

Pilot Monitoring of Constituents of Emerging Concern (CECs) in the Russian River Watershed (Region 1)

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EXECUTIVE SUMMARY – INTRODUCTION

In 2015, the Surface Water Ambient Monitoring Program (SWAMP) released guidance for monitoring of contaminants of emerging concern (CECs) in ambient waters across California. Among the recommendations provided to SWAMP by the State's Expert Panel on CECs in aquatic ecosystems was monitoring of a list of priority CECs that included selected hormones, pharmaceuticals and personal care products, current use pesticides, and other chemicals found in consumer and commercial products, in water, sediment and tissue. The Panel also recommended evaluation of bioanalytical tools and non-targeted analysis to improve current water quality monitoring. In response, the North Coast Regional Water Quality Control Board commissioned a pilot study to screen for CECs in the Russian River watershed (RRW). As the region's most populous watershed, the RRW is home to forested, suburban and agricultural lands, with direct discharges from known point sources of CECs restricted to high flow conditions. This study consisted of 3 tasks: 1) targeted analysis and bioanalytical screening of CECs in water and sediment samples from the RRW; 2) targeted analysis of CECs in fish tissue; and 3) prioritization and initial monitoring of an expanded list of pesticides applied to agricultural lands within the RRW.

For Task 1, river water and sediment samples collected at 8 stations during wet weather conditions (for water) and during dry weather (for sediment) in 2016 were screened for endocrine bioactivity using 2 in vitro bioassays (IVBs) and analyzed for 31 CECs by GC-MS and LC-MS. In addition, final effluents from 2 wastewater treatment plants (WWTPs) were collected and screened using IVBs and targeted chemical analysis. Samples were collected, processed and analyzed in accordance with quality assurance/quality control (QA/QC) guidelines for statewide CEC pilot monitoring studies approved by SWAMP, and as reflected in the quality assurance project plan (QAPP).

Targeted chemical analysis of 11 CECs in aqueous samples and 20 CECs in sediment samples indicated that while some were frequently detectable, concentrations of most CECs were below monitoring trigger levels (MTLs) established by the State's Expert Panel. Exceptions were observed for the current use pesticides bifenthrin, permethrin and fipronil in sediment. The highest occurrence of these pesticides, primarily associated with suburban/urban applications (e.g. ant, termite and pet flea control), were found at stations near Santa Rosa, the largest city in the RRW. Analysis of the aqueous and sediment samples using standardized IVBs that screen for estrogenic and glucocorticoid activity were uniformly low, indicating little cause for concern for

endocrine related toxicity across the RRW. Excellent agreement between targeted chemical monitoring of known estrogens, the status quo approach for exposure assessment, and the estrogen IVB results suggests that this assay shows promise as an effective screening tool for receiving water environments.

Full Text

http://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/1020_PilotCECs.pdf