

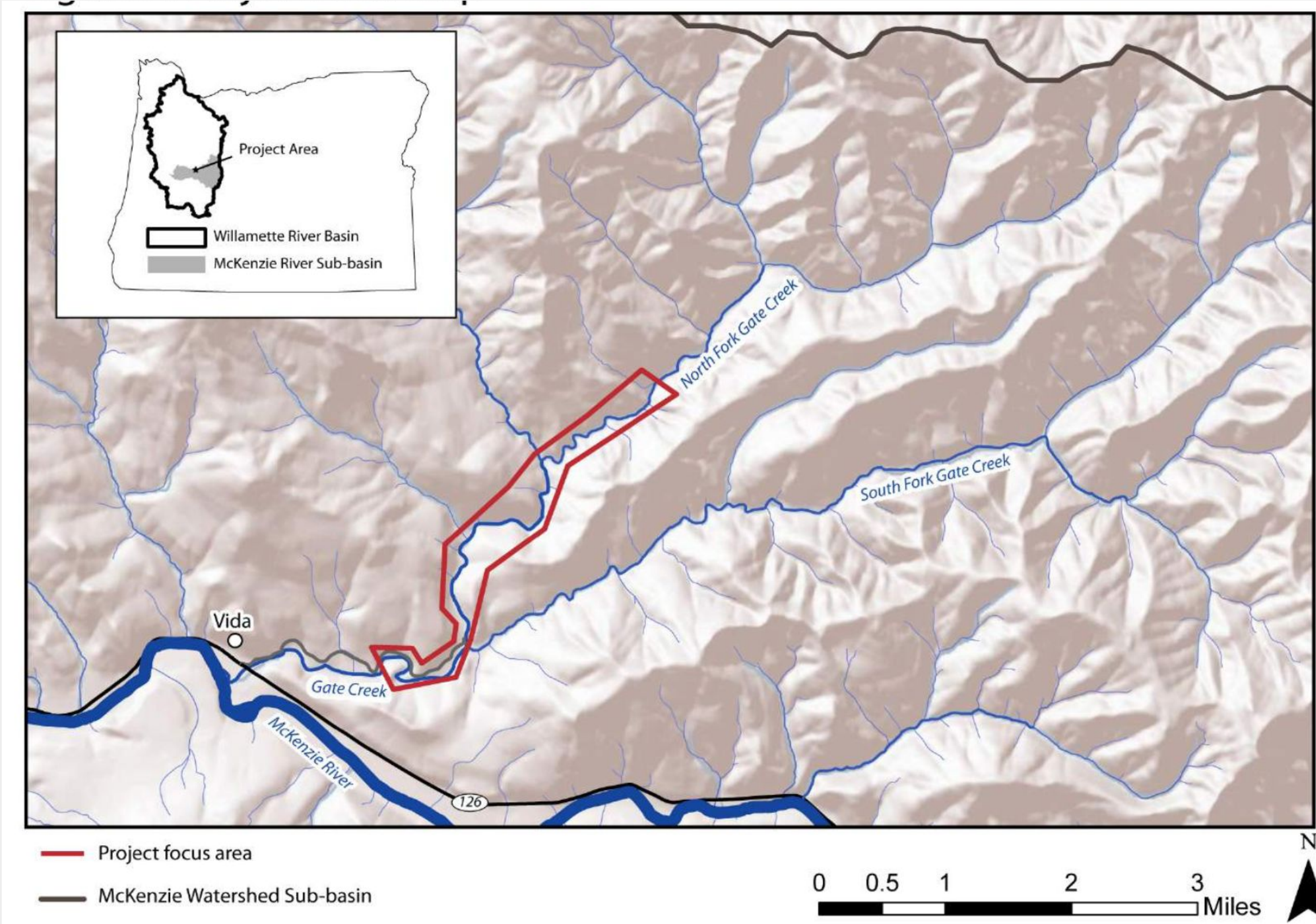
# Habitat Assessment & GIS Analysis of a Western Cascades Stream: Gate Creek, McKenzie Basin, Lane County, Oregon



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## Background

- The Project seeks to enhance habitat for the Endangered Species Act (ESA)-to help threatened spring Chinook salmon, cutthroat trout, Pacific lamprey, non-listed rainbow trout and other native species by addressing the impacts of land management practices within the Gate Creek subwatershed.
- Because of the logging done near and around the creek the local wood amount has come to a very reduced quantity. The loss of large wood from stream channels and the floodplain has altered natural processes and reduced the quality and quantity of habitat for native fish.
- The lack of well-sorted alluvial substrate has decreased spawning habitat availability for spring Chinook salmon and native trout. Quantity and quality of pools, With the loss of off-channel habitat has negatively affected rearing habitat potential for salmonids. Other native fish are more widely distributed throughout the sub-watershed.



## Project Development

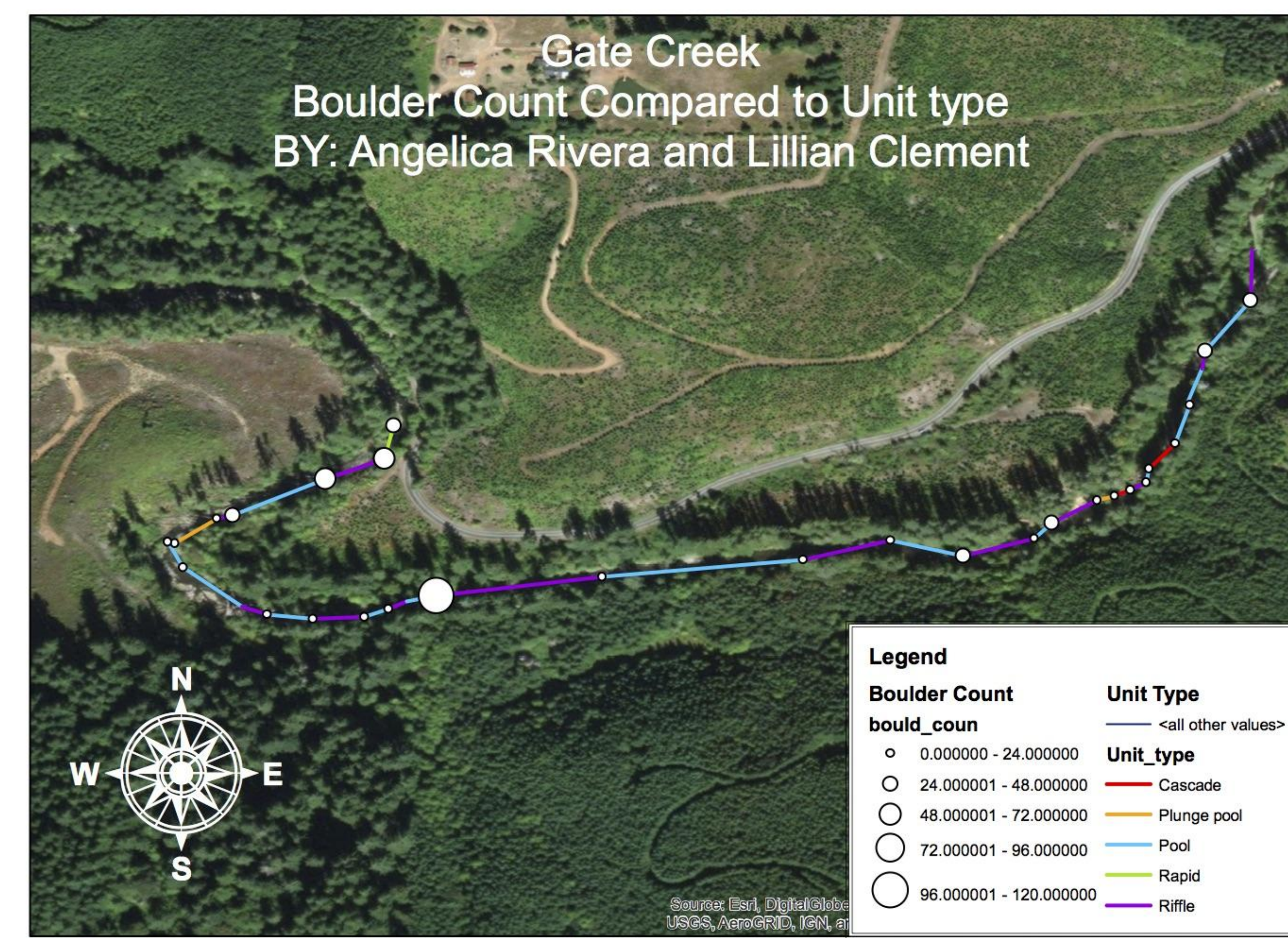
- In 2017 -2018the Springfield WELL Project partnered with the Eugene BLM District and the McKenzie Watershed Council, to focus on surveying Gate Creek.
- With the collaboration of all teams, the stream has been surveyed seven times.
- Work sites are on a combination of private and public land.
- The intent of the project is to improve habitat for salmon and other native fish species.

## The Water and Energy Learning Lab (WELL) Project

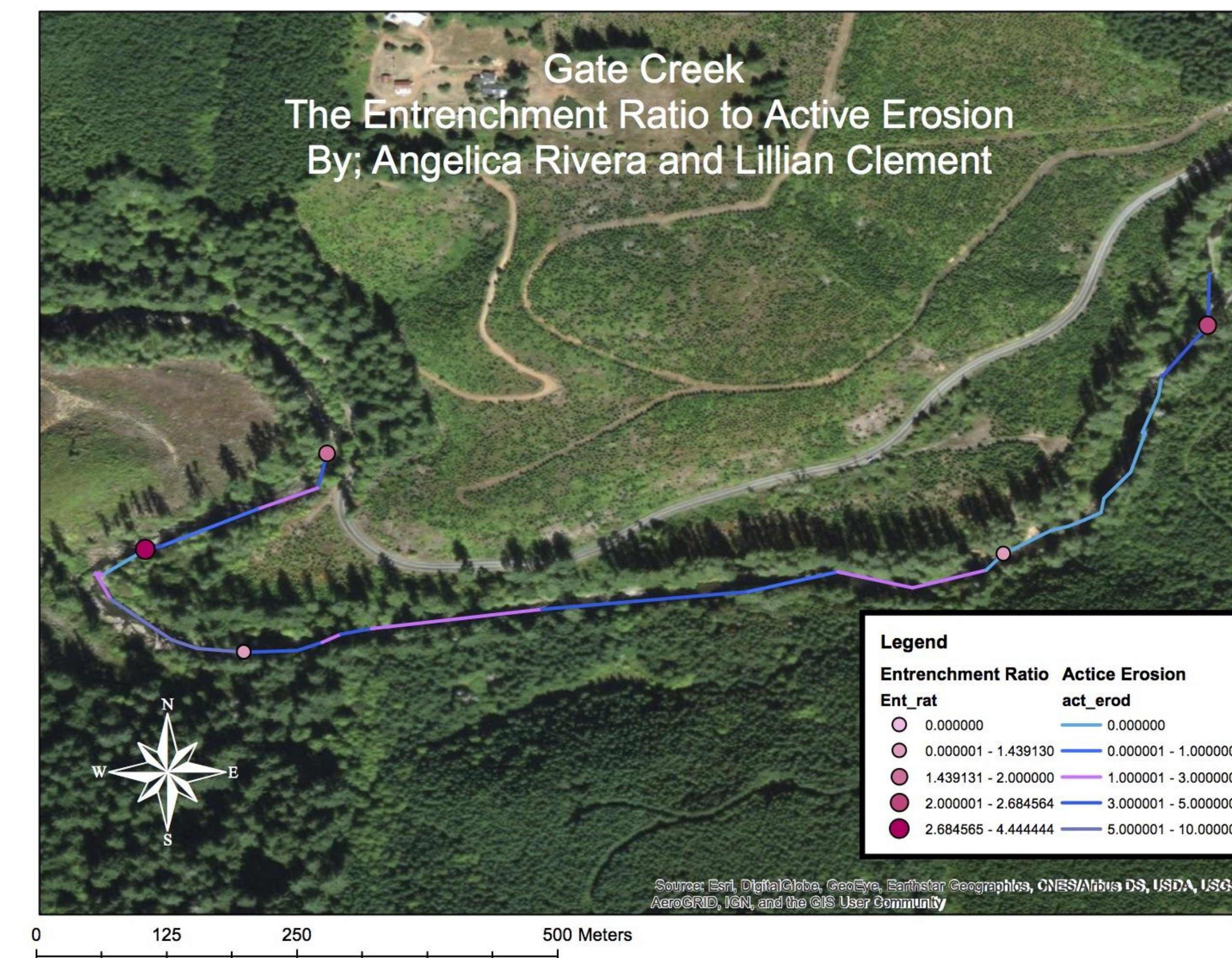
- In 2017 the Springfield WELL Project began a partnership with the Eugene BLM District and the McKenzie Watershed Council focused on the NF Gate Creek and Minney Creek.
- The stream channel is broken into habitat units (pools, riffles) and a series of metrics collected within each unit.
- The ODFW Aquatic Inventory protocol was modified to accommodate a large amount of surveys (up to 14) and attempts to have students take quantitative measurements.
- Student surveys are accomplished by breaking the team of 10-14 students into 3 sub-teams, with each team responsible for a sub-set of metrics.

## In-Stream Habitat Assessment Team Survey Methodology

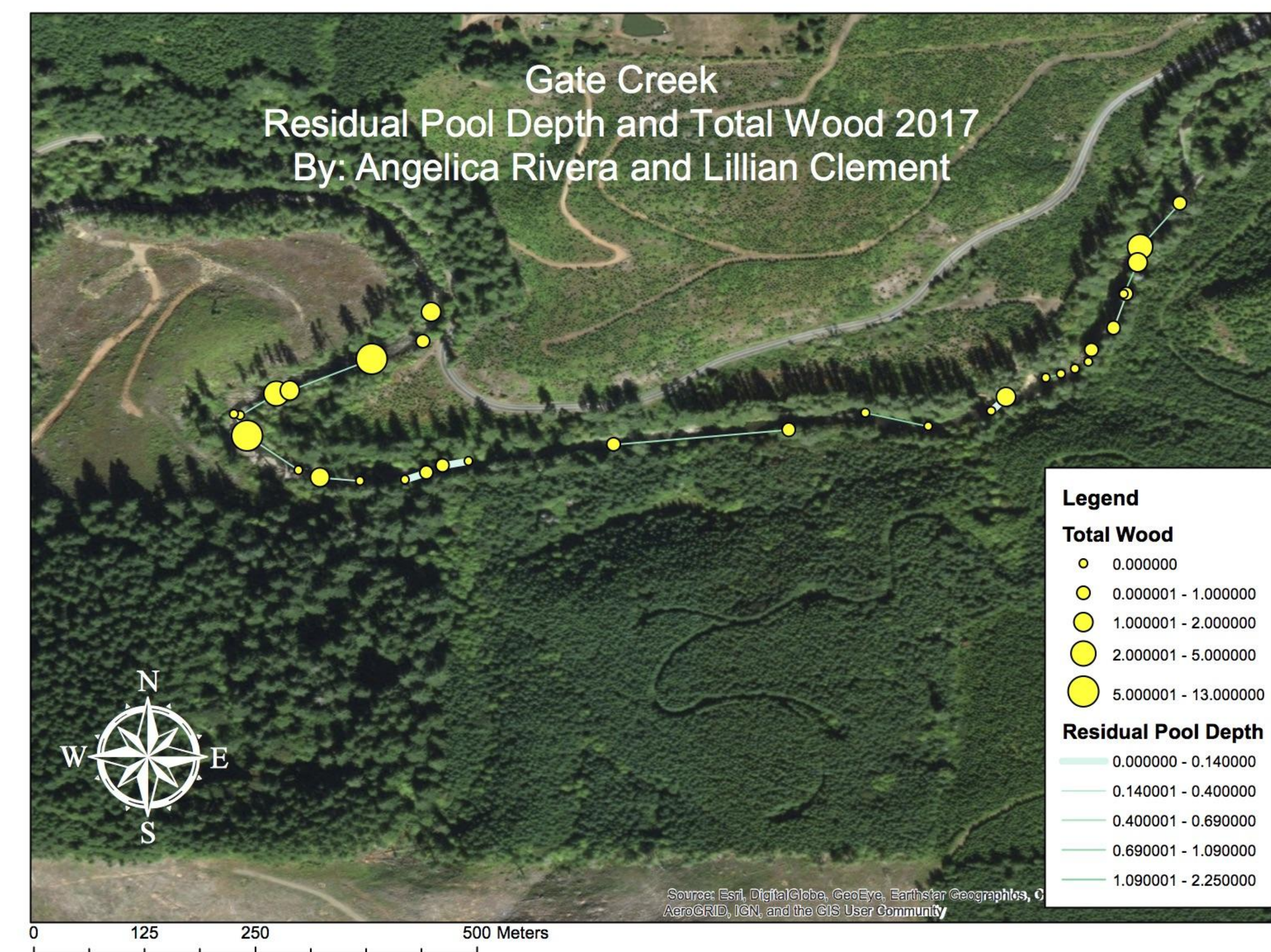
- Two In-Stream Habitat Assessment Teams worked with the McKenzie Watershed Council to survey Gate Creek a total of seven times. Students followed modified protocols adapted from the Oregon Department of Fish and Wildlife Aquatic Inventory Methodology to take quantitative measurements as opposed to qualitative assessments or estimates whenever possible.
- Student surveys are accomplished by breaking the team of 10 to 14 students into 3 sub-teams, with each team responsible for a subset of metrics including:
  - Unit-Type-riffle, pool, glide, etc.; Unit Length, Photo Records,
  - In-Stream Wood Size & Count for every 100 meters , Structure of placed wood structures, % Shade, % Bank Active Erosion, Substrate Composition, Slope
  - Average Wetted Width/Depth, Pool Depth/ Tailout Crest, Active Channel Width/Height, FloodPlain Width/Height
- Students worked with the WELL Project instructor, and the McKenzie Watershed Council, to assess data and prepare maps utilizing GIS Software.



The map above shows the boulder count compared to the unit type. There are 5 types of units cascade, plunge pool, pool, rapid and riffle. The boulder can affect the path of the stream creating a new type of unit.



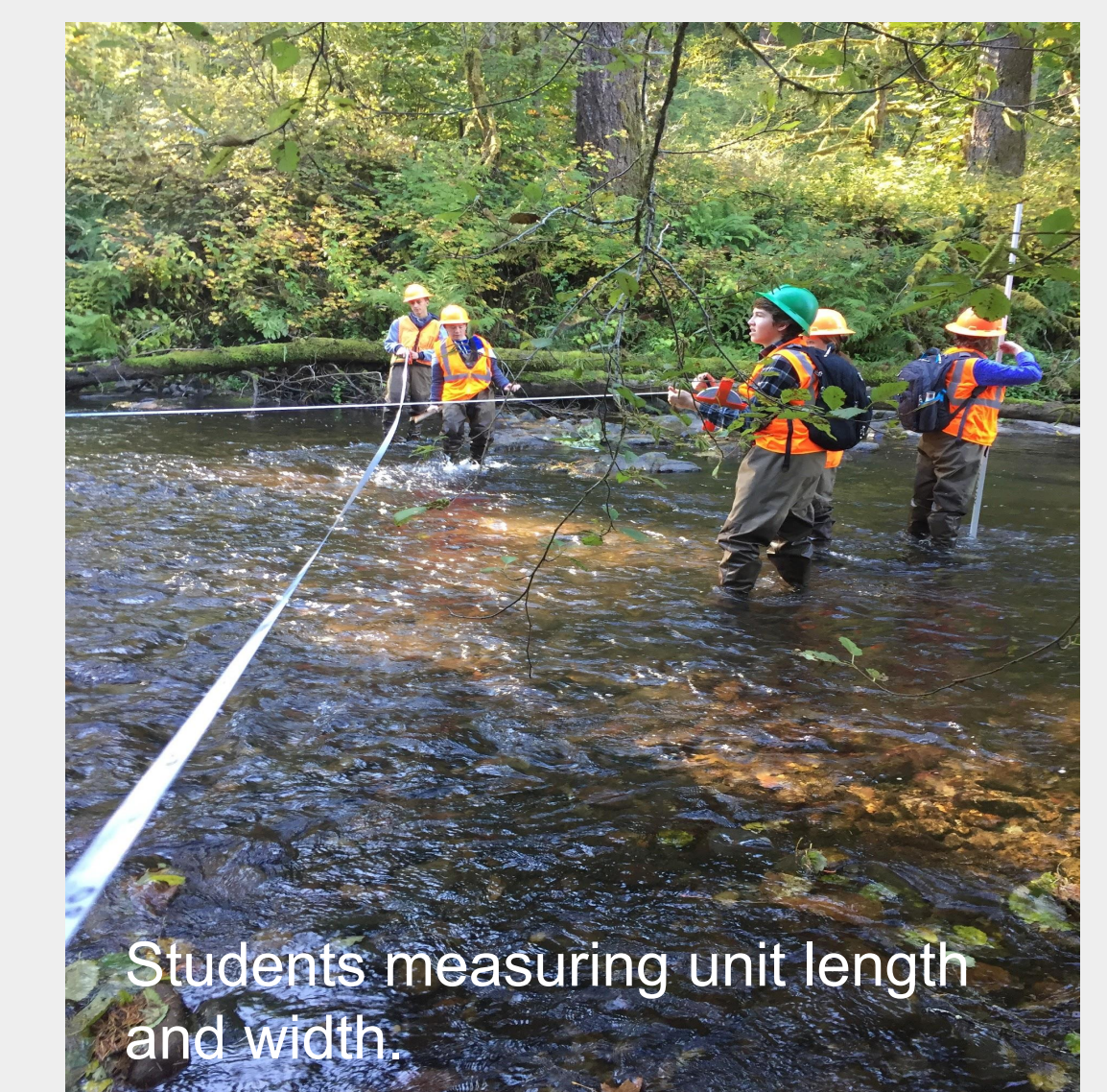
Entrenchment ratio affects the width of the stream because of erosion. Erosion is the process of being broken down or being eroded by wind, water, or other natural agents.



The map up above shows the Total Wood and Residual Pool Depth. The wood can affect the path and the strength of the currents. The wood can stop the flow of the stream causing a lower residual pool depth.

## Results

Metric	Summer 2017	ODFW Standards
Survey Length	532.7 Meters	
ACW (meters) average	8.2	
Width to Depth Ratio	4.1	Desirable
Entrenchment ratio	2.21	Desirable
Percent Shade	75.82%	Desirable
Percentage Substrate Silt and Sand	16%	Not desirable but not undesirable
Percentage Substrate Gravel	17%	Not desirable but not undesirable
Percentage Substrate Cobble	24%	
Percentage Substrate Boulder	25%	
Percentage Substrate Bedrock	18%	
Percentage Total Pool Area	5%	Undesirable (Desirable:<10)
Residual Depth of Pools	.28	Not desirable but not undesirable
Total Wood per 100 meters	7.13	Undesirable



## Conclusion

- To address the undesirable metrics that do not meet the ODFW benchmarks we propose to:
- Increase large wood placement along the channel
  - Instill restoration teams to plant trees near or on the banks of the channel
  - Insert gravel augmentation where the cobble % is abundant

These changes will decrease cobble and silt & sand percent to the desirable range that are currently unsuitable for the aquatic environment. Additionally these improvements will foster a habitat for fish, including their spawning, and will provide a suitable habitat for organisms in the aquatic food chain to thrive.



Students measuring the slope and shade of the unit.

## Acknowledgments

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- Springfield Utility Board & Eugene Water and Electric Board
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