2017-2021 Science Action Agenda: A Collaborative Roadmap for Delta Science

Yumiko Henneberry, Delta Science Program, yumiko.henneberry@deltacouncil.ca.gov
Lindsay Correa, Delta Science Program, lindsay.correa@deltacouncil.ca.gov

Although several collaborative organizations exist in the Delta, there has been no shared science agenda that lays out common priority science needs, questions, and actions. This has made comprehensive and efficient science planning, funding, coordination and integration difficult, while critical science gaps persist. The 2017-2021 Science Action Agenda (SAA) addresses this issue through prioritizing and aligning near-term science actions to inform management and policy decisions. The SAA is a four year science agenda intended to fill gaps and serve as the glue for synergistic and multi-benefit science to support important management needs. Thus, actions identified in the SAA are those that fall between the mission statements and priorities of a single group, program, or agency but are otherwise recognized as cross-agency and multi-group priorities.

The 2017-2021 SAA identifies 13 high-priority science actions in five thematic actions areas that were identified through an open and transparent prioritization process. This collaborative effort involved input from the Delta Science community, major synthesis efforts, key peer-reviewed literature, public comments, and Delta Independent Science Board review. The priority actions address needs that go beyond the Delta and provide benefits for the San Francisco Bay-Delta Estuary. Examples of priority science activities that link the Bay and Delta include restoring habitats on a landscape scale, modernizing monitoring efforts and tools, advancing integrated modeling efforts, and exploring the human-dimensions of natural resource management. The Comprehensive Conservation and Management Plan also served as a source document for actions identified in SAA and the two documents share similar themes including restoration of tidal habitats, understanding effects of invasive species, and developing comprehensive research and monitoring programs.

Keywords: science action agenda, collaborative science, delta science program

Poster Topic Public Outreach

Delta Plan Performance Measures

Lita Brydie, Delta Stewardship Council, lita.brydie@DeltaCouncil.ca.gov
Martina Koller, Delta Stewardship Council, Martina.Koller@DeltaCouncil.ca.gov
Cory Copeland, Delta Stewardship Council, Cory.Copeland@DeltaCouncil.ca.gov

There's a Performance Measure for that… you've heard the mobile commercials from finding the nearest dog park, to shopping online, to tracking your spending, "there's an app for that". Well, some may be surprised to know that the practice of developing performance measures for Delta Plan co-equal goals has become as important as developing a new app. Performance Measures track progress on how are we doing in implementing the Delta Plan, a comprehensive, long-term management plan for the Delta. Here at the Delta Stewardship Council, we have developed a set of performance measures: administrative to report on decisions, resources and implementation of a programs or plans; output measures to track on-the-ground implementations; and outcome measures to evaluate specifics responses to management actions. Tracking progress through Delta Plan performance measures aids in sustaining and improving the Delta habitats and living resources, reliable water supply for California, and protecting the Delta as an evolving place. So when one thinks about progress towards sustainability or improving functionality. Remember, there's a Performance Measure for that.

Keywords: tracking, performance measure, performance measures, implementation, delta plan, co-equal goals

Poster Topic Public Outreach

Heavy Rainfall Follows Record Drought: Changes in Lake Merritt

Bryant La, Oakland High School, bryantla9629@gmail.com
Win Teavir, Oakland High School, teavir2000@gmail.com
Chris La, Oakland High School, chris.la0042@gmail.com
Angela Ma, Oakland High School, ma.angela99@gmail.com
Uriel Lopez, Oakland High School, leiru.zepol@gmail.com
Tamia Proctor, Oakland High School, tamiatamia34@gmail.com
Davonte Holland, Oakland High School, cooperelon510@gmail.com

The purpose of our research was to investigate the effect of the heavy rainfall in 2017 on water quality in Lake Merritt, a tidal lagoon in the middle of heavily urbanized Oakland, CA. Specifically, how were water temperature, salinity, transparency, pH, and dissolved oxygen (D.O.)—important indicators of lake health—affected by the increased rainfall brought by 2017's atmospheric rivers?

Water quality measurements have been taken weekly by classes of Oakland High School students from 1997-2017. Water was collected by grab sampling from the top of the water column and by using a LaMotte Dissolved Oxygen Water Collector to sample from the bottom. Students used simple instruments: an alcohol thermometer for air and water temperature, a salinity refractometer, a Secchi disk for transparency, pH strips, and CHEMets D.O. vacuum ampoules for dissolved oxygen.

We compared the water quality indicators (January to April) for three years - 2015 (drought), 2016 (El Niño) and 2017 (extreme rainfall) at shore and mid-lake stations. We found significant decreases in salinity and warmer water temperatures in 2017 compared to 2015 and 2016. Dissolved oxygen was lower in 2017 than in 2016. Very low salinity during February 2017 rains, tide gate closures and other urban runoff factors, probably worsened the annual die-off of marine-adapted organisms and possibly triggered a die-off of bat rays.

While atmospheric rivers have long been a feature of California weather, climate models predict that they will increase in frequency in the future. Monitoring the water quality of Lake Merritt is needed to understand better how changing weather patterns in our estuary will affect habitats and species. In the face of further environmental change, it will become only more necessary that we conserve the health of our wetlands and demand that government take action against climate change.

Keywords: water quality, atmospheric rivers, salinity, dissolved oxygen, Lake Merritt, drought

Poster Topic Public Outreach

Oakland Adopt a Drain Volunteers Prevent Flooding and Improve Water Quality by Keeping Storm Drain Inlets Clean and Clear

Mike Perlmutter, City of Oakland, Public Works, Environmental Services, mperlmutter@oaklandnet.com
Jennifer Stern, City of Oakland, jstern@oaklandnet.com

The City of Oakland Public Works' Adopt a Drain program supports volunteer efforts to keep storm drain inlets clean and clear of trash and debris. Ensuring "only rain down the drain" is especially helpful during storms when blocked storm drains can back up and cause flooding. Year-round storm drain maintenance helps intercept trash before it pollutes downstream waters.

The City of Oakland provides support for Adopt a Drain volunteers through instruction, tools and supplies, assistance with debris pickups, and notification of impending storm events.

Over 1,000 of Oakland's approximately 7,500 storm drains have been adopted. The more than 800 Adopt a Drain volunteers greatly supplement the capacity of the twenty City staff servicing the storm drain system, with its more than 7,500 storm drains, 370 miles of drain pipe, seven pump stations and 40 miles of creeks. Volunteers can quickly and preemptively provide basic maintenance on drains and can have a far more extensive and immediate reach across the city than staff during storm and flooding emergencies.

Oakland uses a map interface at www.AdoptaDrainOakland.com for depicting the City's storm drain inlets to the public for possible adoption. This easy to use interface has helped spur new volunteer registrations. Social media, word-of-mouth, and timely news coverage prior to and during storm events has also contributed to volunteer registrations.

www.AdoptaDrainOakland.com was created in partnership with Open Oakland, a group of civic minded volunteer computer programmers. The map can be updated in real time to show storm drain system changes and adoptions. The open source software is being adapted freely by other municipalities. A multi-city collaboration has been formed to update this platform for the benefit of all municipalities.

Oakland has developed additional resources such as outreach and instructional flyers that are also available to other municipalities. More info at www.oaklandadoptaspot.org and www.AdoptaDrainOakland.com.

Keywords: storm drain, volunteer, trash, water quality, social media, flooding, www.oaklandadoptaspot.org

Poster Topic Public Outreach

Wintering Waterfowl Avoidance and Tolerance of Recreational Trail Use

Lynne Trulio, San Jose State University, ltrulio@earthlink.net
Heather White, State of California, Department of Water Resources, number1schmead@yahoo.com

We used an experimental approach to investigate wintering waterfowl responses to introduced trail use at foraging sites with and without recreational trails in California, USA. Waterfowl were exposed to trail use in the form of two researchers walking levees adjacent to ponded habitat, and the number of waterfowl by species were compared before versus after experimental walks in 40-m bands starting at the levee and extending 200 m into the ponds. We recorded distances to the nearest individuals, responses of focal animals, and numbers of recreational trail users. The most numerous species were Ruddy Duck (*Oxyura jamaicensis*), Northern Shoveler (*Anas clypeata*), and scaup spp. (*Aythya affinis* and *A. marila*). At trail sites, recreational use averaged 1 to 82 people/hr. The greatest difference in numbers of birds before vs. after experimental walks occurred in the two 40-m bands closest to the levee at both non-trail sites and trail sites. Neither the response of birds over the winter season nor the total number of birds vs. the number of recreational trail users indicated increasing tolerance to trail use for waterfowl overall. However, species varied in their tolerances. Ruddy Duck numbers declined with increasing numbers of recreational trail users, while Northern Shoveler numbers increased. Based on distances individual birds stayed from researchers during our walks, we suggest managers consider putting new trails approximately 200 m from wintering waterfowl foraging habitat to reduce or avoid immediate impacts to waterfowl.

Keywords: avoidance, ducks, habituation, human disturbance, tolerance, trail, waterfowl, wintering

Poster Topic Public Outreach