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Water Resources: Existing Water Quality Programs

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1.2.0 Existing Water Quality Programs

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Santa Monica Bay is markedly cleaner today than it was 30 years ago, demonstrated most prominently by the steady decrease of pollutant loadings to the Bay from the two major publicly owned treatment works (POTWs), and by the recovery of marine life and habitat around the outfalls of these POTWs in the Bay (see Section 2.1 for more detail). Improvements have continued over the last five years, although progress has slowed as the remaining sources of pollutant loading are more difficult to control. Population growth in an already highly urbanized coastal plain—one of the most populous areas in the nation—continues to generate different kinds of pollutants in large quantities. The pollutants of greatest concern include pathogens, trash, nutrients, and chemical contaminants that discharge through the region’s thousands of miles of storm drains, most of which flow directly into the Bay without effective source control or treatment. Other ongoing contributors of contaminants to the Bay come from nonpoint sources such as septic systems and boating activities. Legacy pollutants remain in the Bay’s sediments from historical discharges such as dichloro-diphenyl-trichloroethanes (DDTs) and polychlorinated biphenyls (PCBs). Relatively new, but growing in recent years, are the recognition and the need to address contaminants of emerging concern (CEC), such as pharmaceuticals and personal care products (PPCPs), and perfluorinated compounds, among others. CECs are such because they are widely distributed, persistent in the environment, potentially detrimental to the health of aquatic organisms and humans, and difficult to remove through wastewater treatment processes.

The primary, and one of the most effective, mechanisms to control pollutant loading from various sources are the pollutant reduction targets in the form of the Total Maximum Daily Loads (TMDLs). These were developed and issued by the federal and state water quality regulatory agencies. Since 2003, 12 TMDLs have been developed and adopted by the Los Angeles Regional Water Quality Control Board (Los Angeles Regional Water Board) to regulate the amount of trash, bacteria, metals, and other toxins in the Bay and three major water bodies in the Bay watershed: Marina del Rey, Ballona Creek and its estuary, and Malibu Creek and Lagoon ([Table 1.2-1](#)). Two additional TMDLs were developed and enacted by the United States Environmental Protection Agency (EPA), one for sedimentation and nutrients to address benthic community impairments in the Malibu Creek and Lagoon (see [Sidebar 1.2](#) for more), and one for sediment and invasive exotic vegetation in the Ballona Creek Wetlands ([Table 1.2-1](#)). The TMDLs are being implemented mostly through new control measures incorporated into existing National Pollution Discharge Elimination System (NPDES) permits.

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Successful development and implementation of TMDLs is achieved through an adaptive process that matches management capabilities with scientific understanding. It requires cultivation of a good understanding of all relevant watershed issues, including knowledge of the sources of pollutants, and the link between specific pollutants and other stressors to water quality impairments. It also relies on engaging all stakeholders to develop, evaluate, and adopt cost-effective and innovative pollutant control strategies. This collaboration may result in broad implementation achieving integrated water resource management within a given geography. Finally, extensive and long-term monitoring is needed for tracking the progress of water quality improvements moving towards the TMDL goals, and for collecting information on specific watershed elements needed for possible mid-course correction.

Articles presented in this chapter provide several case studies that demonstrate how the TMDL development and implementation processes have been carried out in the Bay watershed, with emphasis on the application of scientific understanding and implementation through collaborative source control and sustainable solutions.

Sidebar 1.2: Biology-based TMDL for Malibu Creek and Lagoon

Authors: Cindy Lin², Eric D. Stein³

Malibu Creek and Lagoon were identified as impaired water bodies under Section 303(d) of the Federal Clean Water Act for sedimentation and nutrients to address benthic community impairments. These listings are different from most others in the country because there was no specific pollutant associated with or identified as causing negative benthic community effects. Instead the listing was based on biological endpoints, which is consistent with the Clean Water Act's goal of protecting the biological integrity of state and federal waters. Since pollution impacts have become so complex, California increasingly relies on biological endpoints as measures of condition, as they reflect cumulative stress on the aquatic environment and integrate the effects of various stressors over time.

The challenge of developing biologically-based TMDLs is that they require multiple lines of evidence and assessments to determine the cause(s) of impairment that are critically affecting the benthic community condition. Potential causes of impairment for the Malibu Creek Watershed and Lagoon were investigated using the EPA Causal Analysis/Diagnosis Decision Information System (CADDIS) approach. CADDIS provides a systematic evaluation of all potential stressors based on the best available comprehensive data sets, and produces a list of "likely" and "unlikely" causes of stress on the biological communities. In conjunction with CADDIS and other statistical analyses, nutrients and sediment were identified as the pollutants most strongly associated with biological impairment and negative stream condition. The TMDL implementation plan focused on these pollutants as priorities for restoration management.

The biologically-driven approach used in the Malibu Creek watershed provided a more comprehensive and unbiased approach to identifying key stressors than the traditional approach, where stressors are assumed to produce adverse or undesirable biological effects at the start of the process. This approach is also consistent with California's stated objective to focus more directly on biological endpoints in regulatory and management programs.

² United States Environmental Protection Agency, Region 9

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Table 1.2-1. TMDLs developed for Santa Monica Bay and their implementation status. *EPA-established TMDLs;
**Amended in Feb. 2014 to include load allocations for discharge of dissolved copper, etc.

Pollutant	Water Body	Date in Effect
Bacteria	Santa Monica Bay, dry weather	JUL 2003
	Santa Monica Bay, wet weather	JUL 2003
	Marina del Rey Harbor, Mother's Beach and Back Basin	MAR 2004
	Malibu Creek	JAN 2006
	Ballona Creek, Estuary, Sepulveda Channel	APR 2007
Trash	Ballona Creek	AUG 2002
	Malibu Creek	JUL 2009
Marine Debris	Santa Monica Bay	MAR 2012
Toxics	Ballona Creek Estuary	JAN 2006
	Marina del Rey Harbor**	MAR 2006
Metals	Ballona Creek, Ballona Creek Estuary	OCT 2008
DDTs and PCBs*	Santa Monica Bay	MAR 2012
Sedimentation and Nutrients to Address Benthic Community Impairments*	Malibu Creek and Lagoon	JUL 2013
Sediment and Invasive Exotic Vegetation*	Ballona Creek Wetlands	MAR 2012