

Rising Tides – Where Can Our Shorelines Be and What Can We Do About It

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Keywords: BCDC, Shorelines, Climate Change

Session Title: Day 1 Plenary Session

Speaker Biography: In 2012, Zack Wasserman was appointed by Governor Jerry Brown as Chair of the San Francisco Bay Conservation and Development Commission. As General Counsel to the East Bay Economic Development Alliance, Zack played an integral role negotiating with BCDC on the Bay Plan Amendment to address rising sea levels. He currently serves as vice-chair of the San Francisco Regional Center that coordinates regional policies of MTC, ABAG, BAAQMD and BCDC. He serves as general counsel to the Oakland Chamber of Commerce and the East Bay Economic Development Alliance, as well as to several non-profit corporations and foundations engaged in technology transfer and scientific development.

San Francisco Bay Year 2115: Three Science Fictions

Kim Stanley Robinson, Writer

Keywords: San Francisco Bay, Future, Science Fiction

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Speaker Biography: Kim Stanley Robinson is a science fiction writer who lives with his wife and sons in Davis, California. His first novel was published in 1984, and he has published about twenty novels since then. He was sent to the Antarctic by the NSF, and his books have been translated into 24 languages. His *Mars* trilogy is an international best-seller and recent novel *2312* was a New York Times bestseller. He was named a “Hero of the Environment” by Time magazine in 2008, and now works with the Sierra Nevada Research Institute.

Drought, Demography and Conservation – The Estuary and 21st Century California

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The San Francisco Estuary encapsulates environmental challenges of land-use, climate-change, declining governmental capacity and evolving public priorities faced by conservation efforts across the State. As population grows towards some 50-60 million by 2050 we are grappling with a climatic trajectory to hotter and more arid conditions. This is producing altered physical environments, disturbance regimes and ecosystems. Perhaps more fundamentally, the demography, life experiences and the very concept of nature itself are evolving in the State. With the largest proportion of urban dwellers in the United States in California, the experiencing and conceptualization of nature is as likely to be formed in the empty lot down the street as in the mountains of Yosemite. These trajectories of environmental, demographic and socioeconomic change are manifest and clear. They are trajectories that extend beyond California to the Southwest and in some cases nationwide. The current California drought and its impacts must be viewed in the wider context of these larger temporal and geographic patterns. This drought is not an end-state of these trajectories but rather a way-station that points to the future. The 21st century is a new world of considerable conservation challenges. Here then is the critical importance of the San Francisco Estuary and its terrestrial, marsh and aquatic habitat. As wrought as it is with conflicts over species and habitat protection, land usage, and the provision of water resources, being situated within an urban megalopolis of 7 million people the Estuary offers an opportunity to showcase resolve and success in grappling with the myriad environmental challenges afflicting many of the world's coastal metropolises. Just as importantly it provides a chance to engage this massive urban population with the diverse nature at their doorstep and develop conservation ethos in new generations of Californians for the benefit of the State and beyond.

Keywords: San Francisco Estuary, Conservation, Nature, Climate Change, Drought, Population, Cities

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Speaker Biography: Glen M. MacDonald is John Muir Memorial Chair of Geography and a UCLA Distinguished Professor. He is a Co-PI for the Department of the Interior's Southwest Climate Science Center. His research focuses on climate change, its causes and its impacts on the environment and society. A particular focus of his work has been water resources and society in western North America and the global semi-arid regions and the concept of the 'Perfect Drought'. He has over 150 scientific and popular press pieces and an award winning book on biogeography. He speaks widely to the public and policy makers and has provided presentations and testimony to a number of California state agencies and the US Senate Appropriations Committee. Glen MacDonald is a Member of the National Academy of Sciences, a Fellow of the American Geophysical Union, a Fellow of the American Association for the Advancement of Science, and a Guggenheim Fellow.

From American Samoa to California: Confronting the Environmental Challenges of the 21st Century

Jared Blumenfeld, Administrator for EPA's Pacific Southwest Region (Region 9),

San Francisco Bay is recognized around the world for its natural beauty and ecological significance. Jared Blumenfeld, EPA's regional administrator of the Pacific Southwest, will highlight EPA's work in identifying and addressing the threats to the Bay and Delta's ecological health. The Clean Water Act has enabled EPA to improve the Estuary's condition from 50 years ago by reducing legacy pollutants like PCBs and mercury, improving polluted stormwater, and supporting ecological restoration efforts. The current challenges of climate change, and expected 'mega droughts' for California, call for more engagement with EPA's partners at the state and local level, as well as with academia and innovators from across the globe in order to keep pace with new technology and approaches needed to sustain our communities and our environment.

Keywords: San Francisco Bay, Clean Water Act, climate, drought

Session Title: Day 1 Plenary Session

Speaker Biography: Jared Blumenfeld was appointed by President Barack Obama to serve as EPA Regional Administrator for the Pacific Southwest in November 2009. EPA Region 9 is home to more than 48 million people in California, Arizona, Hawaii, Nevada, the Pacific Islands, and 148 tribal nations. Mr. Blumenfeld priorities at EPA include strong enforcement, environmental justice, protecting and restoring our air, land and waters, building strong federal, state, local and tribal partnerships, and taking action on climate change. Before becoming Regional Administrator, Mr. Blumenfeld was the Director of the San Francisco Department of the Environment where he spent eight years as the primary environmental decision-maker for the city. Jared helped to initiate many landmark environmental laws that became part of the municipal Environment Code. These included San Francisco's ban of plastic bags, a 2020 zero waste goal, LEED Gold building standards, and an overarching precautionary principle framework.

Surviving the Storm: The Bay Area Economy at Risk

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[Jim Levine](#), Managing Partner, Montezuma Wetlands; Co-Chair, Bay Area Council Water Committee

California's climate is famously volatile, with winters of devastating floods separated by years of remorseless drought. Following recent mega storms in New York and New Orleans, the Bay Area Council Economic Institute, in partnership with AECOM, the Brattle Group, the California Coastal Conservancy, Gensler and the Gordon & Betty Moore Foundation, have produced *Surviving the Storm*, a report which models the potential economic impacts of a 150-year mega storm striking the Bay Area.

California is vulnerable to prolonged periods of heavy rainfall, elevated tides and gale force winds known as "atmospheric rivers." The great flood of 1862 brought rain to Northern California for 43 days straight, transforming the central valley into an inland sea, destroying Sacramento and bankrupting the state.

Surviving the Storm models a significantly smaller storm than 1862, but larger than anything seen since. Seven days of torrential rain would grind daily life to a halt. Local rivers and creeks would swell beyond anything seen since the Gold Rush. Air travel would stop and major roadways would be blocked. The San Francisco Bay, elevated by low barometric pressure, storm surge, and a king tide, would overtop local levees like a clogged sink, resulting in widespread flooding.

Silicon Valley, much of which is below sea level, is particularly vulnerable: over \$7 billion worth of damage is expected to occur in San Mateo and Santa Clara counties alone. As we saw in New Orleans following Hurricane Katrina, businesses are only able to suspend operations for so long until they uproot and go elsewhere, sometimes never to return.

From wetland restoration to levee improvement, surviving the Storm examines policy opportunities for local, state and federal officials to greater investments in the Bay Area's flood protection infrastructure.

Keywords: flood, extreme weather, atmospheric river, economy, superstorm, levees, wetlands

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Speaker Biography: Jim Levine is a Bay Area entrepreneur with a graduate degree in environmental engineering from UC Berkeley. In 1998, Levine began the Montezuma Wetlands restoration project, helping to pioneer the use of dredged sediment to accelerate the restoration of tidal wetlands and other habitat, influencing federal policy on dredging and wetlands around the country. Montezuma launched its 1,800 acre tidal wetland restoration project site operations as part of the 2003 Port of Oakland's 50-foot dredging project, and has since received more than 6 million cubic yards of sediment while readying the first 500-acres of wetlands for full restoration. Prior to Montezuma, Levine founded and ran Levine*Fricke, a prominent environmental engineering and contracting firm that successfully remediated California's first Superfund site, and worked with the US Army and Navy to pioneer technologies to stabilize nuclear materials. Jim started his career as a staff engineer for the San Francisco Bay Regional Water Quality Control Board, and has previously served as a BCDC Commissioner, a Trustee for the Oakland Children's Hospital, a board member for organizations helping at-risk youth, and was a long-time advisory board member for UC Berkeley's College of Engineering.

How Healthy is Our Estuary?: The 2015 State of the Estuary Report

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The 2015 State of the Estuary Report, produced by the San Francisco Estuary Partnership, provides a broad-based, data-driven assessment of the health of estuarine ecosystems in the San Francisco Bay-Delta. The authors hope that this assessment will help natural resource managers and scientists make better decisions about how to best allocate resources to protect and restore the estuary, while informing a broader reading audience. A large team of scientists collaborated to provide data and interpret that data, and to create indicators of estuarine health within their area of expertise. These indicators of the health of the estuary fall into five attribute areas: Water, Habitat, Living Resources, Ecological Processes, and Stewardship.

The State of the Estuary Report 2015 is the latest in a series of analyses of estuarine health, most recently following the 2011 State of the Bay (also a San Francisco Estuary Partnership product) and earlier reports produced by The Bay Institute. The 2015 report expands greatly upon the 2011 report, principally by adding new indicators that address the health of Delta ecosystems. In addition to adding the Delta freshwater portion of the estuary, new information has also been added about the marine portion of the estuary—the Gulf of the Farallones. Also, several new indicators for the Habitat, Living Resources, and Ecological Processes are included, which reflect our greater scientific understanding of elements of the estuary that previously did not have enough data to be included in such a health assessment. Based on this suite of scientific information, a story is emerging about how anthropogenic stresses are impacting estuarine ecosystem function, to what degree restoration to date has lessened these stresses, and what areas need attention in the future in order to restore estuarine health in this era of rapid change.

Keywords: health assessment, Delta, subregions, habitat change, flows, ecological processes,

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Speaker Biography: Letitia Grenier co-directs SFEI's Resilient Landscapes Program. She is the science lead for the 2015 State of the Estuary Report (a SF Estuary Partnership project) and the 2015 update to the Baylands Ecosystem Habitat Goals (a California Coastal Conservancy project), heading a team of over 200 environmental scientists, managers, and regulators to develop sciencebased recommendations for restoring and maintaining the health the Bay's tidal wetlands in the face of rising sea levels and other stressors. Letitia holds a PhD in Conservation Biology from the University of California at Berkeley and has previously worked on investigating bioaccumulation of contaminants in estuarine food webs, the condition of California's wetlands, and other ecological questions about the Bay. Her focus now is to work with partners to conserve California's living resources by developing landscape-scale, collaborative, sciencebased visions and solutions.

The Bay and the Delta: Making Connections during Drought, a Scientific Update and Insights from Europe

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San Francisco Bay and the California Delta are connected by more than Suisun Bay and the Carquinez Strait. The severe ongoing drought highlights the hydrologic, chemical, biologic, and ecologic connections that exist between our estuaries and river networks. These interactions often take place in strongly human-modified estuaries and rivers. Some emerging research taking place in Europe on some of their more highly modified estuaries and rivers is germane to San Francisco Bay and the Delta. Four examples from Europe are 1) the increasing prevalence and impact of harmful algal blooms, 2) emerging anthropogenic organic contaminants and their impacts on aquatic food webs, 3) multiple stressors interacting in Mediterranean rivers and degrading biota in rivers and estuaries, and 4) the effects of intermittent rivers in the landscape on perennial waters and coastal ecosystems. Warming temperatures, increased carbon dioxide, altered hydrology, and nutrient loading all push the pendulum towards stronger, longer, and more prevalent harmful algal blooms in both estuaries and deltas. The broad spectrum of organic contaminants (e.g. pharmaceuticals, personal care products, and pesticides) found in natural waters in the parts per billion and parts per trillion levels are not always benign, and analytical chemical methods to measure these pollutants are improving. Mediterranean rivers and estuaries are particularly susceptible to these contaminants due to warming temperatures, enhanced residence times, and increased inputs. The role of multiple stressors has long been a topic of interest in San Francisco Bay and the Delta. This topic is an emerging research area in Europe with interactions between emerging pollutants, heavy metals, nutrients, and climate change on biofilms and aquatic food webs of particular interest. Finally, intermittent rivers, which make up more than half of river networks worldwide and more than two-thirds of river networks in California, have emerged as a fruitful area of research.

Keywords: Europe, harmful algal blooms, emerging contaminants, multiple stressors, intermittent rivers

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Speaker Biography: Dr. Cliff Dahm is recently professor emeritus (as of July) at the University of New Mexico, where he taught and carried out research for 31 years. His research interests are in the areas of ecosystem studies, biogeochemistry, aquatic ecology, ecosystem restoration and the science and policy interface. He served as lead scientist for the CALFED Bay-Delta Science Program that became the Delta Science Program after passage of the Delta Reform Act in 2009. He was lead scientist from July of 2008 through February of 2012. His current research activities are on the ecology and biogeochemistry of intermittent rivers, the use of continuous sensor devices to measure and understand water quality, and the impacts of forest fires on streams and rivers.

The Fruits of Our Labors: Progress in Restoration and the Challenges Ahead

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San Francisco Bay has undergone numerous transformations throughout its long history. The Baylands were once viewed as wastelands, needing to be reclaimed for 'better' uses. The large degree of tidal wetland loss since the mid-1800's due to urbanization, agriculture and salt production has been well documented, and eventually resulted in major shifts in public policy and attitude toward the Bay. Following a period of conservation and protection, we now find ourselves in the era of large-scale habitat restoration. But even with numerous success stories surrounding us, our community is faced with a new and even more daunting challenge.

Climate change threatens the Baylands, their wildlife, and the ecosystem services they provide to human communities. This threat increases the magnitude and complexity of the challenges to achieving a healthy and sustainable Baylands ecosystem with continued threats from urbanization, pollution, and invasive species. A corresponding increase in our innovation, partnerships among stakeholders, and monetary investment is required to achieve the Baylands acreage goals and to maintain the ecosystem services the Baylands provide over the next century.

Keywords: restoration, Baylands Goals Update, climate change

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Speaker Biography: John is a wetland ecologist that has served as the Executive Project Manager for the South Bay Salt Pond Restoration Project since 2009. John has almost 20 years of experience working on large-scale wetland restoration projects from San Francisco Bay, to coastal Louisiana, to mangrove swamps in the central Pacific. He has an M.S. in biology from the University of Louisiana at Lafayette and a B.S. in biology from Tulane University.