

Our Actions, Our Estuary
9th Biennial State of the San Francisco Estuary Conference
POSTER ABSTRACTS: Water Use Management & Watershed Management

Potential Benefits of the Delta Corridors Plan

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The Delta Corridors Plan would connect the San Joaquin River (SJR) with the estuary at Franks Tract, and would separate the SJR salt and fish from export pumping. The entire SJR flow would be diverted into Old River and down Grant Line Canal to Old River. Old River between Grant Line Canal and Coney Island would be divided to separate the SJR flow from the water supply flow to the CVP and SWP exports. The SJR flow would cross over the Victoria Canal water supply corridor at the north end of Coney Island. Four barriers would be constructed with boat locks to separate the Middle River water supply corridor from the SJR-estuary corridor in Old River.

The CVP and SWP fish facilities would continue to operate, although with fewer fish and much less debris because of the separation of the SJR. The primary louver bypass flows (of about 250 cfs) from each facility would be pumped into Old River, to allow the salvaged fish to return to the SJR-estuary corridor, improving the salvage efficiency by about 25% for all fish. The Delta Cross Channel (DCC) would be opened and fish screens would be installed at DCC and Georgiana Slough.

Potential benefits of the Delta Corridors Project would be: (1) reduced salinity at the exports, (2) wastewater discharges would be separated from drinking water intakes, (3) full exports during the VAMP period, (4) Sacramento fish would be separated from the water supply corridor, (5) Delta smelt spawning in the lower San Joaquin River or along Old River would no longer be subject to entrainment losses, and (7) The risk of water supply interruption from levee failure events would be reduced.

Key Words - *Delta conveyance; export salinity; fish entrainment; fish screens; San Joaquin River*

Theme: Water Use and Management

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Water and the City: What influences urban water supply and sanitation decisions?

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Sustainable urban water use and infrastructure are critical components of long-term planning for the San Francisco Estuary. Cities and the Estuary are tightly linked: the Estuary system provides water to over two thirds of California residents, but it is also vulnerable to the activities that take place there. Better understanding is needed of the decision making processes and incentives that shape these links. This research documents the institutional and political features of local urban water management in California and explores the influence these features have on decision making about recycled water, water conservation, utility pricing, and storm water capture in 55 California cities. The results point to gaps in the policy system that, if filled, could help ensure a sustainable link between cities and the San Francisco Estuary system.

Key Words - *water management, urban water use, policy*

Theme: Water Use and Management

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Collaborative governance and adaptive management: Lessons from California's CALFED Water Program

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Both for its technological and institutional innovations and for its history of conflicts, California's water system has been one of the most observed in the world. A forthcoming Special Issue of Environmental Science and Policy on the CALFED Bay-Delta Program continue in this tradition. CALFED is likely the most ambitious experiment in collaborative environmental policy and adaptive management the world has seen to date. This Issue moves beyond the celebratory tone of other analyses of collaborative, adaptive management and looks closer into how collaborative networks work to produce innovation, and more importantly to reflect also on their inherent contradictions, limitations and "dark sides". While collaborative governance enhances mutual understandings and can be a source of innovation, it appears ill-suited to resolve alone the distributive dilemmas at the core of many water – and other environmental – conflicts. A lacuna in existing research concerns the institutional design of effective boundaries and linkages between democratic politics, legitimate authority, and adaptive governance, i.e. the mix of institutions that can provide sufficient responsibility, accountability and democratic legitimacy, without choking off the self-organizing interaction, shared learning, and communication that is at the heart of collaboration. A painful realization in the Delta is that environmental conservation and further growth may be fundamentally at odds; efficient win-win solutions, institutional or technological, seem insufficient to satisfy the competing demands posed upon the system. Radical decisions and changes might be necessary, but they seem unlikely under current institutional arrangements and political conditions.

Theme: Water Use and Management

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Severity of the 2007-2009 drought in the Sacramento River watershed and corresponding reductions in Delta diversions and outflow

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Precipitation in the watershed of the Sacramento River in water years 2007-2009 has been below average. Some of this precipitation has been stored in reservoirs, released to flow downstream to the Delta and Bay, and pumped out of the Delta by the State and Federal water projects. Drought and pumping limitations intended to benefit the Delta ecosystem have curtailed water exports from the Delta. The objectives of this study are to evaluate 1) how severe the 2007-2009 drought is compared to other 3 year droughts dating back to 1920, 2) the corresponding reduction of Delta water exports, and 3) the corresponding reduction in Delta outflow. Analysis of an index of eight precipitation stations in the Sacramento River watershed indicates that precipitation during the 2007-2009 drought was at the 16th percentile of all three year periods since 1920. Delta pumping and Delta outflow volumes obtained from the DWR DAYFLOW computer program are compared to historic pumping and outflow rates. These results quantify the severity of the drought, reduced water exports from the Delta, and reduced Delta outflow to San Francisco Bay.

Key Words - *Precipitation; Drought; Sacramento River; Pumping; Delta*

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How are we doing? Developing a watershed scorecard for the Napa River and Sonoma Creek watersheds

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The Sonoma Creek and Napa River communities share a need for tools that focus attention on watershed management, describe current conditions and trends, and provide a common vocabulary for discussing natural resource stewardship in their watersheds. To meet this need, we are developing a “Watershed Health Scorecard,” a simple one-page report card, modeled after the San Francisco Bay Index, on the condition of our natural resources, backed by the best science available. The first focus for each watershed's Scorecard was water supply. We selected five indices to answer the question: how is the watershed doing at providing enough water, now and in the future, for people and nature? Each index is composed of one or more indicators, which will be scored for the 2007 water year based on a reference condition or management target. The data and science behind the scores will be posted in detail on the web. We learned several lessons from developing the Scorecard in two watersheds simultaneously. For example, for optimum transferability, indices should be designed to adapt to the data and characteristics of individual watersheds, because we found that available data and ecosystem drivers varied considerably, even in two adjacent watersheds. We discovered that index and indicator selection is the biggest hurdle in creating the scorecard. Another challenge lies in accounting for, and reporting transparently, uncertainties in scores and trends. We hope the Scorecards will be re-scored regularly in the future, to facilitate better watershed management.

Key Words - *indicators; targets; watershed; water supply*

Theme: Watershed Management

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Environmental Data Upload and Visualization Tools

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Easy access to reliable data is a primary objective of any environmental information management system. Providing high quality, scientific information allows for the formulation of technically sound policies and the ability to address specific management questions. Tools can assist with the flow of information through the various data management steps of data collection and uploading, and facilitate the retrieval, exchange, and visualization of results. This poster highlights tool development from two projects. The Regional Monitoring Program for Water Quality (RMP) is the primary source of long-term contaminant monitoring data for the San Francisco Estuary and annually collects water, sediment, and tissue samples. The South Bay Mercury Project (SBMP) is a collaborative, three-year project that characterizes mercury in the sediment, water, and sentinel species indicative of different landscape management endpoints in South Baylands. Field data collection entry forms have been developed in Microsoft Access for both projects and enable data to be easily uploaded into a database. These entry forms have reduced staff time in the field and costs for entering standardized information into project databases. Constraints prevent entry of erroneous data by providing standard code lists. The RMP makes its 15-year dataset available online through a user-defined query tool, from which results can be downloaded into Excel in both a cross-tabulated and flat-file format. Dynamic mapping of concentrations allows users to view spatial distributions across the Estuary, and statistical functions, such as cumulative distribution function plots, provide aggregated summaries. The SBMP uses Google Earth for reporting mercury results at specific sample sites. Concentrations are distinguished using a range of colors and symbol heights. This visualization tool provides scientists with a valuable aerial perspective for evaluating results. These visualization tools are powerful methods for conveying information in meaningful ways to environmental managers and scientists responsible for managing the Estuary's resources.

Key Words - *visualization tools; data management*

Theme: Watershed Management

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Linking Groundwater with Stream and Wetland Systems

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Streams and wetlands are intimately linked with groundwater resources. Locally, groundwater discharging into the San Francisco Bay and tributary systems may affect tidal, near-shore, and riparian habitats. Unfolding the nexus between surface water and groundwater systems leads to effective management of water resources. Basic calculation of a hydrologic budget bounds the surface water and groundwater contributions and may reveal the vulnerability of creeks and water bodies to diversions and groundwater withdrawals. Pollutants associated with contaminated industrial sites and contaminants from urban and agricultural runoff can leach into groundwater and discharge to surface water, adversely affecting streams and wetlands. The impact and extent of these interactions depend on the chemical and physical nature of the pollutants (including contaminant mobility) and the hydrogeological conditions between the two water regimes. On-line databases provide free information to professionals engaged in stream and wetland restoration or cleanup of contaminated sites. These include GeoTracker (<http://geotracker.waterboards.ca.gov>), Envirostor (<http://www.envirostor.dtsc.ca.gov>), California Wetland Tracker (<http://www.wetlandtracker.org>), and the California Integrated Water Quality System (http://www.waterboards.ca.gov/water_issues/programs/ciwqs/publicreports.shtml). The Water Board has authorities under Section 401 of the Federal Clean Water Act and the Porter-Cologne Water Quality Control Act (California Water Code) to regulate discharges of fill into waters of the State. Many activities that involve streams or wetlands require a Water Board permit. Water Board staff have prepared A Primer on Stream and River Protection for the Regulator and Program Manager to guide applicants through the permit process. We developed a Rapid Permit Assessment Checklist to make it easier and faster to submit a clear and complete permit application. The draft Groundwater-Surface Water Interaction Checklist helps to determine if all potential sources of information for identifying groundwater-surface interaction at a site have been identified and reviewed.

Key Words - *Groundwater-surface water interaction; stream and wetland systems; site cleanup; stream and wetland restoration*

Theme: Watershed Management

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San Francisco Bay Region Wetland and Riparian Base Map

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Management at the watershed scale for tracking changes in the extent and condition of aquatic habitat—as affected by projects, land use and climate change requires accurate and current baseline information of hydrological features and habitats. Federal datasets exist (National Wetland Inventory [NWI; USFWS] and National Hydrography Dataset [NHD; USGS]) that depict hydrological and habitat information at various resolutions. When applied in a local or regional context, these datasets fail to provide the comprehensive and sufficiently detailed information needed to guide management decisions. The San Francisco Estuary Institute is creating a new Base Map of aquatic habitat for the Bay Area as part of the Wetlands Regional Monitoring Program (www.wrmp.org). The Base Map will provide current and comprehensive data to local planners and managers and update federal datasets with high resolution information. The Base Map includes accurate representations of tidal flats, tidal marsh, streams, ditches, rivers, lakes, ponds, seasonal and perennial wetlands, and riparian areas. The information is captured through a combination of methodologies including; aerial photo interpretation, field work and landscape modeling. The mapping resolution exceeds existing standards and has undergone extensive internal quality control to meet regional and local needs. The Base Map is part of a larger initiative to extend proven, cost-effective wetlands assessment tools throughout the watersheds of the Bay Area. There are three types of tools in the wetlands assessment tool kit: Level 1 tools are landscape-level assessments using map inventories and analysis of landscape features; Level 2 tools are standardized, yet rapid, qualitative assessments of ambient conditions requiring only a moderate cost; Level 3 tools are intensive quantitative measurements of conditions, stressors, or cause-and-effect relationships and are more costly. The wetlands assessment tool kit will help environmental scientists, managers and the interested public identify opportunities for ecological restoration, floodplain management, and water supply reliability enhancements, improve our understanding of natural processes, and develop climate change adaptation strategies.

Key Words - *wetland; riparian; watershed management; mapping; hydrology;*

Theme: Watershed Management: Maps

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New Creek & Watershed Maps of Morgan Hill & Gilroy and Oakland & Berkeley

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To educate and provide basic data to the public and professionals, Oakland Museum of California publishes a series of creek and watershed maps of the San Francisco Bay area. The latest two maps, published in 2009, are of the Morgan Hill and Gilroy area in southern Santa Clara County, and a new edition of the map depicting the Oakland & Berkeley area. Both maps feature detailed maps of the modern and historical drainage network on the front side, and regional maps and historical vignettes on the reverse side.

New on the reverse side of the Oakland & Berkeley map is a shaded relief map of the historical streams, wetlands, and marshes of the East Bay as they probably looked in the middle 1800s. Included are lands that drain to the eastern shore of the San Francisco Bay, from Carquinez Straight to Altamont Pass, and south to Mount Hamilton.

On the Morgan Hill & Gilroy map we present the story of Coyote Creek, which at times in the past flowed south to Monterey Bay instead of north to San Francisco Bay as it does today.

Key Words - *watershed Oakland Berkeley Morgan Hill Gilroy Creeks historical hydrology*

Theme: Watershed Management: Maps

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Concord Naval Weapons Station – Vegetation Community Mapping

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Due to relative inaccessibility, accurate vegetation community mapping in tidal marshes can be difficult to achieve quickly and cost effectively. However, monitoring changes in marsh communities and species composition can be essential to understanding the health of these systems. This study attempted to create a quick and inexpensive approach to mapping vegetation communities within a 200 acre tidal marsh in the Suisun Bay, Contra Costa County, California. Combining remote sensing, field verification, and geographic information systems, an initial vegetation community map was created in a pilot study in late summer 2005 and replicated in late summer 2008. Following ground level and helicopter surveys, WRA utilized eCognition Elements 4.0 software (Definiens Imaging) and a four band color-infrared aerial photograph with 6 inch resolution to interpret signatures of the plant communities. eCognition is a remote sensing application that utilizes a supervised segmentation process to interpret features within the image. Thousands of polygons were generated using this segmentation process. A few sample polygons were then selected to represent each vegetation community. After all samples were selected, eCognition was then allowed to classify the remaining polygons into the appropriate communities. This process was repeated 10 times until the classification accuracy was acceptable. This data was then exported into GIS (ArcGIS-ESRI) for analysis and map generation. Changes in the area of vegetation communities on the tidal marsh were readily identifiable, allowing for assertions to be forwarded accounting for the increase in communities dominated by saline tolerant and invasive species. The results of this vegetation mapping study indicated that these survey methods provided a reliable, repeatable, and cost effective way of detecting major landscape-scale changes in vegetation communities within tidal marshes.

Key Words - *GIS, vegetation mapping, remote sensing*

Theme: Watershed Management: Maps

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