Integration of Velocity and Depth Measurements to Develop a Flow Rating Curve for an Irregular Spillway

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A field surveying effort was conducted over a one year period to develop an equation that relates flow rate to depth for a flowing spillway (dike) in Lancaster, California. The development of the equation, which is the main objective of this project, is quite valuable, because it helps determine flow rate from simple depth measurements under challenging field conditions (e.g., an irregular and weathered spillway). The project was part of research and consulting work for the Los Angeles County Sanitation Districts, which is the agency that manages the surface water impoundment where the spillway is located. The spillway conveys overflows of recycled water from Piute Ponds to Rosamond Dry Lake within the property of Edwards Air Force Base. The project consisted of surveying the dike and using open channel hydraulic principles to develop a relationship between flow rate and the water elevation over the spillway. Measurements of flow velocity and depth were integrated to calculate flow rates at different depth levels, and regression analyses were conducted to develop the aforementioned equation. This approach represented a significant improvement over previous efforts, which assumed critical flow assumptions at the spillway crest. Regression analyses helped obtain an acceptable flow rating equation that relates flow as a function of depth on the highly irregular spillway. Additional measurements will be performed to improve and verify the equation.

The Prevalence of Antibiotic Resistant Bacteria (ARB) in waters of the Lower Ballona Creek Watershed, Los Angeles County, California

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Antibiotic resistant bacteria (ARB) are considered to be biological pollutants, posing risks to public health and threats to the environment. These bacteria have been reported from some coastal wetlands in Southern California, although little is known about the extent of their distribution and prevalence in these coastal systems, or their potential threats to human health and ecosystems. The goal of this study was to characterize the presence and relative abundance of antibiotic resistant bacteria in the highly urbanized waters of the lower Ballona Creek Watershed in Los Angeles County. Initial screenings for ARB were conducted in the Del Rey Lagoon, and subsequently from flood and ebb tidal flows within the Ballona Wetlands, in wetland sediments, and in freshwater runoff from Ballona Creek. The presence and abundance of ARB were determined through replicate plating onto antibiotic infused agar at clinical concentrations. Insensitivities were confirmed using Kirby-Bauer disc diffusion testing. Bacteria displaying insensitivities to five or more antibiotics were identified biochemically using the Vitek 2 Compact system, or molecularly by PCR through 16s RNA sequencing. Of the 2005 isolates collected from the lagoon, most (40.6%) were resistant to sulfamethoxazole, the least

(3.5%) to ciprofloxacin, and 39% were resistant to multiple antibiotics (up to eight). Initial results for the flood-ebb flow wetland studies indicated a lower presence of ARB in ebb versus flood flows, suggesting that natural wetland processes reduced the abundance of these bacteria. Differences in the antibiotic profiles of isolates from collections in the various water sources will be discussed.

Temperature-Influenced Termination of House Finch Breeding
Tauras Vilgalys

House finches breed over a wide geographic range covering much of the United States and Mexico. Historically, this nesting has shown broad synchrony with house finches breeding from March to July. In a number of other bird species, there have been trends of earlier breeding in response to changing environmental conditions over recent decades. Using over five hundred nest records, this study undertakes a detailed examination of the historical timing of breeding of house finches in California, examining patterns of reproductive timing from 1882 to 2012. Earliest, average, and latest lay date were calculated for each decade for which at least ten records were available (average 48). No significant trend was observed in the onset of nesting across the study period ($p > 0.10$). However, the breeding season has been terminating significantly earlier (by ~20 days) in more recent years ($p = 0.0185$, $R = - 0.785$). Across the study period, this advance in the timing of termination correlates with warmer summer temperatures ($p = 0.063$, $R = -0.759$). Furthermore, we present results of an experimental study suggesting that warmer summer temperatures directly stimulate earlier termination of breeding, specifically the onset of molting, in this species. As house finches may lay multiple clutches in a year, this early termination may reduce the total reproductive output.

Quo: A Programmable Social Network Status Demultiplexer
Jasmine Dahilig, Andrew Forney, and Tyler Nichols

The proliferation of social media outlets in the modern era has begotten an increasingly larger variety of channels whereby users may project their thoughts, interests, and even trivialities. With this expansion comes the added benefit of different forums for different types of projection, but also, the added difficulty of projecting a single thought, or status, to multiple sites (such as Facebook, Twitter, and Google+). Quo seeks to bridge this gap between the disparate social media outlets by providing users with a web application whereby a single status may be customized for, then sent to, as many or as few sites as desired—it provides a single place to update multiple aspects of an individual's virtual identity. The present idea is to do so in a way that employs the latest in interaction design tactics and to explore novel methodologies of graphically accomplishing this much needed convenience. Apropos, users of Quo will be able to create and manage their accounts from a centralized location and subsequently direct and customize their updates in a streamline, flexible format

Modeling, Predicting, and Mapping the risk of pre-harvest aflatoxin contamination in U.S. corn and peanuts due to climate change

Sergio Gonzalez

Every year, hundreds of millions of dollars are lost due to aflatoxin contamination of U.S. corn and peanut crops. Aflatoxin is a potent human carcinogen produced by the *Aspergillus flavus* and *Aspergillus parasiticus* strains of fungi under certain environmental stress conditions such as drought and high temperatures. With anthropogenic climate change, agricultural areas under pre-harvest aflatoxin contamination risk are likely to change considerably. Projecting the areas would be under optimal aflatoxin contamination due to these changing climatic factors would serve valuable information for U.S. corn and peanut growers to minimize their crop contamination risk. In this study, an aflatoxin risk index, a scale measuring the relative risk of aflatoxin contamination, is applied to both corn and peanuts under various climate change projections from a high resolution hydrologic model driven by a regional climate model. A pre-harvest aflatoxin risk distribution is mapped for U.S. corn and peanuts from 2013 to 2049 over the entire continental United States. Changes in vulnerability of current corn and peanut farming areas susceptible to increased pre-harvest aflatoxin risk are shown during the growing seasons. The maps also indicate projected favorable areas to grow corn and peanuts, showing both spatial and temporal shifts under the future scenario. To adapt to these changes, U.S. corn and peanut farmers will therefore have to grow crops in new areas and/or change growing seasons to avoid a high probability of pre-harvest aflatoxin contamination due to climate change.