Connecting Bay Area Students to the San Francisco Bay-Delta Watershed

Rachelle Cardona, Save The Bay, rcardona@savesfbay.org

Every year more than 2,000 middle and high school students are inspired to become the next generation of Bay stewards through Save The Bay's Restoration Education Programs**.** Many students are not familiar with the San Francisco Bay, its connections to the Bay-Delta watershed, and how their own actions have effects upon this ecosystem. Save The Bay aims to help remedy this disconnect by leading community based restoration programs for Bay Area youth. Save The Bay's Bay Discovery program is a day-long restoration education field trip that engages students with the San Francisco Bay estuary and critical tidal marsh restoration. These introductory programs help students gain an understanding of the local watershed, drawing on the connections between human actions and a healthy environment. Water conservation is one component of Save The Bay's education programs, bringing attention to the high demand for fresh water and the need to treat it as a valuable resource. Through hands on restoration and educational activities students better understand the pathway of connected waterways and consequences of pollution entering our watershed from all sources ranging from headwaters in the Sierra Nevada mountain range down to the San Francisco Bay and Pacific Ocean. Students that participate in our shoreline clean-ups gain first-hand experience with human impacts on our watershed as they collect littered items they make use of everyday, such as fast food containers, straws, plastic wrappers, and drink containers. Save The Bay's Restoration Education Programs strive to connect students to water conservation and pollution prevention in the San Francisco Bay-Delta watershed to ensure better health and stewardship of this valuable ecosystem and resource.

Keywords: watershed, students, pollution, trash, education, environment impacts, stewardship, youth, restoration

Poster topic: Watersheds

GIS-Based Decision Support Tool for Estimating Riparian Zones at the Watershed and/or Project Scale

Marshall Kunze, San Francisco Estuary Institute, marshallk@sfei.org
Scott Dusterhoff, San Francisco Estuary Institute, scottd@sfei.org
Kristen Cayce, San Francisco Estuary Institute, kristen@sfei.org
Sarah Lowe, San Francisco Estuary Institute, sarahl@sfei.org
Jamie Kass, CUNY, jkass@gc.cuny.edu
Pete Kauhanen, San Francisco Estuary Institute, petek@sfei.org

The loss of riparian areas throughout the Bay-Delta region has affected water quality and habitat conditions and presented a number of challenges for resource managers related to water management and land use planning. Current approaches for restoring and protecting riparian areas are starting to focus on appropriate riparian functions or ecological services, including stream shading, bank stabilization, organic and inorganic material input, runoff filtration, floodwater storage, and groundwater recharge. Land-use planners therefore need tools to help delineate and map the extent of "functional riparian width" as a means of ensuring appropriate riparian width in developed stream reaches targeted for restoration and relatively undisturbed stream reaches targeted for development.

The Riparian Zone Estimator Tool (RipZET) is a GIS-based decision support tool under development that estimates functional riparian width based on channel type and associated appropriate functions. The tool provides reach-scale functional riparian width estimates based on average height of mature riparian vegetation, the steepness of hillslopes adjacent to the channel, and the floodplain inundation extent for large storm events. The appropriate width estimate for a reach is then determined based on the riparian functions associated with different channel types, which range from steep headwater channels to low-gradient, meandering channels with broad floodplains.

RipZET has been tested to date in the San Francisco Bay Area, as well as in the Tahoe Basin and Central Coast, and has been reviewed by regional science and management experts. This presentation will provide examples of tool applications around the state, with an emphasis on the Bay Area applications using floodplain inundation extents to determine riparian functional width. Once finalized, RipZET will provide watershed management communities with a robust tool that can be used to size riparian areas to achieve needed levels of selected riparian functions.

Keywords: watersheds, water management, land use planning, riparian, restoration, GIS

Poster topic: Watersheds

The Delta Watershed Initiative Network (Delta WIN)

Shakoora Azimi-Gaylon, Sacramento-San Joaquin Delta Conservancy, sagaylon@deltaconservancy.ca.gov
Kathryn Kynett, Sacramento-San Joaquin Delta Conservancy, kathryn.kynett@deltaconservancy.ca.gov
Nancy Ullrey, Sacramento-San Joaquin Delta Conservancy, ullrey@deltaconservancy.ca.gov

The Sacramento-San Joaquin Delta (Delta) is home to more than 55 species of fish and 750 species of plants, and provides irreplaceable habitat for numerous species of migratory birds. Delta waterways are identified as threatened and are listed on the Clean Water Act Section 303(d) List as impaired by multiple pollutants. The current drought and projected impacts of climate change are expected to exacerbate existing water quality problems. Many water quality and ecosystem problems have multiple causes and are best addressed using an integrated and coordinated approach to protect natural resources at the watershed level. At this critical junction, a platform is needed to connect people, resources, organizations, and programs, and to facilitate a regional network of locally initiated projects in a comprehensive approach. Such an approach supports sound science, informs adaptive management, uses innovative thinking, and implements best management practices. Using this approach, the Delta Watershed Initiative Network (Delta WIN) is a voluntary initiative that integrates multiple efforts at the local level to improve water quality and ecosystem health while providing regional benefits. Delta WIN focuses on water quality assessment, examining and emerging data, implementing best management practices, and education and outreach. Data collection and synthesis will identify data gaps and establish baselines for understanding watershed conditions, screen for potential pollution problems, and inform adaptive management decisions and best management practices. By leveraging and coordinating resources, Delta WIN will enhance, expand, and create opportunities for greater watershed health.

Keywords: water quality, monitoring, data, watershed, waterways, pollutants, adaptive management

Poster topic: Watersheds

Characterization of the Mass Flux of Salts, Nutrients, and Oxygen-Demanding Substances from the San Joaquin River to the Estuary

William Stringfellow, University of the Pacific, wstringfellow@lbl.gov
Shelly Gulati, University of the Pacific, sgulati@pacific.edu
Ashley Stubblefield, University of the Pacific, a_stubblefield@u.pacific.edu
Jeremy Hanlon, University of the Pacific, jhanlon@pacific.edu
Chelsea Spier, University of the Pacific, cspier@pacific.edu
Joel Herr, Systech Water Resources, Inc., joel@systechwater.com
Mary Kay Camarillo, University of the Pacific, mcamarillo@pacific.edu

A total maximum daily load (TMDL) for oxygen demanding substances in the San Joaquin River (SJR) in California is under development due to frequently occurring hypoxic conditions. Here, we present a mass balance analysis that was developed to identify the sources of oxygen-demanding substances and nutrients in the upstream portion of the SJR and to characterize the mass flux of these materials from the SJR to the Delta estuary. These studies were conducted to provide a scientific basis for management actions to be taken to meet TMDL requirements. Data was collected for flow and ten water quality constituents at locations within the main-stem of the SJR, major river inputs (tributaries), and major diversions for the 60 mile portion of the SJR included in the study area. The mass balance analysis was performed by calculating mass loads of all tributaries entering the SJR within the study area for a single year. Tributary flows and mass load inputs were compared and considered in the determination of their relative impacts on the SJR and the identification of best targets for water quality improvement efforts. Additionally, all mass loads were summed (tributary inputs minus diversions) and compared with observed mass loads in the SJR at the downstream limit of the study area. Discrepancies in summed and observed surface flows and mass loads are consistent with previous studies and explained by estimations of groundwater contributions, nitrate uptake by algal growth, denitrification by anoxic soils, and precipitation and evapotranspiration. These efforts are supportive of the TMDL process where load allocation is being performed and where determining the best locations for implementation of improvement projects is critical for improving the overall health of the river.

Keywords: Nitrogen, ammonia, phosphorous, salinity, irrigated agriculture, Central Valley, monitoring

Poster topic: Watersheds