

## SCCWRP Annual Report 2011

### Integrated coastal effects study: Synthesis of findings

Steven M. Bay, Doris E. Vidal-Dorsch, Daniel Schlenk<sup>1</sup>, Kevin M. Kelley<sup>2</sup>, Keith A. Maruya and Joseph R. Gully<sup>3</sup>

<sup>1</sup>*University of California, Riverside, Riverside, CA*

<sup>2</sup>*California State University Long Beach, Long Beach, CA*

<sup>3</sup>*Sanitation Districts of Los Angeles County, Whittier, CA*

#### ABSTRACT

Concern over the environmental impacts of contaminants of emerging concern (CECs) has increased in recent years as a result of studies showing their occurrence in waste discharges and receiving waters, and instances of fish endocrine disruption associated with some CECs. Limited information is available regarding the types, concentrations, and fate of CECs discharged to the Southern California Bight (SCB) from treated wastewater discharges and their potential for ecological impacts. This study investigated the impacts of CECs from ocean wastewater discharges on SCB fish. Samples of effluent from the four major municipal wastewater treatment plants were collected. In addition, seawater, sediment, and hornyhead turbot (*Pleuronichthys verticalis*) from the effluent discharge areas and a reference station were also sampled and analyzed for multiple chemical and biological indicators. Low concentrations of many pharmaceutical, personal care products and industrial and commercial compounds were frequently measured in the effluent samples. Some CECs were detected in sediment and seawater collected near the outfall sites, indicating the potential for fish exposure. Seawater CECs were detected at concentrations lower than one part per trillion. Fish livers contained certain types of CECs confirming exposure. Fish plasma hormone analyses suggested the presence of physiological effects including reduced cortisol levels, relatively high levels of male estradiol, and reduced thyroxine. Male fish plasma also contained low levels of vitellogenin. Most fish responses were found at all sites, and could not be directly associated with effluent discharges. However, concentrations of thyroxine were lower at all discharge sites relative to the reference, and estradiol concentrations were lower at three of the four outfall sites. The physiological responses found in this study did not appear to be associated with adverse impacts on fish reproduction or populations. Overall, fish from discharge and reference sites had similar reproductive cycles. Analysis of long-term monitoring data showed that hornyhead turbot populations were stable (or increasing) and that the fish community composition near the outfall discharges was typical of that expected in reference areas.

#### Full Text

[ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/AnnualReports/2011AnnualReport/ar11\\_335\\_350.pdf](ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/AnnualReports/2011AnnualReport/ar11_335_350.pdf)