Analysis of Autolevel Transects Along Copeland Creek

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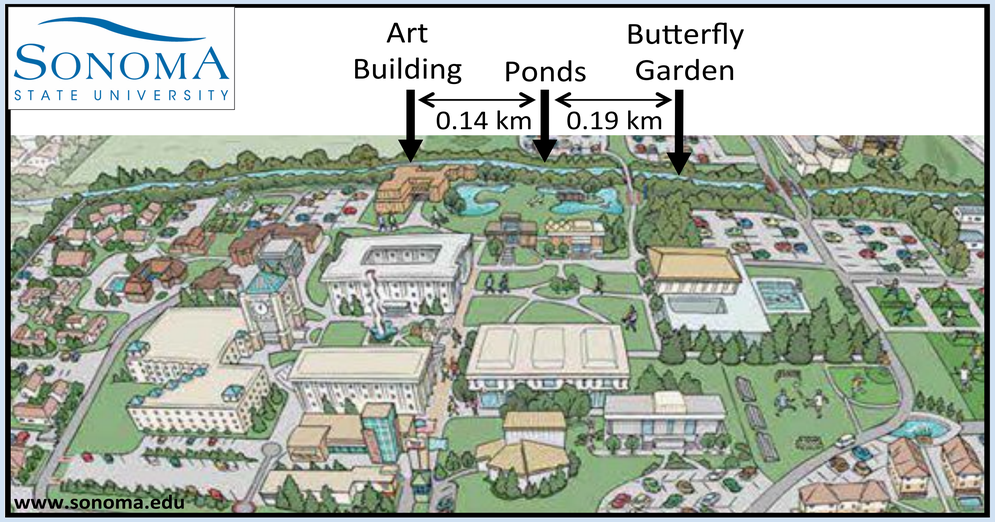
Abstract

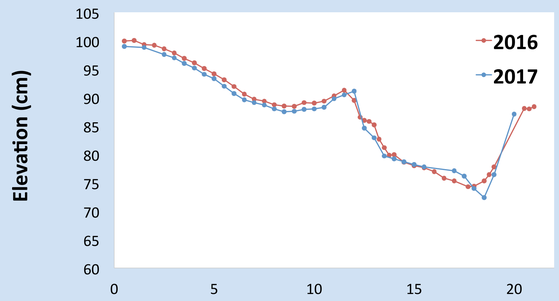
Storm events common to Mediterranean climates have the capability to move large amounts of sediment downstream, changing the shape and depth of creeks. Auto-level transects generate cross-sectional views of the morphology of creek beds**. The goal of this study was to determine if there was a significant change in the distribution of sediment in Copeland Creek after the unusually wet 2017 rainy season compared to the unusually dry 2016 summer.** Auto-level transects were taken at three locations along Copeland Creek as it passes through the Sonoma State campus in November/December 2016, and then again in April 2017. The resulting cross sections were compared.



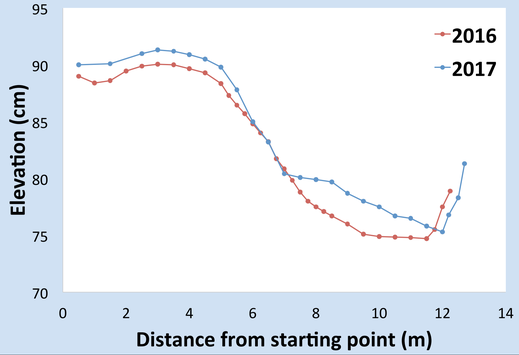
Experimental Design

A stadia rod, 100 meter transect line, and an auto-level were used to measure relative depths at three locations along SSU's Copeland Creek. A standard 0.5m distance was used between each measurement along the transect, shortening the distance when depth changed rapidly, and extending the distance when insignificant depth change occurred. Once measurements were collected for each site, graphs were generated that correlated the measured distances to their relative depths. These methods were applied in both December 2016 and April 2017 and the resulting graphs were compared.

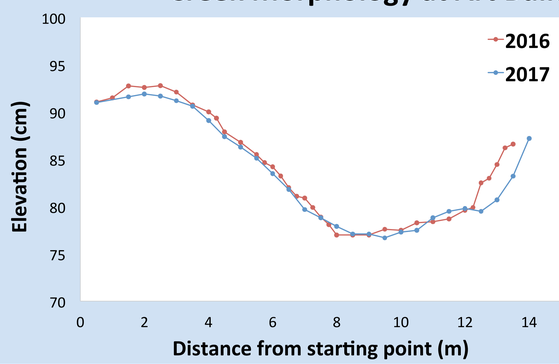
Creek Morphology at Butterfly Garden



Creek Morphology at Ponds



Creek Morphology at Art Building



Conclusions

- Creek morphology did not change much at the **Butterfly Garden** site. Deepening of the north-most portion of the channel occurred, but a shallowing of the south-most portion of the channel occurred as well, suggesting displacement of the north-most portion of the channel to the south-most portion of the channel.
- The most noticeable change was at the **Ponds** site. Sedimentation observed on the south bank could be explained by water flowing faster from the upstream direction as the elevation drops. The water then slowed immediately downstream as it entered a pool. The depth of the channel shallowed by 2.6 cm, suggesting significant sedimentation. The north-most bank widened 2.2 cm, illustrating the effects of erosion that could have been the source of sedimentation in the channel.
- At the **Art Building** site, the north-most bank widened 3.4 cm, indicating erosion of that bank, which was mostly exposed soil.

Future Directions

- Clear north banks so measurements can proceed further up the bank.
- Repeat the measurements to monitor the patterns of erosion and sedimentation along the creek at different times of the year.
- Add cross sections further downstream in attempt to follow discover where the eroded sediment may have been deposited.

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