The Impact of Sonoma State University on the Water Quality of Copeland Creek using Ion Chromatography. Bella Neufeld (Advisor Mark Perri Chem 497).

The health of a given body of water within an ecosystem gives insight into the overall quality of that environment. Due to events like eutrophication, it is especially helpful to analyze nutrients, such as phosphates and nitrates. Copeland Creek runs through the Sonoma State University campus and can be traced out to the Pacific Ocean, so it is a useful location to monitor water quality. We measure nutrient pollution running through Copeland Creek as well as a variety of anions present in the surface waters.


Geog 317 was a lab methods course in the fall of 2012. During this semester students analyzed different soil types. This course also served as a service learning project to assist the Preserve of Fairfield Osborn. This research also contributed to Sonoma State University’s WATERS collaborative. Students collected and compared samples from mixed woodland and grassland environments. This lab course offered students practical data collection and field method experience. The product of this research created a baseline for future studies to pursue, as well as the opportunity to do original research.


Undergraduate students at Sonoma State University with the guidance of Michelle Goman PhD. spent the fall semester of 2012 collecting and analyzing sediment cores from a marsh site at SSU’s Fairfield Osborn Preserve. In an effort to assess the dynamic function of the sedimentation processes, students where immersed in field and lab data collection and analysis. This experience helped develop student familiarity with field data collection, coring tools and methods, and honed research skills and lab techniques. While data collection, lab techniques and field methods where an important portion of this course, students also contributed to the community with a service-learning component. The product of this research was presented to the Fairfield Osborn Preserve and will create a baseline for future sedimentation research on Copeland Creek.


The American College of Sports Medicine endorses physical activity for improving health and well-being; their motto is “Exercise is Medicine.” Outdoor activities such as gardening and yard work are important
means of physical exercise and can be personally rewarding due to the self-satisfaction of improving one’s quality of life. Stewardship of Copeland Creek requires physical human power to clean the watercourse of refuse and artificial materials, to maintain hiking and biking paths, to plant native species and remove invasive non-natives, and to strengthen the water base for native fish. Therefore this class project examined the effects of self-paced gardening and yard work on Heart Rate responses and rate of metabolism.

**Annual and Spatial Comparison Of Coliform Abundance in Copeland Creek.** Kimber Richardson, Colleen Dailey, and Alexandra Hendricks. (Advisor Mike Cohen Biology 338).

Dr. Michael Cohen’s Environmental Microbiology & Biotechnology class sampled, and analyzed water from Copeland Creek. Previous samples were taken by the 2011 class from the same sites, (east Sonoma State University, west Sonoma State University, and Pressley Rd.). Each year, samples were tested for the presence coliform bacteria (mainly E. coli). The presence of water borne coliform bacteria was detected using IDEXX Quanti-Tray Fecal Indicator Assays. Positive results for coliform bacteria was detected by a yellow color change, and the presence of E. coli was indicated by florescence in the wells of the IDEXX tray when viewed under UV light. From these assays, the MPN (most probable number) of E. coli and other coliform bacteria found in the water was determined. This study determined the presence of coliform bacteria in Copeland Creek, and compares the annual and spatial abundance of these coliforms.

**Sediment Transportation In Copeland Creek.** Chase Takajo (Advisor: Jeff Baldwin Geography Senior Thesis).

Copeland Creek is a tributary of the Laguna de Santa Rosa that is located in Rohnert Park in the north San Francisco bay area. Sediment transportation in Copeland Creek has become an increasing problem for communities close to the creek and the Laguna de Santa Rosa. The Sonoma County Water Agency (SCWA) is interested in the sediment transportation of Copeland Creek because of the affects it will have on: restoration projects in the area, filling of the Laguna de Santa Rosa, issues with channel constrictions, flooding, damages to Sonoma State University and the surrounding community. This project aims to characterize the sediment transport and deposition of Copeland Creek as it passes through the streams alluvial fan. The study aims to address two questions: how much sediment is being transported through Copeland Creek at any given time, and if Copeland Creek is a source of sediment. The second concern is addressed by comparing remotely sensed images from 2004 and 2012 which allows us to compare the channel widths and sediment deposition of the creek through the alluvial fan. The first concern is addressed through the installation of sediment traps in the appropriate areas in order to measure the amount of sediment that is being transported through the creek during a given time. Our study will be based off the Helley-Smith sediment and Pit Trap designs. Since this pit trap will be the first of its kind in the area we will also construct a manual that will lay out how to empty and measure the sediment that has been collected in the trap. This longitudinal study will allow ongoing research of sediment transportation throughout Copeland Creek.
**Water Quality in Copeland Creek.** Claire Varner, Kyle Sprickman, Michael Bruzzon, Lilia Zacchia. (Advisor Debora Hammond Liberal Studies 202 and 320).

Our waterways capture overland flow during storms and water from our gutters and fields. Are there pollutants in Copeland Creek? Where do they come from? What parts of the creek are most compromised and when? To begin a long-term monitoring effort of local water quality, we took the following water quality measurements at 7 sites on Copeland Creek: conductivity, dissolved oxygen, pH, temp, and turbidity.

**Riparian restoration of urban creeks.** Caroline E. Christian, Dillon Lennebacker, Meghan J. Parish and Keenan Foster.

Urban creeks offer many benefits, including protection against flooding, recreational opportunities, and habitat for wildlife. Despite these benefits, urban creeks face numerous challenges, especially invasive plant species that out-compete native species, impede flows during storms, and inhibit the growth of shade-providing tree species. Himalayan blackberry (*Rubus armeniacus*) is a non-native plant species that grows prolifically along streams throughout coastal California. Following initial vegetation removal efforts, blackberry vigorously regrows within 2-3 years. Using a long-term field experiment and monitoring plots, we are assessing the effectiveness of different vegetation management approaches in meeting multiple management objectives. Specifically, we are evaluating the combined effects of different seasons of herbicide application (late spring, late fall) on blackberry regrowth following vegetation removal. Future work will assess the effects of these herbicide treatments on the success of native plants used in creek restoration. Data from long-term monitoring plots will be used to evaluate the effectiveness of stream maintenance activities on decreasing blackberry growth and increasing shade by the tree canopy.