Erosion Patterns along Copeland Creek

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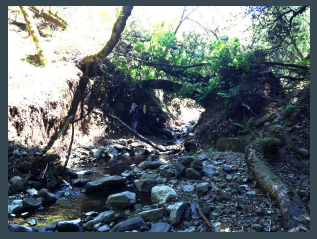
Can information gathered on erosion patterns and channelization in Copeland Creek help the creek in a positive way?



Key Term Definitions

Erosion - surface processes which remove or transport soil, rock, and/or dissolved material.

Sediment - naturally occurring material compounded of rock, sand, dust, etc.

Channelization- the process by which a river's winding course is replaced with straight cuts.

Background

Copeland Creek has become channelized through years of erosion and our research investigates the different factors which have an affect.

Sonoma State researcher Jeff Baldwin conducted an erosion project in Copeland Creek which measured the changes in channel form, creek banks, debris flows, and mud flows.

Why?

Brittany Heck and Mike Thompson have informed us in the past about the negative effects of channelization on life in/along the stream and groundwater recharge.

We wanted to compare two different kind of environments.

Sediment washed down to the school requires periodic and resource draining dredging.

Site Map

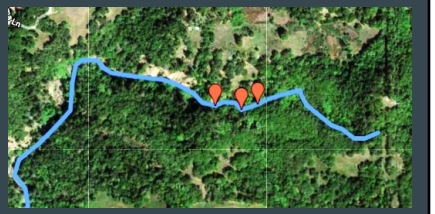
Outside SSU

Fairfield Osborn Preserve

Site Map

Outside Campus

Fairfield Osborn Preserve



Research Process I

Our research compared two locations along Copeland Creek to observe various types of erosion occurring at each site.

At each of location, we established three sites to take sediment samples.

Three random soil samples from each site were taken from within a transect

Research Process II

Height of the banks to the water's surface was measured, and width from bank to bank was measured

At each site a square transect was established and we randomly took soil and sediment.

Pictures were taken at each site as well as general and specific observations.

Signs of Erosion

<u>Naturally Caused Erosion</u>
- Exposed Roots
- Cracks in the Soil
- Brown water
- Collapsed river banks

<u>Human Caused Erosion</u>
- Concrete Blocks
- Piping

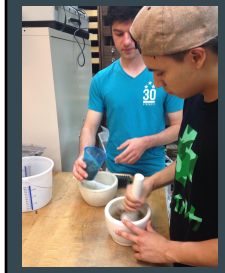
<u>Animal Caused Erosion</u>
- Burrowing

Sifting Methods

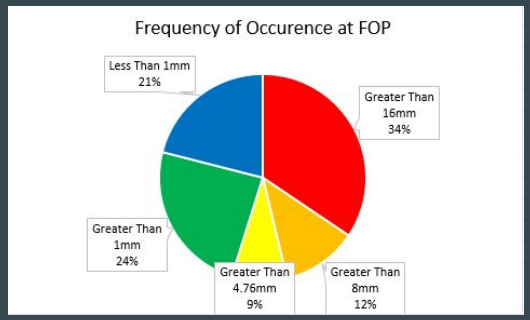
Previously collected and dried sediment samples were sifted through a four tiered sifter the further sifted through a five tiered sifter with smaller mm sizes.

Sediment samples were dried and put through a sifter with multiple tiers to determine average size.

Sifting Methods



Sediment Size



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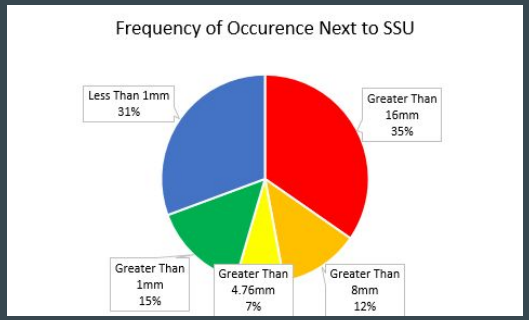
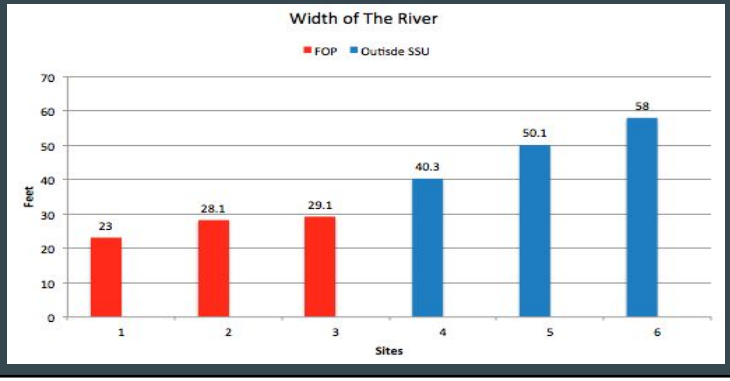


Dimensions of the Creek



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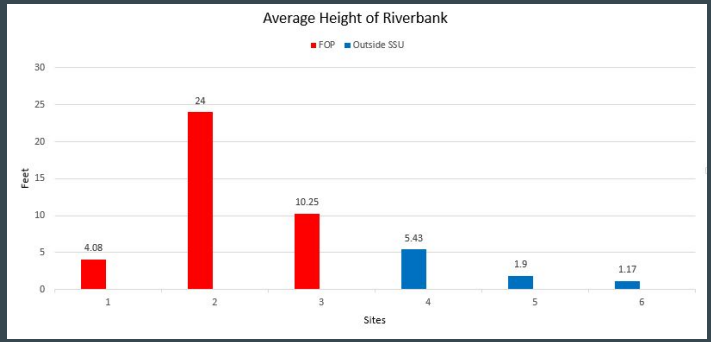

Conclusion

Outside SSU to the school were a wide shallow stretch of river with large amounts of gravel would be classified as a stream bank erosion.

In FOP a thinner stream channel existed with steeper banks than observed to the west would be classified as a gully erosion.

If a project takes place on campus that aims to replicate the creek's conditions at either of these areas, we have information that will help.

Acknowledgments

Thank you to the Geology Department, Fairfield Osborn Preserve, and the teachers of Science 120.

Links

http://ac.els-cdn.com/S016719871530012X/1-s2.0-S016719871530012X-main.pdf?_tid=72f17e48-f7be-11e5-9f1d-00000aacb362&acdnat=1459483485_0acadd66f928906ede39814129f5aad1

http://sonomarcd.org/documents/Copeland-Creek-Watershed.pdf

http://www.fao.org/docrep/t0848e/t0848e-07.htm

http://www.rickly.com/ss/sediment_sampling.htm

http://www.uic.edu/classes/cemm/cemmlab/Experiment%206-Grain%20Size%20Analysis.pdf

http://www.sonoma.edu/waters/projects/sediment/sediment_alluvial.html#collapse

Works Cited

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Gray, D. H., & Sotir, R. B. (1996). *Biotechnical and soil bioengineering slope stabilization: A practical guide for erosion control*. New York: John Wiley & Sons.

Tucker, G. E., & Whipple, K. X. (2002). Topographic outcomes predicted by stream erosion models: Sensitivity analysis and intermodel comparison. *J. Geophys. Res. Journal of Geophysical Research: Solid Earth, 107*(B9).

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