Progress and Challenges in Tackling Pesticides in the Estuary: Session Overview

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Efforts to alleviate and prevent pesticides-related water pollution are taking a new direction. Monitoring and research increasingly focus on obtaining information that is useful for developing pollution mitigation measures. Three excellent examples of current actions and research are presented in this session.

Keywords: Pesticides, pollution mitigation measures

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Speaker Biography: Jan O'Hara is an engineer with the SF Bay Regional Water Board. One of her responsibilities is implementing the TMDL for Pesticide-Related Toxicity in Urban Creeks, a task that requires integrating scientific data on pesticides & aquatic impacts; political realities of how pesticides are regulated; and social considerations like how people do/don't tolerate pests in their homes and yards.

Identifying an Unexpected Source of Urban Pesticide Pollution: Pet Flea Control Products

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Urban insecticides fipronil and imidacloprid were monitored in eight San Francisco Bay Area wastewater treatment plants. In influent and effluent, ubiquitous detections were obtained for fipronil (13-88 ng/L), fipronil degradates including fipronil sulfone (1-28 ng/L) and fipronil sulfide (1-5 ng/L), and imidacloprid (58-306 ng/L).

In influent, 100% of imidacloprid and about two-thirds of the fipronil and degradates were present in the dissolved state, with the rest bound to particles. The insecticides persisted during wastewater treatment, regardless of treatment technology. About one-third of the fipronil and degradates partitioned into sludge; the rest of the fipronil and essentially all of the imidacloprid were discharged in effluent. This first regional study on fipronil and imidacloprid in raw and treated sewage revealed widespread detection and marked persistence to conventional treatment.

Spot-on flea and tick treatments for pets were identified as potential sources of pesticides in wastewater meriting further investigation and inclusion in chemical-specific risk assessments. While outdoor pesticide use is known to contaminate local creeks and urban runoff, this study was the first to suggest indoor uses like spot-on flea control treatments may also be significant. More recently, a study by the California Department of Pesticide Regulation measured significant levels of fipronil in wash water from fipronil-treated dogs that were bathed up to 28 days after receiving treatments. Safer flea control practices include oral medications or frequent indoor vacuuming.

Keywords: fipronil, imidacloprid, wastewater treatment plants, effluent, emerging contaminants, pollution prevention

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Speaker Biography: Dr. Rebecca Sutton joined SFEI in 2013 as a Senior Scientist for the Regional Monitoring Program for Water Quality in San Francisco Bay (RMP). She leads the RMP's Emerging Contaminants Workgroup and a team of scientists investigating contaminants of emerging concern and microplastic in the San Francisco Bay and other regions of California. She also manages SFEI's Green Chemistry focus area, and has been appointed to California's Green Ribbon Science Panel to aid in the implementation of the state's Safer Consumer Products Regulations. Dr. Sutton received her B.S. in Environmental Resource Science from the University of California, Davis and her Ph.D. in Environmental Chemistry from the University of California, Berkeley. Prior to joining SFEI, she was a senior scientist with research and advocacy non-profit Environmental Working Group, where she conducted research on chemicals of concern in air, water, soil, consumer goods, and people.

Protecting Surface Water from Pesticide Related Toxicity: Science Driven Prevention and Response

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The mission of the California Department of Pesticide Regulation's Surface Water Protection Program (SWPP) is to protect surface water from pesticide contamination caused by the use of pesticides in agricultural and urban environments. To achieve its mission, the program integrates the following key components: a) the evaluation of pesticide products submitted for registration in California, b) the monitoring of surface water and sediment for high use pesticides with high aquatic toxicity potential, c) the modeling of fate and transport of pesticides to predict environmental concentrations and assess environmental risk, d) the evaluation of the effectiveness of best management practices to mitigate the offsite movement of pesticides, e) the outreach to pesticide users to implement best management practices, and f) the implementation of regulatory measures. To implement the program mission, our scientists and analytical chemists work collaboratively with pesticide registrants, county agricultural commissioners, State and Regional water boards, pesticide users, and university researchers.

Keywords: Pesticides, Mitigation, Outreach, Monitoring, Modeling

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Speaker Biography: Dr. Jennifer Teerlink is a Senior Environmental Scientist with the Department of Pesticide Regulation, Surface Water Protection Program. She serves as interagency liaison to State and Federal Agencies to coordinate and communicate efforts related to pesticides in surface water. Her current research focuses on identifying and quantifying pesticide inputs to wastewater catchments. Dr. Teerlink has a B.S. and M.S. in Geology and a PhD in Environmental Engineering.

Efforts to Reduce Pesticide Related Toxicity in the Delta and Its Tributaries in the Central Valley

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For over 30 years, the Central Valley Water Board has been working on pesticide related toxicity in the Central Valley, including the Delta and its tributaries. Through a number of regulatory and non-regulatory efforts by the Board and others, there has been a reduction in the widespread toxicity once seen in the Delta and its major tributaries due to the organophosphate pesticides diazinon and chlorpyrifos. Concerns have now shifted to the potential toxic effects of pyrethroid pesticides and other pesticides which are detected in the Delta and its tributaries. The Central Valley Water Board is continuing to work on a number of fronts with partner agencies, researchers, the regulated community and other stakeholders to address current pesticide toxicity issues and help prevent future pesticide impairments.

Keywords: pesticides, toxicity, diazinon, chlorpyrifos, pyrethroids

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Speaker Biography: Danny McClure, P.E. is Senior Water Resource Control Engineer with the California Regional Water Quality Control Board, Central Valley Region. Mr. McClure graduated from Humboldt State University in 1997 with a B.S. in environmental resources engineering. He worked at the Colorado River Basin Regional Water Board from 1998 to 2001 and at the Central Valley Regional Water Board from 2001 to present. At the Central Valley Regional Water Board, he worked on the development and implementation of water quality standards and control programs and Total Maximum Daily Loads (TMDL) for the pesticides diazinon and chlorpyrifos in multiple Central Valley waterbodies, water quality monitoring and assessment, and the development of the pyrethroids pesticides control program and TMDL.