Spring 2014 Field Section Abstracts

An Unlit Candle: Comparing Fire Risk of Treated and Untreated Areas in Claremont Canyon

Jimmy Dunn, Harrison Hucks, Julia Levinson, Robert McHenry and Zarah Rosen

Abstract: Forest fires pose a significant threat to the Claremont Canyon and surrounding neighborhoods. Our research team collected data in nine plots on the untreated north side of Claremont Avenue and nine plots on the treated south side of the street to investigate the current fire danger and to compare management practices. We hypothesized that untreated regions would be more susceptible to fire danger than treated regions due to increased fuel loads, differing tree species composition, and standing tree density. To test our hypothesis, we measured litter, duff, fuel depths, canopy cover, basal area, and tree density. Following Brown's transects methodology, we observed that there was a statistically significant difference in tree basal area, duff levels, 1 hour fuel levels, and 10 hour fuel levels between treated and untreated plots. Our data suggest that the presence of the invasive species eucalyptus can lead to increased fuel levels in untreated areas, which is a primary driver for heightened fire risk.

Analysis of Toxicity in SOGA Garden Soil

Gina Hervey, Melanie Jinon, Alison Ke, Rebecca Kuan and Lindsay Maurer

Abstract: The Student Organic Garden Association (SOGA) at University of California, Berkeley allows students to experience organic urban gardening. It is therefore important to maintain uncontaminated soil. The garden is located at the site of a demolished building complex containing lead-heavy paint (Lead and Arsenic, 2012; Amundson, 2014). Additionally, the city of Berkeley as a whole has high levels of arsenic in soil (Lead and Arsenic, 2012). Thus, it was hypothesized that the garden's soil was contaminated with lead and arsenic, but not other toxic metals. Soil samples collected in the garden were analyzed for lead, cadmium, zinc, copper, arsenic, chromium, molybdenum, and nickel. In toxic amounts, these metals are associated with adverse health effects. Soil samples from Tilden Park were measured, representing soil with minimal human interference. The lead concentration was mapped using GPS coordinates of each sample for a visual interpretation of the data. Lead concentrations in SOGA garden had a mean of 493 ppm, much higher than the mean concentration in Tilden Park soil, 51 ppm. 24 out of the 36 soil samples from SOGA garden had lead concentrations over 400 ppm, deeming the soil unsafe for growing food. Though arsenic, copper, molybdenum, and zinc levels differed between the SOGA garden and Tilden park, the amounts were at safe levels to grow food. Other metals analyzed were at safe levels and at similar concentrations between Tilden Park and the SOGA garden.

Anthropogenic Impacts on Waterway Health: An Assay of Phytoplankton Populations of the East Bay

Evan Ho, Jennifer Huang, Jonathan Nolasco, Ryan Farquhar and Sophie Jia

Abstract: The San Francisco Bay is one of the most impacted watersheds in the United States, if not the world. Phytoplankton communities play an important role in marine ecosystems, thus can be used as a tool to measure the effects of anthropogenic factors on the waterways. Our experiment aims to evaluate how human development across different sites along the San Francisco Bay influences phytoplankton biomass, dissolved oxygen levels, and nitrate concentrations. Phytoplankton samples were collected at three selected sites as well as a control site, all within the Bay Area: the Port of San Francisco, the Berkeley Marina, and the Oakland Estuary, with the Don Edwards National Wildlife Refuge as the control site. Chlorophyll a concentrations were measured using a spectrophotometer to assess the biomass of each site. DO levels were measured at each site using a PASCO Xplorer, and nitrate levels were tested using a nitrate testing kit. It was hypothesized that the sites that are closer to areas of higher human traffic would have higher nitrate levels, more biomass, and lower DO levels. Our results showed that human traffic has detrimental effects on aquatic environments.

On the Current Sea Star Wasting Syndrome Outbreak: A Field Survey of California Intertidal Sea Stars

Tyler Cino, Kathleen Keh, Janet Wu and Emily Usaha

Abstract: Sea star species across the California coast are dying at an unprecedented rate due to the phenomena known as sea star wasting disease. Losing these vital keystone species could very well lead to a dramatic change and lower biodiversity in intertidal communities on the Pacific Coast. This paper investigates sea star wasting syndrome within rocky intertidal zones along the coast of California. To study the effects and spread of the disease we observed nine sites in California to look for the presence or absence of sea stars. We measured environmental conditions, size, species, and total abundance of healthy and diseased stars. Using this data, we attempted to link water temperature, salinity, and pH, along with size of individuals to the spread of the disease. Our prediction would have correlated higher water temperatures with a higher number of infected sea stars. Of the nine observed intertidal communities, sea stars were found at four; with sea star wasting disease present at only one of these. The water temperature, salinity, and pH at each community fell within the average range for intertidal communities. Based on our collected data, we cannot support our hypothesis between warmer water temperature and presence of wasting disease, yet we did witness far lower sea star population sizes compared to historical values, which can possibly be attributed to the disease.

Comparative Soil Analysis of Lateral Microhabitats of Invasive *Eucalyptus globulus*, Native *Baccharis pilularis* and *Querous agrifolia* in Tilden Regional Park

Katelyn Abram, Sydney Johnson, Panda Kreidler, Amy Ling and Mikeala Raphael

Abstract: Eucalyptus spp. have altered native communities by diversifying the microbial communities within the soil, reducing soil vitality by depleting available nutrients, and thinning vegetative diversity within many regions across the globe. As Eucalyptus spp., continue to thrive in California, it would be reasonable to ask if soil fertility beneath invasive species differs from that beneath native vegetation within Tilden Regional Park. Further, we predict there will be a lower pH and less nutrient availability surrounding the invasive species *Eucalyptus globulus,* in comparison to the soil surrounding native species *Quercus agrifolia* and *Baccharis pilularis.* Three sites were compared laterally using judgmental discrete sampling at a depth of six inches. Macronutrient and pH levels were measured in homogenized subsampling and analyzed using a one-way ANOVA with Tukey test and a multivariate principal correlations test. These tests show that all dependent variables tested were correlated. Nitrogen and pH were highly correlated while phosphorous and potassium were inversely correlated. Additionally, pH, nitrogen, and phosphorus showed significantly different means when comparing invasive *E.globalus* to native *Q. agrifolia* and *B. pilularis.* Vegetation type indicated differences in pH, nitrogen and phosphorus, while potassium only showed significant variation between site 1 and 3. Conclusively, as predicted *E.globalus* has altered soil composition, but exactly opposite to what we had predicted.