

Chapter 1. General Introduction

The City of San Diego (City) Point Loma Wastewater Treatment Plant (PLWTP) discharges advanced primary treated effluent to the Pacific Ocean through the Point Loma Ocean Outfall (PLOO) in accordance with requirements set forth in Order No. R9-2009-0001, NPDES Permit No. CA0107409. This Order was adopted by the San Diego Regional Water Quality Control Board (SDRWQCB) on June 10, 2009 and became effective August 1, 2010. The Monitoring and Reporting Program (MRP) in this order specifies the requirements for monitoring ambient receiving waters conditions off Point Loma, San Diego, including field sampling design and frequency, compliance criteria, types of laboratory analyses, and data analysis and reporting guidelines. The main objectives of the monitoring program are to provide data that satisfy permit requirements, demonstrate compliance with California Ocean Plan (Ocean Plan) provisions, detect dispersion and transport of the waste field (plume), and identify any environmental changes that may be associated with wastewater discharge via the outfall.

BACKGROUND

The City began operation of the PLWTP and original ocean outfall off Point Loma in 1963, at which time treated effluent (wastewater) was discharged approximately 3.9 km offshore at a depth of about 60 m. From 1963 to 1985, the plant operated as a primary treatment facility, removing approximately 60% of the total suspended solids (TSS) by gravity separation. The City began upgrading the process to advanced primary treatment (APT) in mid-1985, with full APT status being achieved by July 1986. This improvement involved the addition of chemical coagulation to the treatment process which increased the removal of TSS to about 75%. Since 1986, treatment has been further enhanced with the addition of several more sedimentation basins, expanded aerated grit removal, and refinements in chemical treatment.

These enhancements have further reduced mass emissions from the plant. TSS removals are now consistently greater than the 80% required by the permit (see below). Finally, the City began testing disinfection of PLWTP effluent using a sodium hypochlorite solution in September 2008 following adoption of Addendum No. 2 to previous Order No. R9-2002 0025. Partial chlorination continued throughout 2011.

The physical structure of the PLOO was altered in the early 1990s when it was extended approximately 3.3 km farther offshore in order to prevent intrusion of the wastewater plume into nearshore waters and to increase compliance with Ocean Plan standards for water-contact sports areas. Discharge from the original 60-m terminus was discontinued in November 1993 following completion of the outfall extension. The outfall presently extends approximately 7.2 km offshore to a depth of about 94 m, where the main pipeline splits into a Y-shaped multiport diffuser system. The two diffuser legs extend an additional 762 m to the north and south, each terminating at a depth of about 98 m.

The average daily flow of effluent through the PLOO in 2011 was 156 million gallons per day (mgd), ranging from a low of 127 mgd in September to a high of about 220 mgd in March. Overall, this represents about a 0.6% decrease from the 157 mgd average flow rate in 2010. TSS removal averaged about 87.5% in 2011, while total mass emissions for the year was approximately 9,088 metric tons (see City of San Diego 2012a).

RECEIVING WATERS MONITORING

Prior to 1994, the City conducted an extensive ocean monitoring program off Point Loma surrounding the original 60-m discharge site. This program was subsequently expanded with the

construction and operation of the deeper outfall. Data from the last year of regular monitoring near the original inshore site are presented in City of San Diego (1995a), while the results of a three-year “recovery study” are summarized in City of San Diego (1998). From 1991 through 1993, the City also conducted a “pre-discharge” study in the new monitoring area in order to collect baseline data prior to wastewater discharge into these deeper waters (City of San Diego 1995a, b). Results of NPDES mandated monitoring for the extended PLOO from 1994 to 2010 are available in previous annual receiving waters monitoring reports (e.g., City of San Diego 2011). In addition, the City has conducted annual region-wide surveys off the coast of San Diego since 1994 either as part of regular South Bay outfall monitoring requirements (e.g., City of San Diego 1999, 2012b) or as part of larger, multi-agency surveys of the entire Southern California Bight (SCB). The latter include the 1994 Southern California Bight Pilot Project (Allen et al. 1998, Bergen et al. 1998, 2001, Schiff and Gossett 1998) and subsequent Bight’98, Bight’03 and Bight’08 programs in 1998, 2003 and 2008, respectively (Allen et al. 2002, 2007, 2011, Noblet et al. 2002, Ranasinghe et al. 2003, 2007, 2012, Schiff et al. 2006, 2011). Such large-scale surveys are useful for characterizing the ecological health of diverse coastal areas and in distinguishing reference sites from those impacted by wastewater or stormwater discharges, urban runoff, or other sources of contamination.

The current monitoring area off Point Loma extends from the shoreline seaward to a depth of about 116 m and encompasses an area of approximately 184 km² (Figure 1.1). Fixed sites are generally arranged in a grid surrounding the outfall and are sampled in accordance with a prescribed schedule as specified in the MRP. A summary of the results for quality assurance procedures performed in 2011 can be found in City of San Diego (2012c). Data files, detailed methodologies, completed reports, and other pertinent information submitted to the SDRWQCB and United States Environmental Protection Agency (USEPA) throughout the year are available

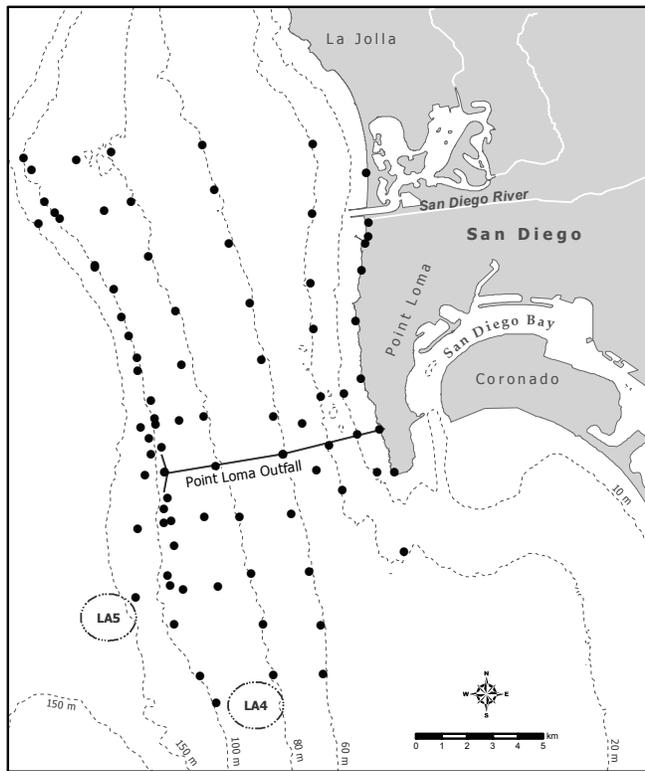


Figure 1.1

Receiving waters monitoring stations sampled around the Point Loma Ocean Outfall as part of the City of San Diego’s Ocean Monitoring Program.

online at the City’s website (www.sandiego.gov/mwwd/environment/oceanmonitor.shtml).

In addition to the above activities, the City provides staffing or funding support for several other projects relevant to assessing ocean quality in the region. One such project involves remote sensing (satellite imaging) of the San Diego/Tijuana coastal region, which is jointly funded by the City and the International Boundary and Water Commission (Svejkovsky 2012). The City also funds a long-term study of the Point Loma and La Jolla kelp forests being conducted by scientists at the Scripps Institution of Oceanography (e.g., Parnell and Riser 2011), and also participates as a member of the Region Nine Kelp Survey Consortium to fund aerial surveys of all the major kelp beds in San Diego and Orange Counties (e.g., MBC Applied Environmental Sciences 2011).

The current MRP also includes provisions for adaptive or special strategic process studies

as determined by the City in conjunction with the SDRWQCB and USEPA. The first of these studies was a comprehensive review of the Point Loma ocean monitoring program conducted by a team of scientists from the Scripps Institution of Oceanography and several other institutions (SIO 2004). This was followed by a large-scale sediment mapping study of the Point Loma and South Bay coastal regions that began in the summer of 2004 (Stebbins et al. 2004), as well as a pilot study of deeper continental slope benthic habitats off San Diego that occurred in 2005 (Stebbins and Parnell 2005). A second phase of the sediment mapping study focused on just the Point Loma region is scheduled to begin in July 2012. The deep benthic pilot study was subsequently expanded into a multi-year deep benthic habitat assessment project expected to be completed in late 2012 or early 2013. Another active project involves annual sampling at the recovery stations mentioned above and in City of San Diego (1998) as part of a long-term assessment project of benthic conditions near the original outfall discharge site. Finally, a multi-phase project is currently underway to examine water mass dynamics (ocean currents, thermocline) within the Point Loma receiving waters, and to characterize the dispersion behavior of the PLOO wastewater plume (Storms et al. 2006, Dayton et al. 2009, Parnell and Rasmussen 2010, Rogowski et al. *in press*).

This report presents the results of all regular receiving waters monitoring activities conducted off Point Loma from January through December 2011. The major components of the monitoring program are covered in the following six chapters: Oceanographic Conditions, Water Quality, Sediment Conditions, Macrobenthic Communities, Demersal Fishes and Megabenthic Invertebrates, and Bioaccumulation of Contaminants in Fish Tissues.

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