



Public Utilities

March 2022

POINT LOMA

WASTEWATER TREATMENT PLANT & OCEAN OUTFALL



**REPORT OF WASTE DISCHARGE
AND APPLICATION FOR RENEWAL OF
NPDES CA 0107409
AND 301(H) MODIFIED
SECONDARY TREATMENT REQUIREMENTS**

VOLUME I

Executive Summary



City of San Diego
Public Utilities Department



March 2022

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EXECUTIVE SUMMARY

Request for Renewal of NPDES CA0107409 and Clean Water Act Section 301(h) & 301(j)(5) Modified Discharge Requirements for the Point Loma Wastewater Treatment Plant (PLWTP)

**City of San Diego
Public Utilities Department**



March 2022

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List of Acronyms and Abbreviations

BIP	balanced indigenous population
BOD	biochemical oxygen demand
City	City of San Diego
CWA	Clean Water Act
DDT	dichlorodiphenyltrichloroethane
EIR	Environmental Impact Report
EPA	United States Environmental Protection Agency
JPA	Joint Powers Authority (Metro Wastewater JPA)
MBC	Metropolitan Biosolids Center
MER	mass emission rate (also referred to as a mass loading rate)
Metro System	San Diego Metropolitan Sewerage System
mgd	million gallons per day
mg/L	milligrams per liter
NCPWF	North City Pure Water Facility
NCWRP	North City Water Reclamation Plant
NPDES	National Pollutant Discharge Elimination System
NTP	Notice to Proceed
Ocean Plan	Water Quality Control Plan for Ocean Waters of California
OPRA	Ocean Pollution Reduction Act
PAHs	polyaromatic hydrocarbons
PCBs	polychlorinated biphenyls
PLOO	Point Loma Ocean Outfall
PLWTP	Point Loma Wastewater Treatment Plant
Regional Board	California Regional Water Quality Control Board, San Diego Region
ROV	remotely operated vehicle
SBOO	South Bay Ocean Outfall
SBWRP	South Bay Water Reclamation Plant
State Board	State Water Resources Control Board
TSS	total suspended solids
ZID	zone of initial dilution

ES 1 PURPOSE OF THE SUBMITTAL

The San Diego Metropolitan Sewerage System (Metro System) provides wastewater service for the City of San Diego (City) and 12 participating agencies. The E.W. Blom Point Loma Wastewater Treatment Plant (PLWTP) serves as the terminal treatment facility for the Metro System. The discharge of treated wastewater from the PLWTP to the Pacific Ocean via the Point Loma Ocean Outfall (PLOO) is currently regulated by a permit issued jointly by the California Regional Water Quality Control Board, San Diego Region (Regional Board) and the United States Environmental Protection Agency (EPA). Regional Board Order No. R9-2017-0007 (National Pollutant Discharge Elimination System (NPDES) CA0107409) establishes modified secondary treatment requirements for the PLOO discharge in accordance with Sections 301(h) and 301(j)(5) of the Clean Water Act (CWA).

Order No. R9-2017-0007 was originally adopted by the Regional Board on April 12, 2017. EPA issued final approval of the joint NPDES permit on August 4, 2017 and the permit became effective on October 1, 2017. Order No. R9-2017-0007 expires on September 30, 2022 and the City is required to file a Report of Waste Discharge requesting renewal of the NPDES permit 180 days in advance of this expiration date (April 3, 2022).

The City, as the operating agency of the Metro System, requests renewal of NPDES CA0107409 and renewal of modified secondary treatment standards for total suspended solids (TSS) and biochemical oxygen demand (BOD) established under section 301(h) and 301(j)(5) of the CWA. This submittal also serves as the Report of Waste Discharge, required to be submitted with the City's request for renewal.



The Point Loma Wastewater Treatment Plant is the terminal treatment facility serving a Metro System population of approximately 2.2 million as of 2021.

ES 2 BASIS OF THE SUBMITTAL

ES 2.1 Renewal of Current NPDES Requirements

The City's comprehensive effluent and receiving water monitoring program has documented that the combination of enhanced source control, flow diversion to recycled water use, chemically enhanced primary treatment at the PLWTP, and a deep and efficient ocean outfall ensures that the PLOO discharge complies with all NPDES permit limits and all applicable state and federal water quality-based standards.¹

In addition to implementing water quality-based standards to protect receiving waters, the CWA establishes a technology-based standard² that requires secondary treatment for all municipal wastewater discharges to inland, estuarine, or marine receiving waters. Sections 301(h) and 301(j)(5) of the CWA, however, acknowledge that technology-based secondary treatment requirements may not be appropriate for all discharges and all receiving waters, and allow EPA to issue modified secondary treatment requirements for dischargers that:



The City's comprehensive effluent and receiving water monitoring program demonstrates consistent compliance of the Point Loma discharge with all discharge permit limits and requirements.

- (1) comply with applicable receiving water standards,
- (2) do not unreasonably impact beneficial uses, and
- (3) maintain healthy, balanced indigenous populations (BIPs) of fish and benthic (bottom-dwelling) species outside the designated zone of initial dilution (ZID).

After review of the City's four prior NPDES applications (1995, 2002, 2007, and 2015) for modified secondary treatment requirements, EPA determined in each instance that the PLOO discharge qualified for modified TSS and BOD requirements under Sections 301(h) and 301(j)(5) of the CWA.

1 A water quality-based standard is a standard that is implemented to protect receiving water quality and ensure protection of beneficial uses, including human health and aquatic habitat.

2 A technology-based standard mandates implementation of a certain treatment technology, regardless of the conditions or quality of a given receiving water.

ES 2.2 Requested TSS and BOD Limits

This permit application requests renewal and continuation of the following TSS, and BOD percent removal requirements established in Order No. R9-2017-0007 pursuant to requirements of CWA Sections 301(h) and 301(j)(5):

- monthly average system-wide removal of TSS of 80%, and
- annual average system-wide removal of BOD of 58%.

ES 2.3 Requested Reduction in PLOO TSS Mass Emission Rates

The current Order No. R9-2017-0007 establishes requirements that limit PLOO TSS mass emissions to 11,999 metric tons per year in the final year of the 5-year permit. Consistent with prior permitting approaches since 1995, the City continues to implement system-wide process improvements to reduce PLOO TSS mass emissions and requests further reduction in TSS mass emission rates (MERs) as part of this permit renewal application, as presented in Table ES-1.

**Table ES-1:
Proposed TSS MERs Expressed as Metric Tons per Year (mt/yr)**

Current and Proposed TSS MERs	NPDES Permit Year (from the effective date of the permit to the year five expiration date of the permit)				
	Year 1	Year 2	Year 3	Year 4	Year 5
Existing TSS MER Established in Order No. R9-2017-0007 ¹ (effective October 1, 2017)	12,000	12,000	12,000	12,000	11,999
Proposed TSS MER Requested for this Renewal of NPDES CA0107409^{1, 2}	11,999	11,999	11,999	11,999	11,998
TSS MER Renewal of NPDES CA0107409 ^{1, 3} <i>To Be Effective Upon the Enactment of Relevant Federal Legislation³</i>	11,500 Commencing on December 31, 2025		9,942 ⁴ Commencing on December 31, 2027		

Table ES-1 Notes:

1. Not to include solids contributions from (1) Tijuana, Mexico via the emergency connection, (2) federal facilities in excess of solids contributions received in calendar year 1995, (3) Metro System flows treated in the City of Escondido, (4) South Bay Water Reclamation Plant (SBWRP) flows discharged to the South Bay Ocean Outfall (SBOO), and (5) emergency use of the Metro System participating agencies over their capacity allotment.
2. PLWTP TSS MERs proposed as part of this application for renewal of NPDES CA0107409. TSS MER limits of 11,999 mt/year are proposed for years 1 through 4 of the renewed NPDES permit, and a TSS MER of 11,998 mt/year is proposed for year 5 of the permit.
3. PLWTP TSS MERs to be effective on the listed dates should the Ocean Pollution Reduction Act (OPRA) II or equivalent federal legislation be enacted during the renewal process or effective period of this permit. Such legislation is supported by local environmental groups, citizen and government organizations and scientists from the Scripps Institution of Oceanography.
4. The 9,942 mt/yr TSS MER rate is equivalent to what the PLWTP would be allowed to discharge at its present full permitted capacity under secondary treatment standards.

ES 2.4 Continued Commitment to the Pure Water San Diego Program

In requesting renewal of 301(h) modified discharge limits for TSS and BOD, this NPDES application does not propose any increase (e.g., relaxation) of the NPDES effluent flow rate, concentration limits, performance goals, or mass emission limits established in Order No. R9-2017-0007. To the contrary, this application is based on a continued direction in water and



The Pure Water San Diego program has a goal of producing up to 83 mgd of purified water by December 31, 2035, which would significantly reduce the City's dependence on imported water.

wastewater facilities planning for the City that proposes to systematically reduce future PLOO discharge flows and solids mass emissions through implementation of the Pure Water San Diego Program. Pure Water San Diego is a long-term (approximately 20-year) program that would provide a safe, reliable, and cost-effective water supply for San Diego through the application of advanced treatment technology to purify recycled water. The Pure Water San Diego Program is a joint water and wastewater facilities plan that envisions a significant investment in potable water reuse and

ancillary facilities that will eventually produce up to 83 million gallons per day (mgd) of potable water supply – an amount that equates to approximately 50% of the total City of San Diego potable water demand.

The Pure Water San Diego Program is the result of collaboration between the City of San Diego, Metropolitan Wastewater Joint Powers Authority (JPA), and a diverse array of regional stakeholders. This regional collaboration was intended to address joint regional water and wastewater facilities needs to (1) provide a safe, reliable, and cost-effective local potable water supply, (2) reduce ocean discharge flows and mass emissions, and (3) support future CWA 301(h) modified permits for the PLWTP while also supporting efforts seeking administrative or legislative actions to achieve a streamlined permitting process for the PLOO discharge, such as OPRA II.

The City, Metro Wastewater JPA, and regional stakeholders have agreed to cooperate to:

- implement a comprehensive potable reuse program using state-of-the-art advanced treatment technology to achieve an ultimate goal of 83 mgd of potable reuse by December 31, 2035,
- sufficiently reduce influent flows and solids loads to the PLWTP so that ultimate PLOO TSS mass emissions are reduced to levels that would have occurred if the 240 mgd PLWTP were to achieve secondary treatment TSS concentration standards,
- support the City's application for renewed 301(h) modified TSS and BOD limits for the PLWTP, and

- support the City's pursuit of administrative or legislative efforts to codify that, as a result of implementing the comprehensive Pure Water San Diego Program, the permitting process for the PLOO discharge is simplified to eliminate the need for going through the 301(h) process.

Flows and loads to the PLWTP will be offloaded as each new purified water treatment plant and associated facilities become operational, which in turn will reduce the flow and associated pollutants discharged to the ocean. The Pure Water San Diego Program is currently designed to be implemented in two phases:

- Phase 1: North City Pure Water Project, and
- Phase 2: Central Area Project.

To demonstrate the City's continued commitment to regulators and stakeholders for moving forward with Pure Water San Diego plans, this NPDES application proposes that the schedule of tasks for implementation of Pure Water San Diego, as presented in Table ES-2, be incorporated into in the renewed PLWTP 301(h) permit.

**Table ES-2:
Pure Water San Diego Potable Reuse Tasks, 2022-2028**

Category	Task	Implementation Date ^{1,2,3,4}
Pure Water Phase 1: North City Pure Water Project ⁵	Complete construction for North City potable reuse facility and pipelines	June 30, 2027
	Produce a cumulative total of at least 30 mgd of potable reuse	December 31, 2027
Pure Water Phase 2: Central Area Project ^{4,6,7}	Complete design of a central area small-scale facility at the PLWTP	June 30, 2023
	Begin Central Area Small-Scale Facility Operation	June 30, 2025
	Issue Notices to Proceed (NTPs) for pre-design of potable reuse facility and pipelines	June 30, 2025
	Issue Notice of Preparation for Central Area Project Environmental Impact Report (EIR)	December 31, 2026
	Issue NTPs for full design of potable reuse facility and pipelines	June 30, 2027

Table ES-2 Notes:

1. The listed milestones are those that are expected to occur during the effective period of the renewed permit that is anticipated to potentially extend until the end of 2028.
2. This schedule is based on the current progress as of the date of submission of the permit renewal application.
3. Task completion dates may require modification in the future based on issues related to the regulatory approval schedule, environmental review issues, supply chain interruptions, legal challenges to the proposed program or projects, or other unforeseen circumstances.
4. Phase 1 Pure Water implements an ultimate annual average daily production of 30 mgd of water suitable for potable reuse.
5. Phase 2 Pure Water implements an ultimate annual average daily production of an additional 53 mgd of water suitable for potable reuse resulting in a cumulative total of 83 mgd. The tasks listed in Table 2 represent the work necessary during the renewed permit period to allow for the ultimate production of 83 mgd of water suitable for potable reuse by December 31, 2035.
6. Future permit applications prior to December 31, 2035, may also contain a schedule of tasks necessary to ensure completion and full operation of Phase 2 by December 31, 2035.
7. These tasks are dependent upon future approval by the Mayor and City Council of San Diego.

As noted, Section 301(h) of the CWA allows an alternative approach to the national technology-based secondary treatment requirements, provided that the discharger can demonstrate compliance with requirements that ensure protection of ocean water quality in the absence of secondary treatment. Prior City of San Diego 301(h) applications have demonstrated compliance with all state and federal receiving water standards and all 301(h) and 301(j)(5) CWA requirements for the protection of the ocean environment. As documented within this application, the current PLOO discharge (1) continues to comply with all applicable criteria for issuance of 301(h) and 301(j)(5) modified requirements for TSS and BOD, and (2) ensures that the PLWTP discharge conforms to receiving water standards that are applicable to all ocean dischargers, including maintaining a BIP of fish and wildlife in receiving waters.



Enhanced source control, chemically enhanced treatment, recycled water use, and the long, deep Point Loma Ocean Outfall combine to provide a high level of protection to San Diego's ocean waters that is similar to that provided by a conventional discharge of secondary effluent.

The Pure Water San Diego Program will further this approach by establishing a program goal of capping PLOO TSS mass emissions at 9,942 metric tons per year-by-year 2028 and beyond. This 9,942 metric ton per year MER is equal to the TSS MER that would occur if the PLWTP were to be operated at its 240 mgd capacity while achieving the secondary treatment TSS effluent concentration standard of 30 milligrams per liter (mg/L). The program goal is to cap PLOO mass emissions at 9,942 metric tons per year-by-year 2028 and beyond. This 9,942-metric-tons-per-year TSS MER goal would be achieved with a combination of:

- PLWTP solids offloading resulting from upstream potable reuse and treatment facilities, and
- maintaining chemically enhanced primary treatment at the PLWTP (no conversion of the PLWTP to traditional secondary treatment) that provides a level of TSS removal that is close to that achieved by secondary treatment.

ES 2.5 Consistency with State Policy

State of California's Recycled Water Policy. The 301(h) application submitted herein and the City of San Diego's commitment to implement the Pure Water San Diego Program are in alignment with the State Water Resources Control Board's (State Board's) Recycled Water Policy, which establishes goals and implementation policies for increasing statewide recycled water use. The 2009 Recycled Water Policy, adopted by the State Board under Resolution 2009-0011, establishes statewide recycled water goals, provides implementation direction to Regional Boards for achieving the goals, and mandates that the State Board and Regional Boards encourage the use of recycled water, as consistent with existing authority and regulations. Implementation of the Pure Water San Diego Program will help achieve Recycled Water Policy goals by increasing regional recycled water use by 30 mgd by December 31, 2027 and by 83 mgd by December 31, 2035.



Advanced treatment technology and redundant treatment processes at the City's North City Demonstration Pure Water Facility have demonstrated that the facility can produce purified water that is of very high quality and surpasses all state and federal drinking water regulations.

Regional Board's Practical Vision. The 301(h) application and the City of San Diego's commitment to implement the Pure Water San Diego Program are also in keeping with the 2013 and 2021 San Diego Water Board Practical Vision, which outlines Regional Board water planning priorities. In accordance with the 2013 Practical Vision (Resolution No. R9-2013-0153) "sustainable water supply" element, the City's proposed reuse program reduces the region's dependence on imported water, improves mineral concentrations in local water supplies, maximizes reuse of local water resources, and maintains and promotes the quality and protection of ocean waters. Similarly, the City's proposed reuse program supports the Regional Board's 2021 update (Resolution No. R9-2021-0007) to achieve a sustainable and resilient local water supply while improving water quality and protecting beneficial uses by offloading flows from the PLWTP for potable reuse, increasing access to sustainable, local, high-quality water and decreasing treated wastewater flows to the Pacific Ocean.



The Pure Water San Diego Program will provide a sustainable and resilient local water supply.

ES 3 ORGANIZATION OF THE APPLICATION SUBMITTAL

This application evaluates the effectiveness of the City of San Diego's source control program, treatment facilities, ocean discharge facilities, and monitoring program in protecting San Diego's ocean environment and ensuring compliance with applicable state and federal regulations. This application for modification of secondary treatment requirements has been prepared in accordance with Title 40, Part 125, Subpart G of the Code of Federal Regulations, as promulgated in the Federal Register by EPA on August 23, 1994. This application is also prepared in accordance with the Amended Section 301(h) Technical Support Document published by EPA in September 1994. This application consists of the following volumes:

Volume I – Executive Summary. The Executive Summary presents an overview of the key elements of the City's ocean discharge system and summarizes findings presented in the 301(h) renewal application.

Volume II – NPDES Application. Volume II presents an overview of the basis of the 301(h) application, applicable federal and state NPDES application forms, and an analysis of how the discharge complies with federal and state antidegradation regulations.

Volume III – Large Applicant Questionnaire. Volume III of the submittal package follows the format established in the Large Applicant Questionnaire within Appendix B of Title 40, Part 125, Subpart G of the Code of Federal Regulations. Text responses to individual questions are presented with supporting tables and graphics.

Volumes IV through X – Technical Appendices. Volumes IV through X of the application present 21 technical appendices (and additional sub-appendices) that support responses to questions of the Large Applicant Questionnaire.



The City's continued success in maintaining and improving systemwide treatment processes along with a robust monitoring and reporting program help the City protect the ocean environment and comply with state and federal regulatory requirements.

ES 4 METRO SYSTEM OVERVIEW

ES 4.1 Treatment and Conveyance Facilities

The Metro System provides for the conveyance, treatment, reuse, and disposal of wastewater within a 450-square-mile service area for the City of San Diego and regional participating agencies. Metro System facilities include wastewater collection interceptors and pump stations, wastewater treatment and water recycling plants, sludge pipelines and solids handling facilities, and two ocean outfall systems. Primary Metro System facilities include:

- North City Water Reclamation Plant (NCWRP),
- Metropolitan Biosolids Center (MBC),
- SBWRP and SBOO,
- Pump Stations 1 and 2, and
- PLWTP and PLOO.



Regularly scheduled maintenance activities within the Metro System and at the PLWTP support treatment efficiency and effectiveness.

Each of these Metro System facilities plays a key role in PLWTP operations and NPDES permit compliance. To augment system performance, the City previously implemented an integrated chemical addition approach³ whereby chemical addition at both upstream collection facilities and treatment facilities is utilized to maximize odor control while at the same time enhancing solids removal performance at the PLWTP. Brief descriptions of primary Metro System facilities are presented below.

NCWRP. The 30 mgd NCWRP produces recycled water for delivery to customers in the North City region and is currently undergoing expansion to accommodate additional flows for the Pure Water San Diego Program. Once constructed, the North City Pure Water Facility (NCPWF) will receive flows from NCWRP and will remove 52 mgd of wastewater normally influent to the PLWTP and produce 30 mgd of purified water suitable for potable reuse. Excess NCWRP treated wastewater is returned to the system for transport to the PLWTP. Waste solids are directed to the MBC for digestion and dewatering.

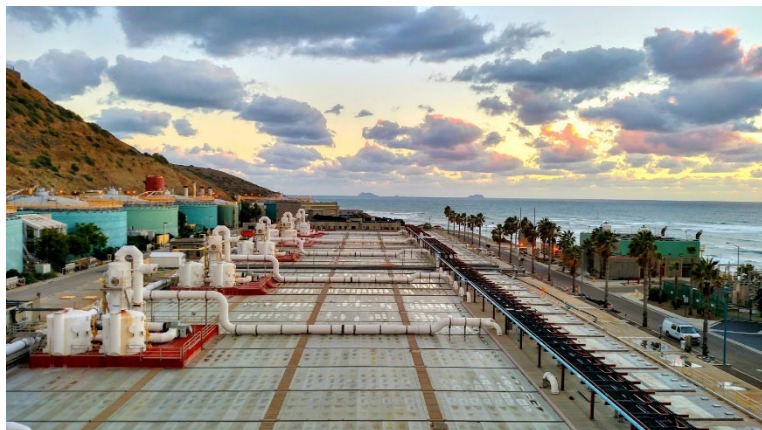
MBC. The MBC digests and dewateres waste biosolids from the NCWRP and dewateres digested biosolids received from the PLWTP.

SBWRP and SBOO. The 15 mgd SBWRP produces recycled water for delivery to customers in the South San Diego region. Solids generated by the SBWRP treatment processes are returned to the system removal at the PLWTP, which are then directed to MBC for digestion and dewatering. SBWRP tertiary treated effluent is directed to a regional recycled water conveyance system for

³ The proprietary PRI-SC technology (Peroxide Regenerated Iron Sulfide Control) involves adding ferrous chloride at upstream points in Metro System collection facilities for odor and sulfide control and adding hydrogen peroxide at downstream points and at the PLWTP to regenerate the iron for use in controlling sulfides and enhancing solids removal at the PLWTP.

reuse. SBWRP flows in excess of recycled water demands receive, at minimum, secondary treatment and are discharged through the SBOO, which is jointly owned by the U.S. International Boundary and Water Commission and the City.

Pump Stations 1 and 2. Pump Station 1 conveys a combination of the flows from the South Metro Interceptor and trucked waste via a receiving station located at Pump Station 1, to Pump Station 2. Virtually all inflow to the PLWTP is conveyed by Pump Station 2. Pump Station 2 has a maximum pumping capacity of 432 mgd. Chemical addition occurs at Pump Station 2 to enhance solids removal at the PLWTP.



The PLWTP is the terminal treatment facility for the Metro System. The Metro System provides conveyance, treatment, reuse, and disposal of wastewater within a 450-square-mile service area for the City and regional participating agencies.

PLWTP and the PLOO. The PLWTP is the terminal treatment facility within the Metro System. The PLWTP provides treatment through a 0.6-inch travelling screen, followed by aerated grit removal, chemically assisted sedimentation, final screening, and effluent disinfection using sodium hypochlorite and polymer prior to discharge to the Pacific Ocean through the PLOO.

The PLOO is one of the longest and deepest municipal wastewater outfalls in the world. The 23,472-foot-long outfall includes a Y-shaped diffuser with two 2,496-foot-long diffuser legs that each has 208 discharge ports engineered to achieve maximum dilution and mixing. Wastewater is discharged at a depth of approximately 310⁴ feet at a distance of more than 4.5 miles offshore. The design of the PLOO helps to protect the ocean environment by (1) achieving a high degree of initial dilution upon discharge, (2) maintaining a submerged plume, (3) preventing the diluted discharge from impinging in and near the Point Loma kelp bed, and (4) preventing the accumulation of solids near the discharge zone. The outfall is computed as achieving a minimum month initial dilution of 20⁴ to 1, and subsequent dilution and dispersion occurs as a result of ocean currents and oceanic mixing⁵. The diluted PLOO discharge is typically confined below a depth of 180 feet. The design of the PLOO diffuser and prevailing ocean currents combine to minimize the potential for re-entrainment of the discharge plume.

4 While this NPDES application describes the PLOO discharge depth as being at an average depth of 310 feet, the actual discharge depth varies with tidal cycles. Due to the height of the diffuser pipe, the depths of the outfall diffuser ports range from 306 to 313 feet below mean lower low water. Maximum water depth in the vicinity of the diffuser is approximately 320 feet.

5 The Ocean Plan specifies that the minimum average month initial dilution be used for purposes of establishing NPDES permit requirements to ensure protection of beneficial uses. Actual PLOO initial dilutions will significantly exceed the 204:1 minimum average month initial dilution throughout most of the year.

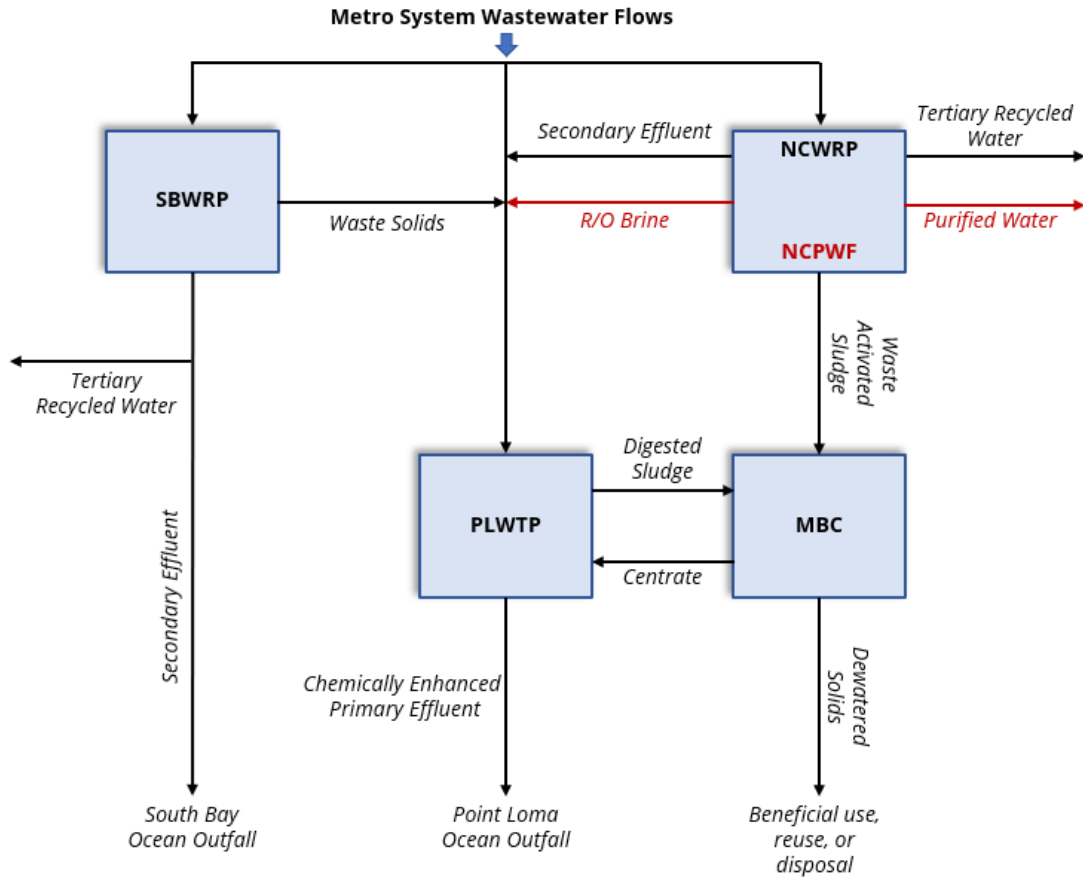
Key Metro System facilities and boundaries of participating agencies are presented in Figure ES-1.

Figure ES-1: Metro System Facilities and Participating Agency Service Areas



Figure ES-2 presents a schematic of Metro System facilities and operations, including the future NCPWF, which is expected to be operational during the next permit cycle.

Figure ES-2: Schematic of Metro System Facilities



Note: Red indicates facilities under construction and flows associated with the Phase 1 NCPWF, expected to be in operation by the end of calendar year 2027.

ES 4.2 Source Control

The City has implemented an EPA-approved Urban Area Pretreatment Program that provides enhanced regulation and control of industrial and non-industrial sources of toxic pollutants. To limit the concentrations of industrial contaminants introduced to the Metro System, the City issues discharge permits, performs compliance monitoring and inspections of industrial discharges, reviews monitoring information, and enforces the permit provisions and state and federal industrial waste pretreatment regulations. The City's Industrial Wastewater Control Program is administered by a staff of professionals that includes industrial wastewater inspectors, technicians, laboratory personnel, and other support personnel.

As part of this comprehensive program, between calendar years 2017 and 2020 the City averaged more than 850 inspections or site visits of industrial facilities per year and over 1,300 unscheduled compliance sampling events per year. The City typically conducts over 15,000 analyses of industrial discharge constituents and reviews and evaluates over 12,000 analytical results from discharger self-monitoring reports annually. The City's industrial source control program has been highly effective. Since inception of the program in 1982, concentrations of most metals in the PLWTP influent have been reduced by approximately a factor of ten. In addition, only a few common toxic organic compounds are detected in the Metro System wastewater, and these compounds (when detected) are typically at or near applicable analytical detection limits.

ES 4.3 Monitoring

The City implements a comprehensive monitoring program to ensure compliance with applicable water quality standards and to assess how the discharge may affect beneficial uses. The program is implemented by a staff of laboratory technicians, biologists, chemists, and other support staff with an annual budget over \$25 million. In addition to featuring influent and effluent monitoring, the monitoring program assesses receiving water quality, sediment chemistry, benthic species occurrence and distribution, and fish tissue monitoring at a wide array of locations both near the outfall discharge and at reference stations. The program operates two ocean research monitoring vessels that include state-of-the-art equipment for the collection and analysis of deep-water monitoring samples.



With a professional staff of technicians, chemists, biologists, and support staff, the City of San Diego conducts the most comprehensive ocean outfall discharge monitoring program in the nation.

ES 5 PROTECTION OF THE OCEAN ENVIRONMENT

Comprehensive oceanography, marine biology, engineering, and other scientific studies have been performed to assess whether the PLWTP discharge adequately protects San Diego's ocean environment. These studies have also evaluated whether the discharge complies with the Water Quality Control Plan for Ocean Waters of California (Ocean Plan) water quality standards, requirements established within the Code of Federal Regulations, and requirements established within Sections 301(h) and 301(j)(5) of the CWA. The following sections summarize the results and conclusions of the comprehensive studies presented within this application to renew NPDES and 301(h) requirements for the PLOO discharge.

ES 5.1 Compliance with State and Federal Standards and Criteria

The PLWTP effluent is routinely analyzed for several hundred physical/chemical, toxic inorganic, and toxic organic constituents. Analysis of data for the period subsequent to the adoption of Order No. R9-2017-0007 demonstrates that the PLOO discharge achieved compliance with:

- all effluent concentration and mass emission standards established within Order No. R9-2017-0007, including achieving 100% compliance with Ocean Plan effluent concentration limits, chronic toxicity standards, and standards for toxic compounds,
- all effluent concentration and mass emission performance goals established within Order No. R9-2017-0007, including achieving 100% compliance with all performance goals for toxic inorganic and organic compounds,
- all State of California receiving water quality standards established within the Ocean Plan for the protection of aquatic habitat and for the protection of public health,
- State of California receiving water quality standards established in the Ocean Plan for the protection of body-contact recreational use, and
- all EPA water quality criteria established for the protection of aquatic habitat, human health and body-contact recreation.

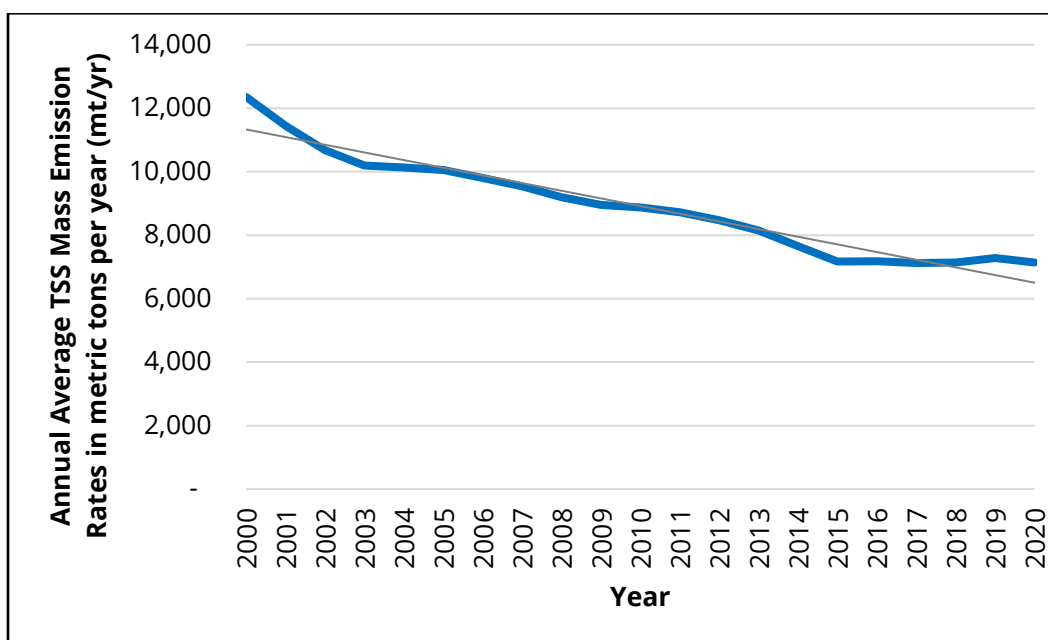
The City's comprehensive ocean monitoring program demonstrates conclusively that receiving water quality in the vicinity of the PLOO is better water quality than necessary to fully protect and support beneficial uses.⁶

⁶ An antidegradation analysis was conducted on both non-chlorinated phenolics and ammonia due to concentrations detected above effluent performance goals contained within Order No. R9-2017-0007. The analysis determined that the water quality impacts were not significant because effluent concentrations of non-chlorinated phenolics and ammonia remain well below 50% of their respective Ocean Plan receiving water quality objectives and the discharge has not affected present or anticipated beneficial uses.

ES 5.2 Clean Water Act 301(h) TSS and BOD Requirements

The City complies with the CWA 301(h) requirement that a minimum 30% removal of TSS, and BOD must be achieved. The PLOO effluent discharge has achieved 100% compliance with this standard and TSS and BOD removal requirements established in Order No. R9-2017-0007. The City achieved a system-wide average TSS removal of approximately 89% and BOD removal of approximately 61% during the effective period of Order No. R9-2017-0007. Additionally, average annual TSS mass emissions have been and continue to be reduced during the period of modified 301(h) TSS and BOD requirements (1995 to present). Figure ES-3 presents the annual average of PLOO TSS mass emissions from 2000 to 2020. As demonstrated in Figure ES-3, the PLWTP ocean discharge has achieved significant reduction in TSS mass emissions over the past 20 years. A continued downward trend is anticipated once flows are diverted to the NCPWF.

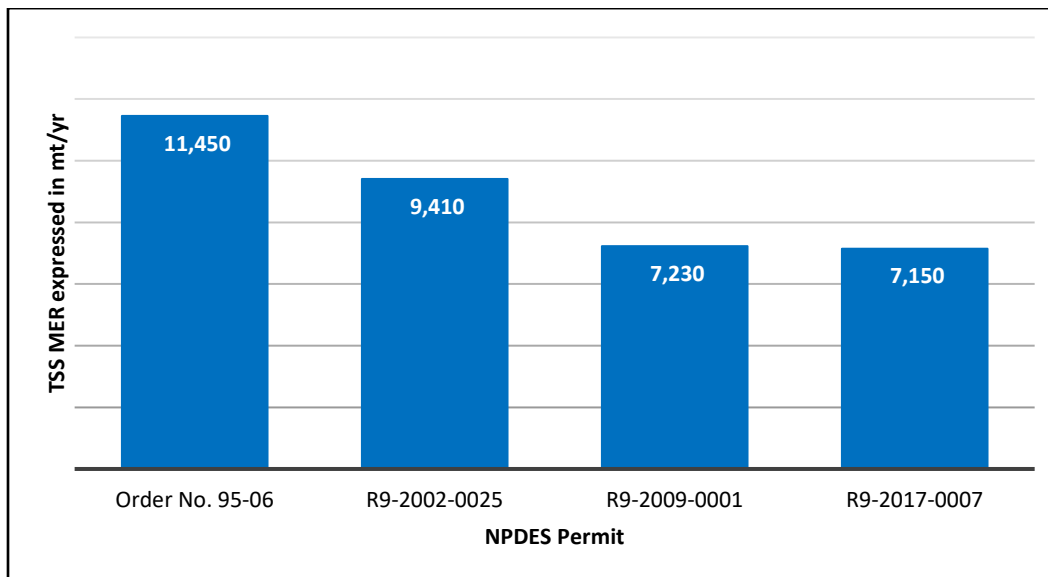
Figure ES-3: Annual Average of PLWTP Effluent TSS MERs, 2000-2020



Notes: The blue line indicates Annual Average TSS Mass Emissions from the PLWTP effluent. The grey line indicates the linear trend of TSS mass emissions from the PLWTP effluent ($R^2 = 94\%$). Calendar year 2020 is the most recent year for which a complete 12-month data set was available at the time of preparation of this report; 2021 data will be electronically transmitted to regulators under separate cover.

Figure ES-4 presents the average annual TSS mass emissions during each modified permit period since the approval of the first modified permit, Order No. 95-06, in 1995.

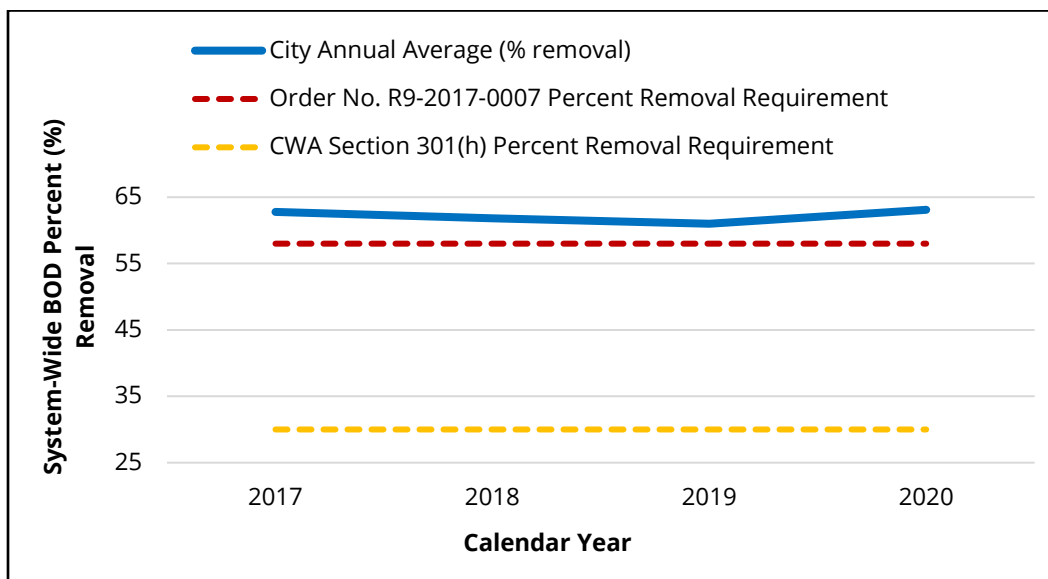
Figure ES-4: Average Annual PLOO TSS MERs (mt/yr) During Effective Periods of NPDES Permits



Note: Calendar year 2020 is the most recent year for which a complete 12-month data set was available at the time of preparation of this report; 2021 data will be electronically transmitted to regulators under separate cover.

The City has also achieved 100% compliance with system-wide annual average BOD percent removal requirements established in Order No. R9-2017-0007. Figure ES-5 presents annual average BOD system-wide removals for calendar years 2017 to 2020.

Figure ES-5: Annual Average of System-Wide BOD Removal, 2017-2020



Note: Calendar year 2020 is the most recent year for which a complete 12-month data set was available at the time of preparation of this report; 2021 data will be electronically transmitted to regulators under separate cover.

ES 5.3 Clean Water Act 301(j)(5) Requirements

The PLOO discharge has achieved 100% compliance with CWA 301(j)(5) requirements that require a minimum monthly average TSS removal of 80% and a minimum annual average BOD removal of 58%, as incorporated into Order No. R9-2017-0007. Table ES-3 summarizes PLWTP BOD and TSS removal during calendar years 2017-2020.

**Table ES-3:
System-Wide BOD and TSS Removal, 2017-2020**

Calendar Year	Annual Average Percent BOD Removal ¹	Annual Average Percent TSS Removal ¹	Monthly Average Percent TSS Removal ¹	
			Minimum Month	Maximum Month
2017 ²	62.8	89.4	84.8	90.8
2018	61.8	89.0	85.6	90.8
2019	61.0	88.5	84.7	90.4
2020	63.1	89.8	88.2	91.1

Table ES-3 Notes:

1. TSS and BOD percent removal computed on a system-wide basis. Calendar year 2020 is the most recent year for which a complete 12-month data set was available at the time of preparation of this report; 2021 data will be electronically transmitted to regulators under separate cover.
2. Order No. R9-2017-000 became effective on October 1, 2017. Data are presented for the entire 2017 calendar year.

As demonstrated in Sections 4.1 and 5.2, respectively, the City has also complied with the Clean Water Act 301(j)(5) requirements to achieve a system capacity of 45 mgd of reclaimed wastewater by 2010 and reduce emissions of TSS discharged to the ocean during the period of modification.

ES 5.4 Physical Oceanography

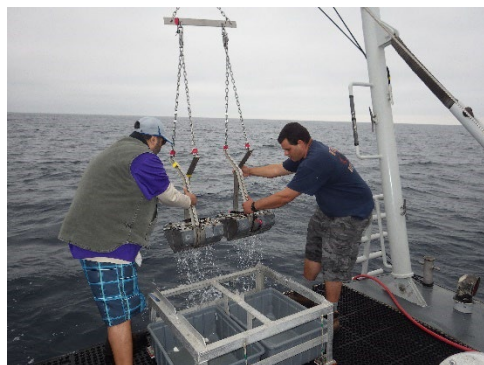
Comprehensive oceanographic studies were conducted to support design and construction of the PLOO, and the City continues to collect and analyze oceanographic data to assess local ocean currents, temperature and salinity profiles, and plume transport. The PLOO diffuser is sited at the edge of the mainland shelf. Beyond the outfall diffuser, the ocean bottom significantly increases in depth. The rapidly increasing depth allows for maximum dispersion of particles before contacting bottom sediments. Ocean currents off the Point Loma coast are generally longshore, but localized and variable cross-shore flow also occurs. Density stratification due to temperature and salinity is a key factor influencing vertical mixing within the ocean. Waters off the coast of



The City's ocean monitoring vessels are equipped to assess water quality throughout the entire water column at each of more than 40 kelp bed and offshore monitoring stations at depths of up to 320 feet.

Point Loma are density stratified for much of the year, with peak stratification occurring during the late summer. As a result of this density stratification, discharged effluent is typically trapped in deep waters and is prevented from rising to the surface.

Fate of Discharged Solids. Upon initial dilution, effluent suspended solids are mixed with marine particles entrained in the ambient receiving waters. Natural concentrations of suspended solids in Point Loma ocean waters can be highly variable and range from approximately 3 mg/L to over 10 mg/L. The Point Loma outfall discharge adds approximately 0.1 mg/L to this background



More than 20 years of sediment chemistry monitoring and inspections of the outfall by ROVs demonstrate that solids are not accumulating in sediments either near or beyond the outfall.

concentration in the immediate vicinity of the outfall discharge. This small increment typically represents only 1% or 2% of the ambient TSS in the immediate discharge zone, and most of this small increment is organic and subject to decay and biological uptake. Small particles not taken up by organisms are dispersed by ocean currents and quickly become unrecognizable above the ambient background concentration.

Sediment monitoring data and inspections of the PLOO discharge zone by remotely operated vehicles (ROVs) during the over 20-year operating history of the extended PLOO (when the outfall was extended to over 4.5 miles offshore) demonstrate that solids are not accumulating in ocean sediments. Sediment data collected since 1994 do not indicate any trends in sediment chemistry or deposition that would degrade marine life. The sediment data further demonstrate that toxic organic compounds in the sediments are typically less than the corresponding analytical detection limits in the immediate outfall area. Elevated concentrations of polychlorinated biphenyls (PCBs), dichlorodiphenyltrichloroethane (DDT), and polyaromatic hydrocarbons (PAHs) have been detected in areas centered around a dredge disposal site south of the outfall and an area north of the outfall near the mouth of the San Diego River, but these elevated concentrations are not related to operation of the PLOO. Sediment concentrations of metals in and near the outfall discharge zone continue to be near background concentrations. Further, sediment BOD concentrations near the outfall continue to be within the range typically seen along the coast of Point Loma.

Dissolved Oxygen. Wastewater discharged through the Point Loma outfall contains biodegradable organic matter. The organic material exerts a demand on dissolved oxygen as the organic material is biologically and chemically broken down in the marine environment after discharge. To ensure protection of aquatic habitat, the Ocean Plan requires that wastewater discharges not cause ambient dissolved oxygen concentrations to be depressed more than 10%. Under worst case conditions, the dissolved oxygen demand associated with the PLOO discharge is computed as depressing ambient dissolved oxygen concentrations by 0.05 mg/L. This

computed 0.05 mg/L value represents a dissolved oxygen depression of approximately 1% under maximum stratification conditions, a value that complies with the Ocean Plan standard by a significant margin.

Monitoring data collected during the past 20 years off the coast of Point Loma demonstrate that ambient dissolved oxygen concentrations follow general seasonal patterns. Maximum dissolved oxygen concentrations (of approximately 10 mg/L) can occur during late spring and summer months when solar incidence, water temperatures, and phytoplankton activity are highest. Lowest dissolved oxygen concentrations (of approximately 3 mg/L at depth) can occur during the spring when cold, saline, deeper offshore water that contains lower natural dissolved oxygen concentrations upwells and moves toward shore. Monitoring data collected to date demonstrate that present day receiving water dissolved oxygen concentrations and seasonal trends are consistent with pre-discharge data collected prior to the construction of the extended PLOO.



Observations and monitoring conducted as part of the City of San Diego's ocean monitoring program demonstrates that the Point Loma discharge does not negatively impact beneficial uses, fishing, or recreation.

Beneficial Uses. Beneficial uses that occur off the coast of Point Loma include recreation, fishing, and the support of marine habitat. Key water-contact recreational activities include swimming, tide pooling, wading, snorkeling, surfing, diving, and sailboarding. Non-contact recreational activities include fishing, sailing, power boating, and whale watching.

Water contact recreational activities are primarily limited to the immediate shoreline or kelp bed. Extensive monitoring demonstrates that the plume from the PLOO does not reach shoreline areas, and that water quality complies with Ocean Plan water contact recreation bacteriological standards in kelp bed areas, as well as in surrounding offshore areas. No water contact recreational activities have been observed outside the State-regulated three nautical mile limit, but monitoring data demonstrate that these offshore waters comply with federal recreational bacteriological criteria. No current federal, state, or local restrictions on recreational activities exist within the Point Loma outfall discharge area.



The City of San Diego's ocean monitoring program utilizes modern water quality monitoring techniques to ensure protection of the environment and beneficial uses.

Sediments. Sediment conditions have been analyzed based on a total of 10 pre-discharge surveys (conducted prior to operation of the PLOO extension) and 54 post-discharge surveys (conducted after discharge from the extended PLOO was initiated). The sediment surveys involve sample collection at 12 primary and 10 secondary outfall and

reference stations. The sediment sampling data demonstrate that sediment concentrations in the discharge area do not degrade marine life. Small increases in sulfide and BOD concentrations have occurred nearest the outfall diffusers, but these increases do not affect sediment quality to the point that it degrades resident marine biota.

Benthic Infauna. Point Loma benthic infauna communities were analyzed based on 10 pre-discharge and 54 post-discharge surveys that involved sample collection at 12 primary core stations and 10 secondary core stations. After over 20 years of discharge from the extended PLOO, monitoring results show that a BIP is maintained beyond the designated ZID. Key species parameters such as infaunal abundance, species diversity, Benthic Response Index, and the numbers and populations of indicator species are maintained within the limits of variability that typify natural benthic communities of the Southern California Bight.

Benthic communities near the outfall continue to be dominated by ophiuroid-polychaete-based assemblages that are prevalent within the Southern California Bight. Although variable, infaunal communities off Point Loma have remained stable from year to year in terms of number



Biologists examine, identify, sort, and tabulate benthic species collected as part of the City's comprehensive ocean monitoring program.

of species, number of individuals, and dominance, values for these parameters in the outfall area are similar to elsewhere in the Southern California Bight. While this overall stability occurs, several trends are evident from comparing pre-discharge and post-discharge conditions. First, there is a general increase in the total abundance and number of benthic infauna species since the discharge was initiated. The increase in species richness is most pronounced nearest the outfall, contrary to what would be expected if environmental degradation were occurring. Increases in infaunal abundance were also generally accompanied by decreases in dominance, another pattern contrary to known pollution effects.

Although some changes in benthic assemblages have appeared in the Point Loma receiving waters, these assemblages are still similar to those present prior to the discharge. The assemblages are also similar to natural indigenous communities within the Southern California Bight.

Demersal Fish and Megabenthic Invertebrates. Demersal fish and megabenthic invertebrate communities were analyzed based on 30 pre-discharge and 291 post-discharge otter trawls. Analyses of temporal and special patterns did not reveal any distinct effects of the outfall discharge on fish or invertebrate communities. The distribution of fish species and populations remained within the range of natural variability for the Southern California Bight, and no changes in community structure were detected in the immediate outfall area that corresponded to the initiation of the wastewater discharge. Finally, the lack of physical abnormalities and indicators of disease such as fin rot, lesions, and tumors suggest that fish populations have remained healthy off Point Loma.

Balanced Indigenous Population. Regulations promulgated pursuant to Section 301(h) of the CWA require that modified 301(h) discharges result in the maintenance of a balanced indigenous population beyond the boundary of the ZID.

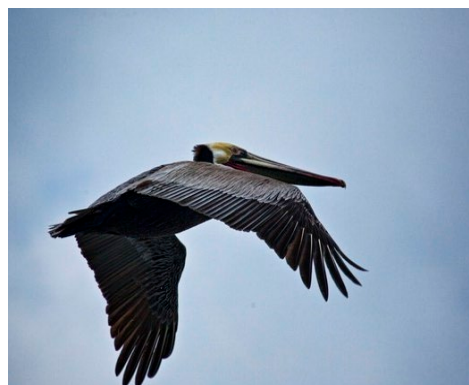


The City's comprehensive ocean monitoring program demonstrates that a balanced indigenous population of benthic organisms exists beyond the PLOO ZID. Common types of benthic invertebrates that are abundant throughout the outfall area and up and down the Point Loma coast include polychaetes, echinoderms, mollusks and crustaceans.

Benthic species, demersal fish, and sediment chemistry samples collected during the current NPDES period continue to demonstrate that a BIP of benthic infaunal organisms and demersal fishes exists beyond the Point Loma outfall ZID. Communities near and beyond the ZID boundary and at reference sites continue to remain characteristic of undisturbed habitat, as demonstrated by trends in total abundance, diversity, species dominance, and species abundances. Further, remote vehicle television observations in the areas around and offshore of the Point Loma outfall have documented no significant sediment accumulation within and beyond the ZID.

Organic and contaminant loading of sediments is not evident in the discharge vicinity. Further, the ZID boundary is characterized by a non-degraded benthic infaunal community that is representative of indigenous species and populations living under natural conditions. Key community factors such as abundance, diversity, benthic response index, and patterns of key "indicator" species are being maintained within the limits of variability that typify naturally occurring regional benthic communities of southern California's outer continental shelf.

Endangered/Threatened Species. A number of threatened or endangered species may contact the waters off the coast of Point Loma, but only deep-diving species (e.g., marine mammals) have the potential for any short-term contact with the discharged wastewater. Through over 40 years of data collection, the comprehensive PLOO ocean monitoring program has not produced any evidence that indicates that the PLOO discharge discernibly and adversely affects fish, kelp, birds, plankton, wildlife, or threatened or endangered species. The City continues to work with appropriate federal agencies to address concerns related to threatened and endangered species and will implement recommended actions, as appropriate.



More than 40 years of monitoring demonstrates that the Point Loma discharge does not adversely impact kelp, birds, fish, or plankton.

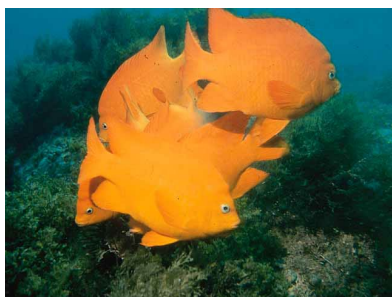
The PLOO discharge has demonstrated consistent compliance with Ocean Plan receiving water standards and federal water quality criteria for the protection of aquatic habitat and marine life.

ES 6 CONCLUSIONS

Requirements governing the modification of secondary treatment standards are established in Title 40, Section 125 of the Code of Federal Regulations. As summarized in Sections 5.2 and 5.3, the Point Loma discharge system conforms with each of these CWA 301(h) and 301(j)(5)

requirements. The attached application for renewal of NPDES CA0107409 demonstrates that maintaining the existing modified 301(h) requirements for TSS and BOD will continue to provide full protection of the ocean environment and beneficial uses. This NPDES renewal application documents that:

- The PLOO discharge achieves compliance with concentration, percent removal, and mass emission effluent standards and performance goals established within Order No. R9-2017-0017 (NPDES CA0107409).



The Point Loma Ocean Outfall discharge complies with State of California standards for dissolved oxygen and water clarity.

- The PLOO discharge complies with TSS mass emission requirements established within Order No. R9-2017-0007, and the PLOO discharge achieved a reduction in overall TSS mass emissions when compared to the prior NPDES permit period (Order No. R9-2009-0001).
- During the current NPDES effective period, the PLOO discharge complied with applicable receiving water standards and federal water quality criteria for the protection of beneficial uses, including Ocean Plan recreational body contact bacteriological standards that are applicable within state-regulated waters (within three nautical miles of the shore) and federal recreational body-contact criteria applicable outside the three nautical mile limit.
- The existing TSS and BOD concentration and percent removal limits established in the current Point Loma NPDES permit are consistent with maintaining the existing high quality of ocean waters off the coast of Point Loma.
- The PLOO provides a high degree of initial dilution, effectively disperses the discharged wastes, and maintains the dilute waste field at more than 100 feet below the ocean surface 99% of the time.
- The PLOO discharge does not result in the accumulation of solids in sediments either near or beyond the PLOO. Since the PLOO became operational, no trends in sediment chemistry or deposition have been observed that would degrade marine life.
- A BIP of fish, shellfish, and wildlife continues to be maintained beyond the ZID.

- The PLOO discharge does not create any discernible negative impacts on beneficial uses, fishing, habitats of special significance, recreation, or public water supplies.
- The PLOO discharge complies with Ocean Plan receiving water requirements for dissolved oxygen and water clarity.
- The City's Industrial Wastewater Control Program has been effective in reducing and controlling the discharge of toxic pollutants to the sewer system.



The Point Loma discharge meets Clean Water Act Section 301(h) and 301(j)(5) criteria for renewal of modified secondary treatment requirements for TSS and BOD.

- The City is continuing efforts to reduce wastewater discharges to the ocean by expanding recycled water and reuse capabilities through traditional recycled water production.
- The City (in concert with the Metro Wastewater JPA and a diverse array of regional stakeholders) has committed to implementing the comprehensive Pure Water San Diego Program, an approximately 20-year joint water and wastewater facilities plan that will (1) implement a comprehensive potable reuse program using state-of-the-art advanced treatment technology that is intended to achieve an ultimate goal of 83 mgd of potable reuse by December 31, 2035, and (2) sufficiently reduce influent flows and solids loads to the PLWTP so that ultimate PLOO TSS mass emissions are reduced to levels that would have occurred if the 240 mgd PLWTP were to achieve secondary treatment TSS concentration standards.
- The PLOO discharge meets the statutory requirements of Sections 301(h) and 301(j)(5) of the CWA.

Table ES-4 summarizes the City’s compliance with the CWA 301(h) and 301(j)(5) criteria.

**Table ES-4:
Summary of Compliance with 301(h) and 301(j)(5) Criteria**

301(h) and 301(j)(5) Requirement	Compliance Demonstrated in City of San Diego Application?
Discharge must comply with applicable state and federal water quality standards and criteria at and beyond the ZID	Yes
Discharge must not impact public water supplies	Yes
A BIP of fish and wildlife must exist beyond the ZID	Yes
Discharge must not contribute to destruction of areas of critical habitat	Yes
Discharge must not interfere with migratory pathways	Yes
Discharge must not result in accumulation of toxic pollutants which adversely affect biota within the ZID	Yes
Discharge must not contribute to stimulation of phytoplankton blooms	Yes
Discharge must not lead to restrictions on recreational activities	Yes
Discharge must have monitoring program to provide data to evaluate the impact of the discharge	Yes
Discharge must not adversely affect other point or non-point discharges	Yes
Discharge must have an approved pretreatment program	Yes
Discharger must submit a nonindustrial source control program	Yes
Discharger must achieve a system capacity of 45 mgd of reclaimed wastewater by 2010	Yes
Discharger must reduce emissions of solids discharged to the ocean during the period of modification	Yes

For these reasons, the PLWTP discharge qualifies for renewal of modified secondary treatment requirements for TSS and BOD in accordance with the requirements of and regulations established pursuant to Sections 301(h) and 301(j)(5) of the CWA.