

**STRATEGIC PROCESS STUDIES AND
REGIONAL MONITORING**

Chapter 3

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INTRODUCTION

The Orange County Sanitation District (District) operates under the auspices of a National Pollutant Discharge Elimination System (NPDES) permit issued jointly by the United States Environmental Protection Agency and the State of California Regional Water Quality Control Board (Order No. R8-2012-0035, NPDES Permit No. CA0110604) in June 2012. The permit requires the District to conduct an ocean monitoring program (OMP) that documents the effectiveness of the District's source control and wastewater treatment operations in protecting coastal ocean resources and beneficial uses. Part of the codified OMP is a requirement to conduct Strategic Process Studies (SPS) and to participate in regional monitoring programs. In addition, the District performs special studies, which are generally less involved than SPS and have no regulatory requirement for prior approval or level of effort.

SPS are designed to address unanswered questions raised by the core monitoring program results or they may focus on issues of interest to the District, such as the effect of contaminants of emerging concern on local fish populations. Some SPS are enumerated in the NPDES permit. Other SPS are proposed annually to, and must be approved by, state and/or federal regulators to ensure proper focus and level of effort.

Regional monitoring studies are those not focused solely on the District's monitoring area, but which focus on larger areas of the Southern California Bight. These may include the "Bight" studies coordinated by the Southern California Coastal Water Research Project (SCCWRP) or studies conducted in coordination with other public agencies and/or non-governmental organizations in the region. Examples include the Central Region Kelp Survey Consortium and the Central Bight Water Quality Study.

This chapter provides study overviews of recently completed and ongoing SPS, special studies, and regional monitoring efforts. Unlike the other chapters in this report, these summaries are the most recent information available up to the publication of this report. In most cases, this information is also used in other chapters of this report to corroborate and supplement core monitoring results. This chapter provides study summaries only and the projects described are not intended as comprehensive reports. Final study reports are available in PDF format at www.ocsd.com.

STRATEGIC PROCESS STUDIES

Sediment Mapping

Maps are an extremely effective data summary tool used to demonstrate spatial extent and magnitude of environmental conditions. Maps help put information about contaminant gradients relative to a source(s) into context over the entire area of interest. Maps of environmental condition in the area of interest across multiple years may help identify changes in spatial extent (i.e., is the outfall footprint expanding or shrinking over time?). However, the ability to create maps with scientific rigor is difficult and rarely accomplished as sampling grids are often too sparse to capture the necessary spatial variability to make reliable predictions at unsampled locations. The District publishes contour maps of pollutants and sediment physical parameters in the Marine Monitoring Annual Reports. These maps are based on the placement of existing sediment sampling stations prescribed in the NPDES discharge permit. This sampling scheme may not be optimal for accurately assessing the outfall footprint for contaminants discharged with the treated wastewater effluent or for assessing potential impacts to biological communities.

The objective of this study is to statistically determine the optimal sediment station array for accurate map generation of the District's outfall footprint for sediment geochemistry analytes and benthic infaunal community metrics. Improved maps will ultimately provide better data for the determination of NPDES permit compliance and empower managers, regulators, and other stakeholders with the best available information on spatial and temporal trends of sediment impacts from the wastewater discharge. As a result of this study, we will be able to answer the following questions: (1) How representative is our existing station grid of the outfall area? (2) Are we undersampling some areas and/or oversampling others? (3) What is the most cost-efficient grid spacing to provide accurate mapping contours? (4) How many additional stations are necessary to characterize spatial variance in the area around the discharge and/or other areas of influence (e.g., Santa Ana River); and (5) What analyses (e.g., chemical parameters, biological indices) will provide the best resolution for mapping the area?

This study is being conducted in two phases. Phase I, completed in March 2010, used District's historical benthic monitoring data to determine the appropriate chemical and biological measures to use in the analysis and to determine where data gaps exist. Spatial trends were assessed using variograms. Variograms model the spatial variability of the data which provides an estimate of optimal station intervals. This was used to focus additional field sampling conducted in Phase II. Phase II had two field sampling events to collect data where gaps exist and to refine the final optimized station location map. The first field sampling event was conducted in July 2011 and the second in July 2012. The analysis of the July 2012 infaunal samples was completed in December 2013. The finalization of the optimized station map has been delayed, and as such, the completion of this project remains ongoing.

REGIONAL MONITORING

Central Bight Regional Water Quality Program

The District is a member of a regional cooperative sampling effort known as the Central Bight Regional Water Quality Monitoring Program (Central Bight) with the City of Oxnard, City of Los Angeles, the Los Angeles County Sanitation District, and the City of San Diego. Each quarter, the participating agencies sample a station grid that covers the coastal waters from Ventura County to Crystal Cove State Beach and from Point Loma to the Mexican Border. The participants employ similarly equipped CTDs and comparable field sampling methods. When combined with the District's Core water quality program data, the Central Bight monitoring provides regional data that enhances the evaluation of water quality changes due to natural or anthropogenic discharges (e.g., stormwater) and provides a regional context for comparisons with the District's monitoring results. The Central Bight data also provides a link to other larger-scale regional programs, such as the California Cooperative Oceanic Fisheries Investigations (CalCOFI) and serves as the basis for the Bight'13 Nutrients sampling.

Bight'13 Regional Monitoring

Since 1994, the District has participated in five regional monitoring studies of environmental conditions within the Southern California Bight (SCB): 1994 Southern California Bight Pilot Project (SCBPP), Bight'98, Bight'03, Bight'08, and Bight'13. The District has played a considerable role in all aspects of these regional projects, including program design, sampling, quality assurance, data analysis, and report writing. Results from these efforts provide information that is used by individual dischargers, resource managers, and the public to improve region-wide understanding of environmental conditions and to provide a regional perspective for comparisons with data collected from individual point sources. During the summer of 2013, District staff conducted field operations, ranging in area from Orange County south to Camp Pendleton in northern San Diego County and west to the southern end of Santa Catalina Island, as part of the Bight'13 sampling effort. In addition, District staff performed sediment chemistry and sediment toxicity analyses, as well as benthic infauna taxonomic identifications. Final reports for the Bight'13 program will be available in December 2017. Program documents, data, and reports on the previous studies are available on the Southern California Coastal Water Research Project's website (<http://sccwrp.org>).

Regional Kelp Survey Consortium – Central Region

The Central Region Kelp Survey Consortium (CRKSC) was formed in 2003 to map giant kelp (*Macrocystis pyrifera*) beds off Ventura, Los Angeles, and Orange Counties via aerial photography. The program is modeled after the San Diego Regional Water Quality Control Board Region Nine Kelp Survey Consortium, which began in 1983. The District has been a member of the CRKSC program since 2003. The CRKSC and San Diego aerial surveys provide synoptic coverage of kelp beds along approximately 220 of the 270 miles of the southern California mainland coast from northern Ventura County to the United States-Mexico Border. Survey results are published annually in a report provided by MBC Applied Environmental Sciences (2014).

2013 Results

In the Central Region, the maximum total kelp canopy decreased from 5.665 km² in 2012 to 5.614 km² in 2013. The number of kelp beds displaying canopy has remained the same in the Central Region (at 24 of 26 historic kelp beds). The total amount of kelp peaked in 2009 with 6.406 km² of canopy coverage, an amount greater than during any past CRKSC survey or of any past synoptic surveys (when all areas were surveyed) since 1989.

The beds farthest upcoast—from Deer Creek to Lechuza—all gained canopy, and two of those beds doubled in size. However, 11 of the 12 beds between Point Dume and Sunset lost canopy in the last year. The average change in size from 2012 was about 14%. The angle of the coastline from Point Dume to Santa Monica Bay is slightly different from that in other areas of Region Nine, and this affects the exposure to waves. The upcoast part of the Palos Verdes beds also fared poorly, and decreased in size by about 27%. The PV II and PV III beds were similar in size compared to last year, while the PV IV and Cabrillo beds increased substantially (>75%). Most of the beds in the Central Region reached their maximum extent in fall or winter. However, many kelp beds, including ones that lost canopy between Point Dume and Sunset, were at their greatest extent in May.

The giant kelp surveys of 2013 continued to demonstrate that most kelp bed dynamics in the Central and San Diego regions are controlled by the large-scale oceanographic environment while micro-variations in local topography and currents can cause anomalies in kelp bed performances. There was no evidence of any adverse effects on the giant kelp resources from any of the region's dischargers.

REFERENCES

MBC Applied Environmental Sciences. 2014. Status of the Kelp Beds 2013 Survey. Prepared for the Central Region Kelp Survey Consortium. 109 pp. + Appendices.