

Habitat Restoration & GIS Analysis of a Salmon Stream: Soda Fork Creek, South Santiam Basin, Linn County, Oregon

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Background

- Soda Fork Creek provides important spawning habitat for native fish species, such as the threatened winter steelhead.
- The habitat in the creek has been impacted by land use practices such as timber harvesting, road building, and active removal of large wood from the stream channel. The removal of large wood allowed the gravels to be washed away, leaving no spawning habitat.
- Threatened winter steelhead have not spawned in this stream for decades.



This is a whole tree structure tipped into the stream to recruit gravel, silt, and sediment, as well as to add to the complexity of the stream.

Project Development

- The Soda Fork Creek project was designed by the Willamette National Forest Sweet Home Ranger District and the South Santiam Watershed Council to improve spawning habitat and stream complexity in Soda Fork Creek.
- The project involved pulling 34 large, live, stream-adjacent trees with root wads attached, into the stream channel.
- The total cost was \$128,000, which included a large skidder outfitted with a 40,000 pound winch that pulled the trees into the water.

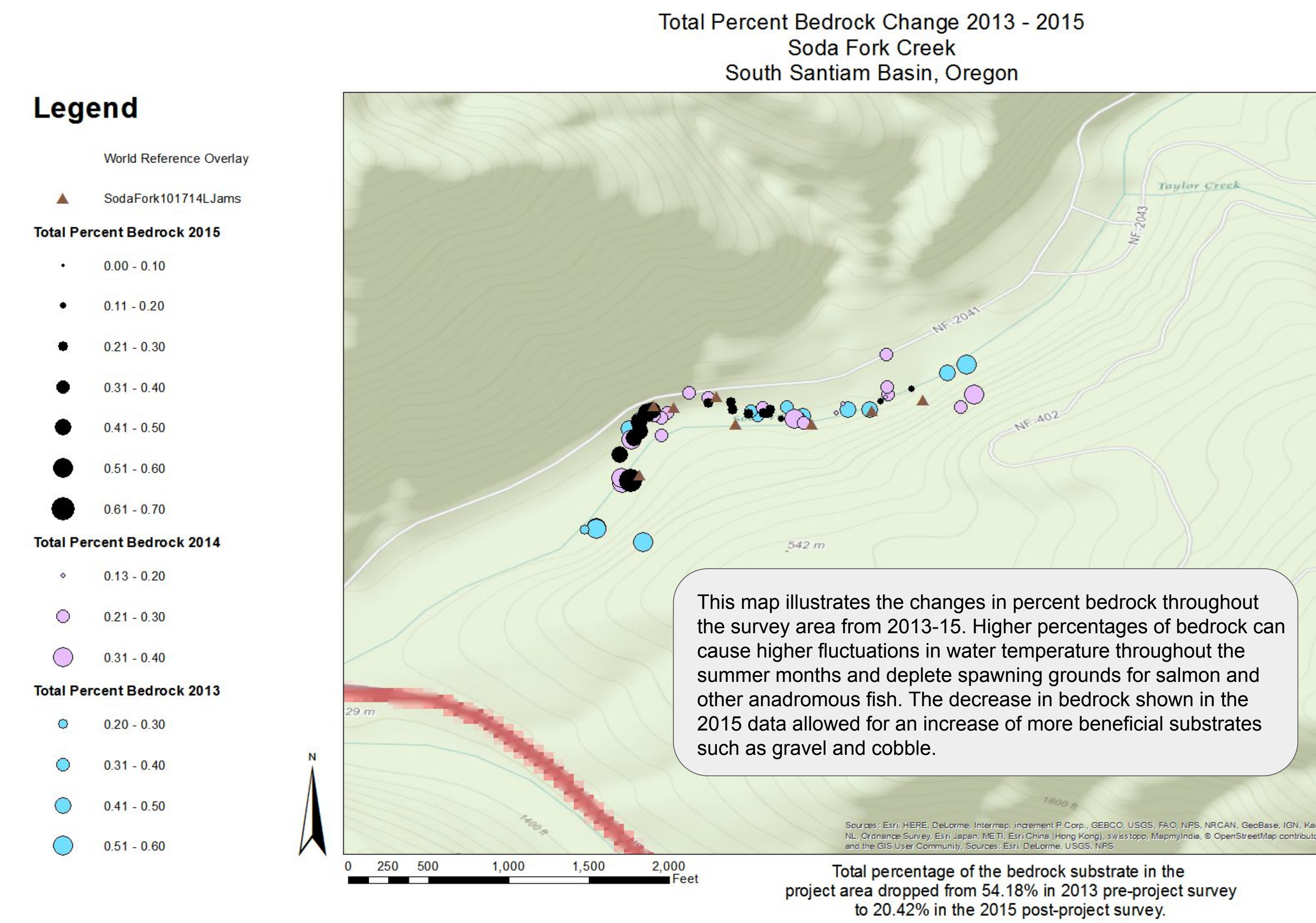


The Water and Energy Learning Lab (WELL) Project

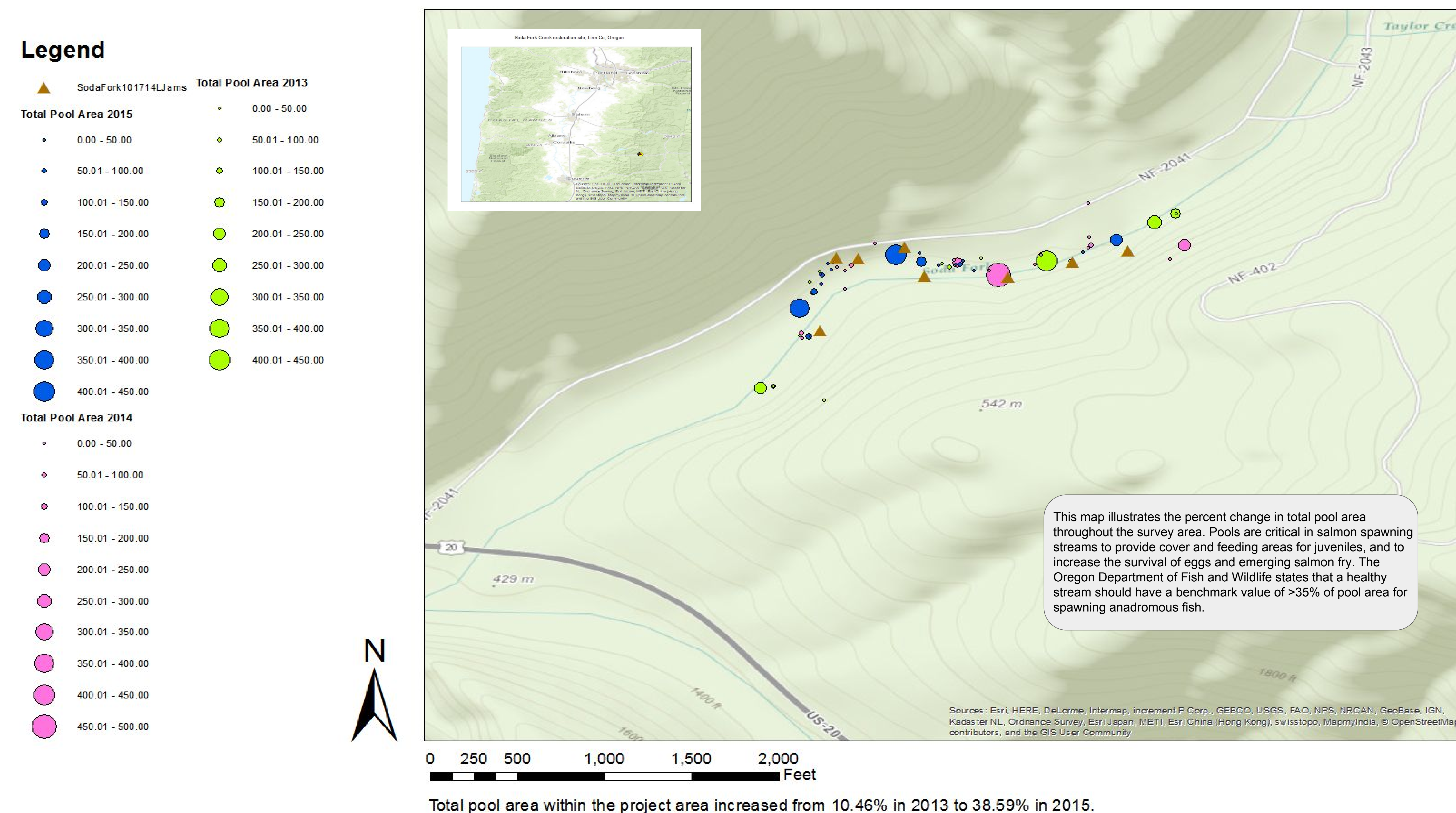
- In 2013, the Springfield WELL Project partnered with the Sweet Home Ranger District to work on the Soda Fork Large Wood Enhancement Project.
- Funded by a long-standing grant from the Springfield Utility Board, the WELL Project is designed to promote student involvement from both high schools and middle schools in the area.
- The high school teams, with more than 60 students, work with watershed councils, federal agencies, private landowners, and other organizations to improve water and energy quality in the area.

In-Stream Habitat Assessment Team Survey Methodology

- Two In-Stream Habitat Assessment Teams worked with the Sweet Home River District to survey Soda Fork Creek a total of three times. Students follow 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, 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, the McKenzie Watershed Council, and the University of Oregon to assess data and prepare maps utilizing GIS Software.



Total Pool Area Change 2013-2015 Soda Fork Creek South Santiam Basin



Total pool area within the project area increased from 10.46% in 2013 to 38.59% in 2015.

Results

- We documented large changes in the percentages of substrate in the project area:
 - Total percentage of the bedrock substrate with the project area dropped from 54.18% in the 2013 pre-project survey to 20.42% in the 2015 post-project survey.
 - Total percentage of gravel substrate increased from 6.04% documented in the 2013 pre-project survey to 25.44% in the 2015 post-project survey.
 - Large wood counts increased from 3.56 pieces (in all size classes) per 100 meters to 23.82 pieces (in all sizes classes) per 100 meters in 2015.
 - Total pool area within the project area increased from 10.46% in 2013 to 38.59% in 2015.
 - Threatened winter steelhead started spawning in this stream again after the restoration project allowed the recruitment of gravels.



Conclusion

- The addition of large wood to the Soda Fork Creek project area has met the following objectives:
- Significant increase in spawning grounds
 - Increase in naturally occurring wood and woody debris
 - Significant increase in total pool area
 - Significant increase in in-stream complexity (more diverse stream units such as pools and riffles)

Additional monitoring will assess the stability of the placed large wood structures and their ability to retain gravel and create habitat over time.



Acknowledgments

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- UO STEM CORE & University of Oregon Libraries