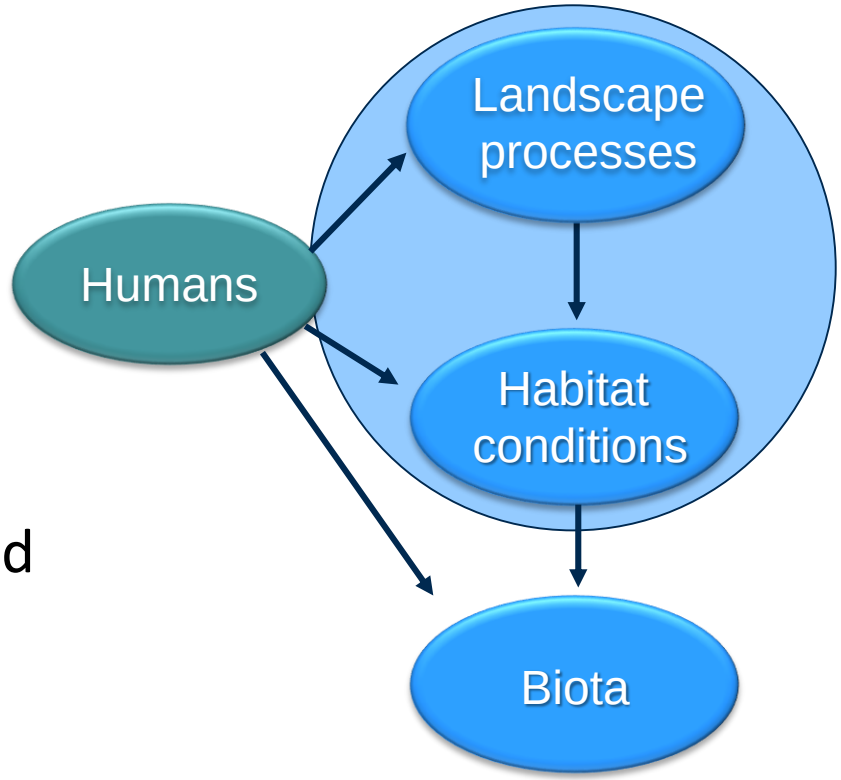
Analysis Overview

- How have habitats changed and altered biota?



Analysis Overview

- What are the root causes of habitat and biological change?



- How have habitats changed and altered biota?

Habitat Change Analyses

- Five habitat areas
  - Small stream (<20 m bankfull width)
  - Large River (>20 m bankfull width)
  - Floodplain habitats
  - Bay/delta habitats
  - Beaver ponds and lakes

- Assess change from natural potential

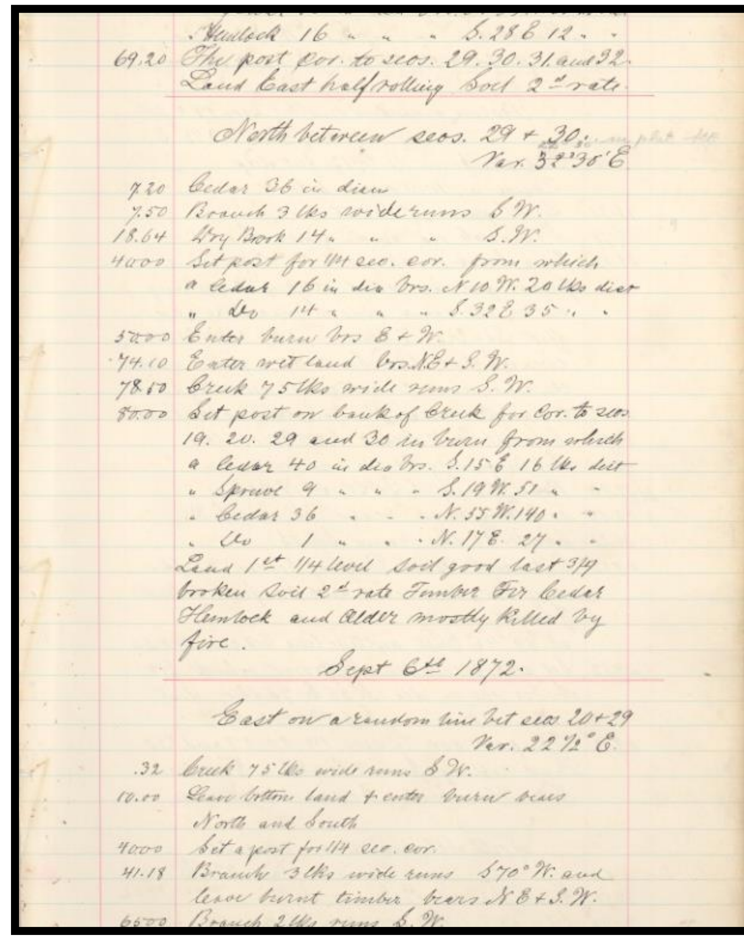
Watershed Process Analyses

- Five watershed processes or functions
  - Riparian functions
  - Hydrologic change
  - Fine sediment change
  - Floodplain connectivity
  - Longitudinal connectivity (migration barriers)

- Assess change from natural rate or condition

Floodplain Habitat Change

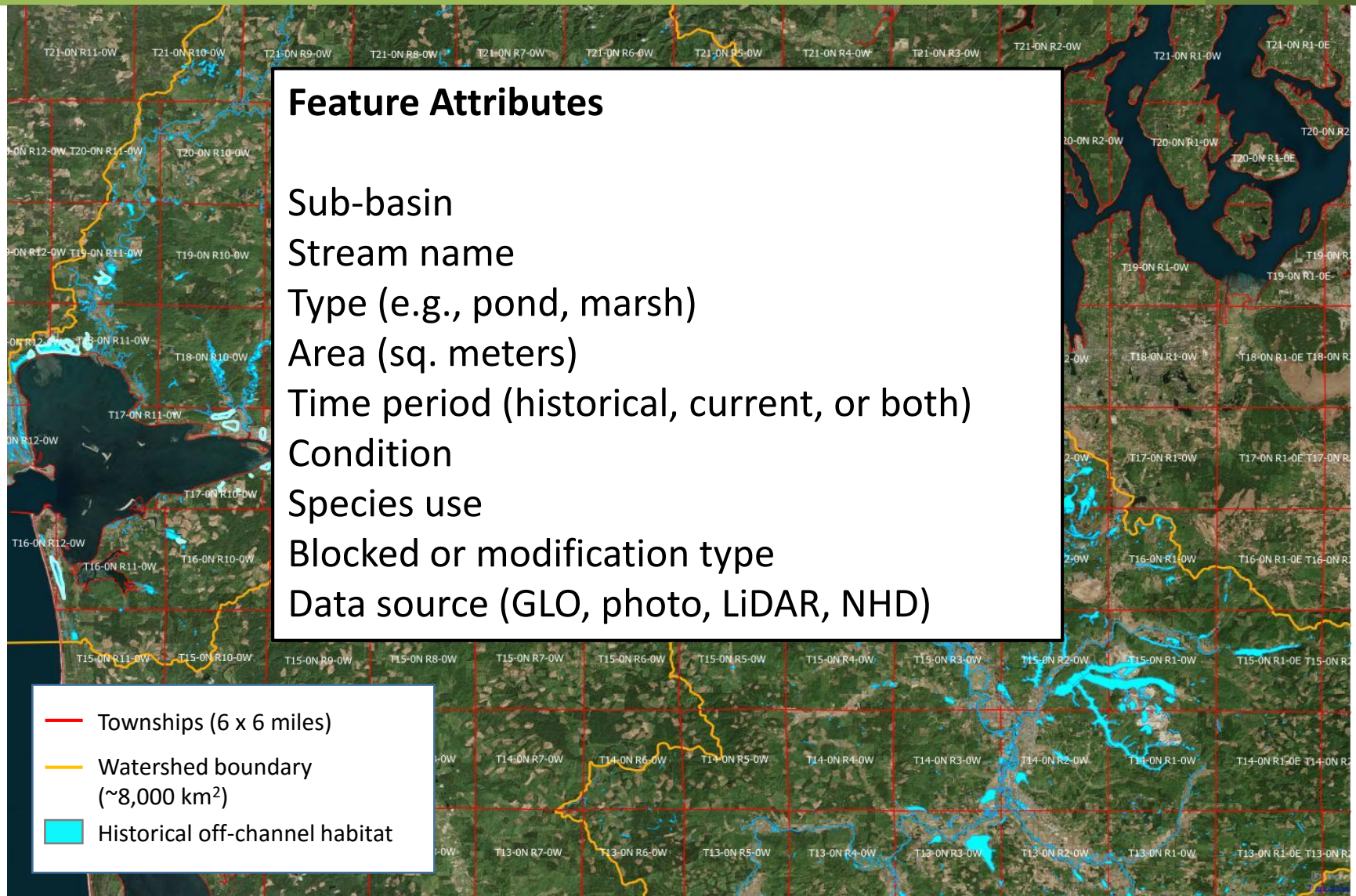
- Map historical floodplain habitats from GLO surveys (1853 – 1901)
- Merge with current datasets
- Classify all features as historical, current, or both
- Classify features as accessible or not (for fish), and degraded or natural
- Summarize historical and current habitat availability


Hemlock 16 " " " S.23 E 12 " "
69.20 The post cor. to secs. 29. 30. 31 and 32.
Land East half rolling Soil 2nd rate

North between secs. 29 + 30.
Var. 3?°30' E
7.20 Cedar 36 in diam
7.50 Branch 3 lks wide runs S W.
18.64 Dry Brook 14 " " S. W.
40.00 Set post for 1/4 sec. cor. from which
a Cedar 16 in dia brs. N 10 W. 20 lks dist
" Do 14 " " " S.32 E 35 " "
52.00 Enter burn brs E + W.
74.10 Enter wet land brs NE + S.W.
78.50 Creek 75 lks wide runs S.W.
80.00 Set post on bank of Creek for Cor. to secs
19. 20. 29 and 30 in burn from which
a Cedar 40 in dia brs. S.15 E 16 lks dist
" Spruce 9 " " " S.19 W. 51 " "
" Cedar 36 " " " N.55 W. 140 " "
" Do 1 " " " N.17 E. 27 " "
Land 1st 1/4 level Soil good last 3/4
broken Soil 2nd rate Timber Fir Cedar
Hemlock and Alder mostly killed by
fire.
Sept 6th 1872.

East on a random line bet secs 20+29
Var. 22 1/2° E.
.32 Creek 75 lks wide runs S W.
10.00 Leave bottom land + enter burn bears
North and South
40.00 Set a post for 1/4 sec. cor.
41.18 Branch 3 lks wide runs S 70° W. and
leave burnt timber bears N E + S.W.
65.00 Branch 2 lks runs S. W.

Floodplain Habitat Change



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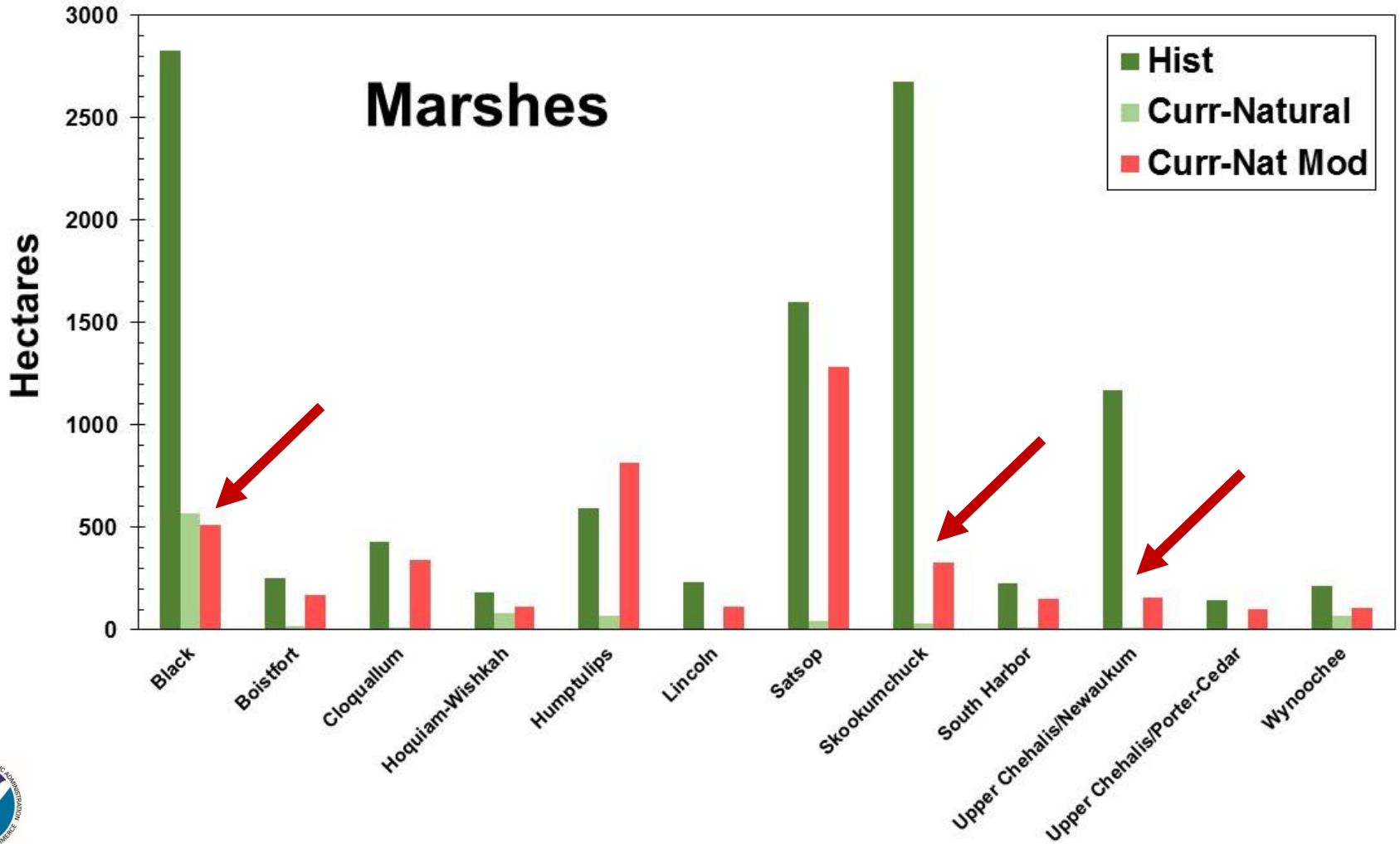
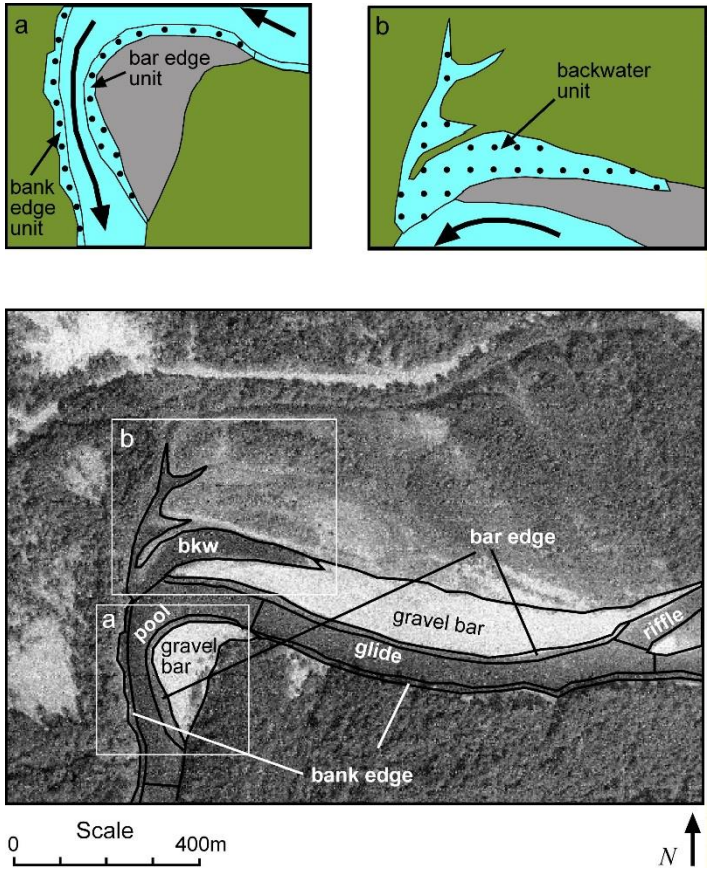


Riverine Habitat Change

- Large river
  - >20 m bankfull width
- Small stream
  - <20 m bankfull width
- Beaver pond area



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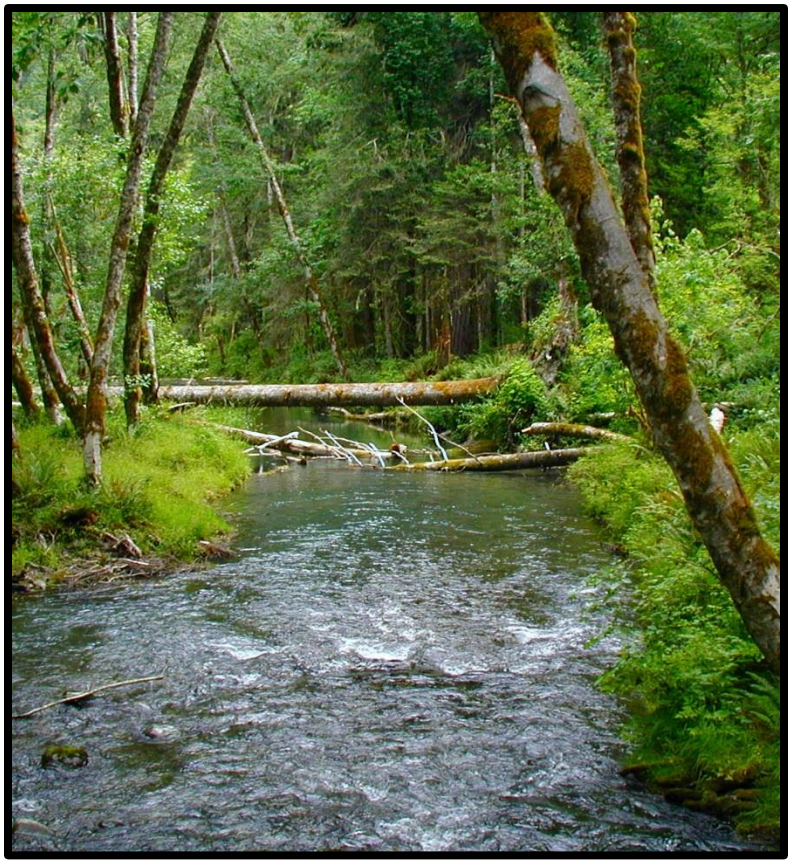

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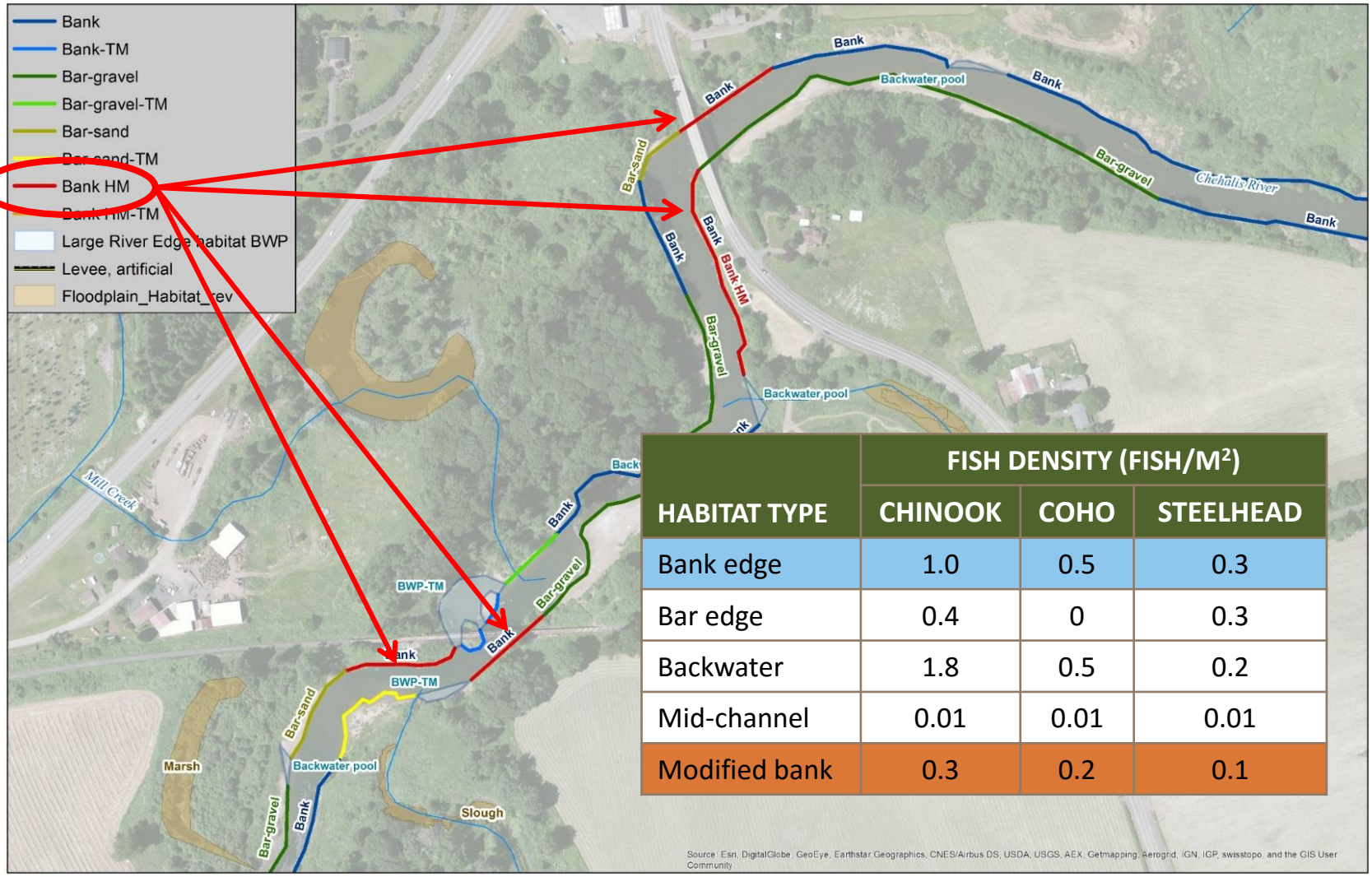
Large River Habitat Change



HABITAT TYPE	FISH DENSITY (FISH/M²)		
	CHINOOK	COHO	STEELHEAD
Bank edge	1.0	0.5	0.3
Bar edge	0.4	0	0.3
Backwater	1.8	0.5	0.2
Mid-channel	0.01	0.01	0.01
Modified bank	0.3	0.2	0.1

Small Stream Habitat Change

SLOPE CLASS	REFERENCE	FOREST	WETLAND	AGRICULTURE	DEVELOPED	BARE
0 – 2%	79 *	73	86	92	73	80
2 – 4%	66 **	43	53	58	47	48
>4%	35 ***	30	-	-	-	32

* Updated based on higher proportion of very low gradient streams in the Chehalis Basin

** Based on reference sites from Beechie et al. 1994 and Beechie and Sibley 1997

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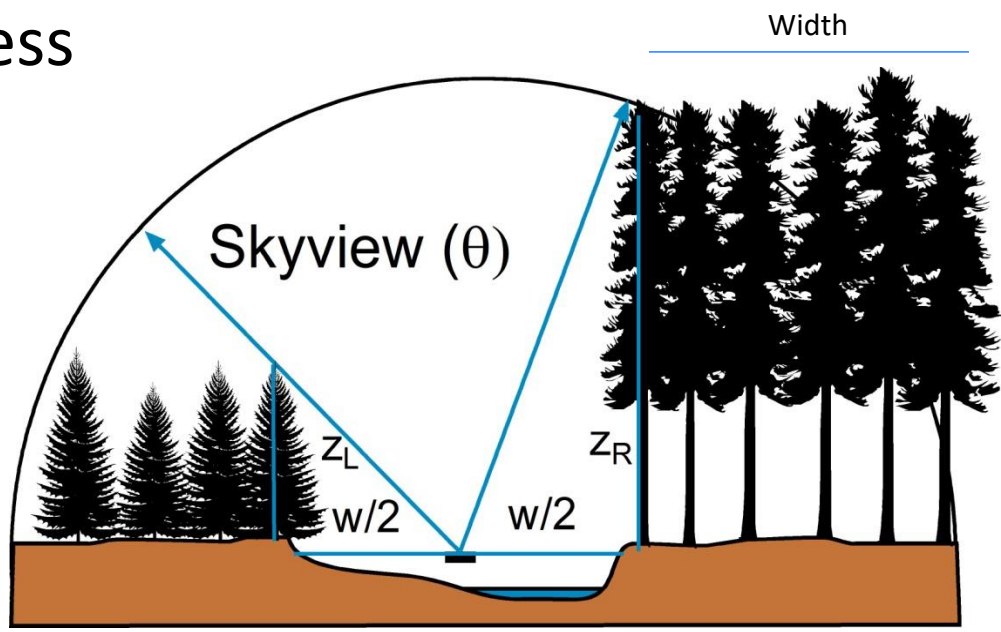
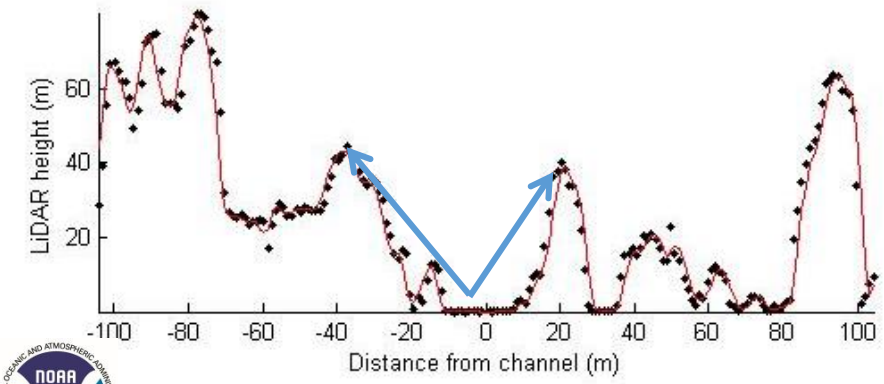
Riparian Function Change

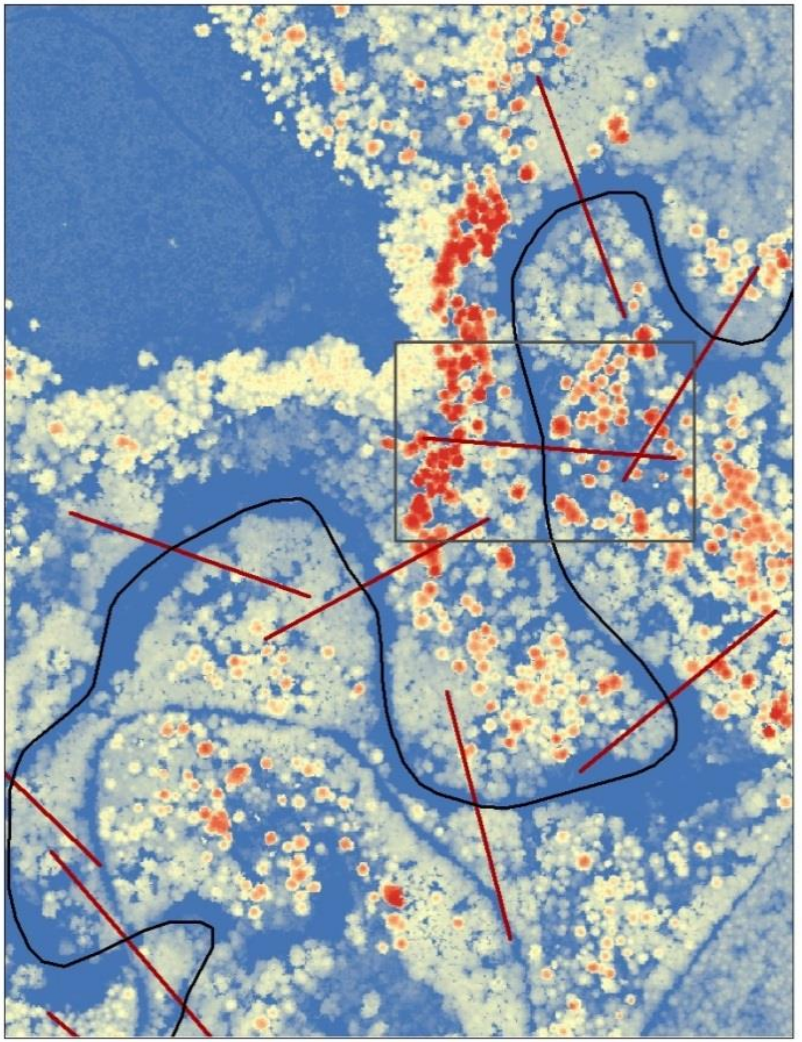
- **Skyview:** canopy openness
- **Buffer width:** indicator of wood recruitment potential



LIDAR Method

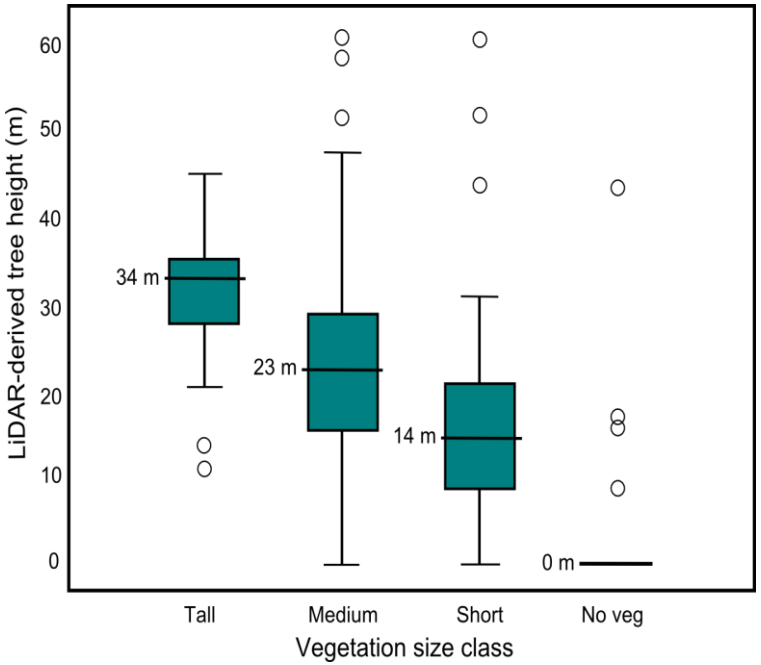
- Calculate skyview from LIDAR canopy height
- Calculate width of zone with large trees (functional wood)

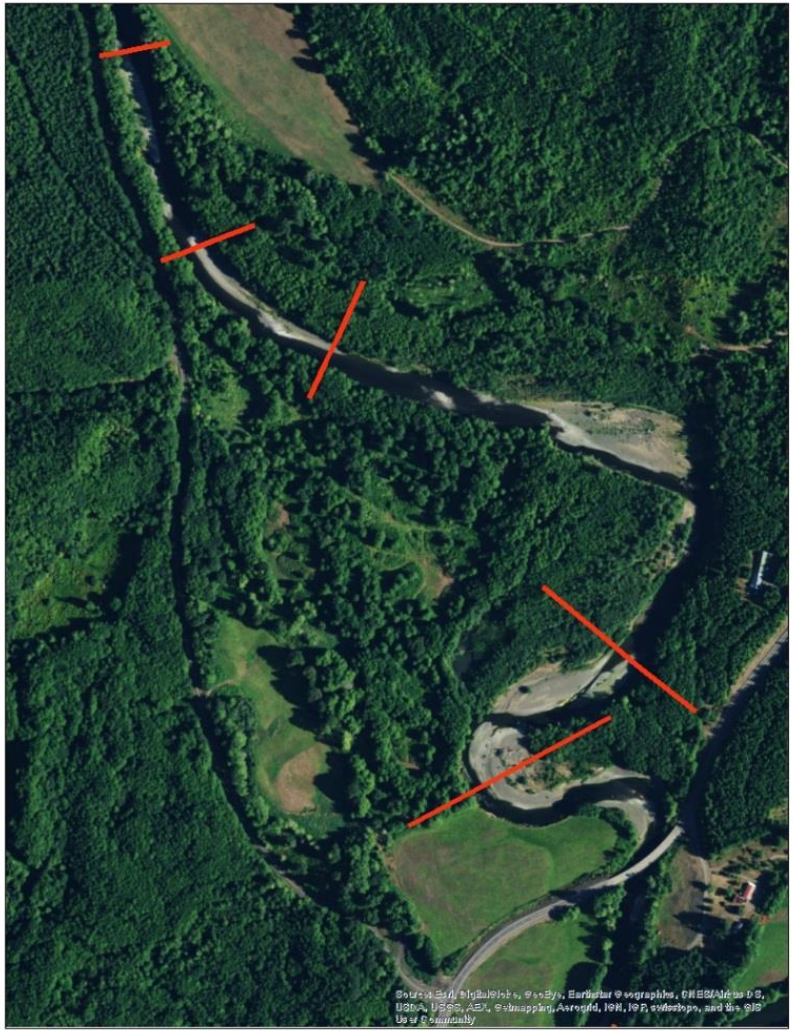




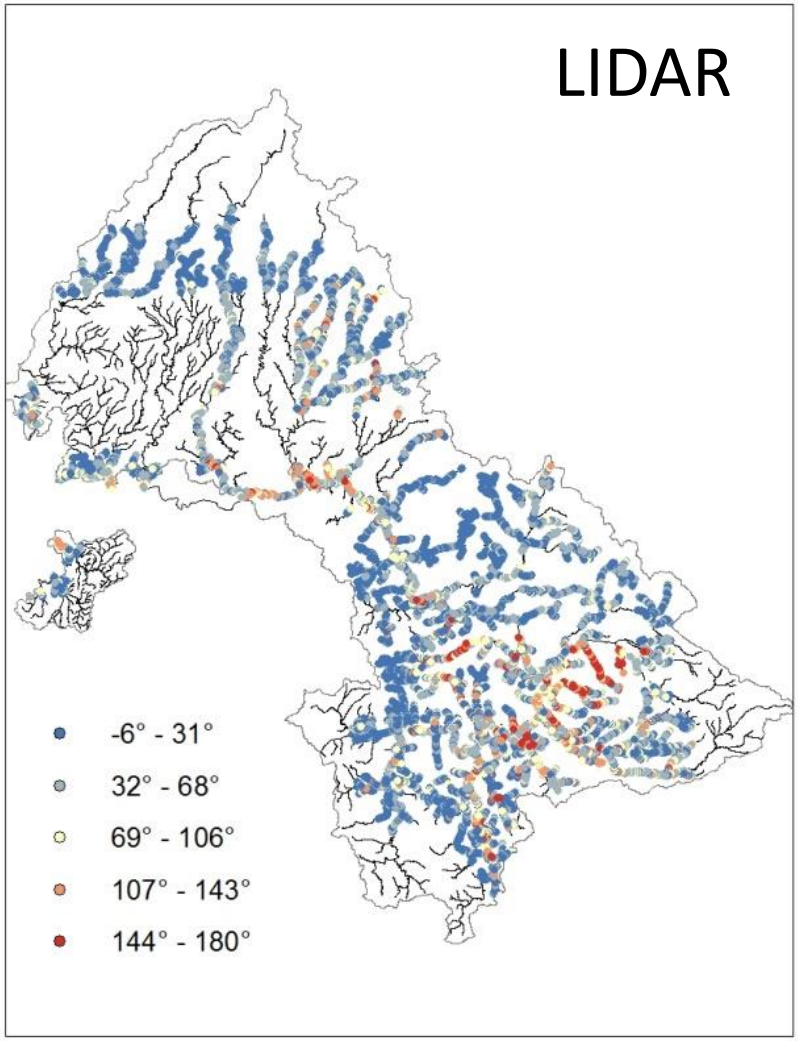
Aerial Photo Method

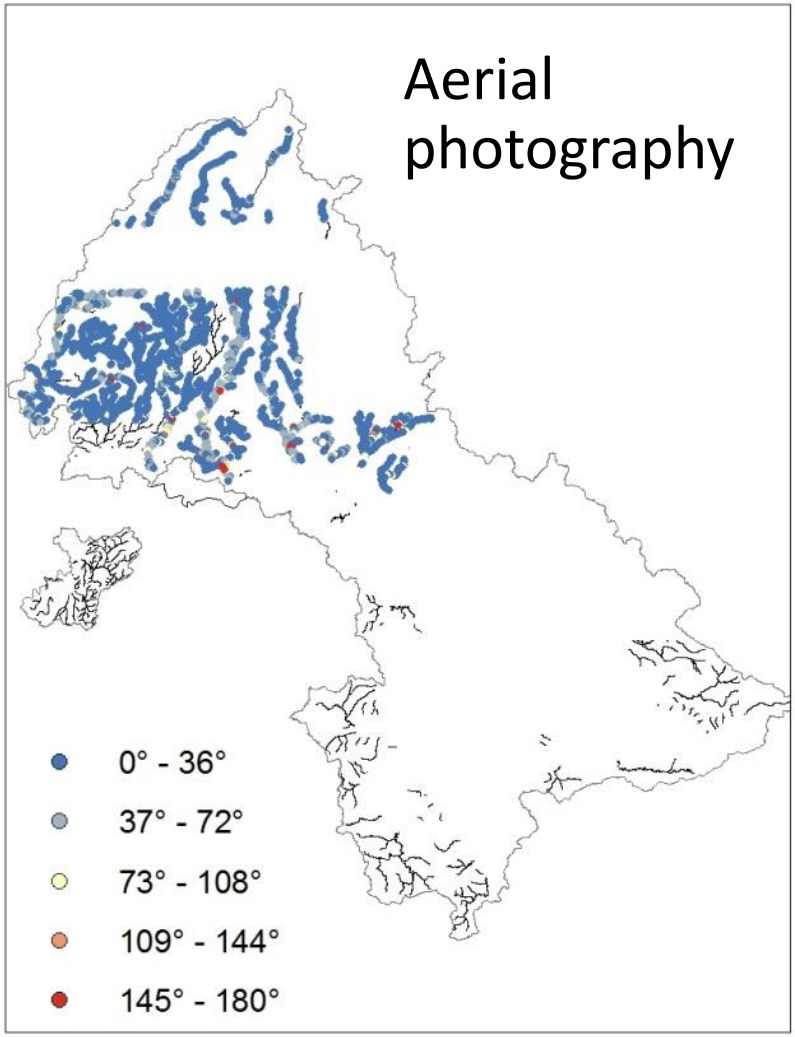
- Where LIDAR not available
  - Measure buffer width
  - Estimate tree height class
  - Same calculations as LIDAR





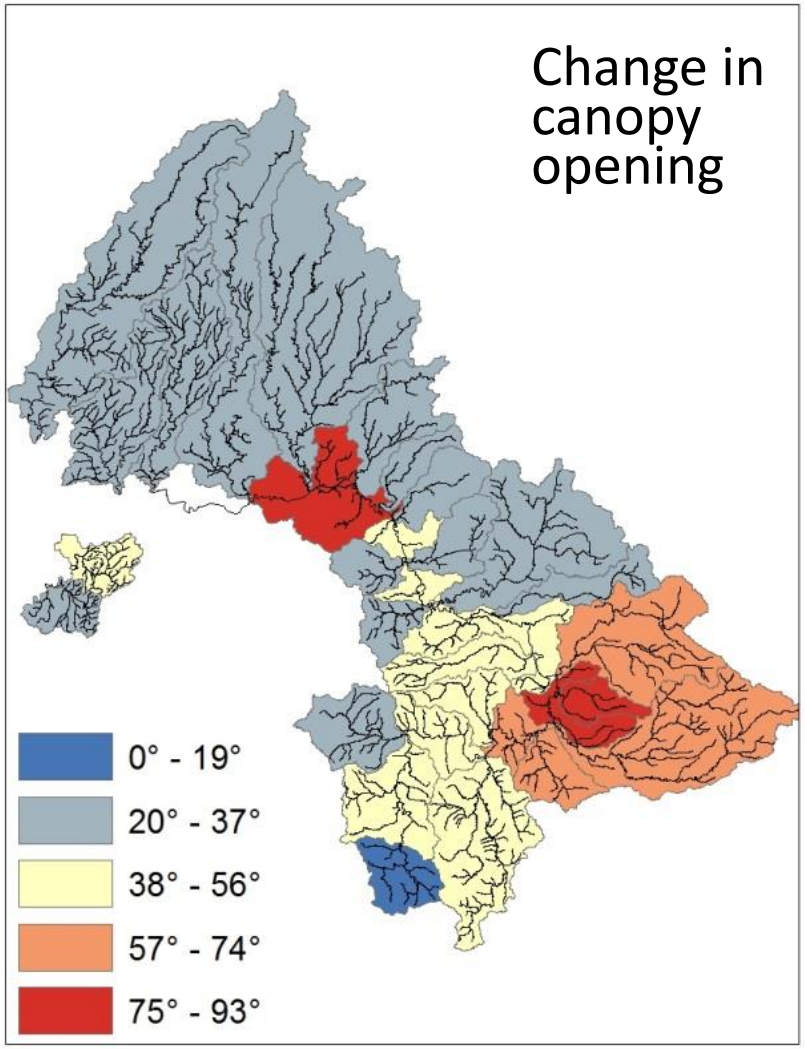
Current Canopy Opening



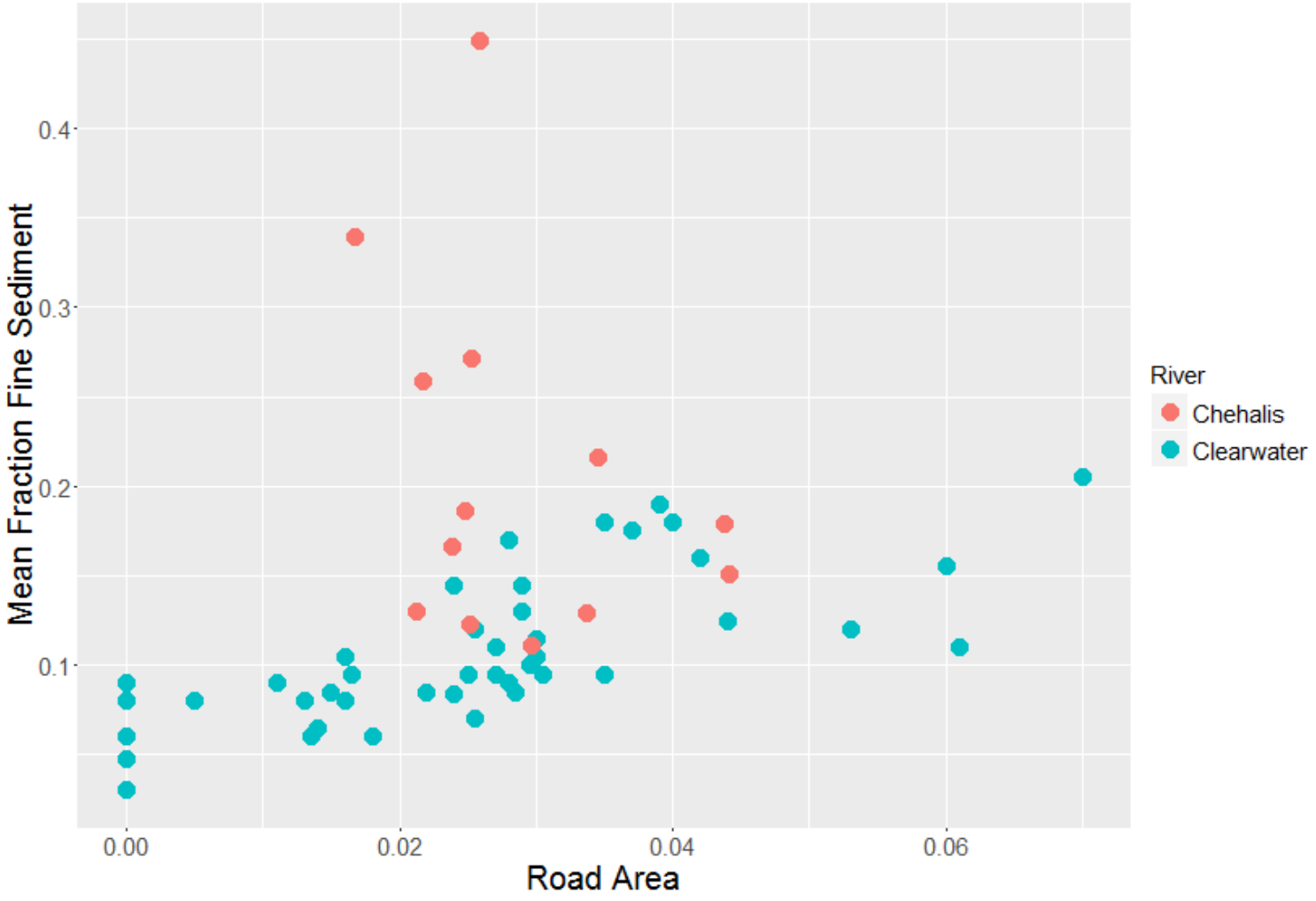


Canopy Opening Change

- Preliminary riparian summary
  - Most basins have relatively large decreases in shade
  - Most areas have narrow buffers of large trees (i.e., low wood recruitment)
- Need to recalculate with revised reference condition



Fine Sediment in Gravels



Progress Summary

FIVE HABITAT AREAS	FIVE PROCESSES
Large river	Riparian functions
Small stream	Hydrologic change
Floodplain habitats	Fine sediment change
Delta/bay habitats	Floodplain connectivity
Beaver pond and lake habitats	Migration barriers

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