The End of Wastewater: Sustainable Infrastructure for an Urban Estuary

David Sedlak, UC Berkeley, sedlak@berkeley.edu

Our municipal wastewater infrastructure was designed to reduce the amount of pollution released to the San Francisco Bay. Over the past forty years, increasing demands for water and recognition of the effects of climate change have led to a greater appreciation of the value of municipal wastewater as a source of water, resources and energy. Coincident with this change in attitude, much of the region's wastewater infrastructure has reached the end of its useful life. It is also becoming clear that many existing treatment plants are situated in locations that are vulnerable to sea level rise. As a result, it is likely that wastewater treatment plants will be replaced by resource recovery facilities that will extract water, energy and fertilizer from sewage. Although this new approach is well aligned with societal objectives of sustainability and resilience, its effect on the San Francisco Bay is uncertain. For example, potable water recycling often produces a waste stream that contains all of the metals, nutrients and organic chemicals that were originally present in the wastewater. Disposal of this concentrated waste stream without adequate treatment or dilution could be deleterious to aquatic life. Wastewater effluent discharges that have the potential to create climate-ready habitat along the margins of the Bay may disappear as water recycling becomes more popular. By anticipating the inevitable changes in our municipal wastewater infrastructure, it will be possible to create a new system that benefits our community and protects the San Francisco Bay.

Keywords: Urban water infrastructure, water reuse, nutrients, contaminants, climate change adaptation

Session Title: Day 2 Plenary Session: Future Visions for Estuary Water Quality

Speaker Biography: David Sedlak is the Malozemoff Professor in the Department of Civil & Environmental Engineering at UC Berkeley, Co-Director of the Berkeley Water Center and Deputy Director of the NSF engineering research center for Reinventing the Nation's Urban Water Infrastructure (ReNUWIt). Professor Sedlak's research addresses the use of natural and engineered systems to improve water quality and new approaches for increasing the sustainability and resiliency of urban water systems. He is a recipient of the NSF CAREER Award, the Paul Busch Award for Innovation in Applied Water Quality Research and the Clarke Prize for Excellence in Water Research. Sedlak is the author of Water 4.0: The Past, Present and Future of the World's Most Vital Resource and serves as editor-in-chief of the ACS journal, Environmental Science & Technology.

The Future of Green Infrastructure for Stormwater Management and Climate Resilience

Andy Lipkis, TreePeople, alipkis@treepeople.org

Andy Lipkis plans to take us back to the future. With climate change and severe weather increasingly stressing and overwhelming the capacity of infrastructure to protect public health and safety and reliably meet our needs; and costs dramatically mounting for upgrading and maintaining separate water quality, water supply, and flood protection systems, it is increasingly difficult to secure public support to pay for all the separate requests. But retrofitting the urban landscape with distributed multi-purpose smart green infrastructure—a combination of natural urban watershed practices, fully integrated with technology that *biomimics* and greatly enhances the performance of natural systems, may be the quickest, most cost effective and politically palatable pathway to sustainability and resilience.

Andy will describe how multiple diverse infrastructure agencies in Los Angeles are collaborating to co-create, finance, pilot test, and maintain these new intelligent landscape retrofit... on the pathway to scaling and accelerating wide scale adoption across the region. *Helping Nature Heal our Cities.*

Keywords: Rainwater Harvesting, Cisterns, Green Infrastructure, Multi-Agency Collaboration, Biomimicry

Session Title: Day 2 Plenary Session: Future Visions for Estuary Water Quality

Speaker Biography: Andy Lipkis founded the non-profit organization TreePeople at age 18 in 1973, and serves as its President today. Under Andy's leadership, TreePeople brings together people, trees, and forest-inspired infrastructure to protect cities against droughts and floods, prevent water and air pollution, and mitigate and adapt to climate change. Andy has received numerous awards, and in 2008 was named an Ashoka Fellow in recognition of his achievements as a social entrepreneur. Andy has been featured in numerous documentaries including the PBS series Visionaries, Dirt the Movie, and Rock the Boat. In 2014, Andy was named to the EPA's Green Infrastructure Collaborative, where he is representing L.A.'s Multi-Agency Collaborative, a group of three of the region's largest water agencies. Andy recently presented at TEDxUCLA, and speaks regularly to business, government, civic leaders and community organizations around the United States, Europe and Asia.

Greener Products for Bluer Waters: California's Safer Consumer Products Regulations

Meredith Williams, California Department of Toxic Substances Control, meredith.williams@dtsc.ca.gov

Many common products can impact water quality. There have been past successes in reducing such impacts by regulating products with bans or registration. New regulations in California and Washington are expected to reduce copper loads to water bodies through management of brake pad metals content. New standards for upholstered furniture will reduce the need for flame retardants, and, in turn, the amount of these substances in water bodies and aquatic species. Nevertheless, challenges remain for reducing impacts from consumer products with regulation. Even successful regulation has had unintended consequences in cases where hazardous chemicals were replaced with other chemicals with unanticipated hazards.

California's Safer Consumer Product (SCP) regulations use a new approach for chemicals regulation. The regulations identify a list of Candidate Chemicals with known human health or environmental hazards. Products containing Candidate Chemicals may be designated as Priority Products by DTSC if the product may cause harm. Manufacturers who wish to sell Priority Products into California must determine whether or not the chemical is truly necessary in the product or whether a safer alternative exists using a rigorous Alternatives Analysis. One strength of the regulations is that a thorough Alternative Analysis can avoid "regrettable substitutes" of one problematic chemical for another. Based on the outcome of the Alternatives Analysis, DTSC may regulate the product through a variety of regulatory responses.

The authorizing statute explicitly calls for consideration of water quality impacts in the Alternative Analysis. DTSC's three year Priority Products Work Plan established aquatic impacts as a policy priority and is currently evaluating product-chemical combinations. DTSC can use water quality monitoring data, bioaccumulation data, biosolids analysis, and source identification to inform its decisions about potential products.

This presentation will provide a regulations overview and discuss how a focus on consumer products can contribute to improvements in California water quality.

Keywords: source identification, pollution prevention, safer consumer products, regulation,

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Speaker Biography: Meredith Williams joined the Department of Toxic Substances Control in 2013 to lead California's new Safer Consumer Products program. She has expertise in research and development and product management for consumer product and chemical companies including Applied Materials and 3M. After nearly 20 years of corporate work, she joined the San Francisco Estuary Institute (SFEI). Among other positions, she served as SFEI's interim Executive Director. She works to ensure the SCP regulations are implemented using robust decision making processes, stakeholder engagement, and strong science. She holds B.S. from Yale University and a Ph.D. in physics from North Carolina State University.

Futuristic Water Quality Management in the Bay Area is Happening Now

Thomas Mumley, SF Bay Water Board, tmumley@waterboards.ca.gov

Our vision of future water quality in the Bay is one wherein there is no pollutant caused water quality impairment except for lingering but managed effects of legacy contamination, Water quality management will be integrated with habitat, flood, water supply, and land-use management. That means greening of infrastructure, less and less direct runoff to creeks and the Bay from hardscape areas, beneficial reuse of wastewater including habitat enhancement and purification for potable water use, and natural creek-system flood management. It also means adequate surveillance to identify emerging contaminants and initiate preventive actions before they become a problem. An ever increasing number of these actions are happening now throughout the Bay Area and green infrastructure and integrated water and habitat management planning is becoming the norm not the exception. Inadequate funding is an obvious barrier to increased and faster implementation, but fortunately, there are also efforts in play to provide new and improved funding mechanisms. Public support is key, and should be forthcoming given that the Bay Area quality of life and economy are dependent on the Bay and the quality of its water and habitat.

Keywords: water quality management, green infrastructure, funding, integrated management

Session Title: Day 2 Plenary Session: Future Visions for Estuary Water Quality

Speaker Biography: Thomas Mumley, Ph.D., has been an Assistant Executive Officer at the San Francisco Bay Water Board since 2007 and is Vice Chair of the San Francisco Estuary Partnership Implementation Committee. He has worked at the San Francisco Bay Regional Water Quality Control Board for over 30 years with experience in nearly all program areas of the Water Board including development and implementation of water quality standards, development and implementation of Total Maximum Daily Loads to fix impaired waters, NPDES wastewater and stormwater permits, nonpoint source control and watershed management. He received his BS degree in Chemical Engineering from the University of Massachusetts, Amherst in 1976 and his Ph.D. in Chemical Engineering from the University of California, Berkeley in 1983.