

An Adaptive, Comprehensive Monitoring Strategy for Chemicals of Emerging Concern (CECs) in California's Aquatic Ecosystems

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ABSTRACT

A scientific advisory panel was convened by the State of California to recommend monitoring for chemicals of emerging concern (CECs) in aquatic systems that receive discharge of municipal wastewater treatment plant (WWTP) effluent and storm water runoff. The panel developed a risk-based, screening framework that considered environmental sources and fate of CECs observed in receiving waters across the State. Using existing occurrence and risk threshold data in water, sediment and biological tissue, the panel applied the framework to identify a priority list of CECs for initial monitoring in three representative receiving water scenarios. The initial screening list of 16 CECs identified by the panel included consumer and commercial chemicals, flame retardants, pesticides, pharmaceuticals and personal care products, and natural hormones. The panel designed an iterative, phased strategy with interpretive guidelines that direct and update management actions commensurate with potential risk identified using the risk-based framework and monitoring data. Due to the ever changing nature of chemical use, technology, and management practices, the panel offered recommendations to improve CEC monitoring, including: development of bioanalytical screening methods whose responses integrate exposure to complex mixtures and that can be linked to higher order effects; development/refinement of models that predict the input, fate and effects of future chemicals; and filling of key data gaps on CEC occurrence and toxicity. Lastly, the panel stressed the need for adaptive management, allowing for future review of, and if warranted, modifications to the strategy to incorporate the latest science available to the water resources community.

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