City of San Diego
PUBLIC UTILITIES
Water & Wastewater

Application For Renewal of NPDES CA0107409 and 301(h) Modified Secondary Treatment Requirements

POINT LOMA OCEAN OUTFALL

Volume III
Large Applicant Questionnaire

January 2015

THE CITY OF SAN DIEGO PUBLIC UTILITIES DEPARTMENT

Application for Renewal of NPDES CA0107409

301(h) Modified Secondary Treatment Requirements for Biochemical Oxygen Demand and Total Suspended Solids

POINT LOMA OCEAN OUTFALL &
POINT LOMA WASTEWATER TREATMENT PLANT

Submitted pursuant to
Sections 301(h) and 301(j)(5) of the Clean Water Act

City of San Diego
Public Utilities Department
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January 2015

APPLICATION FOR RENEWAL OF NPDES CA0107409
301(h) MODIFIED SECONDARY TREATMENT REQUIREMENTS

Point Loma Ocean Outfall
Point Loma Wastewater Treatment Plant

VOLUME III
LARGE APPLICANT QUESTIONNAIRE

Volume III Summary: *Regulations established in Title 40, Section 125, Subpart G, of the Code of Federal Regulations require 301(h) applicants to respond to a series of technical questions (Large Applicant Questionnaire). This volume presents responses to the Large Applicant Questionnaire. Technical Appendices supporting the Large Applicant Questionnaire responses are presented in Volumes IV through X. As documented within the application, the Point Loma Ocean Outfall discharge complies with all applicable regulations and requirements established pursuant to Sections 301(h) and 301(j)(5) of the Clean Water Act.*

LIST OF VOLUMES

LARGE APPLICANT QUESTIONNAIRE

Responses to Large Applicant Questionnaire
Title 40, Section 125, Subpart G

San Diego Public Utilities Department

January 2015

LARGE APPLICANT QUESTIONNAIRE

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List of Abbreviations

ACOE	U.S. Army Corps of Engineers
ASBS	Areas of Special Biological Significance
ATSD	EPA 1994 *Amended Section 301(h) Technical Support Document*
BIP	balanced indigenous population
BMP	Best Management Practices
BOD	biochemical oxygen demand
BRI	Benthic Response Index
CalCOFI	California Cooperative Oceanic Fisheries Investigation
California Ocean Plan	2012 *Water Quality Control Plan, Ocean Waters of California*
CDFW	State of California Department of Fish and Wildlife
CDOM	colored dissolved organic matter
CFR	*Code of Federal Regulations*
CFL	Contributory Flow Limits
CFU	colony forming unit
CIU	Categorical Industrial User
cm	centimeters
CPFV	commercial public fishing vessels
CTD	conductivity, temperature, depth
CWA	Clean Water Act
DNQ	detected not quantifiable
DPS	Distinct Population Segment
ELAP	Environmental Monitoring Accreditation Program
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
FIB	fecal indicator bacteria
ft	feet
gpm	gallons per minute
gpd	gallons per day
IWCP	Industrial Waste Control Program
HHW	household hazardous waste
km	kilometer

List of Abbreviations
(continued)

m	meters
m^2	square meter
m^3/sec	cubic meters per second
MBC	Metro Biosolids Center
MDL	method detection limit
MER	mass emission rate
Metro System	San Diego Metropolitan Sewerage System
mgd	million gallons per day
mg/l	milligrams per liter
mg/kg	milligrams per kilogram
MLLW	mean low low water
MMPA	Marine Mammal Protection Act
MPA	marine protected area
mt/yr	metric tons per year
nm	nautical mile
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
North City WRP	North City Water Reclamation Plant
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Units
PAHs	polynuclear aromatic hydrocarbons
PLOO	Point Loma Ocean Outfall
Point Loma WWTP	Point Loma Wastewater Treatment Plant
ppm	parts per million
PRI-SC	Peroxide Regenerated Iron Sulfide Control
PUD	City of San Diego Public Utilities Department
PWC	personal watercraft
Regional Board	Regional Water Quality Control Board, San Diego Region
SBOO	South Bay Ocean Outfall
SCB	Southern California Bight

List of Abbreviations
(continued)

SCCWRP	Southern California Coastal Water Research Project
SIO	Scripps Institution of Oceanography
SIU	Significant Industrial User
SMCA	State Marine Conservation Area
SMR	State Marine Reserve
South Bay WRP	South Bay Water Reclamation Plant
State Board	State Water Resources Control Board
SWQPA	State Water Quality Protection Area
TOC	total organic carbon
TSS	total suspended solids
TVS	total volatile solids
USDON	U.S. Department of the Navy
USFWS	United States Fish and Wildlife Service
ZID	zone of initial dilution

Section I
Introduction

Renewal of NPDES CA0107409

I. INTRODUCTION

Section 301(h) of the Clean Water Act (CWA) establishes conditions under which the U.S. Environmental Protection Agency (EPA) may issue modified secondary treatment requirements for ocean discharges of treated municipal wastewater. EPA has promulgated regulations governing the application for such modified secondary treatment requirements within Title 40, Section 125, Subpart G of the *Code of Federal Regulations*.

Appendix B to 40 CFR 125, Subpart G presents a two-section questionnaire to be used by large applicants for modification of secondary treatment requirements. The City of San Diego meets the criteria for a large applicant; a large applicant is defined as a discharger serving a population of 50,000 or more, or having a discharge flow in excess of 5 million gallons per day (mgd).

Response Format - Large Applicant Questionnaire

The questionnaire presented in 40 CFR 125, Subpart G, Appendix B includes the following two sections of questions:

Section II General Information and Basic Data Requirements

Section II of the questionnaire presents questions for describing the treatment, source control, and outfall system, the proposed discharge, receiving water conditions, and how the discharge complies with state and federal laws.

Section III Technical Evaluation

Section III of the questionnaire presents questions to assess the effects of the discharge. Section III questions assess the physical characteristics of the discharge, compliance with water quality standards, impacts on public water supplies and recreation, biological impacts of the discharge, and compliance with applicable regulations for toxics control.

Guidance for responding to the questions is provided in *Amended Section 301(h) Technical Support Document* (hereinafter ATSD) EPA Publication 842-B-94-007, September 1994).

In accordance with direction presented in the *Amended Section 301(h) Technical Support Document*, the following sections present responses to the Section II and Section III questions from the Large Applicant Questionnaire. For questions requiring lengthy responses, a brief synopsis of the response is presented in italics at the beginning of the response. More detailed information is presented in regular type font below the italicized summary.

Attached Technical Studies. Responses to more complex issues are evaluated in detail within attached technical appendices presented in Volumes IV through X. Table I-1 summarizes technical appendices presented in support of the City of San Diego 301(h) application.

Table I-1
Technical Appendices to the 2015 301(h) Renewal Application, Volumes IV through X

Volume	Appendix	Description and Sub-Appendices	Original to 2014 301(h) Application[1]	Reprinted from Prior Application
IV	A	Existing Metro System Facilities and Operations	✓	
	B	Future Metro System Facilities: Appendix B.1 Planned Metro System Facilities Improvements Appendix B.2 2012 Recycled Water Use Study Appendix B.3 Water Purification Demonstration Project Report	 ✓ ✓ ✓	
V	C	Ocean Benthic Conditions: Appendix C.1 Benthic Sediments, Invertebrates and Fishes Appendix C.2 San Diego Benthic Tolerance Intervals Appendix C.3 San Diego Regional Sediment Quality Contour Plots Appendix C.4 San Diego Sediment Mapping Study Appendix C.5 Deep Benthic Habitat Assessment Study	 ✓ ✓ ✓ ✓ ✓	
	D	Bioaccumulation Assessment	✓	
VI	E	Sources of PCB Contamination	✓	
	F	Point Loma Ocean Outfall Plume Behavior Study	✓	
	G	Kelp Forest Ecosystem Monitoring Report	✓	
	H	Coastal Remote Sensing Annual Reports	✓	
VII	I	Beneficial Use Assessment: Appendix I.1 Beneficial Use Evaluation Appendix I.2 Compliance with Body Contact Recreation Standards	 ✓ ✓	
	J	Endangered Species Assessment	✓	
	K	Essential Fish Habitat Assessment	✓	
	L	Proposed Monitoring Program	✓	
VIII	M	2013 Annual Biosolids Report	✓	
IX	N	Source Control Program	✓	
	O	2013 Annual Pretreatment Program Report	✓	
X	P	Oceanography		✓
	Q	Initial Dilution Simulation Models		✓
	R	Re-Entrainment		✓
	S	Dissolved Oxygen Demand	✓	
	T	Analysis of Ammonia	✓	
	U	2012 California Ocean Plan	✓	
	V	Correspondence	✓	

1 Includes appendices based on prior 301(h) applications which include updated effluent or receiving water data or computations.

As shown in Table I-1, several technical studies (and associated data) related to oceanography and outfall performance were presented as part of prior PLOO 301(h) applications. These studies remain valid, and for completeness are again presented within this 2014 301(h) application. These studies include:

- Oceanography (presented in Appendix P),
- Initial Dilution Simulation Models (presented in Appendix Q),
- Re-Entrainment (presented in Appendix R), and

Several of the Large Applicant Questionnaire sections involve items for which both of the following conditions are satisfied:

- no material change in facilities, operations, or oceanographic conditions have occurred since the City's prior 2007 301(h) application, and
- the question at issue is not affected by modifications in Metro System facilities or operations that have been implemented since the prior application.

For questions satisfying both of the above conditions, applicable technical studies are summarized and referenced, and the reader is additionally referred to the appropriate detailed response presented within the City's prior 301(h) waiver applications.

Effluent and Receiving Water Data. Effluent and receiving water monitoring data required under the provisions of Monitoring and Reporting Program No. R9-2009-0001 (NPDES CA0107409) have been previously submitted by the City to the Regional Water Quality Control Board (Regional Board) in the form of monthly, quarterly, semiannual, and annual reports. These reports are incorporated by reference as part of this 301(h) application.

In accordance with an agreement between City staff and staff of EPA Region IX, to eliminate duplication and paper waste, effluent and receiving water data from these reports are not reprinted in their entirety herein. Instead, these data have been transmitted to EPA in electronic format. Additionally, the data are summarized and analyzed where appropriate within the Large Applicant Questionnaire and attached appendices.

Data Period Evaluated. This application evaluates influent, effluent, receiving water, beneficial use, and marine habitat data collected pursuant to monitoring requirements established within Order No. R9-2009-0001, This application also presents the results of special studies that have been conducted pursuant to provisions of Order No. R9-2009-0001.

Order No. R9-2009-0001 became effective on August 1, 2010. To eliminate the potential for seasonal bias by utilizing data from partial years, this 301(h) application focuses on evaluating data collected from complete calendar years. For this reason, many of the analyses presented herein consider data from complete calendar years 2010-2013. (Calendar year 2013 was the last complete calendar year of data available at the time of preparation of this application.)

It should be noted that a portion of the year 2010 data were collected pursuant to monitoring requirements established in the prior NPDES permit (Order No. R9-2002-0025). Data collected pursuant to Order No. R9-2002-0025, however, remain relevant to evaluating the effects of the PLOO discharge. These data are also useful in evaluating the potential for exceeding requirements established within Order No. R9-2009-0001.

While a complete data set for calendar year 2014 was not available at the time of preparation of this application, all year 2014 data will be transmitted to regulators in electronic format when the data becomes available in early 2015.

Section II
GENERAL INFORMATION AND BASIC DATA REQUIREMENTS

Renewal of NPDES CA0107409

Section II.A
Treatment System Description

Renewal of NPDES CA0107409

II. GENERAL INFORMATION AND BASIC DATA REQUIREMENTS

II.A TREATMENT SYSTEM DESCRIPTION

II.A.1. On which of the following are you basing your application: a current discharge, improved discharge, or altered discharge, as defined in 40 CFR 125.58? [40 CFR 125.59(a).]

SUMMARY: This application is based on a current discharge, as defined by 40 CFR 125.58(h).

40 CFR 125.58(h) defines a current discharge as:

> *h. Current discharge means the volume, composition, and location of an applicant's discharge at the time of permit application.*

The volume, composition, and location of the Point Loma Ocean Outfall (PLOO) discharge and the description of Metro System treatment facilities is as documented within the findings of Order No. R9-2009-0001. This permit application does not request or propose any changes in effluent concentrations standards, nor does the application request any increase in mass emissions. The application is based on a current discharge, as defined by 40 CFR 125.58.

While the application is based on a current discharge, it is worth noting that a significant number of Metro System improvements have been implemented during the past 20 years. Additionally, as noted in the "Basis of Application" (Volume II), as part of this application the City proposes implementation of a long-term program directed toward significantly increasing recycled water use and reducing future PLOO discharge flows and solids mass emissions.

Summary of Past Metro System Improvements. The Point Loma Wastewater Treatment Plant (Point Loma WWTP) discharge has operated under modified secondary treatment requirements for total suspended solids (TSS) and biochemical oxygen demand (BOD) since 1995. During this period, the City of San Diego, as operator of the Metro System, has implemented a systematic sequence of planned facilities improvements that are directed toward developing recycled water supplies, improving wastewater treatment, reducing PLOO discharge flows, and reducing PLOO mass emissions.

Table II.A-1 (page II.A-3) summarizes progressive Metro System improvements during the prior three 301(h) NPDES permit periods that address the reduction of PLOO discharge flows and/or improve treatment at the Point Loma WWTP. As a result of these actions, the City has been able to achieve (see Figures II.A-1 and II.A-2) a consistent reduction in PLOO TSS mass emissions during each of the prior 301(h) NPDES periods.

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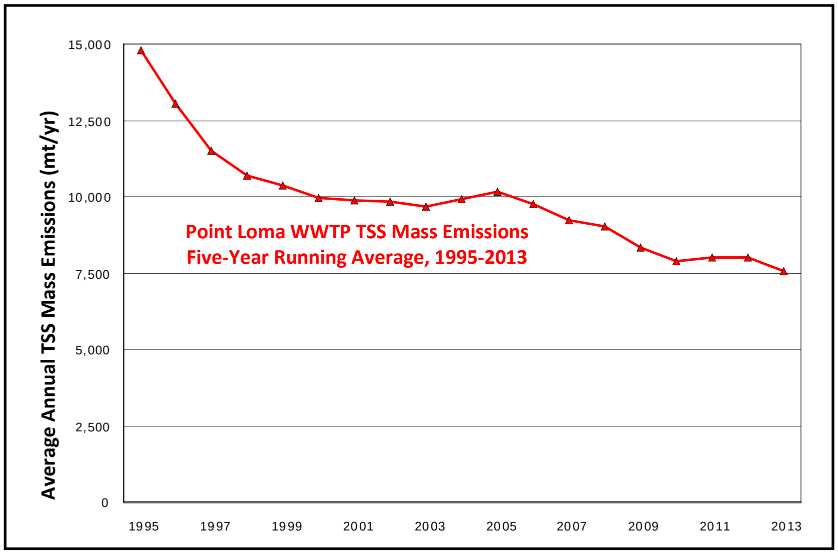

Figure II.A-1 Point Loma WWTP Effluent TSS Mass Emissions Five-Year Running Average, 1995-2013

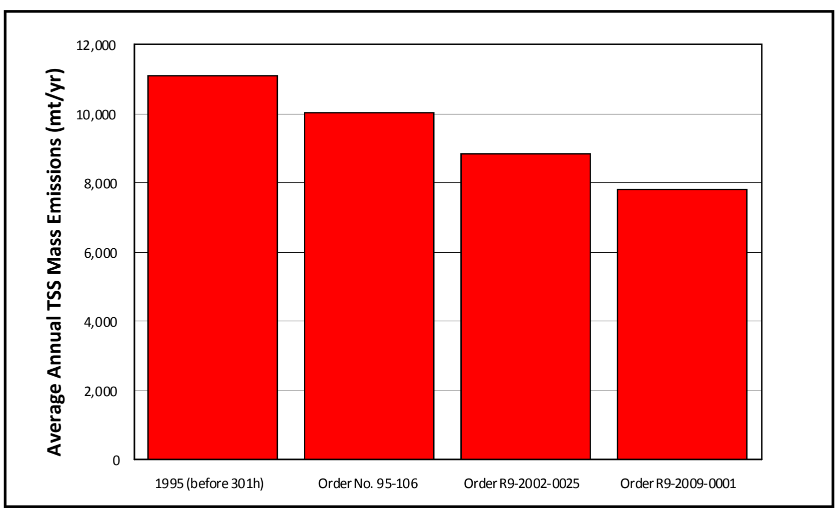

Figure II.A-2 Reduction in Point Loma WWTP Effluent TSS Mass Emissions During the Period of 301(h) Modifications

Table II.A-1
Summary of Major Metro System Milestones to
Improve Treatment and/or Reduce PLOO Discharge Flows, 1995-2014[1]

Action	Improvements to Reduce PLOO Discharge Flows or Improve Effluent Quality		
	Effective Period of Order No. 95-106[2]	Effective Period of Order No. R9-2002-0025[3]	Effective Period of Order No. R9-2009-0001[4]
Improvements to Point Loma solids handling and digestion	✓		
Implementation of solids processing facilities at Metro Biosolids Center	✓		
Flows from Mexico reduced by implementation of International Boundary and Water Commission International Wastewater Treatment Plant (IWTP)	✓		
North City Water Reclamation Plant (North City WRP) brought online	✓		
Approval and Implementation of Urban Area Pretreatment Program	✓		
North City WRP recycled water users brought online[5]	✓	✓	✓
Water conservation/education program to reduce wastewater flows	✓	✓	✓
South Bay Water Reclamation Plant (South Bay WRP) brought online and discharge to South Bay Ocean Outfall initiated[6]		✓	
South Bay WRP recycled water users brought online[7]		✓	✓
Installation of effluent disinfection at the Point Loma WWTP[8]			✓
Implementation/refinement of system-wide chemical addition program to improve treatment effectiveness at the Point Loma WWTP[9]			✓
Completion of comprehensive Recycled Water Study that identified alternatives for increasing recycled water use and offloading Point Loma flows and solids loads[10]			✓
Completion of Water Purification Demonstration Project that demonstrated the technical and regulatory feasibility of potable reuse[11]			✓

1 Clean Water Act 301(h) modified treatment requirements for TSS and BOD have been in effect since 1995.

2 Improvements completed during the effective period of Order No. 95-106, the original Point Loma 301(h) modified NPDES permit which became effective in 1995.

3 Improvements completed during the effective period of Order No. R9-2002-0025, which became effective on August 1, 2003.

4 Improvements completed during the effective period of Order No. R9-2009-0001, which became effective on August 1, 2010.

5 The City of San Diego Public Utilities Department (PUD) maintains ongoing programs (see page II.A-13) to market recycled water, retrofit sites, and bring additional recycled water users online within the distribution service area of the North City WRP.

6 The South Bay WRP discharge to the South Bay Ocean Outfall (SBOO) was initiated in May 2002. The 15 mgd South Bay WRP offloaded flows which otherwise would were previously directed to the Point Loma WWTP.

7 Offsite distribution of South Bay WRP recycled water was initiated in the summer of 2006. Connection of the South Bay WRP distribution system to the Otay Water District recycled water distribution system was completed in May 2007. The City of San Diego Water Department and Otay Water District (which receives and markets South Bay WRP recycled water) maintain ongoing programs to retrofit sites and bring additional recycled water users online within their respective recycled water service areas.

8 Effluent disinfection using sodium hypochlorite was initiated in 2008 to ensure compliance with State of California recreational body-contact bacteriological standards throughout the water column (ocean surface to ocean bottom) in all State-regulated waters (within three nautical miles of the coast). See Appendix A.

9 The City has implemented a system-wide coordinated chemical addition technology called PRI-SC (Peroxide Regenerated Iron Sulfide Control) to improve odor control while increasing solids removal at the Point Loma WWTP. See Appendix A.

10 The 2012 *Recycled Water Study* identified alternatives for increasing non-potable reuse by 7 mgd using existing recycled water infrastructure, and achieving 83 mgd of potable reuse by December 31, 2036. See Appendices B.1 and B.2.

11 The 2013 Water Purification Demonstration Project demonstrated the technical and regulatory feasibility of implementing 15 mgd of potable reuse at the North City WRP and San Vicente Reservoir. See Appendices B.1 and B.3.

Commitment to Implementing Pure Water San Diego Program. While this application is based on a current discharge (per 40 CFR 125.58), this NPDES application also establishes the City's commitment to implement a comprehensive water reuse program called *Pure Water San Diego*. *Pure Water San Diego* is a long-term joint water and wastewater facilities plan that would provide a safe, reliable, and cost-effective drinking water supply for San Diego through the application of advanced treatment technology to purify recycled water. The *Pure Water San Diego* program is the result of collaboration between the City of San Diego, Metro Wastewater Joint Powers Authority (JPA), and a diverse array of regional stakeholders. 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 Point Loma WWTP so that ultimate PLOO TSS mass emissions are reduced to levels that would have occurred if the 240 mgd Point Loma WWTP were to achieve secondary treatment TSS concentration standards,
- support the City's application for renewed 301(h) modified TSS and BOD limits for the Point Loma WWTP, 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 PLOO discharge is recognized as equivalent to secondary treatment for purposes of compliance with the CWA (secondary treatment equivalency).

To demonstrate the City's commitment to regulators and stakeholders for moving forward with *Pure Water San Diego* plans, this NPDES application proposes that the following two enforceable provisions be incorporated into the renewed Point Loma WWTP 301(h) permit:

- reduce allowable PLOO mass emissions of TSS during the five-year NPDES permit, and
- establish enforceable time schedule milestones for the upcoming five-year NPDES permit to support implementation of *Pure Water San Diego* facilities planning.

Proposed Reduction in TSS Mass Emissions Limits. Table II.A-2 (page II.A-5) summarizes existing TSS mass emission rates (MERs) established in Order No. R9-2009-0001. As shown in the table, the current (year 2014) permitted PLOO TSS mass emission limit is 13,598 metric tons per year (mt/year). As part of the renewed 301(h) NPDES permit, it is proposed that PLOO mass emissions be reduced to 12,000 mt/year for years 1 through 4, and to 11,999 mt/year in year 5 of the renewed modified NPDES permit (see Table II.A-2).

Table II.A-2
Comparison of Proposed TSS Mass Emission Rates with Prior NPDES Mass Emission Limits

Year of NPDES Permit	Total Suspended Solids (TSS) Mass Emission Rate (MER) (metric tons per year)			
	Original TSS MER Established in Order No. 95-106[1,2]	TSS MER Established in Order No. R9-2002-0025[1,3]	Existing TSS MER Established in Order No. R9-2009-0001[1,4]	Proposed TSS MER Renewal of NPDES CA0107409[1,5]
Year 1	15,000	15,000	15,000	12,000
Year 2	15,000	15,000	15,000	12,000
Year 3	15,000	15,000	15,000	12,000
Year 4	15,000	15,000	15,000	12,000
Year 5	13,600	13,599	13,598	11,999

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 WRP flows discharged to the South Bay Ocean Outfall, and (5) emergency use of the Metro System participating agencies over their capacity allotments.

2 Original Point Loma WWTP 301(h) NPDES permit adopted in 1995. A TSS mass emission rate (MER) limit of 15,000 mt/year applied through December 31, 1999, and a TSS mass emission limit of 13,600 mt/year applied after January 1, 2000.

3 MER limits within Order No. R9-2002-0025, as amended by State Water Resources Control Board Order No. WQO 2002-0013. A TSS MER limit of 15,000 mt/year applied through December 31, 2005, and TSS MER limit of 13,599 mt/year applied after January 1, 2006. The original version of Order No. R9-2002-0025 imposed a TSS MER limit of 13,995 mt/year for years 1 through 4, but this was revised to 15,000 mt/year by State Water Resources Control Board Order No. WQO 2002-0013.

4 TSS MER limits established within Order No. R9-2009-0001, which became effective on August 1, 2010. A TSS MER limit of 15,000 mt/year applied through December 31, 2013, and TSS MER limit of 13,598 mt/year applied after January 1, 2014.

5 Point Loma WWTP TSS mass emission rates proposed as part of this application for renewal of NPDES CA0107409. TSS MER limits of 12,000 mt/year are proposed for years 1 through 4 of the renewed NPDES permit, and a TSS MER of 11,999 mt/year is proposed for year 5 of the permit.

Enforceable Time Schedule Milestones. To further demonstrate the City's commitment to regulators and regional stakeholders to implement the *Pure Water San Diego* program and offload Point Loma WWTP inflows and solids loads, the City proposes that the renewed 301(h) NPDES permit incorporate an enforceable time schedule governing implementation of *Pure Water San Diego* environmental review and facilities design tasks. Table II.A-3 (page II.A-6) presents the proposed enforceable time schedule tasks for inclusion within the renewed five-year NPDES permit.

Future Mass Emission and Potable Reuse Goals. In addition to the proposed enforceable requirements for the upcoming five-year NPDES period, this application also presents the proposed framework and long-term project goals that could form the basis of enforceable requirements in future NPDES permits. These include goals for future PLOO TSS mass emission reductions and goals for implementing additional potable reuse capacity.

Table II.A-4 (page II.A-6) summarizes projected step-wise reductions in PLOO TSS mass emissions that are targeted within the next 20 years. As shown in Table II.A-4, the program goal is to cap PLOO mass emissions at 9,942 mt/year by year 2028 and beyond. This 9,942 mt/year TSS MER would be achieved with a combination of (1) Point Loma WWTP solids offloading resulting from upstream potable reuse and treatment facilities, and (2) maintaining chemically enhanced primary treatment at the Point Loma WWTP (no conversion of the Point Loma WWTP to traditional secondary treatment).

Table II.A-3
Pure Water San Diego Potable Reuse Tasks, 2015 -2020[1]

Category	Task[1]	Implementation Date[1,2]
Pure Water San Diego Environmental Review	Issue Notice of Preparation for Program Environmental Impact Report (EIR)	January 31, 2015
	Publish Draft Program EIR for Public Review	January 31, 2017
	Certify Final Program EIR	January 31, 2018
North City Projects	Notice to Proceed-Final Design of 15 mgd purified water conveyance pipeline from the North City Water Reclamation Plant (North City WRP)	January 31, 2017
	Issue Notice to Proceed on final design of a 15 mgd Potable Reuse Purification Facility (advanced water treatment facility) for the North City WRP site	May 31, 2017
	Complete design of the 15 mgd purified water conveyance pipeline from the North City WRP	October 31, 2019
	Complete design of 15 mgd Potable Reuse Purification Facility (advanced water treatment facility)	January 31, 2020

1 Implementation task proposed for inclusion as an enforceable provision of NPDES CA0107409 to demonstrate the City's commitment to offloading Point Loma WWTP wastewater flows, increasing reuse of the City's wastewater, and reducing Point Loma WWTP flows and mass emissions discharged to the Pacific Ocean.
2 Task to be completed no later than the listed implementation dates.

Table II.A-4
Targeted Point Loma WWTP TSS Mass Emission Goals

Time Period	TSS MER Limit[1] (metric tons per year)
thru 2014	13,598[2]
2015 thru 2025	12,000[3]
2026 thru 2027	11,500[4,5]
2028 forward	9,942[4,5,6]

1 TSS mass emission rate (MER) for the Point Loma WWTP discharge to the Pacific Ocean via the PLOO.
2 Existing TSS MER limit for year 2014 established within Order No. R9-2009-0001.
3 TSS MER limit requested in this 301(h) application for renewal of NPDES CA0107409. The TSS MER limit would be 12,000 metric tons per year in years 1 through 4 of each five year NPDES cycle, and would be reduced to 11,999 mt/year in the final year of the permit.
4 Compliance with proposed reduced TSS MER limit is to be achieved through future offloading the Point Loma WWTP by implementing potable reuse projects as part of the *Pure Water San Diego* program.
5 Program goal would become an enforceable TSS MER limit in either (1) future 301(h) modified NPDES permits or (2) future NPDES permits based on approval of secondary equivalency status for the Point Loma WWTP. (Note: Establishing the secondary equivalency status of the Point Loma WWTP may require administrative or legislative action.)
6 "Secondary equivalency" TSS MER limit capped forever going forward. This 9,942 mt/year MER is the same MER that would apply to a 240 mgd Point Loma WWTP discharge if a 30 mg/l TSS concentration limit (secondary treatment concentration limit) were to be applied.

Table II.A-5 presents targeted *Pure Water San Diego* goals for potable reuse for the next 20 years. As shown in the table, the Pure Water San Diego program targets 83 mgd of potable reuse by December 31, 2035.

Table II.A-5
Potable Reuse Implementation Goals[1]

Phase	Targeted Goal: Cumulative Potable Reuse Capacity	Target Implementation Date
I	15 mgd	December 31, 2023[3]
II	30 mgd[2]	December 31, 2027[3]
III	83 mgd[2]	December 31, 2035[3]

1 Implementation of the targeted potable reuse capacity goals is subject to (1) timely environmental approval of the *Pure Water San Diego* Program and associated projects, (2) timely regulatory approval of proposed reuse facilities and projects program that comprise the *Pure Water San Diego* Program, and (3) continued approval of future 301(h) modified NPDES permits for the Point Loma WWTP or approval of secondary equivalency status for the Point Loma WWTP.
2 Cumulative total purified water production capacity of potable reuse facilities.
3 Target implementation dates may be subject to modification based on regulatory approval schedules, environmental review issues, or legal challenges to the proposed program or projects (see footnote 1).

No Proposed Changes in Effluent Concentration Standards. In keeping with the "current discharge" designation (as defined by 40 CFR 235.58, the City does not request any change in existing NPDES effluent concentration limitations or performance goals established in Order No. R9-2009-0001.

II.A.2. Description of the treatment/outfall system [40 CFR 125.61(a) and 125.61(e)]

a. Provide detailed descriptions and diagrams of the treatment system and outfall configuration which you propose to satisfy the requirements of 40 CFR part 125, subpart G. What is the total discharge design flow upon which this application is based?

SUMMARY: This application is based on an annual average design discharge flow of 240 mgd (10.5 m^3/sec) through the 23,472-foot-long (7,148 meters) PLOO. Discharged wastewaters undergo chemically enhanced primary treatment at the Point Loma WWTP. Detailed descriptions of existing Metro System treatment, solids handling, wastewater conveyance, and ocean discharge facilities are presented in Appendix A (Volume IV). Appendix B.1 presents facilities improvements proposed within the next five-year period. Brief summaries of these facilities are presented below.

System Overview - Existing System

Figure II.A-3 (page II.A-9) presents the location of key Metro System facilities. Figure II.A-4 (page II.A-10) presents a schematic of existing Metro System treatment and solids handling facilities. As shown in the figures, existing Metro System wastewater treatment facilities include the:

- E.W. Blom Point Loma Wastewater Treatment Plant (Point Loma WWTP),
- North City Water Reclamation Plant (North City WRP), and
- South Bay Water Reclamation Plant (South Bay WRP).

Waste solids from the South Bay WRP are conveyed to the Point Loma WWTP for treatment. Waste solids from the Point Loma WWTP and North City WRP are conveyed to the Metro Biosolids Center (MBC) for dewatering and disposal. Appendix A (Volume IV) presents detailed descriptions of Metro System collection, treatment, solids handling, and ocean disposal facilities. Brief descriptions of key Metro System facilities and operations are presented in the following sections.

Pump Station 1. Pump Station 1 (see Figure II.A-3) conveys wastewater from the southern portion of the Metro System through the South Metro Interceptor to Pump Station 2. Ferrous chloride, sodium hydroxide, and sodium hypochlorite are used for odor and sulfide control. With one unit as standby, the Pump Station 1 pumping capacity is approximately 160 mgd.


Figure II.A-3
Metro System Facilities and
Participating Agency Service Areas
DEL MAR
POWAY
Penasquitos Pump Station
Old Penasquitos Trunk Sewer
Pump Station 65
SAN DIEGO
Pump Station 65 Force Main
Pump Station 64
New Penasquitos Trunk Sewer Relief Pipeline
North City WRP
North City Raw Sludge and Reclaimed Water Pipelines
Pacific Ocean
North City Tunnel Connector
Centrate Pipeline
PADRE DAM MUNICIPAL WATER DISTRICT
LAKESIDE/ ALPINE
Metro Biosolids Center
East Mission Gorge Pump Station
Rose Canyon Trunk Sewer
Metro Operations Complex
WINTERGARDENS
East Mission Beach Trunk Sewer
Digested Sludge Pipeline
Mission Gorge Trunk Sewer
EL CAJON
LA MESA
OTAY WATER DISTRICT
North Mission Valley Interceptor
Digested Sludge Pipeline
Pump Station 2
North Metro Interceptors
LEMON GROVE
SPRING VALLEY
Point Loma Ocean Outfall
CORONADO
Pump Station 1
Point Loma Wastewater Treatment Plant
NATIONAL CITY
South Metro Interceptor
Wastewater Facilities
Existing Facility
Existing Pipelines
City of San Diego Metro System Area
Metro Wastewater Participating Agency Areas
CHULA VISTA
OTAY WATER DISTRICT
Otay River Wastewater Pipeline
OTAY RIVER PUMP STATION
IMPERIAL BEACH
Grove Avenue Pump Station
South Bay Wastewater Pipeline
EAST OTAY MESA SEWER MAINTENANCE DISTRICT
SAN DIEGO
South Bay Land Outfall
South Bay Reclamation Sewers
MEXICO
South Bay WRP
Key: WRP - Water Reclamation Plant
Miles
0 1 2 4 6
South Bay Ocean Outfall
SanGIS

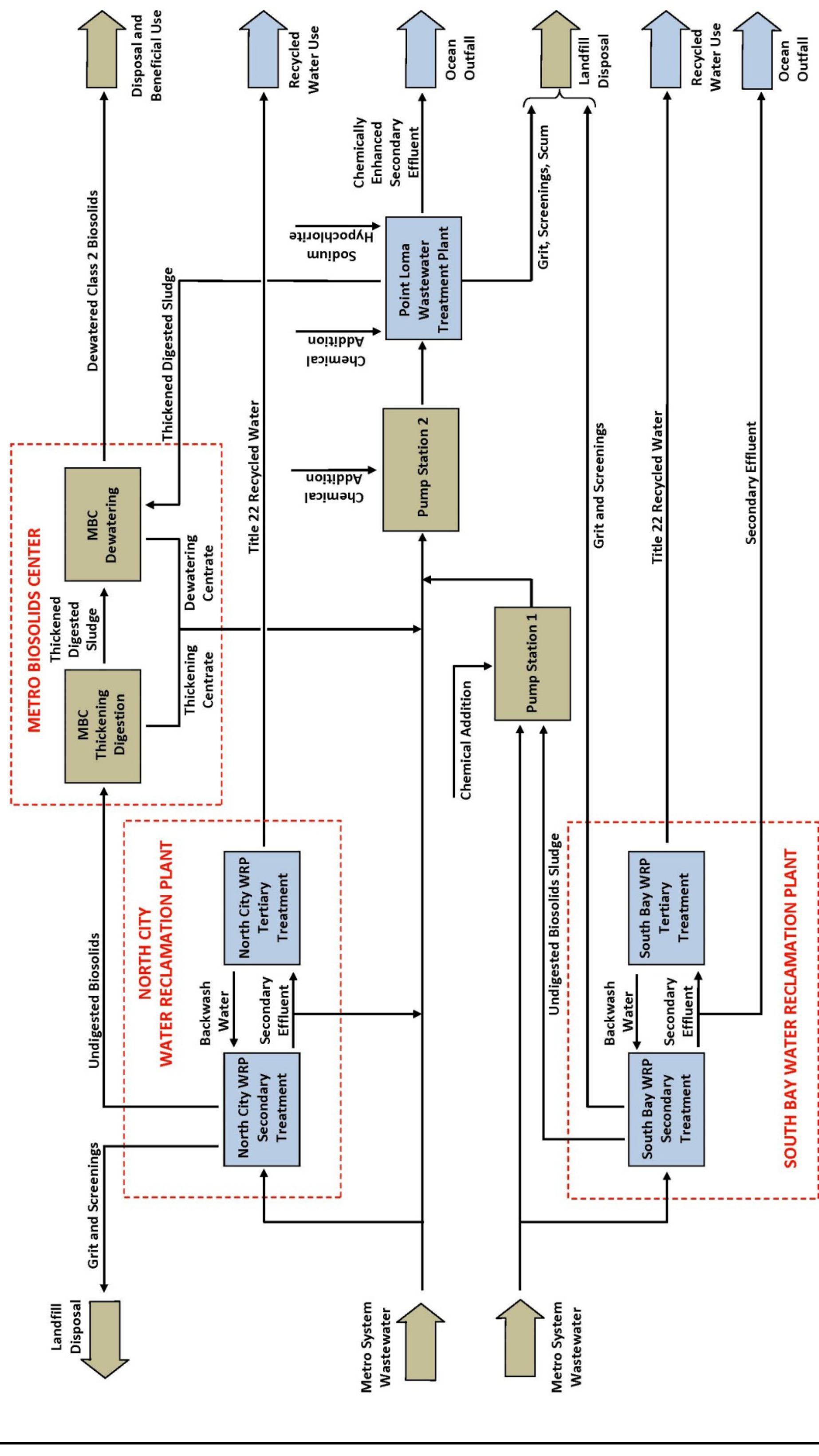

Figure II.A-4
Schematic of Metro System Operations

Pump Station 2. Pump Station 2 is the largest and most important pump station within the Metro System. Virtually all wastewater delivered to the Point Loma WWTP is pumped through Pump Station 2. In addition to pumping wastewater, Pump Station 2 provides chemical addition (hydrogen peroxide, sodium hydroxide, and sodium hypochlorite) and coarse screening for all effluent directed to the Point Loma WWTP.

With one main pump serving as a standby unit, Pump Station 2 has a maximum pumping capacity of 432 mgd. Pump Station 2 discharges wastewater to the east portal of the Point Loma Tunnel through two 87-inch diameter force mains, respectively 2.9 and 2.7 miles long. One force main follows a land route while the second force main is routed underneath San Diego Bay. The Point Loma Tunnel conveys wastewater to the Point Loma WWTP under the Point Loma peninsula.

Point Loma WWTP. The Point Loma WWTP is the terminal treatment facility that discharges to PLOO. The Point Loma WWTP has a treatment capacity of 240 mgd (10.5 m^3/sec). The Point Loma WWTP receives a blend of secondary treated effluent from North City WRP, return solids from the South Bay WRP, centrate from the MBC, and untreated sewage from all other parts of the Metro System. Figure II.A-5 (page II.A-12 presents a schematic of Point Loma WWTP treatment processes. Appendix A (Volume IV) presents a detailed description of the Point Loma WWTP, along with unit process design criteria and chemical addition operations. Point Loma WWTP processes include:

- mechanical self-cleaning climber screens to remove rags, paper, and other floatable material from the raw wastewater,
- chemical addition to enhance settling and achieve at least 80 percent removal of suspended solids,
- aerated grit removal including grit tanks, separators and washers,
- sedimentation where flocculated solids (sludge) settle to the bottom of the sedimentation tanks and scum floats to the surface,
- sludge and scum removal facilities,
- effluent disinfection,
- final screening, and
- anaerobic digestion of waste solids.

Onsite solids treatment at the Point Loma WWTP consists of anaerobic sludge digestion. Digested sludge is transported via pipeline to the MBC for dewatering and disposal. Screenings, grit, and scum are trucked to a landfill for disposal.

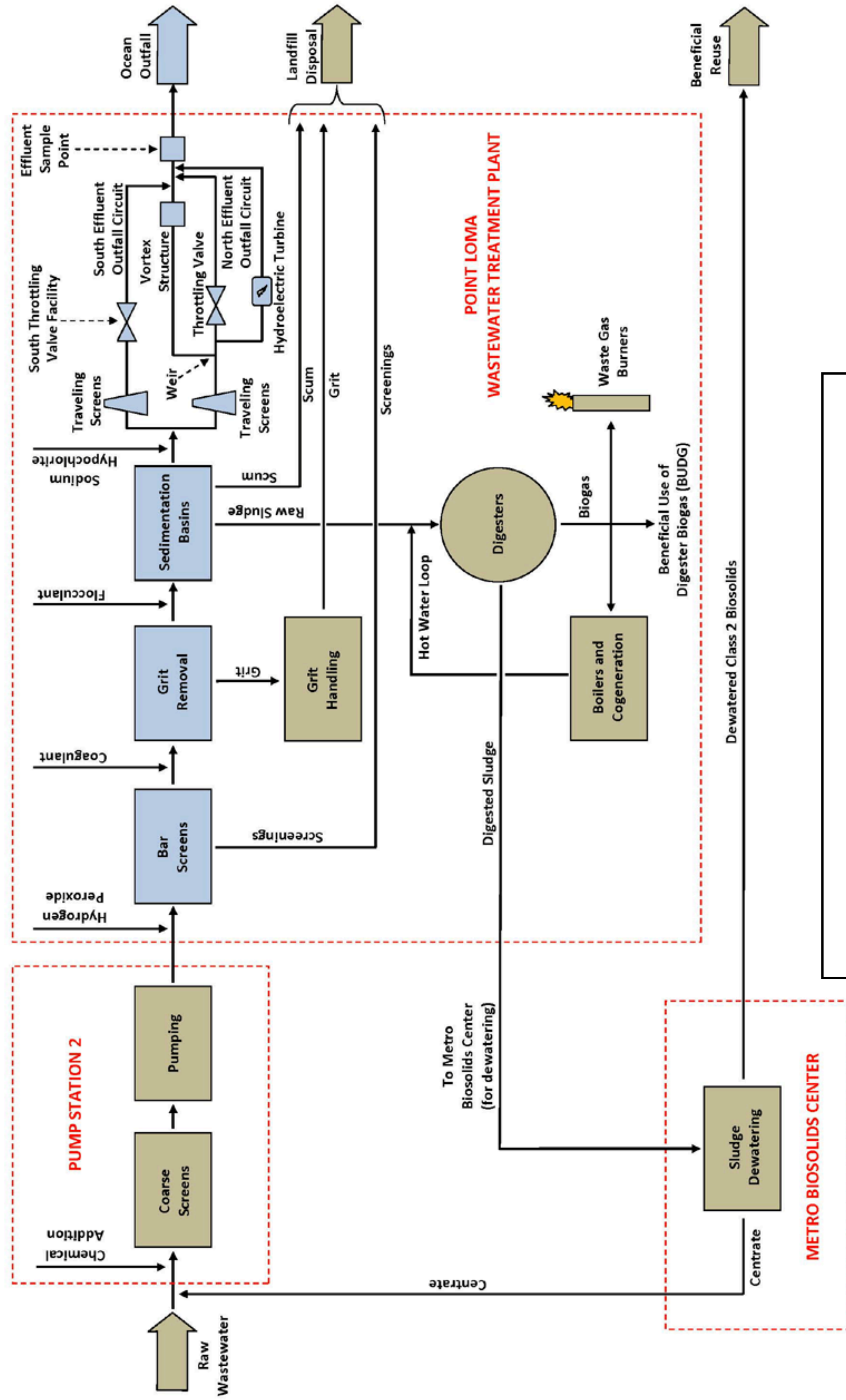

Figure II.A-5
Schematic of Point Loma WWTP Treatment Processes

System-Wide Integrated Chemical Addition. Significant improvements during the past few years have been achieved in solids removal effectiveness at the Point Loma WWTP. This increase in TSS removal is largely attributed to the City's implementation of an integrated system-wide chemical addition approach. The City during the past several years has proceeded with phased implementation of a proprietary technology called PRI-SC (Peroxide Regenerated Iron Sulfide Control). The PRI-SC system involves coordinated chemical addition at key points within the Metro System to achieve the following goals:

- improved solids removal at the Point Loma WWTP,
- more effective odor control,
- reduced iron and solids emissions to PLOO, and
- reduced system-wide chemical costs.

The conceptual basis of the PRI-SC system is to utilize iron for sulfide control, and to utilize hydrogen peroxide (H_2O_2) to regenerate ferrous or ferric iron from the spent iron salts for subsequent use as a flocculent. In practice, this integrated chemical addition approach involves dosing ferrous chloride at several upstream locations (see Appendix A) for odor control within Metro System collection facilities. The second part of this integrated process involves adding hydrogen peroxide at downstream points to regenerate the iron for use in sulfide control and to enhance settling and solids removal at the Point Loma WWTP. In this way, iron added at upstream collection facilities and pump stations for odor control is regenerated and becomes available for enhancing flocculation in the Point Loma WWTP primary treatment clarifiers.

When combined with anionic polymer and additional ferric chloride injected at the Point Loma WWTP, the City has been able to achieve significant improvements in TSS removals. City operators continue to refine chemical addition practices as part of this PRI-SC approach, but have achieved steady improvement in Point Loma TSS removals during the past several years. Point Loma effluent TSS concentrations averaged 37.2 mg/l during 2012, and 33.5 mgd during 2013. Point Loma effluent TSS concentrations achieved to date during 2014 have averaged less than 30 mg/l.

Point Loma Ocean Outfall (PLOO). Treated effluent from Point Loma WWTP is discharged to the PLOO. A detailed description of the PLOO is presented in Appendix A (Volume IV). The PLOO consists of an original 11,226-foot-long (3,422 meter) outfall section that was constructed in 1963 and a 3,732-meter-long (12,246 feet) extension that was added in 1993. The total length of the outfall system is 7,148 meters (23,472 feet). The two diffuser legs branch outward from the outfall in a "wye" orientation at a depth of approximately 310 feet (94 meters). Each diffuser leg is 2,496-feet-long (761 meters) and consists of 7-foot, 5.5-foot, and 4-foot internal diameter pipe. Diffuser ports are set in the middle of each pipe on opposite sides, six inches above the springline of the pipe. No changes in the physical structure of PLOO have occurred during the past five years, and no changes are proposed during the next five years.

North City WRP. The 30 mgd (1.31 m^3/sec) North City WRP collects and treats wastewater from a service area that includes Del Mar, La Jolla Valley, Mira Mesa, Rancho Peñasquitos, Poway, and Sorrento Valley. Recycled water produced by the North City WRP complies with requirements established by the State of California within Title 22, Division 4 of the *California Code of Regulations* for unrestricted body contact (e.g. disinfected tertiary recycled water).

Appendix A presents a detailed description of the North City WRP. The North City WRP serves two purposes. First, the plant produces tertiary-treated recycled water for delivery to customers in the North City region. Second, the North City WRP contributes to Metro System TSS and BOD removal, providing relief to the downstream Point Loma WWTP. North City WRP wastewater flows in excess of recycled water demands receive secondary treatment. Secondary treated effluent is returned to the sewer for conveyance to the Point Loma WWTP. North City WRP waste solids are directed to the MBC for digestion and dewatering. North City WRP treatment processes (see Appendix A) include:

- influent pumping,
- screening,
- aerated grit removal,
- primary sedimentation with sludge and scum removal,
- sideline flow equalization,
- anoxic-aerobic activated sludge consisting of anoxic mixing with mixed liquor recycle and fine bubble aeration,
- secondary clarification with scum removal,
- mixed liquor and excess sludge wasting,
- chemical addition for coagulation,
- flocculation,
- tertiary filtration through anthracite coal media,
- electrodialysis reversal (to reduce recycled water salinity, when required),
- advanced water purification demonstration facilities, and
- effluent chlorination.

Recycled water from the North City WRP is conveyed to recycled water customers via a non-potable recycled water conveyance network that consists of 79 miles of pipeline serving the communities of Mira Mesa, Miramar Ranch North, Scripps Ranch, University City, Torrey

Pines, Santaluz, and Black Mountain Ranch. Recycled water is also provided to recycled water wholesale agencies that include the Olivenhain Municipal Water District and City of Poway.

North City WRP recycled water is primary used for irrigation. During 2013, recycled water production at the North City WRP averaged 6.0 mgd (0.26 m^3/sec), and ranged from 9.8 mgd (0.43 m^3/sec), during August 2013 to 2.3 mgd (0.10 m^3/sec), in January 2013. The treatment and use of North City WRP recycled water is regulated by Regional Board Order No. 97-03 and Addendum No. 1 thereto.

South Bay WRP. The South Bay WRP is an advanced wastewater treatment facility that produces recycled water that complies with requirements of Title 22, Division 4 of the *California Code of Regulations* for unrestricted body contact (e.g. disinfected tertiary recycled water). The South Bay WRP collects and treats wastewater from a service area that includes portions of Chula Vista and the South Bay portion of San Diego. In addition to producing tertiary-treated recycled water for delivery to customers in the South Bay Region, the South Bay WRP provides hydraulic capacity relief to Metro System wastewater collection facilities and the Point Loma WWTP.

The hydraulic capacity of the South Bay WRP is 18 mgd (0.79 m^3/sec), and the plant can produce up to 15 mgd (0.66 m^3/sec) of tertiary treated recycled water. South Bay WRP treatment processes (detailed in Appendix A) include:

- influent pumping,
- screening,
- grit removal,
- primary sedimentation,
- sideline flow equalization,
- air activated sludge process with an anoxic selector zone,
- secondary clarification,
- chemical addition for coagulation,
- tertiary filtration through deep bed mono-media filters, and
- UV disinfection.

South Bay recycled water is conveyed to recycled water customers through a non-potable distribution system that serves the Tijuana Valley, Otay Valley, and Otay Mesa area. South Bay WRP recycled water is also disturbed to the Otay Water District for distribution within the District's service area. The treatment and reuse of South Bay WRP recycled water is regulated by Regional Board Order No. 2000-203 and Addenda Nos. 1 and 2 thereto. During 2013, recycled water production at the South Bay WRP averaged 3.2 mgd (0.14 m^3/sec), and ranged from 5.63 mgd (0.25 m^3/sec), during August 2013 to 0.46 mgd (0.02 m^3/sec), in January 2013.

South Bay WRP wastewater flows in excess of recycled water demands receive secondary treatment and are discharged to the South Bay Ocean Outfall (SBOO). The South Bay WRP discharge to the SBOO is regulated by Regional Board Order No. R9-2013-0006 (NPDES CA0109045). Waste solids from the South Bay WRP are discharged to the sewer system for transport to the Point Loma WWTP for treatment and removal.

Metro Biosolids Center. The MBC is located at Marine Corps Air Station Miramar. MBC provides dewatering for sludge from the Point Loma WWTP and thickening, anaerobic digestion, and dewatering of sludge from the North City WRP. Appendix A (Volume IV) presents a detailed description of MBC solids processing. Appendix A also presents design criteria for MBC facilities, presents schematics of MBC processes, and presents a layout of the facilities at MBC.

Primary sludge and waste activated sludge from the North City WRP is conveyed to flow equalization tanks at MBC. After equalization, the sludge undergoes sludge degritting and centrifuge thickening before being transferred to anaerobic digesters. Digested North City WRP sludge is then transferred to holding tanks where it is mixed with screened digested sludge from the Point Loma WWTP. The mixed sludge is dewatered using high-solids type centrifuges. The dewatered biosolids cake is then pumped to storage silos which provide approximately three days of capacity. Dewatered Class 2 MBC biosolids (see Appendix M, Volume VIII) are transported offsite for use as an alternative daily cover at Otay Landfill or used as a soil amendment.

Planned Near-Term System Improvements

The City maintains an ongoing Capital Improvements Program to replace and/or upgrade Metro System facilities and equipment. As detailed in Appendix B.1, current efforts are underway to:

- upgrade grit removal facilities at the Point Loma WWTP,
- upgrade equipment and improve reliability at Pump Station 2, and
- refine and expand system-wide chemical addition as part of the PRI-SC operations.

To support facilities planning efforts and ensure that collection and treatment facilities maintain adequate capacity to handle or process anticipated flows, the City of San Diego (see Appendix B.1) annually updates future dry weather and wet weather flows using a comprehensive GIS-based (geographic information system) hydraulic model of Metro System and City of San Diego wastewater collection facilities. The model superimposes SANDAG (San Diego Association of Governments) Series 12 population and employment projections on grid levels as small as a city block to generate projected dry weather and wet weather flows, as well as system-wide TSS and BOD loads. Conservative flow and load estimations are employed to ensure that future facilities have adequate capacity to handle or process projected wet weather and dry weather flows.

The City also continues its ongoing efforts to expand non-potable recycled water use that can be served by existing infrastructure within the recycled water service areas of the North City WRP and South Bay WRP. As documented in the City's 2012 *Recycled Water Study* (see Appendix B.2), the City has identified an additional potential 7 mgd of non-potable recycled water demand that can be served by existing infrastructure.

Planned Long-Term System Improvements

As documented in the response to Question II.A.1, the City has committed to implementing the *Pure Water San Diego* program which targets implementing 15 mgd of potable reuse by December 31, 2023, a cumulative total potable reuse of 30 mgd by December 31, 2027, and a cumulative total potable reuse of 83 mgd by December 31, 2035.

The *Pure Water San Diego* reuse effort, in addition to developing a sustainable non-interruptible local water supply that will reduce the need for imported water, will result in significant offload of flow and solids loads to the Point Loma WWTP. The *Pure Water San Diego* program will sufficiently reduce influent flows and solids loads to the Point Loma WWTP so that ultimate PLOO TSS mass emissions would be reduced to levels at or below those that would have occurred if the 240 mgd Point Loma WWTP were to be operated at its design capacity while achieving secondary treatment standards.

b. Provide a map showing the geographic location of the proposed outfall(s) (i.e. discharge). What is the latitude and longitude of the proposed outfall(s)?

Appendix A (Volume IV) presents a detailed description of the PLOO. Figure II.A-6 (page II.A-19) presents the location of the PLOO discharge in plan view. Figure II.A-7 (page A-20) presents a profile view of the PLOO.

As shown in Figure II.A-5, the 7,154-meter-long (23,472 feet) PLOO extends to near the edge of the mainland shelf. Off the coast of Point Loma, the edge of the shelf is located at approximately the 110-120 meter contour; beyond the edge of the shelf the slope of the ocean bottom steepens significantly.

The outfall discharges at a depth of approximately 95 meters (310 feet). The outfall features a "Y"-shaped diffuser. The center of the "Y" diffuser is located at:

- north latitude 32 degrees, 39 minutes, 55 seconds, and
- longitude 117 degrees west, 19 minutes, 25 seconds.

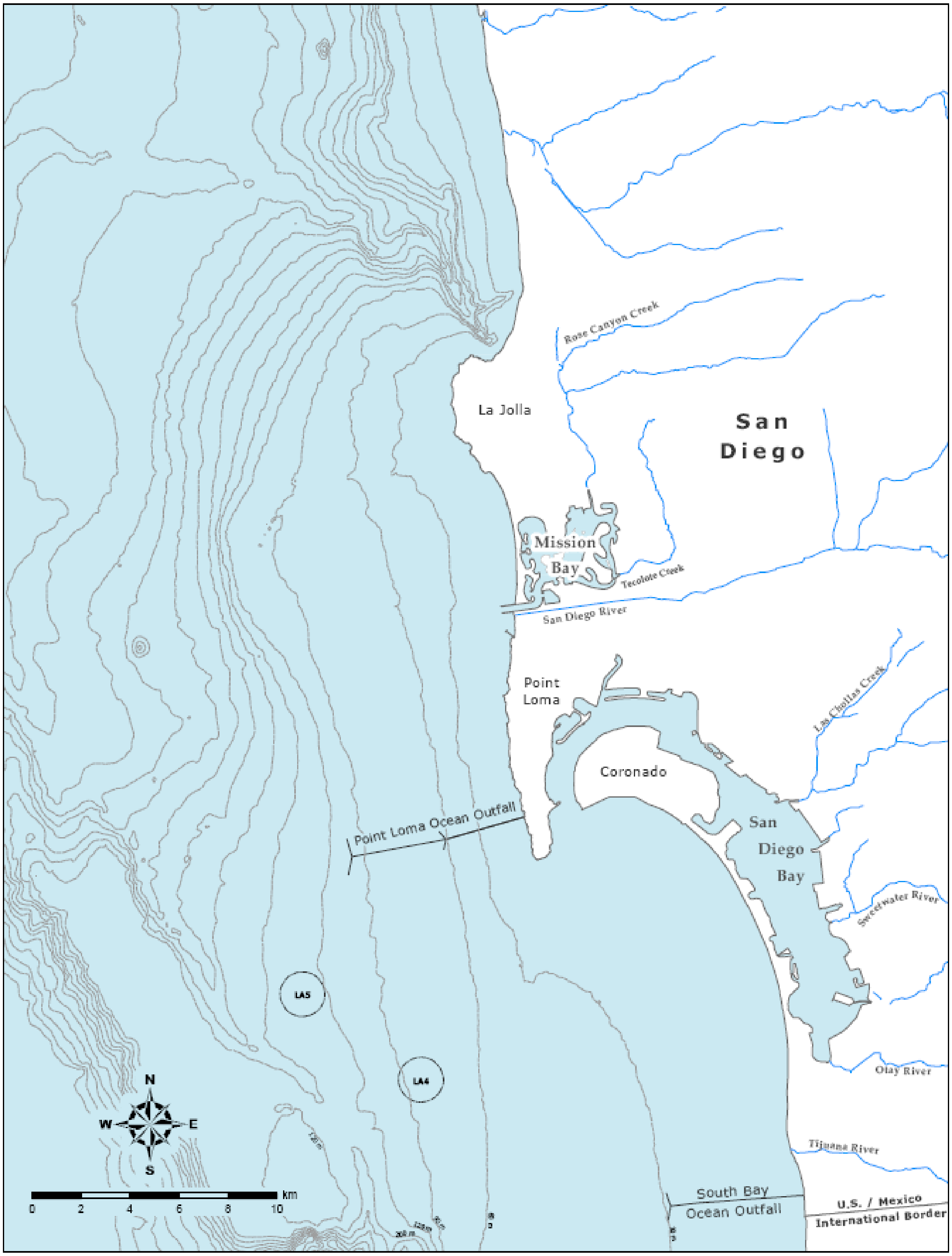

Figure II.A-6 Location of Point Loma Ocean Outfall

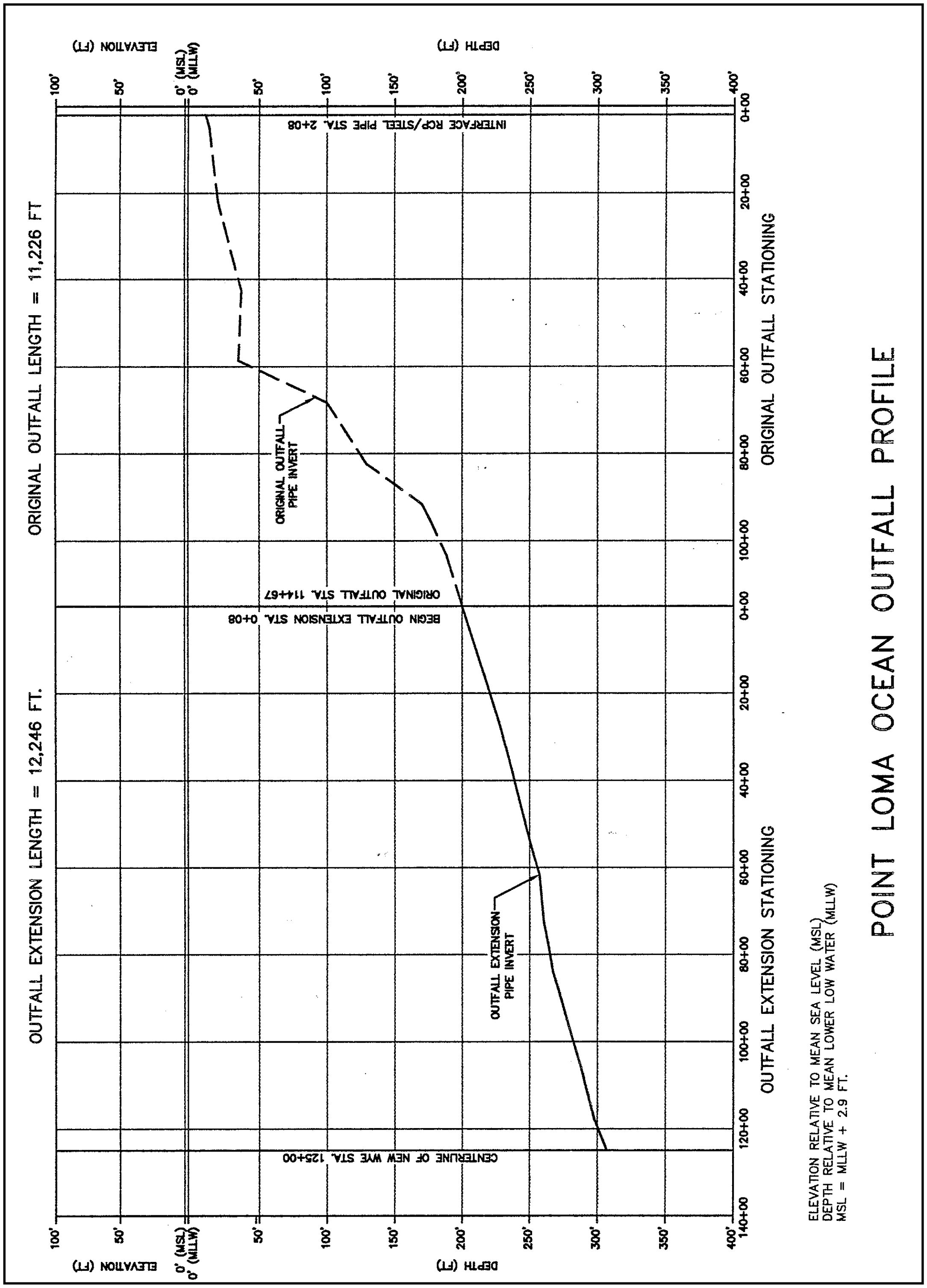

Figure II.A-6 Point Loma Ocean Outfall Profile

c. For a modification based on an improved or altered discharge, provide a description and diagram of your current treatment system and outfall configuration. Include the current outfall latitude and longitude, if different from the proposed outfall.

Not applicable. The application is based on a current discharge. See Appendix A (Volume IV) for a description of existing Metro System wastewater collection, treatment, and outfall discharge facilities.

II.A.3. Primary or Equivalent Treatment Requirements [40 CFR 125.60]

a. Provide data to demonstrate that your effluent meets at least primary or equivalent treatment requirements as defined in 40 CFR 125.58 (r).

SUMMARY: The Point Loma WWTP achieves a degree of treatment significantly in excess of the primary treatment requirements defined in 40 CFR 1256.58(r).

CFR Title 40, Part 125 requires 301(h) applicants to maintain a minimum of primary treatment and achieve 30 percent or more removal of suspended solids and biochemical oxygen demand (BOD). Chemically enhanced primary sedimentation at the Point Loma WWTP provides a degree of treatment significantly greater than the 30 percent removal requirement.

Existing Facilities Performance. Effluent data for calendar years 2010 through 2013 have been previously submitted to the Regional Board in monthly, quarterly, semiannual, and annual monitoring reports. The data have also been electronically transmitted to EPA.

Table II.A-6 (page II.A-23) summarizes TSS removal by month during 2010-2013. Solids removal rates presented in Table II.A-6 are computed as part of monitoring required by the City's existing NPDES permit (NPDES CA0107409, Regional Board Order No. R9-2009-0001). In accordance with reporting procedures required in the City's effluent monitoring program, the solids removal rates presented in Table II.A-6 are computed on a system-wide basis, so as to avoid double-counting of waste flow returns to the Point Loma WWTP influent from the MBC solids processing facilities, the North City WRP, and the South Bay WRP.

As shown in Table II.A-6, monthly TSS percent removal rates during 2010-2013 ranged from 83.1 percent during January 2010 to 92.8 percent in October and November 2013. During 2013, TSS percent removal averaged 90.7 percent, and was at 85 percent or greater each month during the year.

Table II.A.6 also presents Point Loma WWTP monthly average effluent TSS concentrations during 2010-2013. Point Loma effluent TSS averaged 33.5 mg/l during 2013. Preliminary data from 2014 (year 2014 data will be electronically transmitted to regulators when available in 2015) indicate that Point Loma WWTP effluent TSS averaged less than 30 mg/l during calendar year 2014.

Table II.A-7 (page II.A-24) summarizes BOD percent removals during 2010-2013 for the PLOO discharge. Per requirements in Order No. R9-2009-0001, BOD removal is also computed on a system-wide basis to avoid double-counting of returned solids streams. As shown in Table II.A-7, monthly BOD percent removal rates during 2010-2013 ranged from 61 percent to 68.5 percent. During 2013, system-wide BOD removal averaged 65.3 percent.

Table II.A-6
System-Wide TSS Removal, 2010-2013

Month	System-Wide TSS Percent Removal[1,2,3]				Point Loma WWTP Effluent TSS[4] (mg/l)			
	2010	2011	2012	2013	2010	2011	2012	2013
Jan	83.1	87.5	87.8	89.4	35.0	40.6	46.2	34.9
Feb	87.2	87.9	88.1	88.4	36.4	37.4	44.1	39.2
Mar	88.4	88.4	89.5	90.0	36.4	34.6	38.1	36.6
Apr	89.0	88.9	90.3	90.4	36.5	37.8	37.7	35.6
May	90.3	88.4	90.8	90.3	34.1	41.5	34.1	37.8
Jun	89.1	88.4	91.4	90.0	38.7	40.9	31.9	38.3
Jul	90.1	87.9	90.4	86.6	36.4	43.5	38.5	50.4
Aug	90.6	87.9	90.2	92.3	33.9	45.6	36.1	27.2
Sep	89.7	87.1	90.5	93.0	37.1	45.7	36.1	24.1
Oct	88.5	87.1	90.9	92.8	38.9	47.0	33.8	25.2
Nov	89.0	88.3	90.0	92.8	37.1	41.8	34.5	25.5
Dec	85.1	88.0	89.2	92.4	45.3	38.8	35.4	27.0
Annual Average	88.3	88.0	89.9	90.7	37.2	41.3	37.2	33.5
Maximum Month	90.6	88.9	91.4	93.0	45.3	47.0	46.2	50.4
Minimum Month	83.1	87.1	87.8	86.6	33.9	34.6	31.9	24.1

1 TSS percent removal computed on a system-wide basis. Data from PLOO annual monitoring reports submitted to the Regional Board for 2010-2013.
2 Order No. R9-2009-0001 became effective on August 1, 2010. The PLOO discharge was regulated by Order No. R9-2002-0025 for the first seven months of calendar year 2010.
3 Data for calendar year 2014 were not available at the time of preparation of this report. Year 2014 data will be electronically transmitted to regulators when available in 2015.
4 Monthly average Point Loma WWTP effluent TSS concentration during the listed year and month.

Table II.A-7 also presents monthly average Point Loma WWTP BOD concentrations during 2010-2013. As demonstrated in Tables II.A-6 and II.A-7, BOD and TSS removal at the Point Loma WWTP thus greatly exceed the minimum 30 percent removal requirements established in 40 CFR 125.58 (r).

Table II.A-7
System-Wide BOD Removal, 2010-2013

Month	System-Wide BOD Percent Removal[1,2,3]				Point Loma WWTP Effluent BOD[4] (mg/l)			
	2010	2011	2012	2013	2010	2011	2012	2013
Jan	64.8	63.3	63	61.7	105	105	118	118
Feb	63.9	62.2	63.4	61.4	106	107	114	122
Mar	67.3	62.3	63.6	63.9	104	104	115	117
Apr	66.7	66.4	64.1	66.0	108	102	117	119
May	67.9	66.0	65.5	66.0	106	106	118	115
Jun	67.4	65.3	66.6	65.0	105	110	116	124
Jul	67.2	64.9	64.8	61.0	105	114	122	134
Aug	68.0	65.3	65.1	66.7	105	114	117	113
Sep	67.4	63.1	65.9	68.5	104	112	110	99
Oct	65.7	64.7	65.9	68.5	100	107	108	105
Nov	66.2	67.1	63.3	67.3	102	101	124	108
Dec	63.3	64.1	64.5	67.6	95	114	115	111
Annual Average	66.3	64.6	64.6	65.3	104	108	116	115
Maximum Month	68.0	67.1	66.6	68.5	108	114	124	134
Minimum Month	63.3	62.2	63.0	61.0	95	101	108	99

1 BOD percent removal computed on a system-wide basis. Data from PLOO annual monitoring reports submitted to the Regional Board for 2010-2013.
2 Order No. R9-2009-0001 became effective on August 1, 2010. The PLOO discharge was regulated by Order No. R9-2002-0025 for the first seven months of calendar year 2010.
3 Data for calendar year 2014 were not available at the time of preparation of this report. Year 2014 data will be electronically transmitted to regulators when available in 2015.
4 Monthly average Point Loma WWTP effluent BOD concentration during the listed year and month.

b. If your effluent does not meet primary or equivalent treatment requirements, when do you plan to meet them? Provide a detailed schedule, including design, construction, start-up and full operation, with your application. This requirement must be met by the effective date of the new Section 301(h) modified permit.

The question is not applicable. As demonstrated in II.A.3(a), the Point Loma WWTP provides a degree of treatment superior to that required in 40 CFR 125.58(r).

II.A.4. Effluent Limitations and Characteristics [40 CFR 125.60(b) and 125.61(e)(2)]

a. Identify the final effluent limitations for five-day biochemical oxygen demand (BOD_5), suspended solids, and pH upon which your application for a modification is based:

- **BOD_5 (mg/ℓ)**
- **Suspended solids (mg/ℓ)**
- **pH (range)**

SUMMARY: This application is based on the following:

1. *A minimum of 80 percent removal of total suspended solids, computed as a monthly average on a system-wide basis,,*
2. *A minimum of 58 percent removal of BOD, computed as an annual average on a system-wide basis, and*
3. *A pH requirement of 6 -9 pH units at all times.*

Proposed BOD Removal, TSS Removal, and pH Limits. This application does not propose any revisions to the BOD, TSS, and pH effluent limitations that were established in Order No. R9-2009-0001 (NPDES CA0107409).

Table II.A-8 (page II.A-27) presents the BOD, suspended solids, and pH requirements on which this application is based. The proposed limits retained from Order No. R9-2009-0001 implement applicable State of California requirements for BOD, TSS, and pH established in the *Water Quality Control Plan for Ocean Waters* (herein after *California Ocean Plan*). The proposed effluent limits also implement requirements of Section 301(j)(5) of the CWA.

In accordance with *California Ocean Plan* and CWA Section 301(j)(5) requirements, proposed BOD requirements are expressed in terms of percent removal. TSS requirements are expressed in terms of percent removal and maximum month concentration.

As noted, per requirements of Order No. R9-2009-0001, the City computes percent BOD and TSS removal rates on a system-wide basis to avoid double-counting of return solids and centrate streams. This application does not propose any change in the percent removal computational procedures set forth in Order No. R9-2009-0001.

Table II.A-9 (page II.A-27) compares the requirements on which this application is based with applicable state and federal regulations. As shown in the table, the proposed requirements are in accordance with the *California Ocean Plan* and provisions of 40 CFR 124.60.

Table II.A-8
Proposed BOD, Suspended Solids, and pH Limitations
City of San Diego PLOO Discharge

Parameter	Mean Annual Percent Removal	Mean Monthly Percent Removal	Mean Annual Effluent Concentration	Monthly Average Effluent Concentration	Maximum Day Effluent Concentration
Total Suspended Solids	No Requirement	80%[1,2]	No Requirement	75 mg/l[3]	No Requirement
5-Day Biochemical Oxygen Demand	58%[1,2]	No Requirement	No Requirement	No Requirement	No Requirement
pH	No Requirement	No Requirement	6 - 9 Units[3,4]	6 - 9 Units[3,4]	6 - 9 Units[3,4]

1 To be computed on a system-wide basis in accordance with procedures established in Order No. R9-2009-0001.
2 Implements TSS and BOD percent removal requirements established within 301(j)(5)(c) of the Clean Water Act.
3 Implements State of California water quality TSS percent removal standard established within the 2012 *California Ocean Plan* (see Appendix U).
4 Effluent pH to be maintained between 6.0 and 9.0 pH units at all times.

Table II.A-9
Comparison of Proposed Modified Requirements
With Applicable State and Federal Limitations

Requirement	BOD Removal	Suspended Solids Removal	pH Limitation
Requirement on Which this Application is Based	58% Removal[1]	80% Removal[2]	6 - 9 pH Units[7]
Current Requirement of Order No. R9-2009-0001 (NPDES CA0107409)	58% Removal[1]	80% Removal[2]	6 - 9 pH Units[7]
Requirement in 2012 *California Ocean Plan*[3]	Receiving Water Requirements Only[4]	75% Removal[5]	6 - 9 pH Units[7]
Requirement in 40 CFR 125.60[6]	30% Removal[6]	30% Removal[6]	6 - 9 pH Units[7]
Requirement in Section 301(j)(5) of the Clean Water Act[8]	58% Removal[8]	58% Removal[8]	Not applicable

1 Annual average value to be computed on a system-wide basis in accordance with procedures established in Order No. R9-2009-0001 (NPDES CA0107409).
2 Monthly average value to be computed on a system-wide basis in accordance with procedures established in Order No. R9-2009-0001.
3 From the 2012 *California Ocean Plan* (see Appendix U within Volume X).
4 The *California Ocean Plan* does not establish a percent removal BOD requirement or a BOD effluent concentration limit. In lieu of establishing effluent BOD requirements, the *California Ocean Plan* regulates the discharge of oxygen-demanding wastes through establishing BOD-related receiving water requirements, including dissolved oxygen, light transmittance, and biostimulation.
5 The *California Ocean Plan* TSS removal limit is computed as 30-day average. In addition, the *California Ocean Plan* establishes receiving water requirements to prevent the discharge of suspended solids from impacting beneficial uses of marine waters.
6 Primary treatment or equivalent regulations promulgated in 40 CFR 125.58 and 125.60 per Sections 301(h) and 303 of the Clean Water Act.
7 Effluent pH to be maintained between 6.0 and 9.0 pH units at all times.
8 Section 301(j)(5)(C) requires that the EPA Administrator not grant a 301(h) modification pursuant to Section 301(j)(5) unless the discharge achieves a monthly average BOD removal of 58 percent and a TSS annual average removal of 80 percent.

b. Provide data on the following effluent characteristics for your current discharge as well as for the modified discharge if different from the current discharge:

Flow (m^3/sec):

- **minimum**
- **average dry weather**
- **average wet weather**
- **maximum**
- **annual average**

BOD_5 for the following plant flows:

- **minimum**
- **average dry weather**
- **average wet weather**
- **maximum**
- **annual average**

Suspended Solids for the following plant flows:

- **minimum**
- **average dry weather**
- **average wet weather**
- **maximum**
- **annual average**

Toxic Pollutants and pesticides (µg/l)

Dissolved Oxygen (prior to chlorination) for the following plant flows:

- **minimum**
- **average dry weather**
- **average wet weather**
- **maximum**
- **annual average**

Immediate dissolved oxygen demand

Point Loma WWTP effluent data have been submitted to the Regional Board in monthly, quarterly, semiannual, and annual reports. Through agreement with EPA, these data are not reproduced in their entirety herein, but the data have been electronically transferred to EPA. The following section presents a brief summary of effluent flow, BOD, suspended solids, toxic pollutants, and dissolved oxygen data for the current PLOO discharge.

Flow, BOD, and Suspended Solids in Current Discharge. Table II.A-10 (page II.A-29) summarizes wastewater flow, effluent BOD concentrations, effluent total suspended solids concentrations, and effluent dissolved oxygen for the current discharge, as reflected in average daily values for calendar year 2013 (the last year for which a full twelve months of data are available).

During calendar year 2013, precipitation at the Point Loma WWTP was 5.46 inches (13.87 centimeters) - a total approximately one-half of the long-term average annual precipitation at Point Loma. Wet weather averages for 2013 have been determined using the arithmetic average of data for days on which recorded precipitation occurred at the Point Loma WWTP. Table II.A-11 (page II.A-30) presents precipitation days and totals during 2013.

Table II.A-10
Point Loma WWTP Effluent Flows and Quality
Current Discharge - Calendar Year 2013

Condition	Parameter	PLOO Flow		Effluent BOD (mg/l)	Effluent TSS (mg/l)	pH (units)	Effluent Dissolved Oxygen[1] (mg/l)
		m^3/sec	mgd				
All Days[2]	Average Value	6.30	143.8	115	33.5	7.27	1.5[1]
	Maximum Value[5]	8.20	187.1[7]	189[8]	75.1[9]	7.47	3.5[1]
	Minimum Value[6]	5.52	126.1	83	16.5	6.96	0.06[1]
Dry Weather[3]	Average Value	6.26	142.9	115	33.0	7.26	1.5[1]
	Maximum Value[5]	7.14	163.1	189[8]	75.1[9]	7.45	NA[10]
	Minimum Value[6]	5.52	126.1	83	16.5	7.02	NA[10]
Wet Weather[4]	Average Value	6.54	149.3	118	36.3	7.28	0.5[1]
	Maximum Value[5]	8.20	187.1[7]	172[8]	68.3	7.47	NA[10]
	Minimum Value[6]	5.70	130.1	87	16.5	6.96	NA[10]

1 The Point Loma WWTP effluent is no longer evaluated for dissolved oxygen. The listed dissolved oxygen concentrations represented recorded values during August 1992 through July 1993, the last 12 month period during which the Point Loma WWTP effluent was routinely sampled for dissolved oxygen.
2 Average values for all days during calendar year 2013. From City of San Diego (2014b).
3 Based on observed daily Point Loma WWTP flows and water quality during days when no rainfall was recorded during 2013. See Table II.A-11 on page II.A-30 for wet weather days during 2013 at the Point Loma WWTP.
4 Based on observed daily Point Loma WWTP flows and water quality during days when rainfall was recorded during 2013.
5 Maximum daily value recorded during calendar year 2013. The maximum flow, pH, BOD, and TSS values did not occur on the same day.
6 Minimum daily value recorded in calendar year 2013. The minimum flow, pH, BOD, and TSS values did not occur on the same day.
7 The listed maximum wet weather flow is the highest recorded daily wet weather flow at the Point Loma WWTP during 2013. The recorded flow occurred on January 26, 2013 after a two day period of precipitation in which the cumulative two-day precipitation totaled 1.00 inch.
8 The highest observed Point Loma WWTP effluent BOD concentration occurred on January 2, 2014. Point Loma WWTP BOD concentrations exceeded 160 mg/l on three additional days during 2013, including April 15 (162 mg/l), July 11 (172 mg/l), and December 3, 2014 (166 mg/l).
9 The listed highest effluent TSS concentration during 2013 occurred on July 20, 2013 during dry weather conditions. During 2013, Point Loma WWTP effluent TSS concentrations exceeded a 60 mg/l concentration on six days, and all of these days occurred during the dry weather span of July 9, 2014 through July 21, 2014.
10 Minimum and maximum wet and dry weather effluent dissolved oxygen data are not available.

As shown in Table II.A-11, calendar year 2013 was dominated by dry weather. Only three events occurred during 2013 in which daily precipitation exceeded 0.1 inches on consecutive days (January 25-26, March 7-8, and November 21-22). As shown in Table II.A-10, the highest recorded average daily flow at the Point Loma WWTP was 187.1 mgd (8.20 m^3/sec), which occurred on one of these consecutive day wet weather periods (January 25-26).

Table II.A-11
Precipitation Days During 2013[1]

1st Quarter 2013		2nd Quarter 2013		3rd Quarter 2013		4th Quarter 2013	
Date	**Precipitation (inches)**	**Date**	**Precipitation (inches)**	**Date**	**Precipitation (inches)**	**Date**	**Precipitation (inches)**
6-Jan	0.16	5-Apr	T	10-Jul	T	9-Oct	0.07
7-Jan	0.01	8-Apr	T	11-Jul	0.04	10-Oct	T
10-Jan	0.04	14-Apr	T	21-Jul	T	28-Oct	0.02
24-Jan	T	15-Apr	0.01	25-Jul	T	29-Oct	0.16
25-Jan	0.85	25-Apr	T	26-Jul	0.01	4-Nov	T
26-Jan	0.15	5-May	0.04	26-Aug	T	15-Nov	T
27-Jan	T	6-May	0.18	6-Sep	T	20-Nov	T
2-Feb	T	7-May	0.04			21-Nov	0.97
3-Feb	T					22-Nov	0.49
8-Feb	0.27					28-Nov	T
9-Feb	T					3-Dec	0.01
10-Feb	T					5-Dec	0.01
19-Feb	0.26					7-Dec	0.01
20-Feb	0.06					19-Dec	0.34
21-Feb	0.04						
7-Mar	0.18						
8-Mar	1.04						
9-Mar	T						
1st Qtr. Total	3.06	2nd Qtr. Total	0.27	3rd Qtr. Total	0.05	4th Qtr. Total	2.08

1 Precipitation for calendar year 2013 at Lindbergh Field, as reported by the National Weather Service and as presented in the 2013 Point Loma annual monitoring report submitted to the Regional Board. (City of San Diego, 2014b)

Table II.A-12 (page II.A-31) presents a month by month breakdown of effluent flow, pH, TSS, and BOD for calendar year 2013. As shown in the table, highest BOD and TSS values occurred during July 2013. Average monthly BOD and TSS values for July 2013 were skewed by higher effluent concentrations that occurred during the second and third week of the month. Preventive/corrective maintenance was being performed on Sedimentation Basins #3 and #8, Influent Screen #4, and Grit Basin C2 at this time, but similar maintenance performed during the course of the year did not have a noticeable effect on effluent quality, and this temporary period of higher BOD and TSS is not attributed to Point Loma WWTP maintenance. This temporary reduction in Point Loma WWTP treatment effectiveness, however, may have resulted from anomalous conditions in the centrate that was directed to the Point Loma WWTP from MBC.

Table II.A-12
2013 Point Loma WWTP Flows and Water Quality by Month[1]

Month	Flow		Effluent pH Units	Effluent BOD (mg/l)	Effluent TSS (mg/l)
	m^3/sec	mgd			
Jan	6.81	155.4	6.81	118	34.9
Feb	6.58	150.1	6.58	122	39.2
Mar	6.53	149.1	6.53	117	36.6
Apr	6.28	143.4	6.28	119	35.6
May	6.29	143.6	6.29	115	37.8
Jun	6.13	139.9	6.13	124	38.3
Jul	6.30	143.9	6.30	134	50.4
Aug	6.10	139.2	6.10	113	27.2
Sep	6.06	138.3	6.06	99	24.1
Oct	6.11	139.6	6.11	105	25.2
Nov	6.21	141.8	6.21	108	25.5
Dec	6.18	141.0	6.18	111	27.0
Average	6.30	143.8	7.27	115	33.5
Max. Month	6.81	155.4	7.47	134	50.4
Min. Month	6.06	138.3	6.96	99	24.1

1 Data from City of San Diego (2014b) for calendar year 2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.

Toxic Inorganic Compounds. Table II.A-13 (page II.A-32) summarizes concentrations of toxic organic constituents in the Point Loma WWTP effluent during 2013. The table also presents a statistical breakdown of toxic organic constituents in the Point Loma WWTP effluent (20^{th}, 50^{th}, and 80^{th} percentile values).

Table II.A-14 (page II.A-33) presents monthly concentrations of toxic inorganic constituents reported by the City during 2013. Table II.A-15 (page II.A-34) presents a breakdown of Point Loma WWTP effluent concentrations of toxic inorganic constituents for wet weather and dry weather conditions during calendar year 2013. Table II.A-16 (page II.A-35) summarizes concentrations of toxic inorganic constituents in the Point Loma WWTP effluent during 2010-2013. As shown in Table II.A-16, median 2013 concentration values are consistent with median concentration values from years 2010-2012. Year 2013 values are thus considered representative of long-term Point Loma WWTP water quality.

Table II.A-13
Summary of Point Loma Effluent Quality for Calendar Year 2013
Toxic Inorganic Constituents

Constituent	2013 Point Loma WWTP Effluent Concentration (µg/l)					Total Number of 2013 Samples	Number of DNQ or Non-Detected Samples[5]
	Maximum Value[2]	80th Percentile[3]	50th Percentile[3]	20th Percentile[3]	MDL[4]		
Antimony	6.7	5.38	ND	ND	2.9	52	48
Arsenic	1.71	1.03	0.92	0.79	0.4	52	0
Barium	52.2	42.2	35.9	26.0	0.039	52	1
Beryllium	ND[6]	ND[6]	ND[6]	ND[6]	0.022	52	52
Cadmium	1.13	ND[6]	ND[6]	ND[6]	0.53	52	50
Chromium	9.0	2.1	1.3	ND[6]	1.2	52	23
Cobalt	1.52	0.77	ND	ND	0.85	52	41
Copper	34	21.5	15.2	11.1	2.0	52	0
Lead	4.0	ND[6]	ND[6]	ND[6]	2.0	52	44
Mercury	0.0162[7]	0.0104[7]	0.0084[7]	0.0057[7]	0.0005	29[8]	0
Molybdenum	10.6	7.1	5.9	5.0	0.89	52	0
Nickel	16.1	11.1	6.8	5.4	0.53	52	0
Selenium	1.61	1.34	1.01	0.89	0.28	52	0
Silver	1.21	ND[6]	ND[6]	ND[6]	0.4	52	43
Thallium	6.65	ND[6]	ND[6]	ND[6]	3.9	52	43
Vanadium	3.0	2.0	1.4	1.1	0.64	52	4
Zinc	66.1	34	27	21	2.5	52	0
Cyanide	4.0	3.0	3.0	2.0	3.0	52	1

1 Data from City of San Diego (2014b) for calendar year 2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.

2 Maximum sample value during calendar year 2013.

3 Percentile values for 2013.

4 The listed Method Detection Limit (MDL) is the predominant MDL achieved during 2013 for the listed constituent.

5 Number of samples during 2013 in which the constituent was not detected at the referenced MDL or was detected, but below the quantifiable limit (DNQ).

6 ND indicates the constituent was not detected at the listed MDL in any Point Loma WWTP effluent sample during 2013.

7 A total of 52 mercury samples were collected during the month. The results of 23 samples were excluded due to quality control issues, including (1) duplicates that were beyond the acceptable percent relative standard deviation or (2) spiked samples in which the percent spiked recovery was below the acceptable range. Results from these samples are not incorporated into the listed monthly average.

Table II.A-14
2013 Point Loma WWTP Toxic Organic Constituents by Month[1]

Parameter	Monthly Point Loma WWTP Effluent Concentration (µg/l)[1]													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average[2]	Maximum Month
Antimony	ND[3]	ND[3]	ND[3]	ND[3]	4.0	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	< 2.9[4]	4.0
Arsenic	0.73	0.72	0.81	0.94	0.97	0.94	1.12	0.97	1.06	1.09	0.88	0.84	0.92	1.12
Barium	21	27	26	34	46	43	43	41	26	37	32	36	34.4	43
Beryllium	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]
Cadmium	ND[3]	ND[3]	ND[3]	ND[3]	< 0.53	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	< 0.53[4]	ND[3]
Chromium	< 1.2[4]	1.3	ND[3]	< 1.2[4]	< 1.2[4]	3.7	< 1.2[4]	1.3	2.0	< 1.2[4]	6.7	< 1.2[4]	1.8	6.7
Cobalt	ND[3]	ND[3]	< 0.85	< 0.85	ND[3]	1.39	ND[3]	ND[3]	ND[3]	< 0.85	ND[3]	ND[3]	< 0.85[3]	1.39
Copper	23.4	22.9	18.2	15.7	18.9	16.3	20.5	15.3	11.3	10.4	8.8	11.1	16.3	23.4
Lead	ND[3]	ND[3]	< 2.0[4]	ND[3]	< 2.0[4]	< 2.0[4]	ND[3]	< 2.0[4]	ND[3]	< 2. 0[4]	< 2.0[4]	< 2.0[4]	< 2.0[4]	< 2.0[4]
Mercury	0.0069	0.0078	0.0052[5]	0.0098[5]	0.0104[5]	0.0103	0.0105	0.0066	0.0056	0.0042[5]	0.0085[5]	0.0102	0.0082	0.0105
Molybdenum	5.73	5.33	5.41	5.26	8.32	5.09	6.75	5.74	7.03	5.65	6.6	4.12	6.0	8.32
Nickel	6	5.1	5.4	6.5	9.1	11.5	6.9	6.8	13.2	5.8	14.1	7.4	8.0	14.1
Selenium	0.87	0.81	1.01	1.41	1.5	1.35	1.09	0.93	0.92	1.0	1.02	1.0	1.07	1.5
Silver	< 0.4[4]	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	ND[3]	< 0.4[4]	0.4	0.5	0.5	< 0.4[3]	0.5
Thallium	ND[3]	< 3.9[4]	< 3.9[4]	ND[3]	ND[3]	ND[3]	< 3.9[4]	ND[3]	< 3.9[4]	ND[3]	< 3.9[4]	< 3.9[4]	< 3.9[4]	< 3.9[4]
Vanadium	1.67	1.46	0.93	1.13	1.10	1.90	1.00	1.64	1.58	2.09	1.42	1.42	1.47	2.09
Zinc	25	32	32	22	58	27	36	27	23	23	16	20	29.2	58
Cyanide	3.2	3.0	3.0	3.0	2.8	2.8	2.4	3.0	3.1	2.2	3.5	2.3	2.9	3.5

1 Data from City of San Diego (2014b) for calendar year 2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.

2 Arithmetic average of individual daily samples collected during 2013. For purposes of averaging, non-detected (ND) samples were assumed to have one-half the concentration of the MDL referenced in Table II.A-13. Listed averages may differ from those reported in the 2013 Point Loma annual report, which reported averages based on non-detected samples having an assigned concentration of zero.

3 ND indicates the sample was not detected at the MDL referenced in Table II.A-13.

4 The listed value of "< x" indicates that the annual average is less than the Method Detection Limit "x". For purposes of averaging, non-detected (ND) samples were assumed to have one-half the concentration of the MDL referenced in Table II.A-13.

5 Some mercury samples during the month were excluded due to quality control issues, including (1) duplicates that were beyond the acceptable percent relative standard deviation or (2) spiked samples in which the percent spiked recovery was below the acceptable range. Results from these samples are not incorporated into the listed monthly average.

Table II.A-15
Summary of Toxic Inorganic Concentrations in Wet and Dry Conditions
Point Loma WWTP Effluent - Calendar Year 2013

Toxic Inorganic Constituent	MDL[2] (Fg/l)	Wet Weather Conditions[3]					Dry Weather Conditions[4]				
		No. of Samples[3]	Effluent Concentration (μg/l)				No. of Samples[4]	Effluent Concentration (μg/l)			
			Max. Value[5]	Min. Value[6]	Mean Value[7]	Median Value[8]		Max. Value[5]	Min. Value[6]	Mean Value[7]	Median Value[8]
Antimony	2.0	9	3.0	2.0	2.7	3.0	43	4.0	ND[9]	2.9	3.0
Arsenic	2.9	9	ND[9]	ND[9]	ND[9]	ND[9]	43	6.7	ND[9]	< 2.9[10]	ND[9]
Barium	0.4	9	1.71	0.71	0.98	0.94	43	1.21	0.56	0.91	0.91
Beryllium	0.039	9	40.8	22.0	31.5	32.0	43	52.2	ND[9]	35.0	37.0
Cadmium	0.022	9	ND[9]	ND[9]	ND[9]	ND[9]	43	ND[9]	ND[9]	ND[9]	ND[9]
Chromium	0.53	9	ND[9]	ND[9]	ND[9]	ND[9]	43	1.130	ND[9]	< 0.53[10]	ND[9]
Cobalt	1.2	9	8.0	0.6	2.4	1.3	43	9.0	ND[9]	1.65	1.21
Copper	0.85	9	0.960	ND[9]	< 0.85[10]	ND[9]	43	1.52	ND[9]	< 0.85[10]	ND[9]
Lead	3.0	9	25.0	7.0	15.6	15.3	43	34.0	9.0	16.4	15.0
Mercury	2.0	9	2.0	ND[9]	< 2.0[10]	ND[9]	43	4.0	ND[9]	< 2.0[10]	ND[9]
Molybdenum	0.0005	3[11]	9.50	6.08	8.22	9.08	26[11]	16.2	3.20	8.22	8.09
Nickel	0.89	9	8.9	2.8	6.2	6.0	43	10.6	3.3	5.9	5.8
Selenium	0.53	9	15.80	4.74	8.33	6.42	43	16.1	4.10	7.96	6.84
Silver	0.28	9	1.38	0.82	1.08	0.97	43	1.61	0.74	1.07	1.01
Thallium	0.4	9	1.10	ND[9]	< 0.4[10]	ND[9]	43	1.21	ND[9]	< 0.4[10]	0.200
Vanadium	3.9	9	4.90	ND[9]	< 3.9[10]	ND[9]	43	6.65	ND[9]	< 3.9[10]	ND[9]
Zinc	0.64	9	2.67	0.83	1.52	1.43	43	3.02	ND[9]	1.46	1.37
Cyanide	2.5	9	65.8	15.0	31.2	26.8	43	66.1	14.3	28.7	26.8
Antimony	2.0	9	3.0	2.0	2.7	3.0	43	4.0	ND[9]	2.9	3.0

1 Data from City of San Diego (2014b) for calendar year 2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.
2 The listed Method Detection Limit (MDL) is the predominant MDL achieved during 2013 for the listed constituent.
3 Point Loma WWTP effluent sampling results during calendar year 2013 for days (see Table II.A-11 on page II.A-30) where precipitation was recorded.
4 Point Loma WWTP effluent sampling results during calendar year 2013 for days where no precipitation was recorded.
5 Maximum sample value during calendar year 2013 for the listed wet or dry weather conditions.
6 Minimum sample value during calendar year 2013 for the listed wet or dry weather conditions.
7 Arithmetic average of individual effluent samples collected during 2013. For purposes of averaging, non-detected (ND) samples were assumed to have one-half the concentration of the referenced MDL. The above calendar year 2013 averages may differ from those reported in the 2013 Point Loma annual report, as averages reported in the annual report were computed using a concentration of zero for non-detected samples.
8 Median (50th percentile) value during calendar 2013 for the listed wet or dry weather conditions.
9 ND indicates the sample was not detected at the referenced MDL.
10 Less than symbol "<x" indicates that the arithmetic average during the year was less than the referenced MDL concentration "x".
11 Some mercury samples during 2013 were excluded due to quality control issues, including (1) duplicates that were beyond the acceptable percent relative standard deviation or (2) spiked samples in which the percent spiked recovery was below the acceptable range. Results from these samples are not incorporated into statistics listed above.

Table II.A-16
Summary of Point Loma Effluent Quality for Calendar Years 2010-2013
Toxic Inorganic Constituents

Parameter	Point Loma WWTP Effluent Concentration[1] (µg/l)							
	2010		2011		2012		2013	
	Maximum Value[2]	Median Value[3]	Maximum Value[2]	Median Value[3]	Maximum Value	Median Value[3]	Maximum Value[2]	Median Value[3]
Antimony	ND[4]	ND[4]	6.7	ND[5]	ND[4]	ND[4]	6.7	ND[5]
Arsenic	1.54	0.84	1.46	0.85	0.90	0.78	1.71	0.92
Barium	53.7	32.3	41.3	28.5	40.8	24.3	52.2	35.9
Beryllium	0.043	ND[5]	0.084	ND[5]	ND[4]	ND[4]	ND[4]	ND[4]
Cadmium	ND[4]	ND[4]	0.90	ND[5]	0.87	ND[5]	1.13	ND[5]
Chromium	6.0	1.9	3.8	1.6	2.8	1.9	9.0	1.2
Cobalt	1.7	ND[5]	1.5	ND[5]	ND[4]	ND[4]	1.52	ND[5]
Copper	47	19	44	19	36	20	34	15.2
Lead	12	ND[5]	6.0	ND[5]	3.0	ND[5]	4.0	ND[5]
Mercury	0.045	0.0335	0.0292	0.0069	0.0163	0.0073	0.012[6]	0.0084[6]
Molybdenum	12.2	8.2	10.7	6.7	11.2	6.0	10.6	5.9
Nickel	18.2	7.5	13.8	7.2	9.5	6.4	16.1	6.8
Selenium	2.23	1.11	1.59	0.91	1.15	0.84	1.61	1.01
Silver	0.60	ND[5]	0.74	ND[5]	0.60	ND[5]	1.21	ND[5]
Thallium	< 3.9[7]	ND[5]	7.9	ND[5]	4.4	ND[5]	6.65	ND[5]
Vanadium	2.56	1.01	2.96	0.90	2.49	1.30	3.02	1.39
Zinc	36	24	35	25	56	26	66	27
Cyanide	0.004	0.002	0.004	0.002	0.004	0.002	4.0	3.0

1 Data from City of San Diego (2011b-2014b) for calendar years 2010-2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.

2 Maximum sample value during the listed calendar year.

3 Median (50th percentile) value for the listed calendar year.

4 The constituent was not detected at the listed MDL in any Point Loma WWTP effluent sample during the listed year.

5 The constituent was not detected at the MDL referenced in Table II.A-13 (page II.A-32) in more than half of the samples during the listed year.

6 The results of 23 mercury samples during 2012 were excluded due to quality control issues, including (1) duplicates that were beyond the acceptable percent relative standard deviation or (2) spiked samples in which the percent spiked recovery was below the acceptable range. Results from these samples are not incorporated into the above maximum and median values.

7 The constituent was detected in one sample during the year at a level less than the MDL.

Toxic Organic Compounds. The City routinely monitors the Point Loma WWTP effluent for a variety of toxic organic compounds, including:

- chlorinated pesticides and PCBs,
- tributyltin,
- organophosphorus pesticides,
- acid extractable compounds,
- base-neutral compounds,
- volatile organic compounds, and
- dioxins and furans.

Tables II.A-17 through II.A-27 (pages II.A-37 through II.A-47) presents the results of Point Loma WWTP effluent monitoring for each of these categories of toxic organic compounds.

Chlorinated Pesticides and PCBs. Table II.A-17 (page II.A-37) summarizes Point Loma WWTP effluent concentrations for chlorinated pesticides and PCBs. As shown in Table II.A-17, chlorinated pesticides were rarely detected in the Point Loma WWTP effluent during 2013. Quantifiable concentrations were detected in one of 52 weekly samples during 2013 for gamma chlordane, 4,4'-DDE, and Endrin. Constituents that were detected but at levels below quantifiable limits included alpha BHC, beta BHC, alpha chlordane, and 2,4'-DDE.

Table II.A-18 (page II.A-38) summarizes chlorinated pesticide and PCB data from 2010-2013. As shown in Table II.A-18, few instances occurred during 2010-2013 where quantifiable concentrations of chlorinated pesticides and PCBs were detected.

Tributyltin. As also shown in Table II.A-18 (page II.A-38), tributyltin was not detected in any Point Loma WWTP samples during 2010-2013.

Organophosphorus Pesticides. Tables II.A-19 and II.A-20 (pages II.A-39 and II.A-40) summarize Point Loma WWTP effluent concentrations for organophosphorus pesticides during 2010-2013. Malathion is the only organophosphorus pesticide that is periodically observed in the Point Loma WWTP effluent, and it was detected in fewer than half of the Point Loma WWTP samples during 2010-2013.

Acid Extractable Compounds. Tables II.A-21 and II.A-22 (pages II.A-41 and II.A-42) summarize Point Loma WWTP effluent concentrations for acid extractable compounds. Phenol (non-chlorinated) was the only constituent routinely detected in the Point Loma WWTP effluent during 2010-2013. An analysis of phenol sources within the Metro System is presented as part of the Tier I Antidegradation Analysis (Part 3, Volume II).

Table II.A-17
Summary of Point Loma Effluent Quality for Calendar Year 2013
Chlorinated Pesticides, PCBs and Tributyltin

Constituent	Point Loma WWTP Effluent Concentration[1] (µg/l)				Total Number of 2013 Samples	Number of DNQ or Non-Detected Samples[6]
	Maximum Value[2]	Average Value[3]	Median Value[4]	MDL[5]		
Aldrin	ND[7]	ND[7]	ND[7]	0.003	52	52
Dieldrin	ND[7]	ND[7]	ND[7]	0.008	52	52
BHC alpha	0.0014[9]	< 0.001[8]	ND	0.001	52	51
BHC beta	0.020[9]	< 0.006[8]	ND	0.006	52	51
BHC delta	ND[7]	ND[7]	ND[7]	0.004	52	52
BHC gamma	ND[7]	ND[7]	ND[7]	0.003	52	52
Chlordane (alpha)	< 0.002	< 0.002[8]	ND[7]	0.002	52	52
Chlordane (gamma)	0.00245	< 0.002[8]	ND[7]	0.002	52	51
2,4' -DDD	ND[7]	ND[7]	ND[7]	0.003	52	52
2,4' -DDE	0.001[9]	ND[7]	ND[7]	0.001	52	52
2,4' -DDT	ND[7]	ND[7]	ND[7]	0.003	52	52
4,4' -DDD	ND[7]	ND[7]	ND[7]	0.004	52	52
4,4' -DDE	0.00255	< 0.002[8]	ND[7]	0.002	52	51
4,4' -DDT	ND[7]	ND[7]	ND[7]	0.004	52	52
Endosulfan (alpha)	ND[7]	ND[7]	ND[7]	0.003	52	52
Endosulfan (beta)	ND[7]	ND[7]	ND[7]	0.005	52	52
Endosulfan Sulfate	ND[7]	ND[7]	ND[7]	0.005	52	52
Endrin	0.0165	< 0.008[8]	ND[7]	0.008	52	51
Endrin aldehyde	ND[7]	ND[7]	ND[7]	0.009	52	52
Heptachlor	ND[7]	ND[7]	ND[7]	0.002	52	52
Heptachlor epoxide	ND[7]	ND[7]	ND[7]	0.004	52	52
Methoxychlor	ND[7]	ND[7]	ND[7]	0.018	52	52
Nonachlor (cis)	ND[7]	ND[7]	ND[7]	0.005	48	48
Nonachlor (trans)	ND[7]	ND[7]	ND[7]	0.003	48	48
PCB 1016	ND[7]	ND[7]	ND[7]	0.012	52	52
PCB 1221	ND[7]	ND[7]	ND[7]	0.018	52	52
PCB 1232	ND[7]	ND[7]	ND[7]	0.012	52	52
PCB 1242	ND[7]	ND[7]	ND[7]	0.005	52	52
PCB 1248	ND[7]	ND[7]	ND[7]	0.005	52	52
PCB 1254	ND[7]	ND[7]	ND[7]	0.011	52	52
PCB 1260	ND[7]	ND[7]	ND[7]	0.009	52	52
PCB 1262	ND[7]	ND[7]	ND[7]	0.010	52	52
Toxaphene	ND[7]	ND[7]	ND[7]	0.33	52	52
Tributyltin	ND[7]	ND[7]	ND[7]	2.0	12	12

1 Data from City of San Diego (2014b) for calendar year 2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.
2 Maximum sample value during calendar year 2013.
3 Arithmetic average of all calendar year 2013 samples. Samples with not detected (ND) values were assigned a concentration of one-half the referenced MDL for purposes of computing the arithmetic average.
4 Median value during calendar year 2013.
5 Method Detection Limit (MDL) achieved during 2013 for the listed constituent.
6 Number of samples during 2013 in which the constituent was not detected (ND) or was detected but below quantifiable limits (DNQ).
7 ND indicates the constituent was not detected at the listed MDL in any Point Loma WWTP effluent sample during 2013.
8 Less than symbol "<x" indicates that the arithmetic average during the year was less than the MDL "x".
9 Constituent was detected but was not quantifiable (DNQ).

Table II.A-18
Summary of Point Loma Effluent Quality for Calendar Years 2010-2013
Chlorinated Pesticides, PCBs and Tributyltin

Parameter	Point Loma WWTP Effluent Concentration[1] (µg/l)							
	2010		2011		2012		2013	
	Maximum Value[2]	Median Value[3]	Maximum Value[2]	Median Value[3]	Maximum Value[2]	Median Value[3]	Maximum Value[2]	Median Value[3]
Aldrin	ND[4]	ND[4]	ND[4]	ND[4]	0.0062[6]	ND[4]	ND[4]	ND[4]
Dieldrin	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
BHC alpha	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	0.0014[8]	ND[5]
BHC beta	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	0.020[8]	ND[5]
BHC delta	0.085[6]	ND[5]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
BHC gamma	0.006[6]	ND[5]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Chlordane (alpha)	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	< 0.002	ND[5]
Chlordane (gamma)	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	0.00245[6]	ND[5]
2,4' -DDD	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
2,4' -DDE	ND[4]	ND[4]	ND[4]	ND[4]	< 0.001[7]	ND[5]	0.001[8]	ND[5]
2,4' -DDT	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
4,4' -DDD	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
4,4' -DDE	ND[4]	ND[4]	ND[4]	ND[4]	0.0024[6]	ND[5]	0.00255[6]	ND[5]
4,4' -DDT	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Endosulfan (alpha)	0.016[6]	ND[5]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Endosulfan (beta)	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Endosulfan Sulfate	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Endrin	ND[4]	ND[4]	ND[4]	ND[4]	< 0.008[7]	ND[5]	0.0165[6]	ND[5]
Endrin aldehyde	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Heptachlor	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Heptachlor epoxide	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Methoxychlor	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Nonachlor (cis)	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Nonachlor (trans)	0.0145[6]	ND[5]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
PCB 1016	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
PCB 1221	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
PCB 1232	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
PCB 1242	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
PCB 1248	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
PCB 1254	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
PCB 1260	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
PCB 1262	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Toxaphene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Tributyltin	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]

1 Data from City of San Diego (2011b-2014b) for calendar years 2010-2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.
2 Maximum sample value during the listed calendar year.
3 Median (50^{th} percentile) value for the listed calendar year.
4 The constituent was not detected (ND) at the MDL listed in Table II.A-17 in any Point Loma WWTP effluent sample during the listed year.
5 The constituent was not detected at the MDL referenced in Table II.A-17 (page II.A-37) in more than half of the samples during the listed year.
6 The constituent was detected at the referenced MDL in only one sample during the listed year.
7 Constituent was detected in one sample during the year, but at a concentration less than the MDL. Value was reported as "< x".
8 Constituent was detected but not quantifiable (DNQ).

Table II.A-19
Summary of Point Loma Effluent Quality for Calendar Year 2013
Organophosphorus Pesticides

Constituent	Concentration[1] (µg/l)				Total Number of 2013 Samples	Number of DNQ or Non-Detected Samples[6]
	Maximum Value[2]	Average Value[3]	Median Value[4]	MDL[5]		
Demeton O	ND[7]	ND[7]	ND[7]	0.15	12	12
Demeton S	ND[7]	ND[7]	ND[7]	0.08	12	12
Diazanon	ND[7]	ND[7]	ND[7]	0.03	12	12
Guthion	ND[7]	ND[7]	ND[7]	0.15	12	12
Malathion	0.55	< 0.097[8]	ND[7]	0.03	12	6
Parathion	ND[7]	ND[7]	ND[7]	0.03	12	12
Chlorpyrifos	< 0.03[9]	< 0.03[10]	ND[7]	0.03	12	11
Coumaphos	ND[7]	ND[7]	ND[7]	0.15	12	12
Dichlorvos	ND[7]	ND[7]	ND[7]	0.05	12	12
Dimethoate	ND[7]	ND[7]	ND[7]	0.04	12	12
Disulfoton	ND[7]	ND[7]	ND[7]	0.02	12	12
Stirophos	ND[7]	ND[7]	ND[7]	0.03	12	12

1 Data from City of San Diego (2014b) for calendar year 2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.
2 Maximum sample value during calendar year 2013.
3 Arithmetic average of all calendar year 2013 samples. Samples with not detected (ND) values were assigned a concentration of one-half the referenced MDL for purposes of computing the arithmetic average.
4 Median value during calendar year 2013.
5 Method Detection Limit (MDL) achieved during 2013 for the listed constituent.
6 Number of samples during 2013 in which the constituent was not detected (ND) or was detected but below quantifiable limits (DNQ).
7 ND indicates the constituent was not detected at the listed MDL in any Point Loma WWTP effluent sample during 2013.
8 Listed average includes three samples that were detected but not quantifiable (DNQ). Listed DNQ values were used for computing the arithmetic average.
9 The constituent was detected in one sample during 2013, but at a concentration less than the MDL. Value was reported as "< x".
10 Less than symbol "<x" indicates that the arithmetic average during the year was less than the MDL "x".

Table II.A-20
Summary of Point Loma Effluent Quality for Calendar Years 2010-2013
Organophosphorus Pesticides

Parameter	Concentration[1] (µg/l)							
	2010		2011		2012		2013	
	Maximum Value[2]	Median Value[3]	Maximum Value[2]	Median Value[3]	Maximum Value[2]	Median Value[3]	Maximum Value[2]	Median Value[3]
Demeton O	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Demeton S	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Diazanon	ND[4]	ND[4]	0.1[6]	ND[5]	0.1[6]	ND[5]	ND[4]	ND[4]
Guthion	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Malathion	0.65	0.11	0.08	ND[5]	0.15	ND[5]	0.55	ND[5]
Parathion	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Chlorpyrifos	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	< 0.03[7]	ND[5]
Coumaphos	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Dichlorvos	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Dimethoate	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Disulfoton	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Stirophos	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]

1 Data from City of San Diego (2011b-2014b) for calendar years 2010-2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.

2 Maximum sample value during the listed calendar year.

3 Median (50th percentile) value for the listed calendar year.

4 The constituent was not detected at the MDL referenced in Table II.A-19 in any Point Loma WWTP effluent sample during the listed year.

5 The constituent was not detected at the MDL referenced in Table II.A-19 (page II.A-39) in more than half of the samples during the listed year.

6 The constituent was detected at the referenced MDL in only one sample during the listed year.

7 The constituent was detected at a concentration of less than the MDL.

Table II.A-21
Summary of Point Loma Effluent Quality for Calendar Year 2013
Acid Extractable Compounds

Constituent	Concentration[1] (µg/l)				Total Number of 2013 Samples	Number of DNQ or Non-Detected Samples[6]
	Maximum Value[2]	Average Value[3]	Median Value[4]	MDL[5]		
4-chlroro-3-methylphenol	ND[7]	ND[7]	ND[7]	1.67	51	51
2-chlorophenol	ND[7]	ND[7]	ND[7]	1.32	51	51
2.4-dichlorophenol	ND[7]	ND[7]	ND[7]	1.01	51	51
2.4-dimethylphenol	ND[7]	ND[7]	ND[7]	2.01	51	51
2-methyl-4,6-dinitro phenol	ND[7]	ND[7]	ND[7]	1.52	51	51
2,4-dinitrophenol	ND[7]	ND[7]	ND[7]	2.16	51	51
2-nitrophenol	ND[7]	ND[7]	ND[7]	1.55	51	51
4-nitrophenol	ND[7]	ND[7]	ND[7]	1.14	51	51
Pentachlorophenol	7.0	< 1.12[8]	ND[7]	1.12	51	50
Phenol	30.6	21.6	21.7	1.76	51	0
2,4,6-trichlorophenol	ND[7]	ND[7]	ND[7]	1.65	51	51

1 Data from City of San Diego (2014b) for calendar year 2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.
2 Maximum sample value during calendar year 2013.
3 Arithmetic average of all calendar year 2013 samples. Samples with not detected (ND) values were assigned a concentration of one-half the referenced MDL for purposes of computing the arithmetic average.
4 Median value during calendar year 2013.
5 Method Detection Limit (MDL) achieved during 2013 for the listed constituent.
6 Number of samples during 2013 in which the constituent was not detected (ND) or was detected but below quantifiable limits (DNQ).
7 ND indicates the constituent was not detected at the listed MDL in any Point Loma WWTP effluent sample during 2013.
8 Less than symbol "<x" indicates that the arithmetic average during the year was less than the MDL "x".

Base/Neutral Compounds. Tables II.A-22 and II.A-23 (pages II.A-42 and II.A-43) summarize Point Loma WWTP effluent results for base/neutral compounds. Diethyl phthalate was the only base/neutral compound in the Point Loma WWTP effluent that was detected in quantifiable concentrations. Diethyl phthalate (a common plasticizer and solvent) was routinely present in the Point Loma WWTP effluent during 2010-2013.

Purgeable Organic Compounds. Tables II.A-24 and II.A-25 (pages II.A-44 and II.A-45) present Point Loma WWTP effluent results for volatile (purgeable) organic compounds. As shown in the tables, the benzene-based compounds ethylbenzene and toluene are commonly detected in the Point Loma WWTP effluent. Halogenated or brominated compounds detected in the Point Loma effluent during 2013 include:

- bromodichloromethane (dichlorobromomethane),
- bromomethane (methyl bromide),
- chloroethane (ethyl chloride),
- chloromethane (methyl chloride),
- dibromochloromethane (chlorodibromomethane), and
- methylene chloride (dichloromethane).

Table II.A-22
Summary of Point Loma Effluent Quality for Calendar Years 2010-2013
Acid Extractable Compounds

Parameter	Concentration[1] (µg/l)							
	2010		2011		2012		2013	
	Maximum Value[2]	Median Value[3]	Maximum Value[2]	Median Value[3]	Maximum Value[2]	Median Value[3]	Maximum Value[2]	Median Value[3]
4-chlroro-3-methylphenol	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
2-chlorophenol	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
2.4-dichlorophenol	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
2.4-dimethylphenol	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
2-methyl-4,6-dinitro phenol	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
2,4-dinitrophenol	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
2-nitrophenol	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
4-nitrophenol	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Pentachlorophenol	1.6[6]	ND[5]	ND[4]	ND[4]	ND[4]	ND[4]	7.0[6]	ND[5]
Phenol	20.1	15.2	23.6	16.8	25.7	18.85	30.6	21.7
2,4,6-trichlorophenol	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]

1 Data from City of San Diego (2011-2014b) for calendar years 2010-2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.
2 Maximum sample value during the listed calendar year.
3 Median (50th percentile) value for the listed calendar year.
4 The constituent was not detected at the MDL referenced in Table II.A-21 in any Point Loma WWTP effluent sample during the listed year.
5 The constituent was not detected at the MDL referenced in Table II.A-21 (page II.A-41) in more than half of the samples during the listed year.
6 The constituent was detected at the referenced MDL in only one sample during the listed year.

Table II.A-23
Summary of Point Loma Effluent Quality for Calendar Year 2013
Base Neutral Compounds

Constituent	Concentration[1] (µg/l)				Total Number of 2013 Samples	Number of DNQ or Non-Detected Samples[6]
	Maximum Value[2]	Average Value[3]	Median Value[4]	MDL[5]		
Acenaphthene	ND[7]	ND[7]	ND[7]	1.8	12	12
Acenaphthylene	ND[7]	ND[7]	ND[7]	1.77	12	12
Anthracene	ND[7]	ND[7]	ND[7]	1.9	12	12
Benzidine	ND[7]	ND[7]	ND[7]	1.52	12	12
Benzo(a)anthracene	ND[7]	ND[7]	ND[7]	1.1	12	12
Benzo(a)pyrene	ND[7]	ND[7]	ND[7]	1.25	12	12
3,4-benzo(b)fluoranthene	ND[7]	ND[7]	ND[7]	1.35	12	12
Benzo(g,h,i)perylene	ND[7]	ND[7]	ND[7]	1.09	12	12
Benzo(k)fluoranthene	ND[7]	ND[7]	ND[7]	1.49	12	12
Bis (2-chloroethyxy) methane	ND[7]	ND[7]	ND[7]	1.01	12	12
Bis (2-chloroethyl) ether	ND[7]	ND[7]	ND[7]	1.38	12	12
Bis (2-chloroisopropyl) ether	ND[7]	ND[7]	ND[7]	1.16	12	12
Bis (2-ethylhexyl) phthalate	ND[7]	ND[7]	ND[7]	8.96	12	12
4-bromophenyl phenyl ether	ND[7]	ND[7]	ND[7]	1.4	12	12
Butyl benzyl phthalate	ND[7]	ND[7]	ND[7]	2.84	12	12
2-chloronaphthalene	ND[7]	ND[7]	ND[7]	1.87	12	12
4-chlorophenyl phenyl ether	ND[7]	ND[7]	ND[7]	1.57	12	12
Chrysene	ND[7]	ND[7]	ND[7]	1.16	12	12
di-n-butyl phthalate	ND[7]	ND[7]	ND[7]	3.96	12	12
di-n-octyl phthalate	ND[7]	ND[7]	ND[7]	1.0	12	12
Dibenzo(a,h)anthracene	ND[7]	ND[7]	ND[7]	1.01	12	12
3,3-dichlorobenzidene	ND[7]	ND[7]	ND[7]	2.44	12	12
Diethyl phthalate	7.9	5.0	5.1	3.05	12	0
Dimethyl phthalate	ND[7]	ND[7]	ND[7]	1.44	12	12
2,4-dinitrotoluene	ND[7]	ND[7]	ND[7]	1.36	12	12
2,6-dinitrotoluene	ND[7]	ND[7]	ND[7]	1.53	12	12
1,2-diphenylhydrazine	ND[7]	ND[7]	ND[7]	1.37	12	12
Fluoranthene	ND[7]	ND[7]	ND[7]	1.33	12	12
Fluorene	ND[7]	ND[7]	ND[7]	1.61	12	12
Hexachlorobenzene	ND[7]	ND[7]	ND[7]	1.48	12	12
Hexachlorobutadiene	ND[7]	ND[7]	ND[7]	1.64	12	12
Hexachlorocyclopentadiene	ND[7]	ND[7]	ND[7]	1.25	12	12
Hexachloroethane	ND[7]	ND[7]	ND[7]	1.32	12	12
Ideno(1,2,3-cd)pyrene	ND[7]	ND[7]	ND[7]	1.14	12	12
Isophorone	ND[7]	ND[7]	ND[7]	1.53	12	12
Naphthalene	ND[7]	ND[7]	ND[7]	1.65	12	12
Nitrobenzene	ND[7]	ND[7]	ND[7]	1.6	12	12
n-nitrosodi-n-propylamine	ND[7]	ND[7]	ND[7]	1.16	12	12
n-nitrosodi-methylamine	ND[7]	ND[7]	ND[7]	1.27	12	12
n-nitrosodi-phenylamine	ND[7]	ND[7]	ND[7]	3.48	12	12
Phenanthrene	ND[7]	ND[7]	ND[7]	1.34	12	12
Pyrene	ND[7]	ND[7]	ND[7]	1.43	12	12
1,2,4-trichlorobenzene	ND[7]	ND[7]	ND[7]	0.7	24	24

1 Data from City of San Diego (2014b) for calendar year 2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.
2 Maximum sample value during calendar year 2013.
3 Arithmetic average of all calendar year 2013 samples.
4 Median value during calendar year 2013.
5 Method Detection Limit (MDL) achieved during 2013 for the listed constituent.
6 Number of samples during 2013 in which the constituent was not detected (ND) or was detected but below quantifiable limits (DNQ).
7 ND indicates the constituent was not detected at the listed MDL in any Point Loma WWTP effluent sample during 2013.

Table II.A-24
Summary of Point Loma Effluent Quality for Calendar Years 2010-2013
Base Neutral Compounds

Parameter	Concentration[1] (µg/l)							
	2010		2011		2012		2013	
	Maximum Value[2]	Median Value[3]	Maximum Value[2]	Median Value[3]	Maximum Value[2]	Median Value[3]	Maximum Value[2]	Median Value[3]
Acenaphthene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Acenaphthylene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Anthracene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Benzidine	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Benzo(a)anthracene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Benzo(a)pyrene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
3,4-benzo(b)fluoranthene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Benzo(g,h,i)perylene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Benzo(k)fluoranthene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Bis (2-chloroethyxy) methane	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Bis (2-chloroethyl) ether	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Bis (2-chloroisopropyl) ether	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Bis (2-ethylhexyl) phthalate	< 8.96[5]	ND[4]	< 8.96[5]	ND[4]	< 8.96[5]	ND[4]	ND[4]	ND[4]
4-bromophenyl phenyl ether	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Butyl benzyl phthalate	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
2-chloronaphthalene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
4-chlorophenyl phenyl ether	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Chrysene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
di-n-butyl phthalate	ND[4]	ND[4]	< 3.96[5]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
di-n-octyl phthalate	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Dibenzo(a,h)anthracene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
3,3-dichlorobenzidene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Diethyl phthalate	10.7	6.6	6.9	5.4	7.1	5.3	7.9	5.0
Dimethyl phthalate	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
2,4-dinitrotoluene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
2,6-dinitrotoluene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
1,2-diphenylhydrazine	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Fluoranthene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Fluorene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Hexachlorobenzene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Hexachlorobutadiene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Hexachlorocyclopentadiene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Hexachloroethane	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Ideno(1,2,3-cd)pyrene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Isophorone	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Naphthalene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Nitrobenzene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
n-nitrosodi-n-propylamine	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
n-nitrosodi-methylamine	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
n-nitrosodi-phenylamine	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Phenanthrene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Pyrene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
1,2,4-trichlorobenzene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]

1 Data from City of San Diego (2011b-2014b) for calendar years 2010-2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.
2 Maximum sample value during the listed calendar year.
3 Median (50th percentile) value for the listed calendar year.
4 Constituent was not detected (ND) at the MDL listed in Table II.A-23 (page II.A-43) in any effluent sample during the listed year.
5 Constituent was detected at a concentration less than the MDL in one of the 12 annual samples. Value was reported as "< x".

Table II.A-25
Summary of Point Loma Effluent Quality for Calendar Year 2013
Volatile Organic Compounds

Constituent	Concentration[1] (µg/l)				Total Number of 2013 Samples	Number of DNQ or Non-Detected Samples[6]
	Maximum Value[2]	Average Value[3]	Median Value[4]	MDL[5]		
Acrolein	ND[7]	ND[7]	ND[7]	1.3	12	12
Acrylonitrile	ND[7]	ND[7]	ND[7]	0.7	12	12
Benzene	ND[7]	ND[7]	ND[7]	0.4	12	12
Bromoform	ND[7]	ND[7]	ND[7]	0.5	12	12
Carbon tetrachloride	ND[7]	ND[7]	ND[7]	0.4	12	12
Chlorobenzene	0.725[8]	0.28	ND[7]	0.4	12	11[9]
Chlorodibromomethane	1.02	< 0.6[10]	ND[7]	0.6	12	11
Chloroethane	4.49	1.7	1.8	0.9	12	5
Chloroform	10.8	6.5	6.0	0.2	12	12
Dichlorobromomethane	1.26	0.54	< 0.5[11]	0.5	12	10[11]
1,2-dichlorobenzene	ND[7]	ND[7]	ND[7]	0.4	12	12
1,3-dichlorobenzene	ND[7]	ND[7]	ND[7]	0.5	12	12
1,4-dichlorobenzene	0.61[9]	< 0.4[10]	ND[7]	0.4	12	9[9]
1,1-dichloroethane	ND[7]	ND[7]	ND[7]	0.4	24	12
1,2-dichloroethane	ND[7]	ND[7]	ND[7]	0.5	12	12
Trans-1,2-dichloroethylene	ND[7]	ND[7]	ND[7]	0.6	12	12
1,1-dichlroethene	ND[7]	ND[7]	ND[7]	0.4	12	12
1,2-dichloropropane	ND[7]	ND[7]	ND[7]	0.3	12	12
Cis-1,3-dichloropropene	ND[7]	ND[7]	ND[7]	ND[7]	12	12
Trans-1,3-dichloropropene	ND[7]	ND[7]	ND[7]	ND[7]	12	12
Ethylbenzene	1.53	< 0.3[10]	ND[7]	0.3	12	11
Methyl bromide (bromomethane)	2.32	1.05	1.07	0.7	12	5
Methyl chloride (chloromethane)	45	15.7	15.3	0.5	12	0
Methylene chloride	2.3	1.2	1.1	0.3	12	1[11]
1,1,2,2-tetrachloroethane	ND[7]	ND[7]	ND[7]	0.5	12	12
Tetrachloroethylene	ND[7]	ND[7]	ND[7]	1.1	12	12
Toluene	2.53	1.28	1.03	0.4	12	6[12]
1,1,1-trichloroethane	ND[7]	ND[7]	ND[7]	0.4	12	12
1,1,2-trichloroethane	ND[7]	ND[7]	ND[7]	0.5	12	12
Trichloroethylene	ND[7]	ND[7]	ND[7]	0.7	12	12
Trichlorofluoromethane	ND[7]	ND[7]	ND[7]	0.3	12	12
Vinyl chloride	ND[7]	ND[7]	ND[7]	0.4	12	12

1 From Point Loma WWTP monitoring reports submitted to the Regional Board for year 2013. (2013 is the most recent year for which a complete 12 month data set is available.) Data for calendar year 2014 will be electronically transmitted to regulators under separate cover.
2 Maximum sample value during calendar year 2013.
3 Arithmetic average of all calendar year 2013 samples.
4 Median value during calendar year 2013.
5 Method Detection Limit (MDL) achieved during 2013 for the listed constituent.
6 Number of samples during 2013 in which the constituent was not detected (ND) or was detected but below quantifiable limits (DNQ).
7 ND indicates the constituent was not detected at the listed MDL in any Point Loma WWTP effluent sample during 2013.
8 Maximum chlorobenzene concentration during 2013 was 0.725 mg/l DNQ (detected not quantifiable).
9 One of the 12 samples had a chlorobenzene concentration reported as "< 0.4 µg/l". Two samples were detected but not quantifiable (DNQ).
10 Less than symbol "<x" indicates that the arithmetic average during the year was less than the MDL "x".
11 Four of the 2013 samples were DNQ (detected not quantifiable). Listed median value is a DNQ value.
12 Six of the 2013 samples for were DNQ (detected not quantifiable).

Table II.A-26
Summary of Point Loma Effluent Quality for Calendar Years 2010-2013
Volatile Organic Compounds

Parameter	Concentration[1] (µg/l)							
	2010		2011		2012		2013	
	Maximum Value[2]	Median Value[3]	Maximum Value[2]	Median Value[3]	Maximum Value[2]	Median Value[3]	Maximum Value[2]	Median Value[3]
Acrolein	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Acrylonitrile	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Benzene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Bromoform	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Carbon tetrachloride	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Chlorobenzene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	0.725[5]	ND[4]
Chlorodibromomethane	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	1.02	ND[4]
Chloroethane	2.57	ND[4]	ND[4]	ND[4]	3.62	ND[4]	4.49	1.8
2-chloroethyl vinyl ether	1.6[5]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Chloroform	20.1	15.2	23.6	16.8	25.7	18.85	10.8	6.0
Dichlorobromomethane	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	1.26	ND[4]
1,2-dichlorobenzene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
1,3-dichlorobenzene	< 8.96[6]	ND[4]	< 8.96[6]	ND[4]	< 8.96[6]	ND[4]	ND[4]	ND[4]
1,4-dichlorobenzene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	0.61	ND[4]
1,1-dichloroethane	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
1,2-dichloroethane	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Trans-1,2-dichloroethylene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
1,1-dichlroethene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
1,2-dichloropropane	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Cis-1,3-dichloropropene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Trans-1,3-dichloropropene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Ethylbenzene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	1.53	ND[4]
Methyl bromide (bromomethane)	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	2.32	1.07
Methyl chloride (chloromethane)	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	45	15.3
Methylene chloride	57.6	1.9	2.24	1.6	1.99	1.3	2.3	1.1
1,1,2,2-tetrachloroethane	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Tetrachloroethylene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Toluene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	2.53	1.03
1,1,1-trichloroethane	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
1,1,2-trichloroethane	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Trichloroethylene	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Trichlorofluoromethane	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]
Vinyl chloride	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]	ND[4]

1 Data from City of San Diego (2011b-2014b) for calendar years 2010-2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.
2 Maximum sample value during the listed calendar year.
3 Median (50th percentile) value for the listed calendar year.
4 The constituent was not detected (ND) at the listed MDL in any Point Loma WWTP effluent sample during the listed year.
5 Maximum chlorobenzene concentration during 2013 was 0.725 mg/l DNQ (detected not quantifiable).
6 BEHP was detected but not quantifiable (DNQ) in one of the 12 annual Point Loma WWTP effluent samples during the listed year.

Dioxins and Difurans. Table II.A-27 summarizes Point Loma effluent quality for dioxins and Difurans for 2013. As shown in the table, no dioxin or furan compounds were detected in quantifiable concentrations during 2013, but several compounds were detected at concentrations below reporting levels.

II.A-27
Summary of Point Loma Effluent Quality for Calendar Year 2013
Dioxins and Furans

Constituent	Number of 2013 Samples			TCDD Equivalents[2] (picograms per liter)			Toxicity Factor[2]
	Total Number[3]	Number of Non-Detect Samples[4]	Number of DNQ Samples[5]	2013 Maximum Value[6]	2013 Annual Median[7]	2013 MDL[8]	
2,3,7,8-tetra CDD	12	12	0	ND[9]	ND[9]	0.26	1.0
1,2,3,7,8-penta CDD	12	12	0	ND[9]	ND[9]	0.277	0.5
1,2,3,4,7,8_hexa_CDD	12	12	0	ND[9]	ND[9]	0.482	0.1
1,2,3,6,7,8-hexa CDD	12	12	0	ND[9]	ND[9]	0.484	0.1
1,2,3,7,8,9-hexa CDD	12	12	0	ND[9]	ND[9]	0.479	0.1
1,2,3,4,6,7,8-hepta CDD	12	0	12	< 0.055[10]	< 0.034[10]	0.53	0.01
octa CDD	12	0	12	< 0.036[10]	< 0.024[10]	1.4	0.001
2,3,7,8-tetra CDF	12	12	0	ND[9]	ND[9]	0.257	0.1
1,2,3,7,8-penta CDF	12	12	0	ND[9]	ND[9]	0.335	0.05
2,3,4,7,8-penta CDF	12	12	0	ND[9]	ND[9]	0.335	0.5
1,2,3,4,7,8-hexa CDF	12	12	0	ND[9]	ND[9]	0.284	0.1
1,2,3,6,7,8-hexa CDF	12	11	1	< 0.049[10]	ND[9]	0.281	0.1
1,2,3,7,8,9-hexa CDF	12	12	0	ND[9]	ND[9]	0.348	0.1
2,3,4,6,7,8-hexa CDF	12	12	0	ND[9]	ND[9]	0.294	0.1
1,2,3,4,6,7,8-hepta CDF	12	12	0	ND[9]	ND[9]	0.295	0.01
1,2,3,4,7,8,9-hepta CDF	12	12	0	ND[9]	ND[9]	0.397	0.01
octa CDF	12	12	0	ND[9]	ND[9]	0.738	0.001

1 Data from City of San Diego (2014b) for calendar year 2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.
2 TCDD equivalents are in concentrations of picograms per liter (10^{-6} µg/l), and represent the concentration of the constituent multiplied by the respective toxicity factors. Toxicity factors are as listed in Table 10 of Order No. R9-2009-0001.
3 Total number of samples during 2013 for the listed constituent.
4 Number of samples during 2013 where the constituent was not detected (ND).
5 Number of samples during 2013 where the constituent was detected but not quantifiable (DNQ).
6 Maximum sample value reported during calendar year 2013.
7 Mean value during calendar year 2013.
8 Maximum Method Detection Limit (MDL) achieved during 2013 testing.
9 ND indicates the constituent was not detected at the listed MDL in any Point Loma WWTP effluent sample during 2013.
10 Value was detected but not quantifiable (DNQ).

Radioactivity. Table II.A-28 presents the results of radioactivity monitoring of the Point Loma WWTP effluent during 2013.

Table II.A-28
Point Loma WWTP Monthly Effluent Radiation[1]
Calendar Year 2013

Month	Gross Alpha Radiation (picocuries/liter)	Gross Beta Radiation (picocuries/liter)
Jan	9.8"7.2	37.4"8.5
Feb	1.9"7.6	25.8"7.6
Mar	-3.0"6.2	25.8"8.8
Apr	4.8"7.5	31.1"8.5
May	-1.6"10.0	33.5"14.0
Jun	3.9"7.9	28.0"12.0
Jul	6.3"8.0	33.9"8.5
Aug	-3.1"7.6	24.9"9.1
Sep	4.4"7.0	31.6"9.2
Oct	-2.4"6.9	31.9"9.3
Nov	7.1"8.4	33.5"11.0
Dec	5.5"7.4	37.1"8.25
Average	2.8 " 7.7	31.2 " 9.6

1 Data from City of San Diego (2014b) for calendar year 2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.

Immediate Dissolved Oxygen Demand. The large applicant questionnaire (40 CFR 125, Subpart G) requires 301(h) applicants to identify the "immediate dissolved oxygen demand" (IDOD) of the discharge. The IDOD test is unreliable, and has not been an accepted test for measuring oxygen-demanding effects of a wastewater for over 35 years. As a result of the test's inherent unreliability, the 14th edition of *Standard Methods for the Examination of Water and Wastewater* (published in 1975) eliminated the IDOD test.

To satisfy the requirements of 40 CFR 125, Subpart G, the City of San Diego performed a series of IDOD tests in 1994 in accordance with procedures listed in the 13th edition of *Standard Methods* (which was published in 1971). The maximum observed IDOD from nine samples was 1.74 mg. The average IDOD value in the nine samples was 0.95 mg/l.

II.A.5. Effluent Volume and Mass Emissions [40 CFR 125.62(e)(2) and 125.67]

a. Provide detailed analyses showing projections of effluent volume (annual average, m^3/sec) and mass loadings (mt/yr) of BOD_5 and suspended solids for the design life of your treatment facility in five-year increments. If the application is based on an improved or altered discharge, the projections must be provided with and without the proposed improvements or alterations.

SUMMARY: Effluent volumes and mass emission are projected using a comprehensive hydraulic model of the Metro System collection system that is based on Series 12 population and employment projections developed by the San Diego Association of Governments (SANDAG). With implementation of the Pure Water San Diego program, PLOO discharge flows and mass emissions are projected to be less in 2036 than in year 2015.

The design life of Metro System treatment facilities varies among the treatment components. Mechanical equipment may have a design life of 20 years, while concrete structures may last for 50 years or more. A design life of 20 years (representing the replacement life for some of the onsite mechanical equipment) is used for purposes of projecting the flow and mass emission data requested by Question II.A.5(a).

As detailed in Appendix B.1, the City of San Diego annually updates projected future Metro System flows and loads through a comprehensive GIS-based (geographic information system) hydraulic model of Metro System and City of San Diego wastewater collection facilities. The model superimposes SANDAG (San Diego Association of Governments) Series 12 population and employment projections on grid levels as small as a city block to generate projected dry weather and wet weather flows. The model also computes system-wide TSS and BOD loads on the basis of observed historic influent data and treatment facilities performance.

Projected Dry Weather Flows. Average annual Metro System flows under dry weather conditions are estimated on the basis of historic data and a 60+ year precipitation data base. Table II.A-29 (page II.A-50) presents effluent volume, TSS, and BOD loads for the period 2015 to 2036. Table II.A-29 also presents projected PLOO discharge flows and mass emission projections for this time period. As shown in the table, projected PLOO discharge flows and mass emissions are based on attainment of the *Pure Water San Diego* goals of implementing 15 mgd of potable reuse by year 2024, implementing a cumulative total of 30 mgd of potable reuse by year 2028, and implementing a cumulative potable reuse of 83 mgd by year 2036.

Table II.A-29
Projected Dry Weather Metro System Flows, 2015-2036

Year	Metro System Population[1]	Projection for Total Metro System				Projected PLOO Discharge					
		Average Metro System Inflow[2]		Total Metro System Mass Load[3] (metric tons/year)		Average Annual PLOO Discharge[4]		Average Annual PLOO Mass Emissions[5] (metric tons/year)		Effluent Concentration[5] (mg/l)	
		m^3/sec	mgd	TSS	BOD	m^3/sec	mgd	TSS	BOD	TSS	BOD
2015	2,268,160	7.62	174	71,344	71,344	7.01	160	8,754	27,582	40	125
2016	2,303,357	7.75	177	72,492	72,492	7.10	162	8,909	28,017	40	126
2017	2,338,554	7.89	180	73,640	73,640	7.18	164	9,064	28,453	40	126
2018	2,373,750	7.97	182	74,788	74,788	7.27	166	9,219	28,889	40	126
2019	2,408,947	8.10	185	75,936	75,936	7.36	168	9,373	29,325	40	127
2020	2,444,144	8.24	188	77,084	77,084	7.45	170	9,528	29,760	41	127
2021	2,455,214	8.28	189	77,453	77,453	7.45	170	9,578	29,900	41	127
2022	2,466,284	8.32	190	77,822	77,822	7.49	171	9,628	30,040	41	127
2023	2,477,353	8.35	190.7	78,191	78,191	7.53	172	9,678	30,180	41	127
2024[6]	2,488,423	8.38[6]	191.3[6]	78,437	78,437	6.88[6]	157[6]	9,234	28,516	43	132
2025	2,499,493	8.41	192	78,724	78,724	6.88	157	9,273	28,621	43	132
2026	2,521,834	8.50	194	79,339	79,339	6.97	159	9,353	28,872	43	132
2027	2,544,175	8.54	195	79,954	79,954	7.01	160	9,433	29,123	43	132
2028[7]	2,566,515	8.63[7]	197[7]	80,774	80,774	5.61[7]	128[7]	7,258	22,459	41	127
2029	2,588,856	8.72	199	81,389	81,389	5.70	130	7,336	22,717	41	127
2030	2,611,197	8.76	200	82,004	82,004	5.74	131	7,415	22,976	41	127
2031	2,632,759	8.85	202	82,660	82,660	5.83	133	7,498	23,251	41	127
2032	2,654,320	8.89	203	83,316	83,316	5.91	135	7,582	23,527	41	127
2033	2,675,882	8.98	205	83,973	83,973	5.96	136	7,665	23,803	41	127
2034	2,697,443	9.02	206	84,629	84,629	6.05	138	7,749	24,078	41	127
2035	2,719,005	9.11	208	85,285	85,285	6.09	139	7,832	24,354	41	127
2036[8]	2,750,420	9.24[8]	211[8]	86,515	86,515	4.16[8]	95[8]	5,093	14,159	39	108

1 Based on SANDAG Series12 population projections.
2 Dry weather average annual Metro System flows projected on the basis of unit residential wastewater generation rate of 72.1 gpcd and an employment unit generation rate of 22.3 gpcd. Projections from City of San Diego PUD (2014).
3 Projections conservatively based the highest waste strengths observed during the past 5 years. TSS and BOD concentrations are projected to increase in future years as ongoing conservation reduces per capita flow but per capita TSS and BOD contributions remain unchanged.
4 Flows discharged to the PLOO, as reduced by (1) upstream recycled water production and use, (2) diversion of flows to the South Bay WRP, and (3) production and use of purified water. Projected PLOO flows include reverse osmosis reject (brine) from upstream advanced water purification facilities constructed as part of the *Pure Water San Diego* program. (See footnotes 6, 7, and 8)
5 Upper estimate value conservatively based on maintaining historic Point Loma WWTP TSS removal rates while influent concentrations of TSS (see footnote 3) are projected to increase due to water conservation. Actual TSS mass emissions are projected to be less than those projected above; Point Loma WWTP TSS concentrations averaged 30-35 mg/l during most months within the past three years.
6 Point Loma discharge flows and loads reduced through implementation of 15 mgd of upstream potable reuse. Based on targeted *Pure Water San Diego* potable reuse implementation goal for December 31, 2023. Implementation date may be influenced economic conditions, population, and water conservation.
7 Point Loma WWTP discharge flows and loads are reduced by implementation of an additional 15 mgd of upstream potable reuse (total cumulative potable reuse of 30 mgd). Based on achieving the targeted *Pure Water San Diego* potable reuse implementation goal for December 31, 2027. Implementation date may be influenced economic conditions, population, and water conservation.
8 Point Loma WWTP discharge flows and loads are reduced by implementation of an additional 53 mgd of upstream potable reuse (total cumulative potable reuse of 83 mgd). Based on achieving the targeted *Pure Water San Diego* potable reuse implementation goal for December 31, 2035. Implementation date may be influenced economic conditions, population, and water conservation.

As shown in Table II.A-29, the model is conservative in estimating PLOO TSS mass emissions. PLOO TSS effluent concentrations and mass emissions for year 2015 are respectively projected at 40 mg/l and approximately 27,600 pounds per day. Observed PLOO TSS concentrations and mass emissions during the past two years averaged approximately 20 percent less than these estimated values.

Projected Wet Weather Flows. While the City maintains and aggressive program to limit collection system inflow and infiltration (I&I), historic I&I within the Metro System has averaged 4 to 5 percent of the average annual dry weather flow, but can be significantly higher during periods of peak hydrologic events.

Average annual Metro System flows under 10-year return wet weather conditions are estimated (see Appendix B.1) on the basis of historic data and a 60+ year precipitation data base, and an assumed annual increase of I&I of 1.5 percent (a value commensurate with the increase in mileage of Metro System and Participating Agency collection systems). Table II.A-30 (page II.A-52) presents average annual flows under 10-year return wet weather conditions for the period 2015 through 2036. Table II.A-30 also presents projected Point Loma WWTP TSS and BOD loads under 10-year return wet weather flow conditions for the period 2015 through 2036, as simulated in the Metro System hydraulic model.

As shown in Table II.A-30, PLOO 10-year return wet weather flows are estimated to be 20 percent higher than the corresponding projected dry weather flows shown in Table II.A-29. TSS and BOD mass emission loads are also projected to be 20 percent higher under 10-year return wet weather conditions than corresponding dry weather conditions. PLOO 10-year return flows are projected at (192 mgd) for year 2015 and (204 mgd) for year 2020.

Table II.A-30
Projected 10-Year Return Wet Weather Metro System Flows, 2015-2036

Year	Metro System Population[1]	Projection for Total Metro System				Projected PLOO Discharge					
		Average Metro System Inflow[2]		Total Metro System Mass Load[3] (metric tons/year)		Average Annual PLOO Discharge[4]		Average Annual PLOO Mass Emissions[5] (metric tons/year)		Effluent Concentration[5] (mg/l)	
		m^3/sec	mgd	TSS	BOD	m^3/sec	mgd	TSS	BOD	TSS	BOD
2015	2,268,160	9.07	207	84,875	84,875	8.41	192	10,493	33,191	40	125
2016	2,303,357	9.20	210	86,269	86,269	8.50	194	10,682	33,715	40	126
2017	2,338,554	9.37	214	87,663	87,663	8.63	197	10,871	34,239	40	126
2018	2,373,750	9.51	217	89,057	89,057	8.72	199	11,060	34,763	40	127
2019	2,408,947	9.68	221	90,451	90,451	8.81	201	11,249	35,287	40	127
2020	2,444,144	9.81	224	91,845	91,845	8.94	204	11,438	35,810	41	127
2021	2,455,214	9.86	225	92,118	92,118	8.94	204	11,478	35,900	41	127
2022	2,466,284	9.86	225	92,392	92,392	8.98	205	11,517	35,989	41	127
2023	2,477,353	9.90	226	92,665	92,665	8.98	205	11,557	36,079	41	128
2024[6]	2,488,423	9.94	227	93,075	93,075	8.37	191[6]	11,131	34,499	42	131
2025	2,499,493	9.99	228	93,485	93,485	8.41	192	11,183	34,671	42	131
2026	2,521,834	10.08	230	94,305	94,305	8.50	194	11,287	35,016	42	131
2027	2,544,175	10.16	232	95,125	95,125	8.59	196	11,392	35,361	42	131
2028[7]	2,566,515	10.25	234	95,945	95,945	7.23	165[7]	9,190	28,834	40	126
2029	2,588,856	10.34	236	96,765	96,765	7.32	167	9,295	29,178	40	126
2030	2,611,197	10.43	238	97,585	97,585	7.40	169	9,399	29,523	40	126
2031	2,632,759	10.51	240	98,405	98,405	7.49	171	9,504	29,868	40	126
2032	2,654,320	10.60	242	99,225	99,225	7.58	173	9,608	30,212	40	126
2033	2,675,882	10.69	244	100,045	100,045	7.67	175	9,713	30,557	40	126
2034	2,697,443	10.78	246	100,865	100,865	7.75	177	9,817	30,901	40	126
2035	2,719,005	10.86	248	101,685	101,685	7.84	179	9,922	31,246	40	126
2036[8]	2,750,420	10.95	250	102,505	102,505	5.87	134[8]	7,189	20,958	39	113

1 Based on SANDAG Series12 population projections.
2 Projected wet-weather (10-year return frequency) annual Metro System flows. Projections from San Diego PUD (2014).
3 Projections conservatively based the highest observed waste strengths during the past 5 years. TSS and BOD concentrations are projected to increase in future years as ongoing conservation reduces per capita flow but per capita TSS and BOD contributions remain unchanged.
4 Flows discharged to the PLOO, as reduced by (1) upstream recycled water production and use, (2) diversion of flows to the South Bay WRP, and (3) production and use of purified water. Projected PLOO flows include reverse osmosis reject (brine) from upstream advanced water purification facilities constructed as part of the *Pure Water San Diego* program. (See footnotes 6, 7, and 8)
5 Upper estimate value conservatively based on maintaining historic Point Loma WWTP TSS removal rates while influent concentrations of TSS (see footnote 3) are projected to increase due to water conservation. Actual TSS mass emissions are projected to be less than those projected above; Point Loma WWTP TSS concentrations averaged 30-35 mg/l during most months within the past three years
6 Point Loma discharge flows and loads reduced through implementation of 15 mgd of upstream potable reuse. Based on targeted *Pure Water San Diego* potable reuse implementation goal for December 31, 2023. Implementation date may be influenced economic conditions, population, and water conservation.
7 Point Loma WWTP discharge flows and loads are reduced by implementation of an additional 15 mgd of upstream potable reuse (total cumulative 30 mgd of potable reuse). Based on achieving the targeted *Pure Water San Diego* potable reuse implementation goal for December 31, 2027. Implementation date may be influenced economic conditions, population, and water conservation.
8 Point Loma WWTP discharge flows and loads are reduced by implementation of an additional 53 mgd of upstream potable reuse (total cumulative potable reuse of 83 mgd). Based on achieving the targeted *Pure Water San Diego* potable reuse implementation goal for December 31, 2035. Implementation date may be influenced economic conditions, population, and water conservation.

b. Provide projections for the end of your five-year permit term for 1) the treatment facility contributing population and 2) the average daily total discharge flow for the maximum month of the dry weather season.

SUMMARY: Population within the Metro System service area is projected at 2.444 million in year 2020 (the end of the five-year NPDES permit term). The annual average PLOO discharge flow under dry weather conditions in year 2020 is projected at 8.24 m^3/sec (188 mgd). Peak recycled water demands during the maximum month of the dry season will result in a year 2020 projected PLOO discharge of approximately 7.96 m^3/sec (181.8 mgd).

Population and Average Annual Flows in 2020. Table II.A-29 (page II.A-50) presents year-by-year population, average daily flow, and peak flow projections for the five-year NPDES permit period under dry flow conditions. As shown in Table II.A-29, the projected Metro System population at the end of the five-year NPDES permit (year 2020) is approximately 2.444 million. Average annual system-wide Metro System flows under dry weather conditions during 2020 are conservatively projected at 8.24 m^3/sec (188 mgd) for year 2020.

Maximum Month Dry Season Flow. The projected average annual PLOO discharge flows presented in Table II.A-29 take into account average annual recycled water use at the City's North City WRP and South Bay WRP. PLOO flows, however, are less during dry summer months than this annual average value due to seasonal recycled water demands.

As discussed on page II.A-15, North City WRP recycled water use during 2013 averaged 6.0 mgd (0.26 m^3/sec), but increased to 9.8 mgd (0.43 m^3/sec), during the peak dry season. South Bay WRP recycled water use during 2013 average 3.2 mgd (0.14 m^3/sec), but peaked during August at 5.63 mgd (0.25 m^3/sec). As shown in Table A.II-31 (page II.A-54), combined peak recycled water demands at the two WRPs are this approximately 6.2 mgd (0.27 m^3/sec) greater than average annual recycled water demands.

Conservatively applying this 6.2 mgd difference between annual and peak recycled water use against the projected year 2020 188 mgd average annual PLOO dry weather flow (see Table II.A-29), daily PLOO discharge flows during August of 2020 (maximum month of the dry season) are projected at approximately 181.8 mgd (188 mgd average annual PLOO discharge less 6.2 mgd difference between peak and average annual recycled water demands).

Table A.II-31
Difference Between Average Annual and
Peak Month Dry Season Recycled Water Demands[1]

Parameter	North City WRP[1]	South Bay WRP[2]	Totals
Peak Month Recycled Water Demand	5.63 mgd	9.8 mgd	15.4 mgd
Average Annual Recycled Water Demand	3.2 mgd	6.0 mgd	9.2 mgd
Difference[3,4]	2.4 mgd	3.8 mgd	6.2 mgd

1 North City recycled water demands from 2013 North City WRP Annual Report submitted to the Regional Board. (See Page II.A-15.)
2 South Bay WRP recycled water demands from 2013 South Bay WRP Annual Report submitted to the Regional Board. (Sage II.A-15.)
3 Difference between annual average recycled water demands and peak month recycled water demands based on 2013 data. Values rounded to two significant figures.
4 Future planned increases in recycled water use within the North City WRP and South Bay WRP service areas are planned (see Appendix B.1). Additional recycled water use by Metro System member agencies (e.g. Padre Dam and Otay Municipal Water Districts) may further increase future peak recycled water use.

II.A.6. Average Daily Industrial Flow (m^3/sec) [40 CFR 125.64] Provide or estimate the average daily industrial inflow to your treatment facility for the same time increments as in Question II.A.5(a) above.

SUMMARY: Industrial flows from all Metro System permitted industrial dischargers during 2013 were 0.21 m^3/sec (4.9 mgd). This includes 0.011 m^3/sec (0.26 mgd) from Categorical Industrial Users (CIUs) and 0.21 m^3/sec (4.7 mgd) from other Significant Industrial Users (SIUs). Total Metro System industrial flows through the next 20 years are projected to remain flat at approximately 0.21 m^3/sec (4.8 mgd).

Appendix N (Volume IX) presents a detailed breakdown of the distribution of industrial flow by type of industry. Appendix N also presents estimates of industrial users and industrial flows discharged within the Metro System.

As documented in Appendix N, reductions in both the number of industrial dischargers and in total industrial discharge flows have occurred during the past decade. While the number and type of future Metro System industrial discharges will be dependent on economic conditions, it is projected that the number of industrial dischargers and total industrial discharge flows will remain relatively flat over the next 20 years.

Table II.A-32 (page II.A-56) summarizes projected industrial flow contributions to the Metro System for the next 20 years. As shown in the table, current (year 2013) Metro System industrial flows are estimated at 0.21 m^3/sec (4.9 mgd). Future combined SIU and CIU flows within the Metro System are projected to remain steady at 0.21 m^3/sec (4.8 mgd).

As shown in Table II.A-32, Metro System industrial flows contribute less than 5 percent of the total Metro System flows. Flows from industries for which federal categorical standards have been established comprise less than one-quarter of one percent of the total Metro System flow.

Table II.A-32
Existing and Projected Flows and Industrial Users

Category	Parameter		Year					
			Prior and Current Totals		Projected Future Totals			
			2010	**2013**	**2018**	**2023**	**2028**	**2033**
Number of Industries	Number of CIUs[1]		44[4]	41[4]	49[5]	49[6]	49[6]	49[6]
	Number of SIUs[2]		82[4]	72[4]	62[5]	62[6]	62[6]	62[6]
	Total Number of Industrial User Permits[3]		1,439[4]	1,318[4]	1,146[5]	1,146[6]	1,146[6]	1,146[6]
Industrial Flows	CIUs[1]	mgd	0.38[4]	0.26[4]	0.23[5]	0.23[6]	0.23[6]	0.23[6]
		m^3/sec	0.017[4]	0.011[4]	0.010[5]	0.010[6]	0.010[6]	0.010[6]
	SIUs[2]	mgd	5.5[4]	4.7[4]	4.7[5]	4.7[6]	4.7[6]	4.7[6]
		m^3/sec	0.24[4]	0.21[4]	0.21[5]	0.21[6]	0.21[6]	0.21[6]
	Total[7] (CIU & SIU)	mgd	5.7[4,7]	4.9[4,7]	4.8[5,7]	4.8[6,7]	4.8[6,7]	4.8[6,7]
		m^3/sec	0.24[4,7]	0.21[4,7]	0.21[5,7]	0.21[6,7]	0.21[6,7]	0.21[6,7]
Industrial Flows as Percent of Total Metro System Flows	Total Metro System Flows	mgd	167.5[8]	156.2[9]	182[10]	190.7[10]	197[10]	205[10]
		m^3/sec	7.34[8]	6.84[9]	7.97[10]	8.35[10]	8.63[10]	8.98[10]
	Percent CIU Flow[11]		0.23%[11]	0.17%[11]	0.13%[11]	0.12%[11]	0.12%[11]	0.11%[11]
	Percent SIU Flow[11]		3.28%[11]	3.01%[11]	2.58%[11]	2.46%[11]	2.39%[11]	2.29%[11]
	Percent Industrial Flow[11]		3.40%[11]	3.14%[11]	2.64%[10]	2.52%[11]	2.44%[11]	2.39%[11]

1 Categorical Industrial Users (CIUs) subject to federal technology-based categorical pretreatment standards.
2 Additional non-CIU dischargers designated as Significant Industrial Users (SIUs).
3 Industries not regulated as CIUs or SIUs but for which the City has established industrial user permits and discharge requirements.
4 Observed total, as reported within Table N.1-4 of Appendix N.
5 Projected total for 2018, as presented within Table N.1-4 of Appendix N. Total is based on SANDAG economic projections.
6 Projections beyond 2018 will depend on economic conditions. The above estimates assume "flat growth" (zero change) in number of industries and industrial flows beyond 2018.
7 The listed sum of the listed component flows for SIUs and CIUs (rounded to two significant figures) may not be exactly the same as the listed total SIU/SIU flow due to rounding error.
8 Total Metro System flow for 2010 estimated on basis of average Point Loma WWTP inflow of 156.6 mgd, with 2.404 billion gallons removed by South Bay WRP operations (SBOO discharge plus recycled water use) and 1.588 billion gallons distributed to North City WRP recycled water customers. Values reported in 2010 Point Loma annual monitoring report submitted to the Regional Board.
9 Total Metro System flow for 2013 estimated on basis of average Point Loma WWTP inflow of 143.8 mgd, with 2.343 billion gallons removed by South Bay WRP operations (SBOO discharge plus recycled water use) and 2.182 billion gallons distributed to North City WRP recycled water customers. Values reported in 2013 Point Loma annual monitoring report submitted to the Regional Board.
10 Projected Metro System flow for dry weather conditions, as presented in Table B.1-5 of Appendix B.1.
11 Percent expressed as a percent of total Metro System flows. Note that Table N.1-4 of Appendix N presents industrial flows as a percent of Point Loma WWTP influent flows, not total Metro System flows. As a result, the percentages presented in Table N.1-4 based on the Point Loma WWTP inflow differ slightly than the values presented above that are based on total Metro System flows.

II.A.7. Combined Sewer Overflows [40 CFR 125.65(b)]

a. Does (will) your collection and treatment system include combined sewer overflows?

No. The City of San Diego maintains separate collection systems for storm water and sewage.

b. If yes, provide a description of your plan for minimizing combined sewer overflows to the receiving water.

Not applicable.

II.A.8. Outfall/Diffuser Design. Provide the following data for your current discharge as well as for the modified discharge, if different from the current discharge: [40 CFR 125.61(a)(1)]

- **Diameter and length of the outfall(s) (meters)**
- **Angles of port orientations from horizontal (degrees)**
- **Port diameter(s) in meters and the orifice contraction coefficients(s), if known**
- **Vertical distance in meters from mean lower low water (or mean low water) surface and outfall centerline (meters)**
- **Number of ports**
- **Port spacing (meters)**
- **Design flow rate for each port if multiple ports are used (m^3/sec)**

Appendix A presents a detailed description of the PLOO. No changes in outfall design parameters or configuration is proposed as part of this current NPDES application. As documented in Appendix A, the PLOO consists of original outfall pipe and a larger extended section added in 1994. Basic design criteria of the PLOO include:

- The original section is a 3,422-meter-long (11,226-foot-long), reinforced concrete pipe with an internal diameter of 2.74 meters (9 feet). The PLOO extension, also constructed of reinforced concrete pipe, has an internal diameter of 3.66 meters (12 feet) and a length of 3,732 meters (12,246 feet).
- The total length of the outfall system is 7,154 meters (23,472 feet). The orientation of the extension is S 78^o 40' W.
- The "Y" shaped diffuser system for the outfall extension has two legs that are each 760.8 meters (2,496 feet) in length.
- The internal diameter of each diffuser leg is reduced from 2.1 meters to 1.2 meters (7 feet to 4 feet) over the length of the diffuser leg.
- The compass directions (proceeding from the "Y" structure) for the two diffuser legs are N 17^o 13' W. and S 11^o 16' W, respectively.
- The diffuser ports are positioned 15 centimeters (6 inches) above pipe springline.
- The angle of port orientation is 5° below horizontal, and perpendicular to the pipe. The port diameters are 9.53 centimeters (3.75 inch) in the 7-foot diffuser sections, 10.80 cm (4.25 inch) in the 5.5-foot sections, and 12.07 cm (4.75 inch) in the 4-foot sections.
- The respective number of ports in each diffuser leg are: 84, 70, and 54.

- The orifice contraction coefficient varies from 0.970 to 0.975.
- The vertical distance from the ocean surface (mean lower low water) to the outfall port centerline varies from 93.3 meters to 95.4 meters (306 feet to 313 feet).
- There are a total of 416 diffuser ports (208 ports on each diffuser leg), all of which are open.
- The port spacing is 7.32 meters (24 feet) (measured on each side of the pipe).
- Ports are positioned opposite each other on the two sides of the diffuser pipes (i.e., not staggered).

Table II.A-33 summarizes overall port design criteria. As shown in the table, the design maximum flow rate for each port varies from 0.0477 m^3/sec to 0.0503 m^3/sec (1.09 mgd to 1.15 mgd).

At the annual average Point Loma WWTP capacity of 10.5 m^3/sec (240 mgd), the average discharge flow per outfall port is projected at approximately 0.0253 m^3/sec (0.58 mgd).

Table II.A-33
Point Loma Ocean Outfall Diffuser Configuration

Section[1]	Length Per Leg (meters)	Internal Diameter (meters)	Pipe Thickness (cm)	Port Spacing[2] (meters)	Port Diameter (cm)	Number of Ports Per Leg	Approx. Range of Depth[3] MLLW (meters)	Port Design Flow Rate (m^3/sec) (max)
1	307.2	2.13	22.86	7.32	9.53	84[4]	93.3 - 94.2	0.048
2	256.0	1.68	22.86	7.32	10.80	70[4]	94.2 - 94.8	0.050
3	197.5	1.22	22.86	7.32	12.07	54[4]	94.8 - 95.4	0.049
Total (each leg)	760	---	---	---	---	208[4]	---	---
Approximate discharge flow per port for maximum dry weather flow - 10.51 m^3/sec (240 mgd)[5]								0.025[5]
Approximate discharge flow per port for peak hour flow - 19.76 m^3/sec (451 mgd)[5]								0.048[5]

1 Each diffuser leg is comprised of three sections of pipe, each with a successively decreasing diameter.
2 Port spacing shown is for ports on the same side of diffuser leg. Ports are located on both sides on the diffuser leg.
3 Elevation from the centerline of the ports to the ocean surface at Mean Lower Low Water (MLLW).
4 All ports are open.
5 Nominal diffuser port discharge flow based on listed maximum dry weather and maximum peak hour flows, divided by 416 ports. Actual flows through individual ports under these load conditions will vary with port diameter. Discharge flows through the ports will be within design limits for both maximum dry weather and peak hour flows.

Section II.B
Receiving Water Description

Renewal of NPDES CA0107409

II.B. RECEIVING WATER DESCRIPTION

II.B.1. Are you applying for a modification based on a discharge to the ocean or to a saline estuary (40 CFR 125.58(q))? [40 CFR 125.59(a)]

This application for modification of secondary treatment requirements is based on a discharge to the ocean.

II.B.2. Is your current discharge or modified discharge to stressed waters? If yes, what are the pollution sources contributing to the stress? [40 CFR 125.61(f)]

SUMMARY: Receiving waters in the vicinity of PLOO are not stressed.

The City's prior 301(h) application documented that waters off the coast of Point Loma are of excellent quality and provide a healthy habitat for fish and wildlife. Since the City's original 1995 NPDES 301(h) permit was approved, comprehensive water quality monitoring, sediment monitoring, benthic species monitoring, fish abundance, and bioassay monitoring continue to demonstrate the excellent quality of waters and habitat off the coast of Point Loma. As documented in Appendices C and D, and in the responses to Question III.D, this comprehensive monitoring record demonstrates that:

- Receiving waters in the Point Loma area continue to comply with water quality standards established in the *California Ocean Plan* for the protection of marine species and human health.
- Dissolved oxygen concentrations in receiving waters are typical for waters of the Southern California Bight.
- Concentrations of contaminants and the organic content of the sediments remain in the range of background conditions.
- 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.
- Macrofaunal assemblages off Point Loma are comparable to natural, balanced indigenous populations elsewhere in the Southern California Bight.
- Macrobenthic species abundance, richness, and diversity in the vicinity of the outfall are characteristic of natural ranges for the San Diego region.
- Fish are abundant, and no statistical differences exist between fish caught in the discharge zone and fish caught in areas far removed from the outfall for disease, tumors, abnormalities, or fin erosion.
- Contaminants in fish distributed throughout the region are within ranges reported elsewhere for southern California fish.

- A balanced indigenous population of fish, shellfish, and wildlife exist beyond the zone of initial dilution (ZID).

Detailed descriptions of sediment chemistry and benthic infauna during the period 2007-2013 are presented in Appendix C. Appendix D presents an evaluation of bioaccumulation in organism tissue.

The City collects and analyzes receiving water quality in the Point Loma area as part of a comprehensive water quality monitoring program. Detailed receiving water monitoring information has previously been submitted to the Regional Board as part of monthly, quarterly, semiannual, and annual reports. The City has also transmitted water quality monitoring data to EPA as part of this application for renewal of 301(h) requirements.

As documented in the attached appendices and in the responses to Questionnaire Sections III.B and III.D, receiving waters in the Point Loma area continue to be of excellent quality, and are not stressed.

II.B.3. Provide a description and data on the seasonal circulation patterns in the vicinity of your current and modified discharge(s). [40 CFR 125.61(a)]

SUMMARY: The PLOO discharge produces a submerged wastefield, and the minimum depth to the top of the wastefield is typically 100 feet (30 meters). Currents at this depth are dominated by longshore (upcoast and downcoast) motion. Net currents are upcoast at approximately 3 centimeters per second (cm/sec). Short-period cross-currents occur but are of limited duration.

A detailed characterization of seasonal circulation patterns in the Point Loma vicinity was presented in the City's 1995 301(h) application which included a description of:

- regional and local bathymetry, and
- regional currents and currents in the Point Loma shelf area.

Appendix P presents the detailed characterization from the City's 1995 301(h) application. Seasonal circulation patterns in the Point Loma area remain as described in this 1995 document, and are summarized below.

Seasonal Patterns. Local ocean current circulation in the vicinity of the PLOO discharge occurs within a larger circulation of the California Current, California Undercurrent, and Southern California Undercurrent. These currents are graphically represented in Figure II.B-1 (page II.B-5).

The California Current is a broad current that typically moves at a velocity of 10 to 20 cm/sec. Surface circulation within the Southern California Bight is dominated by the Southern California Countercurrent, a counter-clockwise circulation between the California Current and the coast. Flow rates of this current vary by season, but are typically greatest during the spring. The California Undercurrent is a northward flow beneath the Southern California Countercurrent.

Mainland Shelf Currents. Current measurements presented in Appendix P document characteristics of mainland shelf currents off the coast of Point Loma. Key general characterizations of these mainland shelf currents include:

- the net subsurface flow is upcoast at approximately 3 cm/sec,
- the net surface flow is in the opposite direction (downcoast) at approximately 6 cm/sec,

- net flow immediately near the ocean bottom has a strong offshore (toward deeper waters) component that can exceed the longshore flow velocity,
- variations in the longshore currents occur on time intervals longer than tidal periods,
- variations in cross-shore currents are dominated by tidal cycles,
- typical transport distances associated with tidal cycles are approximately 0.6 to 1.9 miles (1 to 3 km),
- waters along the near-shore shelf are dispersed with offshore waters on time scales of weeks, and
- long-term variability in currents can equal or exceed the seasonal variability.

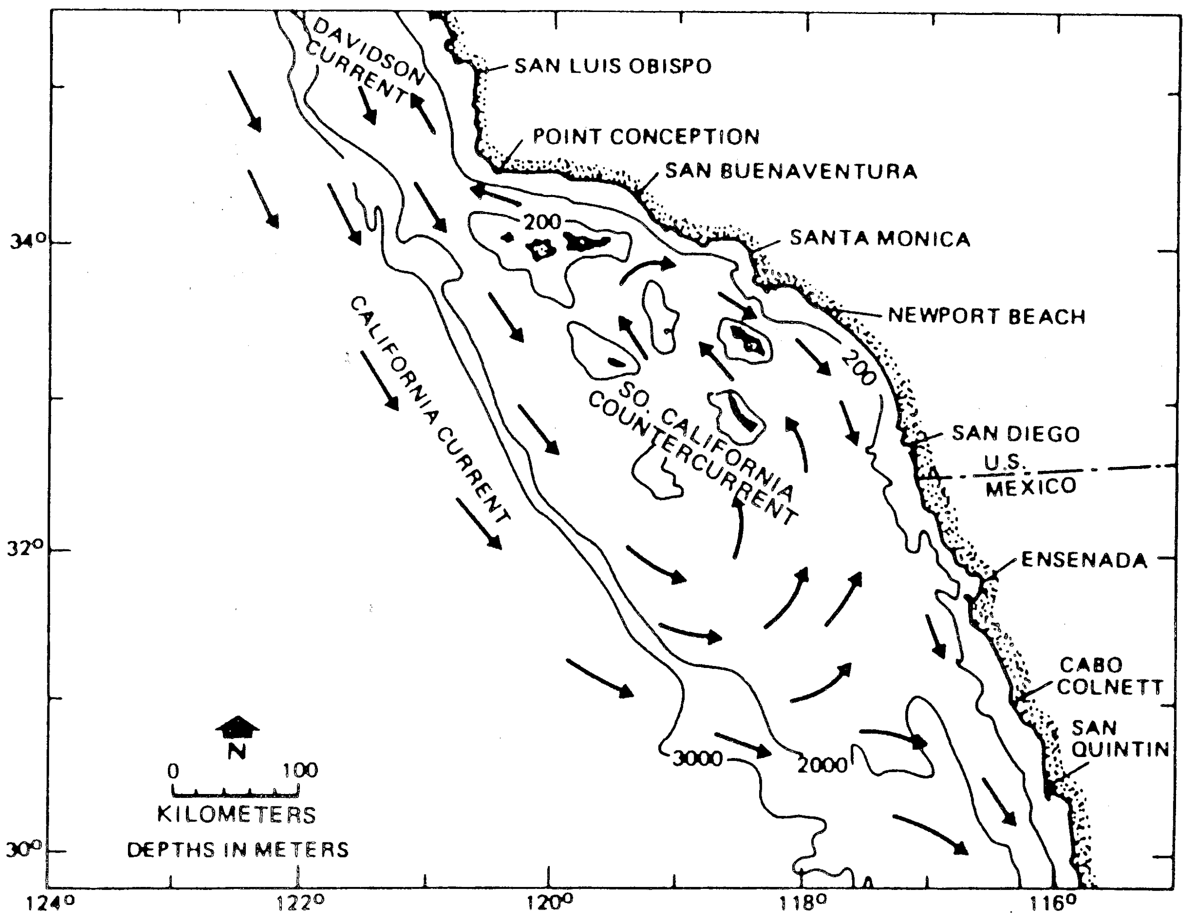

Figure II.B-1 Primary Currents of the Southern California Bight

Appendix P presents the results of comprehensive current monitoring for the Point Loma vicinity. Observed current data were used as input to a computer model (see Appendix Q of the City's 1995 3901(h) application) that simulated movement of the PLOO wastefield. The modeling assessed movement within a simulation area 30 km by 12 km (19 by 7.5 miles). The modeling determined an average flushing time for this simulation area of approximately 4.5 days. The modeling also projected a 90 percent probability that any given "parcel" of wastewater discharged from the PLOO would, after a high degree of dilution and dispersion, be transported out the simulation area within 10 days.

II.B.4 Oceanographic conditions in the vicinity of the current and proposed modified discharge(s). Provide data on the following: [40 CFR 125.62(a)]

- **Lowest ten percentile current speed (m/sec)**
- **Predominant current speed (m/sec) and direction (true) during the four seasons**
- **Period(s) of maximum stratification (months)**
- **Periods of natural upwelling events (duration and frequency, months)**
- **Density profiles during period(s) of maximum stratification**

SUMMARY: A detailed characterization of the oceanographic conditions in the vicinity of PLOO is presented in Appendix P (Volume X). Lowest ten percentile current speeds in the vicinity of the discharge are approximately 2 to 3 centimeters per second (cm/sec). Predominant (net) currents are upcoast and also typically range from 2 to 3 cm/sec. The period of maximum stratification is typically January. Stratification is typically weakest (allowing the potential for upwelling) during May.

A detailed characterization of oceanographic conditions in the vicinity of the PLOO discharge was presented in the City's 1995 301(h) application. This characterization remains valid, and is presented again herein within Appendix P. General oceanographic conditions are summarized below.

Lowest Ten Percentile Speed. Ocean current studies performed during the early 1990s prior to construction of the extended PLOO remain valid in characterizing the lowest ten percentile current speed. Results of these earlier ocean current monitoring efforts are presented in Appendix P.

Table II.B-1 (page II.B-8) summarizes 10th percentile, 50th percentile (median), and 90th percentile of current speeds within the typical depth range of the PLOO wastefield. As shown in Table II.B-1, 10th percentile current speeds are typically 2 to 3 cm/sec. Median current speeds are on the order of 7 to 10 cm/sec.

Predominant Seasonal Current Speeds and Directions. Appendix P presents the results of comprehensive ocean current studies performed prior to construction of the extended PLOO. These prior measurements of current speeds and directions remain valid.

As documented in Appendix P, seasonal ocean currents can be described in terms of net flow and variations about the net flow. Table II.B-2 summarizes net flow by season, and Table II.B-3 (page II.B-9) summarizes variations about the net flow. As shown in Table II.B-2, net speeds are highest during fall, winter, and spring months. Currents are predominantly longshore during these times.

As shown in Table II.B-3, longshore currents vary over longer time intervals (intervals greater than tidal cycles), while cross-shore currents are dominated by tidal influences. Because cross-shore currents occur over shorter periods of time (and reverse with tidal events), the potential for onshore transport of the PLOO wastefield is reduced. Net currents are thus dominated by the longshore currents.

Table II.B-1
Statistical Characterization of Ocean Currents in Vicinity of the PLOO[1]

Statistical Parameter	Depth (meters)	Ocean Current Speed (cm/sec)				
		Winter 1990	Spring 1990	Summer 1990	Fall 1990	Winter 1991
10th Percentile	60	3.5	3.2	3.1	2.1	2.8
	80	4.0	3.4	1.8	2.8	2.5
Median	60	9.4	9.3	7.8	8.1	7.6
	80	12.5	9.5	8.5	7.6	7.5
90th Percentile	60	18.5	19.2	16.8	15.2	15.8
	80	20.9	18.3	17.7	14.8	15.7

1 From pre-construction oceanographic studies of the PLOO extension. See Appendix P for details.

Table II.B-2
Net Current Speeds by Season in the Vicinity of the PLOO[1]

Season	60m Depth		80m Depth	
	Current Speed (cm/sec)	Direction	Current Speed (cm/sec)	Direction
Winter - 1990	4.9	020	6.5	005
Spring 1990	4.6	018	5.1	008
Summer 1990	2.0	081	0.7	123
Fall 1990	3.3	033	2.6	004
Winter 1991	2.1	029	1.3	029

1 From pre-construction oceanographic studies of the PLOO extension. See Appendix P for details.

Table II.B-3
Variances by Season and Frequency

Season	Subtidal Frequency				Tidal Plus Super-Tidal Frequency			
	Longshore Variation (cm^2/sec^2)		Cross-Shore Variation (cm^2/sec^2)		Longshore Variation (cm^2/sec^2)		Cross-Shore Variation (cm^2/sec^2)	
	60m	80m	60m	80m	60m	80m	60m	80m
Winter	32.9	23.8	8.4	8.6	30.8	20.6	23.5	37.3
Spring	64.0	50.9	9.7	8.1	21.1	19.5	22.2	30.4
Summer	55.5	55.9	7.2	7.0	26.5	26.7	14.5	27.2
Fall[1]	33.3	15.8	2.0	0.9	27.3	29.4	31.5	36.5
Winter	52.8	40.9	5.2	6.0	30.5	32.6	18.4	63.2

1 From pre-construction oceanographic studies of the PLOO extension. See Appendix P for details.

2013 Oceanographic Data Collection. During 2013, the City deployed moored oceanographic instruments at three sites near the PLOO in order to provide near-continuous measurement of ocean current and water temperature data. Moored stations were established at:

- the 100-meter contour near the present PLOO diffuser,
- the 60-meter contour near the site of the original PLOO diffuser, and
- the 60 meter contour approximately 4.7 kilometers south of the PLOO.

Figures II.B-2 (page II.B-68) and Figure II.B.3 (page II.B-69) summarize the results of the 2013 ocean current study. As shown in the figures, the dominant current mode was along a north-south axis, with occasional flow along a northwest-southeast axis. At the 60 meter depth, current flow oscillated between north and south throughout the year, with a southward flow being more common in May and August. At depths below 60 meters, flow was predominantly to the north with less oscillation, except during October when flow trended southward.

Current velocities generally decreased with increasing depth. Within a 10-20 meter depth, velocities varied seasonally, with highest velocities occurring during the spring and late summer. Current velocities were generally slower below 60 meters, except for periods in late January and August-September.

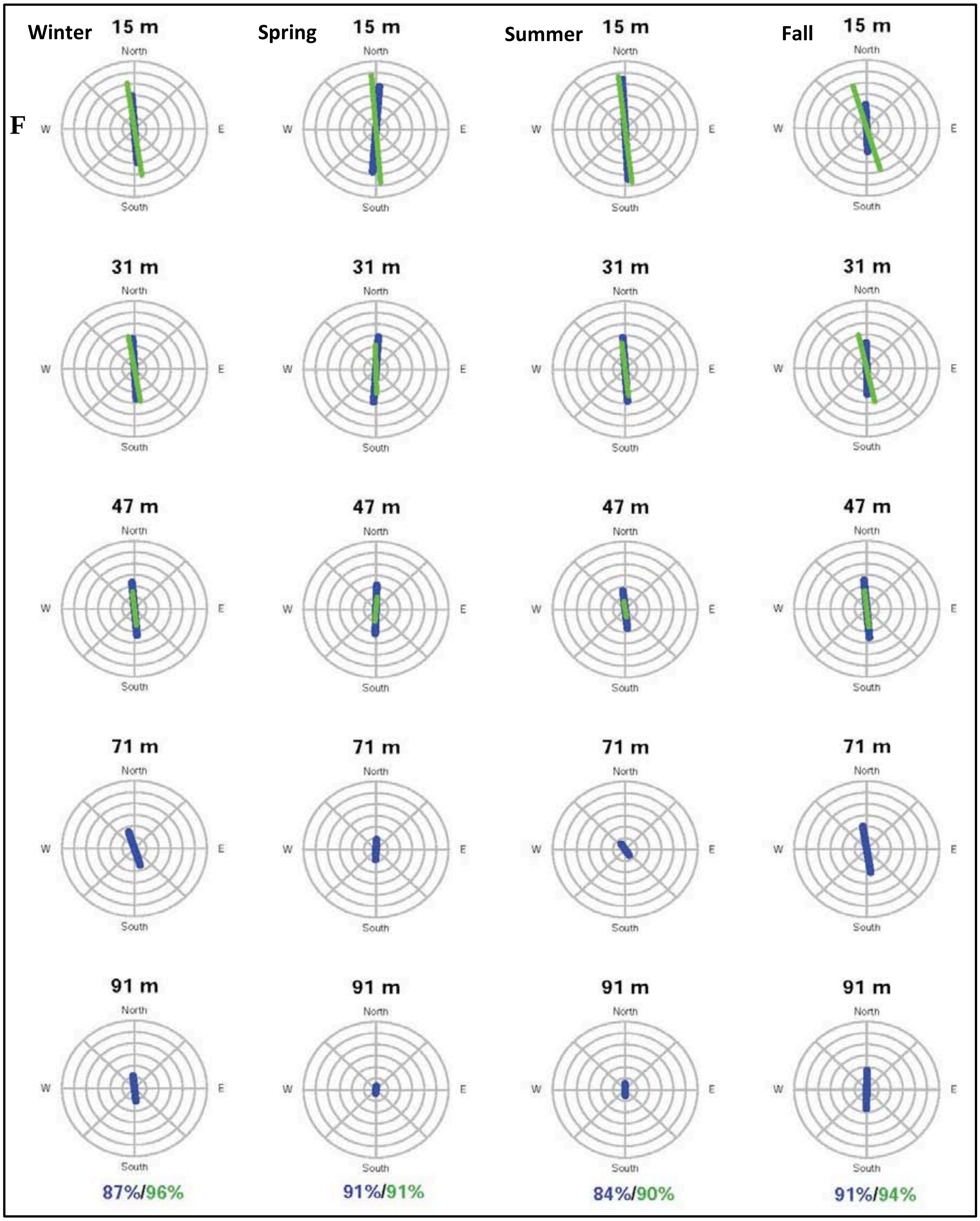

Figure II.B-2 Dominant PLOO Ocean Current Modes, 2013

Percentages indicate fraction of the total variance accounted for by the dominant current mode for each location. Line length equals current magnitude, with each concentric ring representing a velocity of 0.1 meter per second.

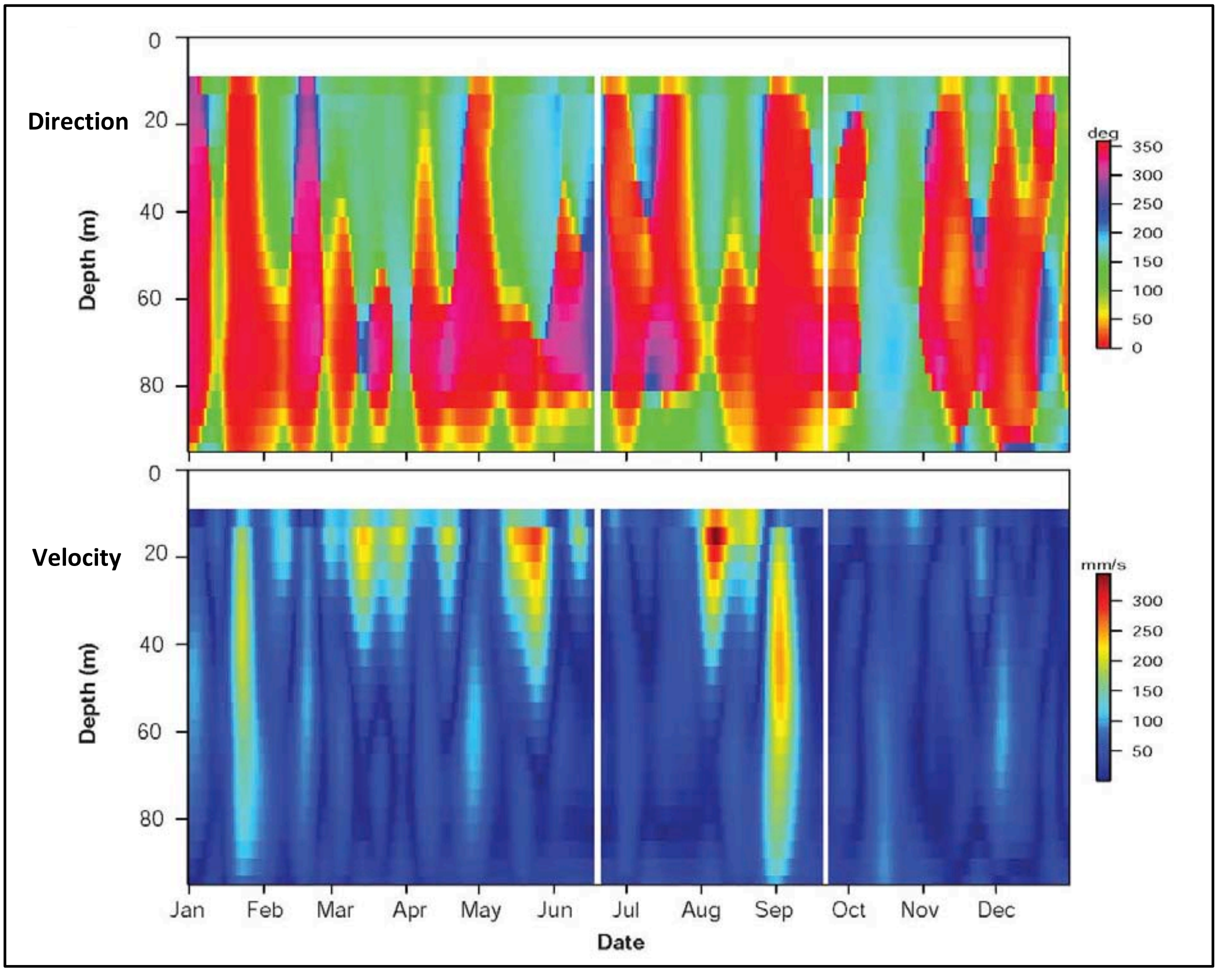

Figure II.B-3 Current Velocity and Direction by Depth at the PLOO, 2013

Data from PLOO outfall 100 meter station for 2013.

Period of Maximum Stratification. Maximum stratification occurs when the thermocline depth is great and density gradients across the thermocline remain sufficiently strong to trap the discharged waste plume.

The City's 1995 301(h) application characterized temperature density profiles, and described how the thermocline depth (as measured from the ocean surface) increases during summer and autumn months) and reaches a maximum depth typically in or near January. Computer modeling using these density data was used to confirm that the period of maximum stratification occurs at this time - typically in or near January. Appendix Q presents a reprint of the stratification analyses and initial dilution modeling that was included within the City's original 1995 301(h) application. Data and conclusions presented in this 1995 effort remain valid.

To continuously update this information, the City collects temperature/salinity/density data at several dozen stations in the vicinity of the PLOO. Figure II.B-4 characterizes seasonal changes in mean ocean density temperature and salinity in the PLOO vicinity. As shown in Figure II.B-4, seasonal stratification characteristics are strongly defined, with the thermocline deepening and strengthening (strong density gradients) in the summer, deepening but with less pronounced density gradients in the late summer and fall, and reaching maximum depths in late fall/early winter.

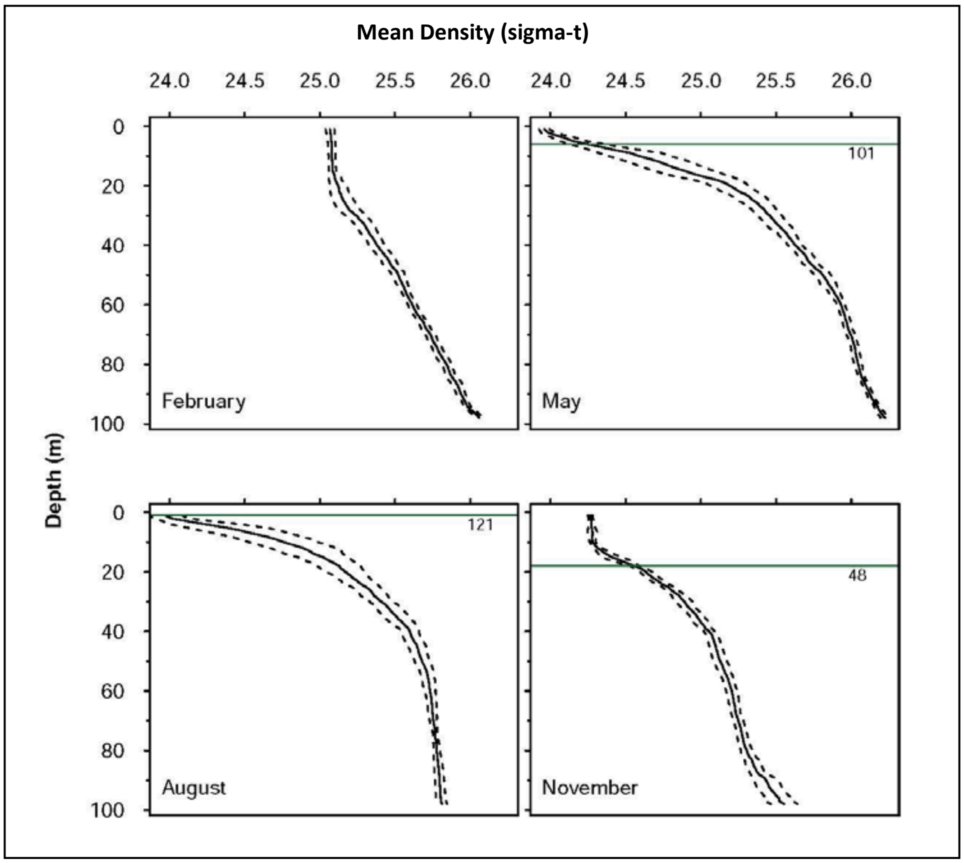

Figure II.B-4 Seasonal Changes in PLOO Temperature/Salinity Profiles

Solid lines are means, dotted lines are 95 percent confidence intervals, and horizontal lines indicate the depth of maximum buoyancy frequency, indicating the value in cycles^2/minute. Buoyancy frequencies of less than 32 cycles^2/minute occurred in February, indicating a well-mixed water column.

The combination of ocean monitoring data and computer modeling (see Appendix Q) confirms that the strength and depth of the thermocline during winter months (in combination with the depth of the PLOO discharge) create maximum stratification conditions.

Period of Natural Upwelling Events. Oceanographic work to characterize upwelling events in the vicinity of the PLOO discharge were presented in the City's 1995 301(h) application and remain valid. For reference, these 1995 studies are presented in Appendix P. As documented in Appendix P, the potential for upwelling is greatest during weak stratification conditions that occur in spring.

Local upwelling (vertical currents), however, can occur in waters beneath the thermocline without significantly disturbing the depth or strength of the thermocline. Such upwelling events are localized, and are interspersed with similar episodes of downwelling.

Density Profiles During Periods of Maximum Stratification. Density profiles during typical periods of maximum stratification are presented in Appendix Q.

II.B.5. Do the receiving waters for your discharge contain significant amounts of effluent previously discharged from the treatment works for which you are applying for a section 301(h) modified permit? [40 CFR 125.57(a)(9)]

SUMMARY: No. The effectiveness of the PLOO is not significantly affected by re-entrainment; receiving waters for the PLOO discharge do not contain significant amounts of previously discharged effluent.

The City's 1995 301(h) waiver application evaluated re-entrainment for a wastewater flow of 240 mgd (10.51 m^3/sec). Results from this detailed re-entrainment modeling study remain valid, and are presented in Appendix R. As documented in Appendix R, deep-water ocean currents off the coast of Point Loma are predominantly longshore. Typical current speeds range from 7.5 m/sec to 12.5 cm/sec (see Table II.B-1 on page II.B-8). Such current speeds advect the wastefield away from the vicinity of the outfall. Intermittent re-entrainment can, however, occur during periods of current reversals if previously discharged wastewater is transported back into the ZID. During such episodes, the overall "effective" initial dilution could be diminished as a result of this re-entrainment.

As documented in Appendix R, a volumetric mass-distribution model was used to evaluate potential re-entrainment effects for the 240 mgd (10.51 m^3/sec) PLOO discharge. A total of 13,757 time-series cases were investigated to determine the amount of effluent that re-enters the initial dilution zone during any 30-day period. Any time effluent is carried back into the initial dilution zone, the "effective" initial dilution is reduced. Table II.B-4 summarizes the results of the modeling for the 13,757 time-series cases. As shown in the table, little overall difference exists between the computed effective initial dilution (dilution including the effects of re-entrainment) and the median initial dilution (for the 13,757 test cases) that would have occurred in the absence of any re-entrainment.

Table II.B-4
Effective Initial Dilutions Considering Re-Entrainment
240 mgd (10.51 m^3/sec) PLOO Discharge)

Parameter	Computed Volumetric Initial Dilution[1,3]	Effective Initial Dilution Including Re-entrainment[2,3]	Percent difference
Median Initial Dilution	338:1	317:1	1.6 %

1 Volumetric initial dilution is the initial dilution that would occur in the absence of any re-entrainment. Values shown above are from Table R-3, page R-12 from Appendix R.
2 Median computed effective initial dilution (initial dilution incorporating the effects of re-entrainment) for 13,757 time-series cases. Computed for an average background concentration at 67m depth.
3 Values shown above are from Table R-3 within Appendix R.

II.B.6. Ambient Water Quality Conditions During the Period(s) of Maximum Stratification: at the zone of initial dilution (ZID) boundary, at other areas of potential impact, and at control stations: [40 CFR 125.61(a)(2)]

a. Provide profiles (with depth) on the following for the current discharge location and for the modified discharge location, if different from the current discharge:

- **BOD_5 (mg/l)**
- **Dissolved oxygen (mg/l)**
- **Suspended solids (mg/l)**
- **pH**
- **Temperature (EC)**
- **Salinity (ppt)**
- **Transparency (turbidity, percent light transmittance)**
- **Other significant parameters (e.g. nutrients, toxic pollutants and pesticides, fecal coliforms)**

Receiving water quality data collected is submitted to the Regional Board in monthly, quarterly, and annual monitoring reports. Within the annual reports, City scientists analyze the data and develop conclusions relative to data trends and causative factors.

These monitoring reports are incorporated by reference into this 301(h) application. In accordance with an agreement with EPA, these monitoring reports are not reproduced herein, but the City has transmitted these data in electronic format to EPA for review.

As documented in these monitoring reports, no discernible differences exist between the ZID station profiles of control station profiles for BOD_5, DO, TSS, pH, temperature, salinity, percent light transmittance, or other significant parameters.

b. Are there other periods when receiving water quality conditions may be more critical than the period(s) of maximum stratification? If so, describe these other critical periods and provide the data requested in 5.a for the other critical periods. [40 CFR 125.61(a)]

No. The period of maximum stratification represents the most critical period.

The City's 1995 waiver application assessed a number of potentially critical water quality periods for the 10.5 m^3/sec (240 mgd) PLOO discharge, including:

- periods of maximum stratification,
- periods of maximum hydraulic loading,
- potential critical periods associated with seasonal or temporary changes in water quality,
- potential critical periods associated with exceptional biological activity, and
- potential critical periods associated with low circulation or flushing.

Analyses presented in these 1995 studies remain valid. Appendix P presents the oceanographic study from the 1995 301(h) application, and Appendix Q presents the stratification/initial dilution modeling studies. As documented in Appendices P and Q, stratification is the factor most significant in affecting receiving water ocean water quality in the vicinity of the PLOO discharge. No significant seasonal changes in hydraulic loading occur, and no periods of low flushing or low circulation occur in the discharge zone.

Ambient receiving water quality off the coast of Point Loma consistently complies with *California Ocean Plan* water quality objectives, and no water quality-related critical periods occur. None of these factors has as much impact on water quality as the period of maximum stratification.

Maximum stratification typically occurs in or around January. As discussed in the response to Question III.A.1, minimum month initial dilution for a flow of 10.5 m^3/sec (240 mgd) is more than 50 percent lower than the projected 338 to 1 median initial dilution. Since no critical periods exist due to seasonal changes in hydraulic loading, water quality, biological activity, or ocean currents, the period of maximum stratification is concluded to represent "worst case" receiving water conditions.

II.B.7. Provide data on steady state sediment dissolved oxygen demand and dissolved oxygen demand due to resuspension of sediments in the vicinity of your current and modified discharge(s) (mg/l/day).

The City's 1995 301(h) application evaluated steady state sediment dissolved oxygen demand and dissolved oxygen demand due to resuspension. These analyses remain valid, and an updated version of the analyses are attached as Appendix S.

Summaries of steady-state sediment dissolved oxygen depression (DO) and DO depression due to resuspension are presented in the response to Questionnaire Section III.B.3.

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Section II.C
Biological Conditions

Renewal of NPDES CA0107409

II.C. BIOLOGICAL CONDITIONS

II.C.1. Provide a detailed description of representative biological community (e.g. plankton, macrobenthos, demersal fish, etc.) in the vicinity of your current and modified discharge(s): Within the ZID, at the ZID boundary, at other areas of potential, discharge-related impact, and at reference (control) sites. Community characteristics to be described shall include (but not be limited to) species composition; abundance; dominance and diversity; spatial and temporal distribution; growth and reproduction; disease frequency; trophic structure and productivity patterns; presence of opportunistic species; bioaccumulation of toxic materials; and the occurrence of mass mortalities.

SUMMARY: A detailed characterization of the pre-discharge biological community within the vicinity of the PLOO discharge was presented in the City's 1995 301(h) waiver application. No significant changes in these communities have occurred in the years after the PLOO discharge was initiated.

The City's 1995 301(h) application presented a detailed description of the pre-discharge biological community that existed in the PLOO region. Included in this 1995 pre-discharge characterization of the Point Loma biological community were the following:

- a description of the plankton, phytoplankton, zooplankton, macrobenthic invertebrates, demersal fish, the Point Loma kelp bed, marine birds and marine mammals. (Appendix T, Volume XIII of the 1995 waiver application),
- a description of the sediment characteristics and the infaunal and hard bottom communities within and outside the ZID (presented in Appendix U, Volume XIV of the 1995 waiver application),
- an assessment of the bioaccumulation of toxic materials in rig and trawl caught fish (presented in Appendix V, Volume XV of the 1995 waiver application), and
- a description of threatened and endangered species found within the Point Loma region (presented in Appendix W, Volume XV of the 1995 waiver application).

Since submittal of the City's 1995 waiver application, the City has continued to conduct a comprehensive monitoring program of water quality, sediment chemistry, benthic organisms, rig-caught fish, and trawl caught organisms. Appendix C presents a detailed evaluation of how the overall biological communities in the Point Loma area have remained consistent with regional averages.

Appendix I.1 presents an evaluation of beneficial uses, including fisheries, habitat, and recreation. Appendix J presents a detailed description of endangered species that may be found in the PLOO vicinity.

As documented in Section III.D, the PLOO discharge has not significantly altered the biological communities in the vicinity of the PLOO discharge.

II.C.2. a. Are distinctive habitats of limited distribution such as kelp beds or coral reefs) located in areas potentially affected by the modified discharge? [40 CFR 125.61(c)]

b. If yes, provide information on type, extent, and location of habitats.

SUMMARY: The Point Loma kelp bed is the only distinctive habitat of limited distribution in the general vicinity of the discharge point. Several distinctive habitats of limited distribution are located in excess of 4.2 miles (6.8 kilometers) from the discharge point.

Point Loma Kelp Bed. The Point Loma kelp bed is an underwater forest of giant kelp (*Macrocystis pyrifera*) that grows on a mudstone/sandstone terrace from depths of about 25 ft (7.6 m) to about 90 ft (27 m) between 1/2 mi (0.8 km) from shore and 1 mi (1.6 km) from shore. The main portion of the kelp bed is bounded by the southern tip of Point Loma (to the south) and the San Diego River (to the north). The PLOO is 3.5 mi (5.6 km) beyond the outer edge of the Point Loma kelp bed. The overall extent of the Point Loma kelp bed varies with oceanographic conditions. A full description of the Point Loma kelp bed and its beneficial uses is provided in Appendix I.1 as are the references cited in the following sections.

Underwater research has been conducted in the Point Loma kelp bed since the mid 1950's when Wheeler North of the California Institute of Technology and his associates at SIO began long-term investigations of kelp bed ecology (Neushul, 1959; North, 1964; North and Hubbs, 1968). Professors Paul Dayton and associates at SIO have done ecological surveys at fixed locations in the Point Loma kelp bed since 1971 (e.g., Dayton and Tegner, 1984, 1990; Dayton et al. 1992, 2003; Tegner et al. 1995, 1996, 1997; Tegner and Dayton, 1987, 1991; Steneck et al. 2002; Graham 2000, 2004; Hewitt et al. 2007; Parnell and Riser 2012; Parnell et al. 2005, 2008, 2010). Their descriptive and experimental studies have established a database unique in the world. They have demonstrated that large-scale, low-frequency episodic changes in oceanographic climate ultimately control kelp forest community structure.

Local biological processes, like recruitment, growth, survivorship, and, reproduction, may be driven by small-scale ecological patterns. But, decade-long shifts in climate (between cold water, nutrient-rich La Niñas and warm water, nutrient-stressed El Niños) and rare but catastrophic storms have been the principal forces governing the diversity and productivity of the kelp forest community at Point Loma. With the single exception of a temporary break in the pipeline conveying wastewater to the offshore outfall whose impact was limited in magnitude and extent (Tegner et al., 1995), there has been no indication in the extensive research on the Point Loma kelp bed ecosystem of any impact of discharged wastewater (see also Appendix G) Kelp Forest Ecosystem Monitoring Report).

As a result of regulations promulgated by the Regional Board, *Macrocystis* kelp beds have been mapped quarterly in by the Region Nine Kelp Survey Consortium since 1983 (e.g., MBCI, 2013, 2014). The kelp survey consortium also tracks the ecological impact of anthropogenic and natural influences on local kelp beds including the effects of ocean wastewater discharges. Results of the most recent kelp survey (MBCI, 2014) show the Point Loma kelp bed decreased slightly (by 4 percent) in 2013 though it still exceeded 2 square miles (5 km^2) in area. The most recent report of the Kelp Survey Consortium (MBCI, 2014) concludes: "There was no apparent correlation between kelp bed growth, or lack thereof, with the various discharges in the region, and there was no evidence to suggest any perceptible influence of the various dischargers on the persistence of the region’s giant kelp beds."

The giant kelp surface canopy has been harvested from the Point Loma kelp bed since 1929. During the 1980s and 1990s it was the single most valuable fishery in the vicinity of Point Loma because of the high value of products created from it. Algin, extracted from kelp, is used as a binder, stabilizer, and, emulsifier in pharmaceutical products, in cosmetics and soaps, and in a wide variety of food, drink, and industrial products (McPeak and Glantz, 1984). Some of the statewide kelp harvest is also used to feed abalone in mariculture operations (MBCI, 2013; CalCOFI 2014).

The Point Loma kelp bed, the largest kelp bed in San Diego County, was particularly important because of its proximity to the kelp processing plant in San Diego Bay. Although the poundage and landed value was proprietary, Wolfson and Glinski (2000) estimated a commercial value of $5-$10 million/year for the Point Loma kelp bed. In 2005, after 76 years of operation, the San Diego kelp harvesting and processing operation was shut down and moved to Scotland.

Kelp harvesting in California is regulated by the California Department of Fish and Wildlife (CDFW). As a result of restrictions on harvesting activities, commercial kelp harvest decreased by 96 percent from 2002 to 2007 (ACOE, 2013). Two kelp beds, one located from the California/Mexico International Boundary to southern tip of San Diego Bay, and one located from the southern tip of San Diego Bay to the southern tip of Point Loma, are considered open, which means they may be harvested by anyone with a kelp harvesting license. Kelp beds at Point Loma and Mission Bay are currently available for lease from the state (ACOE, 2013). A proposal to lease the Point Loma kelp bed was approved by the Fish and Game Commission in April 2012, but it is unknown if it is being presently harvested (MBCI, 2014).

The Point Loma kelp bed is a prime recreational destination for anglers and divers. Appendix I.1 summarizes kelp bed beneficial uses by divers and anglers.

Other Habitats of Limited Distribution. In addition to the Point Loma kelp bed, a number of Areas of Special Biological Significance (ASBS) exist offshore from San Diego. They are located a minimum of 4.2 miles (6.8 kilometers) from the PLOO discharge point. Designated ASBS include marine reserves, marine conservation areas, underwater parks, and water quality protection areas and are described in detail in Appendix I.1 and in the response to Question II.D.3.

II.C.3 a. Are commercial or recreational fisheries located in areas potentially affected by the discharge? [40 JCFR 125.61(c)]

b. If yes, provide information on types, location, and value of the fisheries.

SUMMARY: Both commercial and recreational fisheries are located in areas potentially affected by the discharge. These commercial and recreational fisheries catch a variety of species, and represent a multi-million dollar industry. The various types of fisheries are not affected by the PLOO discharge.

Commercial Fishing. The commercial fishing industry in San Diego is an important element of the regional economy. There are more than 130 commercial fishermen in San Diego whose catch includes lobster, sea urchin, swordfish, spot prawn, white sea bass, rockfish, rock crab, shark, and tuna. A full description of San Diego area fisheries is provided in Appendix I.1 as are the references cited in the following sections.

Fishery catch statistics are reported for large fishery blocks (9-mile by 11-mile (17-km by 20-km) rectangles). Figure II.C-1 depicts nearshore fish blocks in the San Diego area.

From catch data supplied by commercial fishermen, the CDFW reports the weight and dollar value of commercial fish landed by species within each designated fish block. The fish block off Point Loma is Block 860. Fish catch and value for Block 860 is presented in Table II.C-1 (page II.C-7) and Figure.II.C-2 (page II.C-8).

Figure II.C-1
San Diego Nearshore Fish Blocks

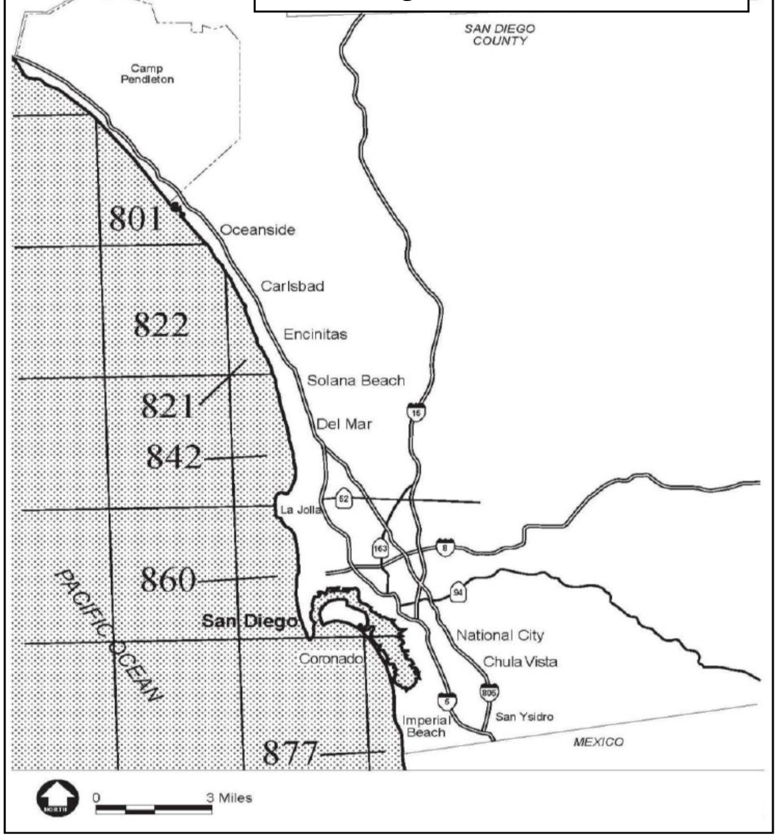


Table II.C-1
Yearly Fisheries Catch Reported from Fish Block 860 (lbs).

SPECIES	2009	2010	2011	2012	2013
Barracuda, CA	2,054	397	862		158
Bass, giant sea	116	83	13		
Bonito, Pacific	138,238				
Cabezon	139	390		329	117
Crab, rock	25,250	32,177	34,869	29,047	25,004
Crab, spider	16,659	9,069	1,722	557	622
Dolphinfish				108	31
Eel, moray	2,215	3,185	38	162	57
Escolar		117			
Guitarfish	27	788	94	81	
Hagfish	59,504	4,661			
Halibut, CA	2,753	2,830	5,177	7,319	6,788
Jacksmelt	228				
Lingcod	113	130	85	20	
Lobster, CA	126,849	127,411	140,341	143,871	144,622
Louvar	119	117		22	8
Mackerel, Pacific	1,890	1		37	
Octopus	50	33	654	76	41
Opah	2,439	1,256		106	1,187
Prawn, spot	2,676	2,151	6,510	4,881	4,686
Ray, bat		4,308	611	434	15
Rockfish, all	5,079	959	2,003	12,591	1,286
Sablefish	10		473	1,399	11
Sanddab	5		47		69
Scorpionfish, CA	57	62	9	29	6
Sea cucumber	1,082	31,730	36,493	11,081	10,690
Sea star	79	158	106	146	135
Seabass, white	1,116	5,605	14,548	11,777	8,604
Shark, leopard		424	148	384	17
Shark, shortfin mako	1,244	719	740	722	793
Shark, soupfin		39	245	42	
Shark, thresher	4,885	3,888	1,036	2,548	12,711
Sheephead	11,729	12,333	12,408	9,215	9,134
Shrimp, ghost	6	13			
Snail, sea	101		9		
Snail, top	155	48	303	346	670
Squid, market	171,406	586,439	3,144	366,022	158,753
Surfperch	11	2	7	47	41
Swordfish	6,472	2,043	191	1,230	8,792
Tuna, albacore	376	5,600	65		
Tuna, bluefin	16,403		113	1,431	470
Tuna, skipjack	749				
Tuna, yellowfin	409				246
Urchin, purple	1,556	1,169	1,375	1,009	
Urchin, red	702,362	643,341	643,364	604,297	
Whelk, Kellet	49,033	15,628	7,739	3,507	1,610
Whitefish, ocean	99	99	15	91	22
Yellowtail	566	1,188	655	3,139	4,868

Source data: California Department of Fish and Wildlife.

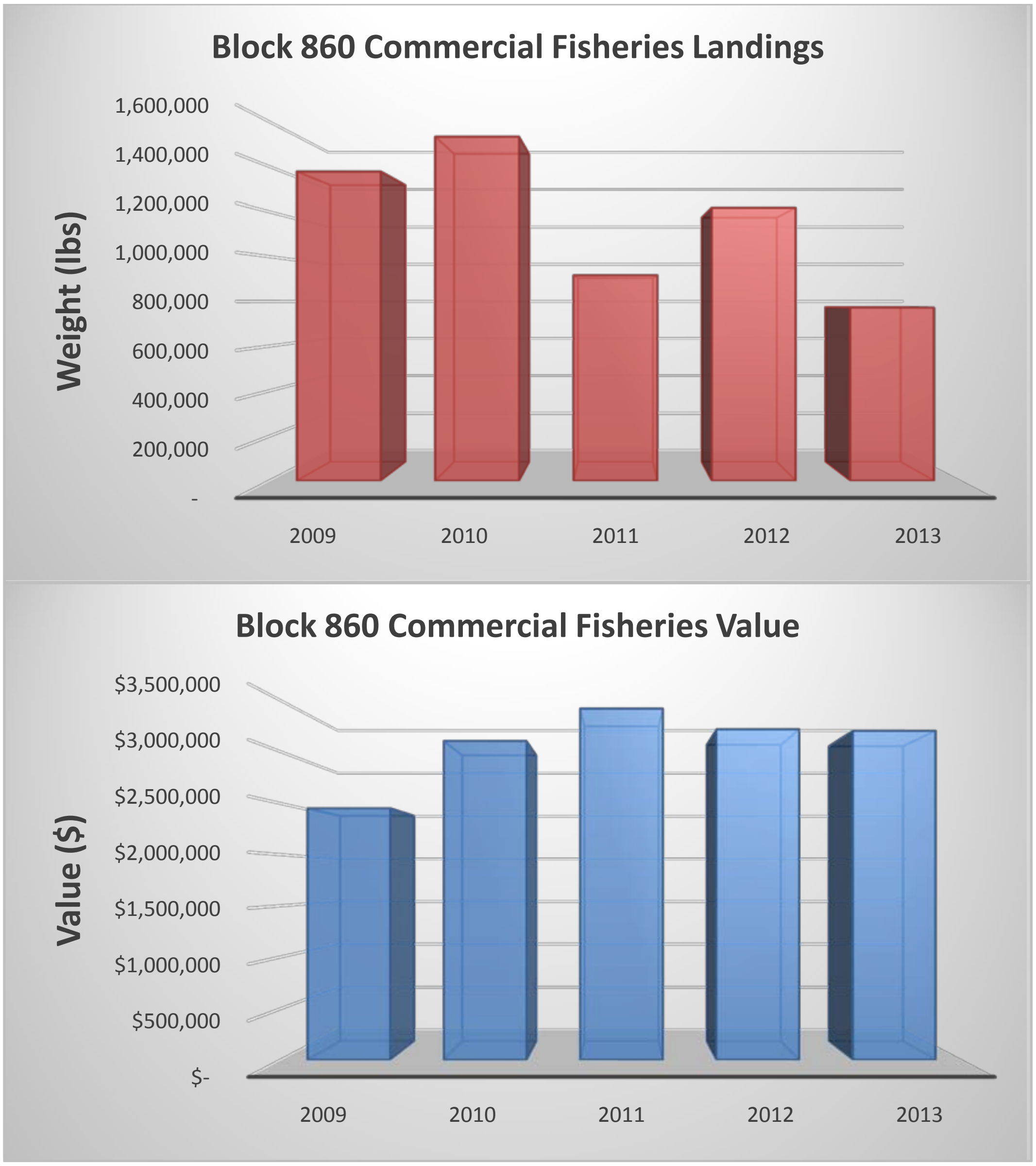


Figure II.C-2. Block 860 Commercial Fisheries Landings and Value 2009-2013.

Many commercially important fisheries species are taken in block 860, with lobster and sea urchin predominating. Not all fish caught from block 860 are brought to port (landed) in San Diego. For example, the large catch of market squid from block 860 is mostly taken by Los Angeles area fishing vessels that return to ports in that area to offload their catch. Landing data specific to Point Loma is not available, so, the proportion of the catch from block 860 that contributes to San Diego's economy is not known. However, landing data are collected at the two harbors adjacent to Point Loma: Mission Bay and San Diego Bay. These data provide a better estimate of the economic contribution of Point Loma's fisheries to the local economy.

The annual dollar value for the top five commercial fisheries species landed at Mission Bay and San Diego Bay from 2009 to 2013 is presented in Table II.C-2 and Figure II.C-3.

Table II.C-2
Top 5 Fisheries Species Value at Mission Bay/San Diego Bay 2009-2013

Species	Fisheries Value/Mission Bay/San Diego Bay				
	2009	2010	2011	2012	2013
Lobster	$ 2,010,382	$2,823,889	$ 3,343,231	$ 3,394,925	$ 3,544,437
Urchin	$ 634,020	$626,789	$ 638,895	$ 586,968	$ 479,322
Swordfish	$ 891,628	$229,385	$ 220,283	$ 322,440	$ 873,529
Spot Prawn	$ 247,025	$241,139	$ 254,588	$ 317,250	$ 465,417
Sheephead	$ 112,258	$130,656	$ 77,169	$ 72,622	$ 109,983

Source data: California Department of Fish and Wildlife.

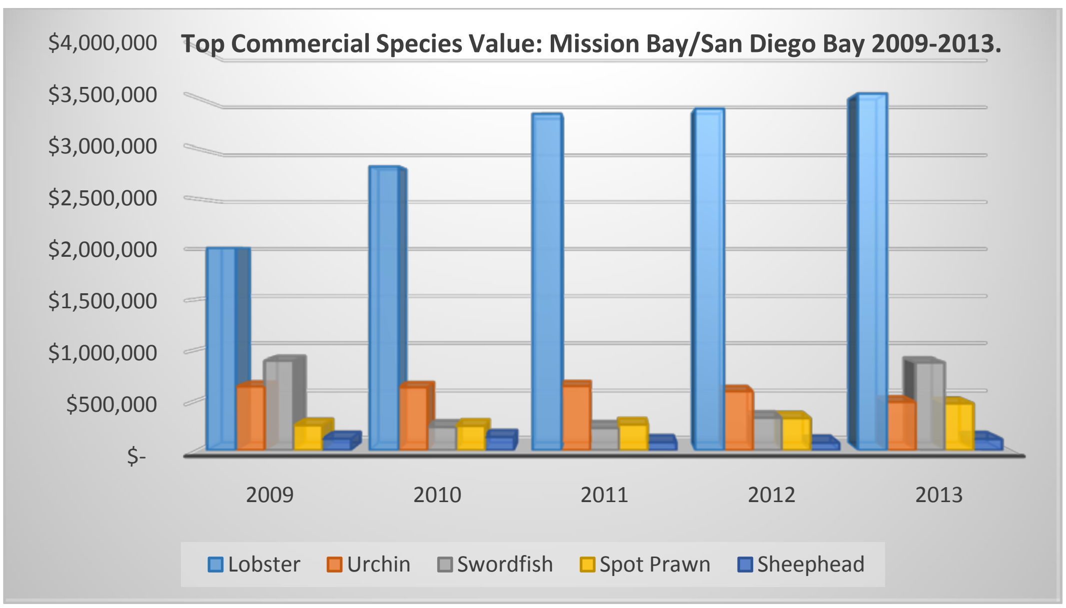


Figure II.C-3 Top Commercial Species Value: Mission Bay/San Diego Bay 2009-2013

California spiny lobster are the premier commercial catch in San Diego. Figure II.C-4 (page II.C-10) shows the weight and value of lobster landed at Mission Bay and San Diego Bay from 2009-2013.

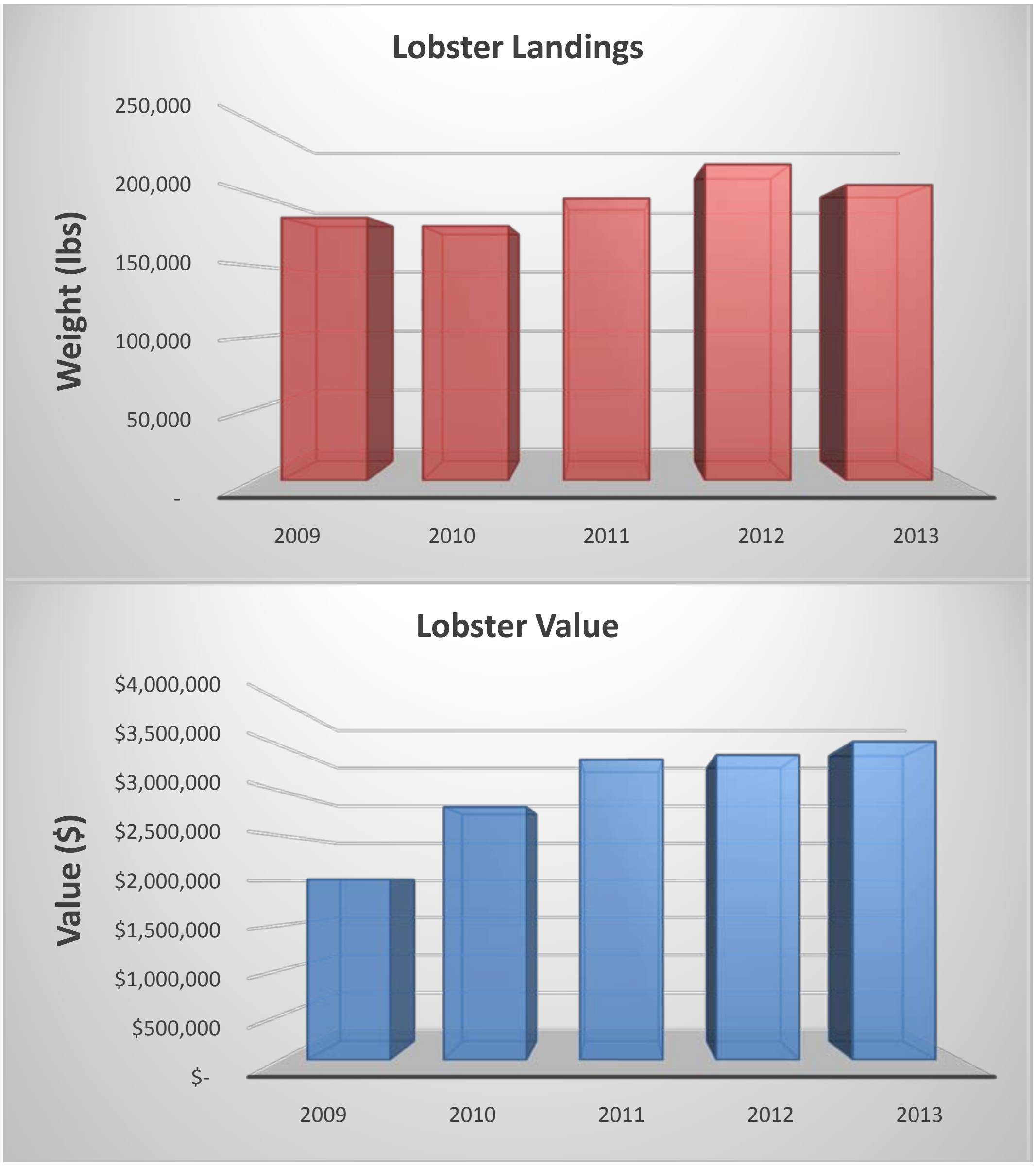


Figure II.C-4 Mission Bay/San Diego Bay Lobster Landings and Value

The wholesale value of lobster landed at Mission Bay and San Diego Bay averaged about three million dollars per year during the period 2009-2013. This represented more than a third of the total value of all commercial species landed in San Diego County.

The second most valuable seafood landed at Mission Bay and San Diego Bay from 2009-2013 was sea urchin, averaging about six hundred thousand dollars per year (Table II.C-2 and Figure II.C-5). Although substantial, sea urchin landed value was less than a quarter of that from lobster.

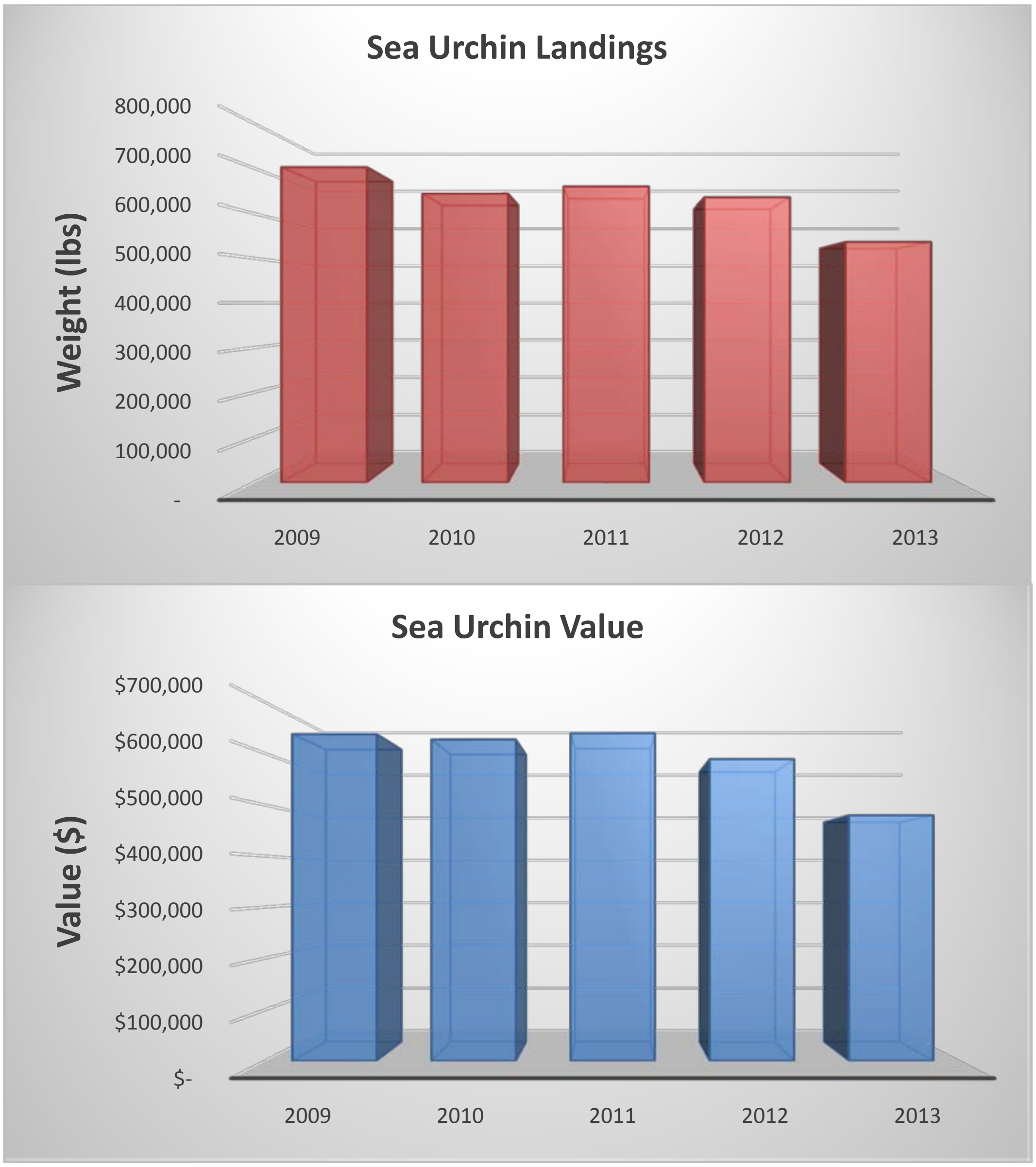


Figure II.C-5 Mission Bay/San Diego Bay Sea Urchin Landings

Both the lobster and urchin fisheries occur near or in the kelp beds, which are limited to maximum depths of about 90 ft (18 m) over consolidated bottom (out to about 1 mi (1.6 km) from shore). Thus, these fisheries take place at a distance of 3.5 mi (5.6 km) or greater from the PLOO.

Swordfish was the third most valuable seafood commodity landed at Mission Bay and San Diego Bay during the five-year period from 2009-2013. Swordfish are taken in offshore waters, well beyond the influence of the PLOO.

Spot prawn were ranked the fourth most valuable seafood landed at ports adjacent to Point Loma from 2009-2013. Spot prawn (*Pandalus platyceros*) are shrimp with four bright white spots, hence the name. As of 1 April 2003 the use of trawl nets to take spot prawn has been prohibited. Most spot prawn are caught in traps set on the sea floor at depths of 600-1,200 ft (183-366 m). Much of the spot prawn catch off Point Loma goes to supply restaurants featuring live display.

Over the past twenty five years there has been a steady increase in demand for "live" finfish. This began primarily to serve members of the Asian community and has since grown to include many markets and Asian restaurants. Traps will catch practically any species willing to enter a small space for food. The primary target species generally weigh 1-3 lb (0.5-1.4 kg) and include sheephead, halibut, scorpionfish, cabezon, lingcod, and several members of the genus *Sebastes* (rockfish). These live fish, presented in salt water aquaria for individual selection, bring several times the value of their filleted colleagues.

Sheephead were the fifth most valuable commercial catch landed at Mission Bay and San Diego Bay from 2009-2013. Their red color and soft, delicate flesh are especially prized in Asian cuisine. Although most commercially landed sheephead are caught by trap some are taken by hook-and-line, and also as bycatch in the gill net fishery.

Other notable commercial fisheries in San Diego marine waters include rock crabs, sea cucumbers, Kellet's Whelk, rockfish, thornyheads, white seabass, California halibut, albacore, thresher shark, sablefish, hagfish, market squid, sardines, anchovies, mackerel, giant kelp, and mariculture. These fisheries are detailed in Appendix I.1.

The total annual value of all San Diego County commercial landings from 2009-2013 is shown in Figure II.C-6 (page II.C-13). As with the total California commercial fisheries value, the San Diego component increased steadily over the period. Also shown in Figure II.C-6 is the proportion of San Diego County commercial landings from Mission Bay and San Diego Bay, which made up over seventy percent of all landed value of commercial fishery species in San Diego County.

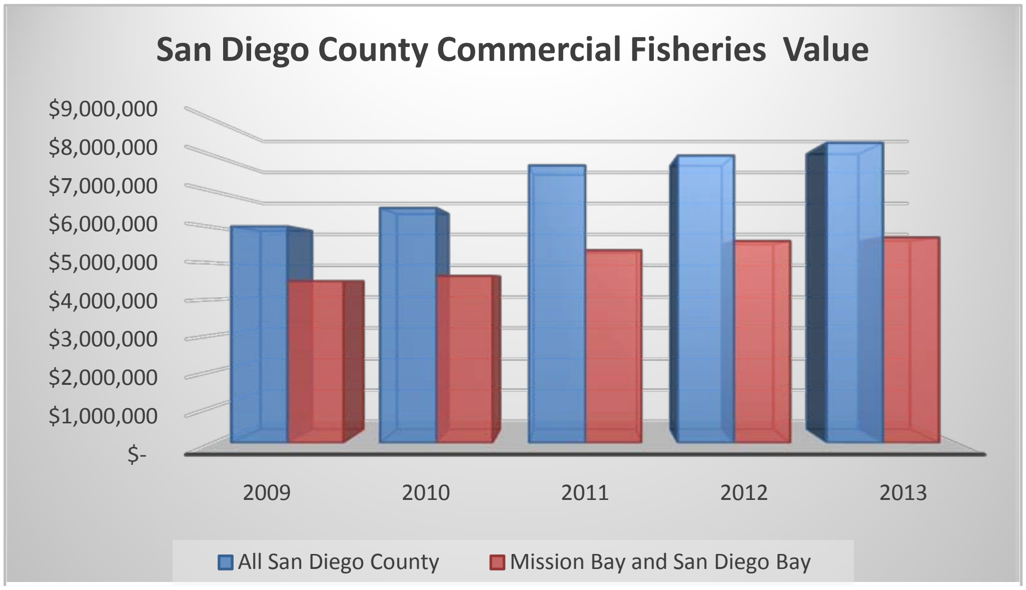


Figure II.C-6 San Diego County Commercial Fisheries Value 2009-2013

Recreational Fishing. Marine recreational fishing and diving activities along the San Diego coast include surf and shoreline fishing, pier fishing, party boat fishing, private boat fishing, snorkeling, and SCUBA diving. In 2012, the most recent annual data available, recreational fishing in California sustained over 12,000 jobs (NOAA, 2014b). The economic value of California recreational fishing in 2012 exceeded $1.7 billion (NMFS, 2014).

The most common target species for beach fishing are barred surfperch, yellowfin croaker, opaleye, and jacksmelt (CMLPA, 2009). Fishers from man-made structures catch Pacific mackerel, Pacific sardine, northern anchovy, queenfish, jacksmelt and other nearshore fish. Rented and chartered boat fishing seek offshore species, especially mackerel, croaker, bass, and rockfish (NOAA, 2014b). There is a small contingent of operators specializing in half-day and full-day charters that typically fish nearshore areas and kelp beds. These operators target sand and kelp bass and California halibut. Oceanside harbor has a few boats in this fishery while Mission Bay and San Diego Bay have larger charter fleets. Fishing occurs year-round, although effort markedly increases in the summer months, peaking in July.

Sport diving and spearfishing activities mostly occur in the nearshore waters, and the number of diving trips in San Diego in the early 1990s was about 30,000 per year (ACOE, 2013). This rate has likely increased in recent years. Most diving occurs where marine life flourishes; especially in kelp beds and rocky areas. Some of the premier diving in San Diego includes trips to locations only accessible by boat, including the outer reaches of kelp beds, vessels intentionally sunk as artificial reefs in "Wreck Alley" off of Mission Beach, and offshore islands and banks. Shoreline diving is also popular.

Much of Point Loma is a military reservation with restricted shoreline access - thus shore fishing is limited and the vast majority of sport fishing is from boats. Typical species targeted by recreational anglers include rockfish, Pacific mackerel, kelp bass, sand bass, California barracuda, Pacific bonito, California sheephead, white seabass, California halibut, yellowtail, rockfish, and seasonal, migratory species like tunas.

At Point Loma, the extensive kelp bed is the primary focus of sport fishing. A flourishing commercial passenger and private fishing vessel fleet, based in San Diego Bay and Mission Bay, operates in the vicinity of Point Loma. Commercial Passenger Fishing Vessels, (CPFVs, commonly called party boats) provide bait, gear rental, food service, fish cleaning, and transportation to fishing grounds for paying passengers on half-day and full day trips. CPFVs mainly fish the outside edge of the kelp bed, as do the majority of private sport fishing boats (Wolfson and Glinski, 1986, 2000). Catch data (the number of fish caught) for the CPFV fleet in Mission Bay and San Diego Bay during 2009-2013 appears below in Table II.C-3.

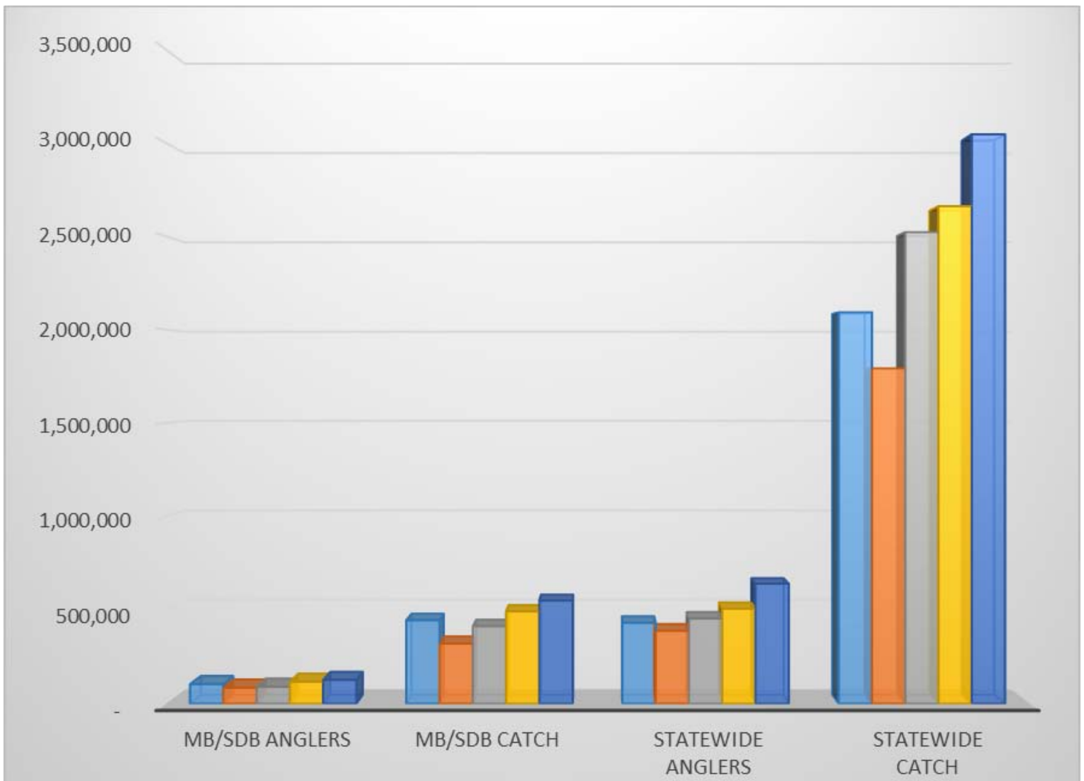
Table II.C-3
Mission Bay and San Diego Bay CPFV Fleet Catch 2009-2013

Common Name	2009	2010	2011	2012	2013
Barracuda, CA	21,759	11,719	11,336	9,844	6,240
Bass, kelp	64,856	24,080	38,597	36,494	11,573
Bass, sand	30,680	26,090	33,345	14,492	23,811
Bonito, Pacific	15,748	743	389	155	606
Cabezon	46	72	113	173	113
Croaker, white	396	246	424	875	671
Fishes, unspecific	3,809	4,377	4,593	6,398	7,530
Flatfishes, unspecific	34	56	27	4	5
Halibut, CA	459	462	289	613	448
Inverts, unspecific	699	4,913	1,037	8,465	4,919
Lingcod	1,689	2,793	3,177	2,954	4,033
Mackerel, jack	0	299	90	20	227
Mackerel, Pacific	7,100	3,518	6,644	4,612	7,253
Other HMS	106,373	38,976	75,557	158,501	133,004
Rockfish, all	62,049	93,205	135,414	109,800	163,380
Sanddab	920	1,009	1,226	889	702
Scorpionfish, CA	20,788	13,765	15,015	8,386	11,915
Seabass, white	177	477	293	235	303
Shark, all	19	29	74	126	42
Sheephead, CA	2,206	1,740	4,164	3,332	2,765
Tuna, albacore	31,403	19,045	284	1,074	23
Whitefish, ocean	9,441	9,161	10,947	5,313	11,094
Yellowtail	66,447	65,105	71,063	120,583	160,468
TOTAL CATCH	**446,821**	**321,882**	**414,099**	**493,977**	**551,202**
Number of Anglers	104,780	85,680	90,357	117,335	127,436
Number of CPFVs	83	83	81	102	105
Catch/Angler	4.26	3.76	4.58	4.21	4.32

Source data: California Department of Fish and Wildlife.

The annual catch for the CPFV fleet reached a high of over half a million fish in 2013 while serving over 127 thousand anglers. The number of CPFVs in the Mission Bay/San Diego Bay area over the five-year period 2009-2013 increased from 83 to 105 with the catch per angler remarkably steady at about four fish per trip.

Figure II.C-7 shows a comparison of Mission Bay/San Diego CPFV fleet activity to the statewide CPFV fleet activity from 2009-2013. All categories of activity increased over the period.



	MB/SDB Anglers	MB/SDB Catch	Statewide Anglers	Statewide Catch
2009	104,780	446,821	432,863	2,092,498
2010	85,680	321,882	389,525	1,792,067
2011	90,357	414,099	455,602	2,520,390
2012	117,335	493,977	507,929	2,659,291
2013	127,436	551,202	641,489	3,043,653

Figure II.C-7 Mission Bay/San Diego Bay and Statewide CPFV Activity

As shown in Table II.C-4 (page II.C-16), the top five sport fish caught by the CPFV fleet at Mission Bay/San Diego Bay during 2009-2013 were rockfish, yellowtail, other highly migratory species, kelp bass, and sand bass. Table II.C-5 presents the estimated marine recreational catch for all species of fish for the southern district (Los Angeles, Orange and San Diego counties) in 2013.

Table II.C-4
Top Five Mission Bay/San Diego Bay CPFV Fleet Species 2009-2013

Common Name	2009	2010	2011	2012	2013
Rockfish, all	62,049	93,205	135,414	109,800	163,380
Other HMS	106,373	38,976	75,557	158,501	133,004
Yellowtail	66,447	65,105	71,063	120,583	160,468
Bass, kelp	64,856	24,080	38,597	36,494	11,573
Bass, sand	30,680	26,090	33,345	14,492	23,881

Source data: California Department of Fish and Wildlife.

Table II.C-5
Marine Recreational Fish Catch for Southern District in 2013

Fishing Mode	Recreational Fish Catch
Man-Made Structures	489,440
Beaches and Banks	256,505
CPFVs	1,327,829
Private and Rental Boats	205,031
Southern District Total	2,278,805

Source data: California Department of Fish and Wildlife.

Because much of Point Loma is a restricted military installation, the proportion of recreational fishing from beaches and man-made structures is substantially reduced compared to the estimates for southern district shown above.

In recreational boat observations off Point Loma, Wolfson and Glinski (1986) found that fishing from private boats concentrated on the kelp bed (often mirroring CPFVs positions). This results in similar species being caught, with the exception of shellfish species (lobster, crab, rock scallops, and sea urchin) which are taken by sport divers in the nearshore zone.

Sport fishing by divers, both free-divers and SCUBA, at Point Loma also takes place in and around the Point Loma kelp bed. Abalone can no longer be collected, but lobster and scallops continue to be harvested (by hand) and a variety of fish are taken by spear. The rip rap boulders covering the outfall pipeline form an artificial reef providing good nearshore recreational fishery catch.

Recreational fishermen are allowed to catch lobster by hand when skin or scuba diving, or by using hoop nets. Historically, diving was the dominant recreational method for catching lobster in southern California, but hoop nets now account for more of the recreational lobster catch than divers (CDFW, 2013a). Hoop nets can be deployed by divers and from boats. Kayaks are increasingly being used to fish for lobster using hoop nets.

Table II.C-6 categorizes typical catch zones for recreational fisheries species caught in the vicinity of Point Loma.

Table II.C-6
Typical Catch Zones for Recreational Species

Category	Species	Surface	Mid-Water	Bottom
Fish	Barracuda	✓		
	Bass, sand			✓
	Bass, kelp	✓	✓	✓
	Bonito	✓	✓	
	Flatfish			✓
	Lingcod		✓	✓
	Mackerels	✓		
	Rockfish			✓
	Scorpionfish			✓
	Sheephead			✓
	Tunas, all	✓	✓	
	Whitefish			✓
	Yellowtail	✓		
Shellfish	Crab			✓
	Lobster			✓
	Sea snail			✓
	Sea urchin			✓

Recreational fishing varies seasonally and is weather related, especially when fishing from boats, as is the case off Point Loma. Summer months have greatest fishing activity. Recreational fishing gradual increases throughout the calendar year beginning in March and ending in February.

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Section II.D
State and Federal Laws

Renewal of NPDES CA0107409

II.D. STATE AND FEDERAL LAWS

II.D.1. Are there any water quality standards applicable to the following pollutants for which a modified discharge is requested:

- **Biochemical oxygen demand or dissolved oxygen?**
- **Suspended solids, turbidity, light transmission, light scattering, or maintenance of the euphotic zone?**
- **pH of the receiving water?**

SUMMARY. The State of California Ocean Plan establishes numerical effluent standards, numerical receiving water standards, and narrative receiving water objectives to prevent impacts to designated beneficial uses of the state's ocean waters. The California Ocean Plan establishes specific objectives that address potential impacts from the discharge of wastewater that contains BOD, TSS, or other pollutants that may inhibit light transmittance and maintenance of the euphotic zone.

California Ocean Plan. As noted in the response to Questionnaire Section II.A.4, this application requests modified water quality standards for BOD and TSS. The *California Ocean Plan* establishes water quality standards to ensure that discharges of BOD and TSS do not impact beneficial uses of the State's ocean waters. A copy of the 2012 version of the *California Ocean Plan* is presented as Appendix U. The *California Ocean Plan* defines ocean waters as follows:

> *OCEAN WATERS are the territorial marine waters of the State as defined by California law to the extent that these waters are outside of enclosed bays, estuaries, and coastal lagoons. If a discharge outside the territorial waters of the State could affect the quality of the waters of the state, the discharge may be regulated to assure no violation of the Ocean Plan will occur in ocean waters.*

California law defines territorial waters of the State as marine waters that extend to 3.0 nautical miles (5.6 km) offshore from the coast.

The *California Ocean Plan* establishes numerical effluent standards, numerical receiving water standards, and narrative receiving water standards to protect beneficial uses of the State's ocean waters. Provision I.A of the *California Ocean Plan* states:

> *Beneficial uses of the ocean waters of the State that shall be protected include industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture; preservation and enhancement of designated Areas of Special Biological Significance (ASBS); rare and endangered species; marine habitat; fish migration; fish spawning an shellfish harvesting.*

Standards Related to BOD. The discharge of BOD or other oxygen demanding pollutants to the marine environment may potentially:

- result in reduced dissolved oxygen concentrations in sediments or receiving waters,
- increase dissolved sulfide concentrations in sediments, or
- provide a source of nutrition that leads to algae blooms or nuisance growth that in turn causes reduction in receiving water dissolved oxygen concentrations, reduced light transmittance, water discoloration, aesthetic impacts, or other objectionable impacts.

The degree to which the discharge of BOD may affect the marine environment is dependent on a number of discharge- and site-specific factors, in part including:

- depth and location of discharge,
- outfall design, ocean currents, temperature and stratification conditions,
- ambient water quality and light transmittance characteristics,
- discharge flow, concentration, and mass emissions of oxygen-demanding pollutants,
- size and settling characteristics of discharged organic particulate matter,
- sediment conditions,
- receiving water assimilative capacity, and
- benthic and biological communities in the vicinity of the discharge.

The *California Ocean Plan* recognizes that a "one size fits all" BOD effluent concentration standard does not necessarily address or prevent impacts to receiving water quality and beneficial uses. As a result, in lieu of establishing an effluent BOD standard, the *California Ocean Plan* establishes a series of numerical receiving water limits designed to ensure that the discharge of oxygen-demanding wastes does not adversely impact receiving water quality and beneficial uses. Table II.D-1 (page II.D-3) presents 2012 *California Ocean Plan* standards related to wastewater discharges of BOD or other oxygen-demanding wastes.

As shown in Table II.D-1, *California Ocean Plan* receiving water standards related to BOD (or other oxygen-demanding wastes) include receiving water standards for dissolved oxygen, dissolved sulfides, organic material in sediments, nutrients, and light transmittance. Additionally, the *California Ocean Plan* establishes standards to prevent degradation (as statistically defined in the *California Ocean Plan*) of marine communities due to the discharge of oxygen-demanding wastes or any other pollutants.

Table II.D-1
California Ocean Plan Standards to Regulate the Discharge of BOD to Ocean Waters of California[1]

Requirement No.[1,2]	Regulated Parameter[1]	State of California Ocean Plan Water Quality Objective[1]
II.C.2	Receiving water color	The discharge of waste[3] shall not cause aesthetically undesirable discoloration of the ocean surface.
II.C.3	Light transmittance	Natural light shall not be significantly[4] reduced at any point outside the initial dilution zone as a result of the discharge of waste.
II.D.1	Receiving water dissolved oxygen	The dissolved oxygen concentration shall not at any time be depressed more than 10 percent from that which occurs naturally, as a result of the discharge of oxygen demanding waste[3] materials.
II.D.3	Receiving water dissolved sulfides	The dissolved sulfide concentration of waters in and near sediments shall not be significantly[4] increased to levels which would degrade[5] indigenous biota.
II.D.5	Organic materials in marine sediments	The concentration of organic materials in marine sediments shall not be increased to levels that would degrade[5] marine life.
II.D.6	Nutrients	Nutrient materials shall not cause objectionable growths or degrade[5] indigenous biota.
II.E.l	Biological characteristics	Marine communities, including vertebrate, invertebrate, and plant species, shall not be degraded.[5]

1 Standard established in the 2012 *California Ocean Plan*. (See Appendix U.)
2 Section number within the *California Ocean Plan* where the standard is established.
3 The *California Ocean Plan* defines "waste" as the discharger's total discharge of whatever origin, i.e. gross, not net, discharge.
4 As defined by the 2012 *California Ocean Plan*: "Significant difference is defined as a statistically significant difference in the means of two distributions of sampling results at the 95 percent confidence level."
5 The *California Ocean Plan* defines degradation as follows: "Degradation shall be determined by comparison of the waste field and reference site(s) for characteristic species diversity, population density, contamination, growth anomalies, debility, or supplanting of normal species by undesirable plant and animal species. Degradation occurs if there are significant differences in any of three major biotic groups, namely, demersal fish, benthic invertebrates, or attached algae."

Standards Related to TSS. The *California Ocean Plan* establishes both effluent and receiving water standards to prevent discharges of suspended solids from adversely impacting beneficial uses of marine waters. Table II.D-2 (page II.D-4) summarizes *California Ocean Plan* standards that related to the discharge of suspended solids.

Table II.D-2
California Ocean Plan Standards to Regulate the Discharge of TSS to Ocean Waters of California[1]

Requirement No.[1,2]	Regulated Parameter[1]	State of California Ocean Plan Water Quality Objective[1]
II.C.1	Floating particulates	Floating particulates and grease and oil shall not be visible.
II.C.2	Receiving water color	The discharge of waste[3] shall not cause aesthetically undesirable discoloration of the ocean surface.
II.C.3	Receiving water light transmittance	Natural light shall not be significantly[4] reduced at any point outside the initial dilution zone as a result of the discharge of waste.
II.C.4	Solids deposition in receiving waters	The rate of deposition of inert solids and the characteristics of inert solids in ocean sediments shall not be changed such that benthic communities are degraded[5].
II.D.6	Nutrients	Nutrient materials shall not cause objectionable growths or degrade[5] indigenous biota.
II.E.l	Biological characteristics	Marine communities, including vertebrate, invertebrate, and plant species, shall not be degraded.[5]
III.B	Effluent TSS and TSS removal	Dischargers shall, as a 30-day average, remove 75% of suspended solids from the influent stream before discharging wastewaters to the ocean, except that the effluent limitation shall not be lower than 60 mg/l.
III.B	Settleable solids	Effluent settleable solids shall not exceed an instantaneous maximum of 3.0 milliliters per liter (ml/l), a weekly (7-day) average of 1.5 ml/l, nor a monthly (30-day) average of 1.0 ml/l.
III.B	Effluent turbidity	Effluent turbidity shall not exceed a maximum of 225 Nephelometric Turbidity Units (NTU), a weekly (7-day) average of 100 NTU, or a monthly (30-day) average of 75 NTU.

1 Standard established in the 2012 *California Ocean Plan.* (See Appendix U.)
2 Section number within the *California Ocean Plan* where the standard is established.
3 The *California Ocean Plan* defines "waste" as the discharger's total discharge of whatever origin, i.e. gross, not net, discharge.
4 As defined by the Ocean Plan: "Significant difference is defined as a statistically significant difference in the means of two distributions of sampling results at the 95 percent confidence level."
5 The *California Ocean Plan* defines degradation as follows: "Degradation shall be determined by comparison of the waste field and reference site(s) for characteristic species diversity, population density, contamination, growth anomalies, debility, or supplanting of normal species by undesirable plant and animal species. Degradation occurs if there are significant differences in any of three major biotic groups, namely, demersal fish, benthic invertebrates, or attached algae."

San Diego Region Basin Plan. The Regional Board establishes beneficial uses for the San Diego Region and regional water quality standards to protect the beneficial uses within the *Water Quality Control Plan for the San Diego* Basin (Basin Plan). To protect designated regional beneficial uses of State-regulated marine waters, the Basin Plan incorporates effluent and receiving water standards established in the *California Ocean Plan*.

II.D.2. If yes, what is the water use classification for your discharge area? What are the applicable standards for your discharge area for each of the parameters for which a modification is requested? Provide a copy of all applicable water quality standards or a citation to where they can be found.

SUMMARY: No federal or state water use classification has been established for the discharge area. The California Ocean Plan establishes effluent and receiving water standards to prevent the discharge of BOD and TSS from impacting beneficial uses of marine waters. Appendix U presents a copy of the 2012 California Ocean Plan.

Water Use Classification. No federal or state water use classification has been established for the discharge area.

Ocean Plan Standards. As discussed in the response to Questionnaire Section II.D.1, the *California Ocean Plan* establishes a number of effluent and receiving water standards to prevent the discharge of BOD and TSS from adversely impacting beneficial uses of marine waters. Appendix U presents a copy of the current 2012 version of the *California Ocean Plan*.

Specific effluent and receiving water standards applicable to discharges of BOD and TSS (and citations where they may be found) are presented in Tables II.D-1 and II.D-2 (pages II.D-3 and II.D-4).

II.D.3. Will the modified discharge: [40 CFR 125.59(b)(3)]

- **Be consistent with applicable State coastal zone management program(s) approved under the Coastal Zone Management Act as amended 16 U.S.C. 1451 *et seq*? (See 16 U.S.C. 1456(c)(3)(A))**
- **Be located in a marine sanctuary designated under Title III of the Marine Protection, Research and Sanctuaries Act (MPRSA) as amended, 16 U.S.C. 1431 *et seq*. or in an estuarine sanctuary designated under the Coastal Zone Management Act as amended, 16 U.S.C. 1461? If located in a marine sanctuary designated under Title III of the MPRSA, attach a copy of any certification or permit required under regulations governing such marine sanctuary (See 16 U.S.C. 1432(f)(2))**
- **Be consistent with the Endangered Species Act, as amended, 16 U.S.C. 1531 *et seq*? Provide the names of any threatened or endangered species that inhabit or obtain nutrients from waters that may be affected by the modified discharge. Identify any critical habitat that may be affected by the modified discharge and evaluate whether the modified discharge will affect threatened or endangered species or modify a critical habitat (See 16 U.S.C. 1536(a)(2)).**

SUMMARY: The PLOO discharge will be consistent with provisions of the Coastal Management Act, Marine Protection, Research, and Sanctuaries Act, and Endangered Species Act.

Coastal Management. The State of California regulates activities within a designated coastal zone through seven regional State Coastal Commissions. Coastal Commission regulatory authority over waste discharges to the ocean is limited to:

- considering treatment plant siting issues,
- treatment plant aesthetics, and
- new volumes of sewage originating within the coastal zone.

The Point Loma WWTP and PLOO are within the coastal zone regulated by the San Diego Coast Region of the State Coastal Commission. Each of these existing facilities was constructed and operates in accordance with permits issued by the San Diego Coast Region. Additionally, improvements to these facilities have been implemented in accordance with San Diego Coast Region permits. The City's prior 301(h) waiver application presented information on prior Coastal Development permits for existing Point Loma WWTP treatment, conveyance, disposal facilities, or improvement projects.

The City is currently coordinating with the San Diego Coast Region to process coastal development permits for several proposed Point Loma WWTP improvement and maintenance projects. Table II.D-3 summarizes the status of coastal development permits for these proposed or ongoing Point Loma WWTP maintenance/improvement projects.

Table II.D-3
Status of Coastal Development Permits
Proposed or Ongoing Point Loma WWTP Maintenance/Improvement Projects

Coastal Development Permit Number	Point Loma Facility or Project	Project or Permit Status
Waiver No. 6-09-039	Replace wooden stairway along Sunset Cliffs with aluminum stairway	Waiver from Coastal Development Permit granted on July 28, 2009.
Coastal Development Permit No. 6-09-054	Point Loma WWTP Grit Improvements Project	Permit approved on March 17, 2011. Work is currently underway on the grit improvements project. See Appendix B.1.
Exemption No. 6-10-119	Point Loma WWTP Sedimentation Basins Equipment Upgrade	Project exempted from Coastal Development Permit (exemption notice dated December 16, 2011.

As part of developing this 301(h) application for modified secondary treatment requirements, the City of San Diego has requested that the California Coastal Commission, San Diego Coast Region, provide a determination that the existing and proposed discharge is in accordance with applicable coastal zone management requirements. A copy of the City's letter requesting this determination is presented in Appendix V.

Marine Sanctuary. As noted in the City's 301(h) waiver application, the PLOO discharge is not located in a marine sanctuary.

A number of Marine Protected Areas (MPAs) exist offshore from San Diego. These include marine reserves, marine conservation areas, underwater parks, ASBS, and water quality protection areas. They are located a minimum of 4.2 miles (6.8 kilometers) from the PLOO discharge point. A full description of these MPAs is provided in Appendix I.1 as are the references cited in the following sections.

MPAs are discrete geographic marine or estuarine areas seaward of the mean high tide line or the mouth of a coastal river, including any area of intertidal or subtidal terrain, together with its overlying water and associated flora and fauna, that have been designated by law or administrative action to protect or conserve marine life and habitat (California Fish and Game Commission, 2010; CDFW, 2013b). California also has dedicated ASBS that the California

State Legislature has defined as having biological communities of such extraordinary value that no risk of change in their environment can be entertained (State Board, 2014b). The *California Ocean Plan* prohibits discharge of waste into an ASBS and requires that outfalls be located at a sufficient distance away from an ASBS to assure the maintenance of natural water quality conditions (Raimondi et al. 2012; State Board, 2012b).

In addition, California State Water Quality Protection Areas (SWQPAs) are designated to protect marine species or biological communities from an undesirable alteration in natural water quality (State Board, 2012b). All State Water Board ASBS designations are now also classified as a subset of SWQPAs and require special protections afforded by the *California Ocean Plan.* Six ocean MPAs are within 15 miles (24 kilometers) of Point Loma:

- *The Tijuana River Mouth State Marine Conservation Area* extends along the shoreline from Imperial Beach 2.3 mi (3.7 km) south to the Mexican Border and offshore to a depth of 55 ft (17 m). It is geographically connected with Tijuana River National Estuarine Research Reserve and the Tijuana Slough National Wildlife Refuge creating the most intact contiguous estuarine/marine complex in southern California.

- *The Cabrillo State Marine Reserve* extends 1.3 mi (2 km) along the southern Point Loma shore and out to a depth of 30 ft (6 m). It incorporates the previously established Mia J. Tegner Point Loma State Marine Conservation Area. The Cabrillo State Marine Reserve (SMR) includes a nearshore portion of the Point Loma kelp bed, along with rocky, sandy beach and intertidal habitat, surf grass, and shallow rock reef habitat. It is adjacent to and contiguous with the Cabrillo National Monument. The seaward boundary of the Cabrillo SMR is approximately 4.2 mi (6.8 km) inshore from the Point Loma outfall.

- *South La Jolla State Marine Conservation Area* lies adjacent to and west of the South La Jolla SMR and extends to the limit of state jurisdiction (3 nm (5.6 km) offshore) in depths from 176 to 274 ft (54 to 84 m). The South La Jolla State Marine Conservation Area (SMCA) has a shared northern and southern boundary with the South La Jolla SMR Reserve: from Palomar Avenue in La Jolla to Diamond Street in Pacific Beach, encompassing 2 mi (3.2 km) of shoreline.

- *South La Jolla State Marine Reserve* is adjacent to and east of the South La Jolla SMCA with a shared northern and southern boundary: from Palomar Avenue in La Jolla to Diamond Street in Pacific Beach. It ranges in depth from 0 to 176 ft (0 to 54 m).

- *Matlahuayl State Marine Reserve* is just north of Point La Jolla. It has an alongshore span of 1.2 mi (1.9 km) with depths ranging from 0 to 331 ft (101 m). Approximately 13.8 mi (12 nm) north of the PLOO, the Matlahuayl SMR protects near-shore habitat that supports research activities of the Scripps Institution of Oceanography (SIO). It encompasses the San Diego-La Jolla Ecological Reserve ASBS. This is the closest ASBS/SWQPA to the PLOO. The other ASBS/SWQPA in San Diego County is part of the San Diego-Scripps Coastal State Marine Conservation Area to the north. The Matlahuayl SMR is part of the 5,977 acre (9.3 mi2) San Diego-La Jolla Underwater Park which was dedicated by the San Diego City Council in 1970 to protect the natural ecology and environment. The Park extends from Alligator Point in La Jolla north to Del Mar and out to a distance of 8,000 ft (2,438 m) from shore.

- *San Diego-Scripps Coastal State Marine Conservation Area* is adjacent to and north of the Matlahuayl SMR. It spans 1.1 mi (1.8 km) of shoreline and extends across depths of 10-366 ft (3-112 m). It incorporates the San Diego Marine Life Refuge adjacent to the SIO. In 1929, the California State Legislature granted the University of California "sole possession, occupation, and use" of the intertidal zone and subtidal zone to 1,000 feet offshore along the 2,600-foot-long SIO oceanfront. This area was designated as the San Diego Marine Life Refuge in 1957 and was included in the University of California's Natural Reserve System in 1965. It is also part of the San Diego-La Jolla Underwater Park and incorporates the San Diego-Scripps ASBS/SWQPA.

Endangered Species. Detailed descriptions of endangered species possibly occurring in the vicinity of the PLOO and potential outfall impacts are presented in Appendix J as are references cited in the following section. State and federal regulations to identify and protect endangered or threatened species include the following:

Endangered Species Act. The Endangered Species Act (ESA) of 1973 (16 U.S.C. §§ 1531 et seq.) establishes protection over and conservation of endangered species and the ecosystems on which they depend (USFWS, 2014a). An endangered species is a species that is in danger of extinction throughout all or a significant portion of its range. The ESA establishes procedures for nominating species for protection and prohibits actions that would jeopardize their continued existence. All federal agencies are required to implement protection programs for endangered species and to use their authority to further the purposes of the ESA.

Marine Mammal Protection Act. The Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C. §§ 1361 et seq.) creates the authority to protect marine mammals in waters or on lands under U.S. jurisdiction (NMFS, 2014a). It defines federal responsibility for conserving marine mammals (whales, dolphins, porpoises, seals, sea lions, and sea otters). The MMPA prohibits harassing, capturing, disturbing, or, killing marine mammals except under special permit. It creates a Marine Mammal Commission, Regional offices, and Fisheries Science Centers to implement research and protection.

California Endangered Species Act. The California ESA of 1970, re-amended in 1984, is part of the California Fish and Wildlife Code and is administered by the CDFW (CDFW, 2014). It establishes measures to conserve, protect, restore, and enhance endangered species and their habitats. Certain species that are not recognized as endangered under the federal ESA may be listed as endangered under the California ESA. The provisions included in the California ESA generally parallel those in the federal ESA, but also apply to species petitioned for listing (i.e., state candidates).

As shown in Table II.D-4 (page II.D-11), twenty-four endangered species covered under the federal ESA, the federal MMPA, and/or the California ESA may occur in the vicinity of Point Loma. These include eight marine mammals, seven birds, five sea turtles, two fish, and two invertebrates. Their population biology, status, and distribution are discussed in the following paragraphs.

Whales. Marine mammals are warm-blooded, have fur or hair, breathe air through lungs, bear live young, and nurse them with milk. They have streamlined bodies and most have an insulating layer of blubber. Two types of marine mammals pass through or inhabit San Diego coastal waters; cetaceans and pinnipeds. Whales are members of the first group that also includes dolphins and porpoises (NMFS, 2014b; Perrin et al. 2008). Cetaceans are entirely aquatic, have two front flippers, and tails with horizontal extensions that provide swimming power. The great whales, like blue, gray, and humpback whales, have rows of closely spaced baleen plates that filter out and trap plankton and small fish. Sperm whales, dolphins, and porpoises have teeth for grasping prey.

The second group of marine mammals, pinnipeds (sea lions and seals), regularly haul out on land to rest, breed, and give birth (NMFS, 2014c). Sea lions have visible external ears and can walk on all four flippers by rotating their rear flippers forward under their body. Their swimming power comes from large front flippers. Seals have no external ears and can only crawl on land because their front flippers are small and their hind flippers cannot rotate forward. Seals swimming power comes from their large, fan-like rear flippers.

Of the eight species of great whales that may pass by Point Loma, six are endangered: the blue whale, the fin whale, the humpback whale, the right whale, the sei whale, and the sperm whale (Table II.D-4). The other two great whales, the gray whale and the minke whale, were previously endangered but have now recovered. There are no endangered dolphins or porpoises in the San Diego area.

Table II.D-4
Endangered Species that May Occur in the Vicinity of Point Loma[1]

Category	Common Name	Species Name	Status
Marine Mammals	Blue Whale	*Balaenoptera musculus*	Endangered
	Fin Whale	*Balaenoptera physalus*	Endangered
	Humpback Whale	*Meaptera novaeangliae*	Endangered
	Right Whale	*Eubalaena japonica*	Endangered
	Sei Whale	*Balaenoptera borealis*	Endangered
	Sperm Whale	*Physeter macrocephalus*	Endangered
	Guadalupe Fur Seal	*Arctocephalus townsendi*	Threatened
	Steller Sea Lion	*Eumetopias jubatus*	Threatened
Birds	California Least Tern	*Sterna antillarum browni*	Endangered
	Light-footed Clapper Rail	*Rallus longirostris levipes*	Endangered
	Western Snowy Plover	*Charadrius alexandrines nivosus*	Threatened
	Guadalupe Murrelet	*Synthliboramphus hypoleucus*	Threatened
	Marbled Murrelet	*Brachyramphus marmoratus*	Threatened
	Scripps's Murrelet	*Synthliboramphus scrippsi*	Threatened
	Short-tailed Albatross	*Phoebastria albatrus*	Endangered
Sea Turtles	Green Sea Turtle	*Celonia mydas*	Endangered
	Loggerhead Sea Turtle	*Caretta caretta*	Endangered
	Leatherback Sea Turtle	*Dermochelys coriacea*	Endangered
	Olive Ridley Sea Turtle	*Lepidochelys olivacea*	Endangered
	Hawkbill Sea Turtle	*Eretmochelys imbricata*	Endangered
Fish	Chinook Salmon	*Oncorhynchus tshawytscha*	Endangered
	Steelhead	*Oncorhynchus mykiss*	Endangered
Mollusks	White Abalone	*Haliotis sorenseni*	Endangered
	Black Abalone	*Haliotis cracherodii*	Candidate

1 From CDFW, 2014; NMFS, 2014a, and USFWS, 2014a.

The gray whale, *Eschrichtius robustus*, is the most common whale observed along the San Diego coast and the most easily seen from shore (Jefferson et al. 2011). These large whales can grow to about 50 ft (15 m) long and weigh approximately 80,000 lb (35,000 kg). Gray whales are found only in the north Pacific Ocean – an Atlantic form is extinct (Jones and Swartz, 2009). Gray whales occur in two genetically and spatially distinct populations on the eastern and western sides of the North Pacific Ocean (NMFS, 2013a). The eastern north Pacific gray whales are the subject of the following discussion.

Each year, the gray whale undertakes the longest migration of any mammal, travelling 9,000-12,000 mi (14,500-19,300 km) from its summer feeding grounds in the Bering and Chukchi Seas to breeding and calving lagoons of Baja California and back again to the Arctic Ocean. The journey south, led by pregnant females, begins in late autumn with most whales passing Point Loma during January and February. The northern migration occurs during springtime with whales (especially mother-calf pairs) passing closer to shore than on the way south.

Gray whales usually feed in shallow waters less than 200 ft (60 m) deep (Perrin et al. 2008). They are primarily bottom feeders whose prey includes a wide range of invertebrates living on or near the seafloor. The whales filter amphipods and other crustaceans with their baleen plates. Although generally fasting during the migration and calving season, opportunistic feeding occurs in the shallow coastal waters along the migration path and in the calving lagoons. The gray whale is preyed on by killer whales. Many exhibit attack scars indicating not all attacks are fatal, however fatalities are known (Jones and Swartz, 2009).

Gray whales are susceptible to entanglement in fishing gear and ship strikes. No gray whales were observed entangled in California gillnet fisheries between 2007 and 2011 (Carretta and Enriquez, 2012), but previous mortality in the swordfish drift gillnet fishery has been observed and there have been recent sightings of free-swimming gray whales entangled in gillnets (Carretta et al. 2014). Although acoustic pingers are known to reduce the entanglement of cetaceans in the California drift gillnet swordfish fishery (Carretta and Barlow, 2011), it is unknown whether pingers have any effect on gray whale entanglement. Most data on human-caused mortality and serious injury of gray whales is from strandings. There are few at-sea reports of entangled animals alive or dead. Strandings represent only a fraction of actual gray whale deaths (natural or human-caused), as reported by Punt and Wade (2012), who estimated that only 3.9 to 13.0 percent of gray whales that die in a given year end up stranding and being reported.

For 2007-2011, the most recent five-year period reported by NMFS (Carretta et al. 2013), the total mortality of eastern north Pacific gray whales attributed to ship strikes was six deaths. Additional mortality from ship strikes probably goes unreported because the whales either do not strand or have no evident signs of trauma when observed at sea.

Hunted practically to extinction, the gray whale has staged a remarkable comeback since it was listed as endangered throughout its range under the ESA in 1973. The species appears to have fully recovered and is thought to be close to or at its initial unexploited stock size. The gray whale species was delisted in 1994, as it was no longer considered endangered under the ESA. Its current population estimate is approximately 20,000 individuals (Carretta et al. 2014).

As with other great whales that may occur in the Point Loma region, the National Marine Fisheries Service has not designated any critical habitat for gray whales (NMFS, 2013a).

Minke whales, *Balaenoptera acutorostrata*, the smallest of the baleen whales, can occur year-round off California (Carretta et al. 2014). These sleek, baleen whales feed on krill and schooling fish such as herring, pollock, and cod (Jefferson et al. 2011). Minke whales are lunge feeders, often plunging through patches of krill or shoaling fish. They frequent shallower water more often than any other whales except gray whales. Minke whales are prey for killer whales. Increasing levels of anthropogenic sound in the world's oceans is considered a habitat concern for whales, particularly for baleen whales that communicate using low-frequency sound (McDonald et al. 2008; Hildebrand, 2009; Rolland et al. 2012).

As with other whales, entanglement in commercial gillnets and ship strikes pose a threat to minke whales. Minke whales may occasionally be caught in coastal set gillnets off California and in offshore drift gillnets off California and Oregon (Carretta et al. 2014).

Ship strikes were implicated in the death of one minke whale in 1977, but the reported minke whale mortality due to ship strikes was zero for the period 2004-2008 (Carretta et al. 2014). Although rare in California, with an estimated population in the low to mid hundreds (Carretta et al. 2014), minke whales are relatively abundant elsewhere and are not listed as endangered under the ESA. Like the gray whale, minke whales are protected under the MMPA but are not considered depleted.

The other whales that periodically traverse the area off Point Loma are deeper water species. The most spectacular of these is the blue whale, *Balaenoptera musculus*. Blue whales, the largest animal that has ever lived, can reach over 100 ft (30 m) in length and weigh as much as 330,000 pounds (lb) (150,000 kilograms (kg)) (Perrin et al. 2008). Preying almost exclusively on zooplankton, especially krill, they lunge feed and consume approximately 12,000 lb (5,500 kg) of krill per day.

The blue whale inhabits all oceans and typically occurs near the coast over the continental shelf, though it is also found in oceanic waters (Sears and Perrin, 2008). The Pacific Coast is a feeding area for blue whales during summer and fall (Carretta et al. 2014). They are regularly observed in the Southern California Bight most often along the 200-m (656 ft) isobath.

Blue whales have been documented to be preyed on by killer whales (Jefferson et al. 2011). While there is little evidence that killer whales attack this species in the north Atlantic or southern hemisphere, 25 percent of photo-identified whales in the Gulf of California show rake scars from killer whale attacks (Sears and Perrin, 2008).

Blue whales are susceptible to ship strikes and entanglement in fishing gear (Redfern et al. 2013). Between 1988 and 2007, 21 blue whale deaths were reported along the California coast and eight of these whales were confirmed to have died as a result of ship strikes (Berman-Kowalewski et al. 2010). The offshore drift gillnet fishery is the only fishery that is likely to entangle blue whales off southern California, although no fishery mortality or serious injuries have been observed (Carretta et al. 2013). The drift gillnet fisheries for swordfish and sharks along the Pacific coast of Baja California, Mexico may take animals from this population as well. Some gillnet mortality of large whales goes unobserved because whales swim away with a portion of the net; however, fishermen report blue and fin whales usually swim through nets without entangling and with little damage to the nets (Carretta et al. 2014).

Tagged blue whales exposed to simulated mid-frequency military sonar sounds showed significant behavioral responses, including cessation of feeding, increased swimming speeds, and movement away from the simulated sound sources, even though the simulated source levels were orders of magnitude lower than some operational military sonar systems (Goldbogen et al. 2013). This study suggests that sonar sources could disrupt feeding and displace whales from high-quality feeding areas, with negative implications for individual fitness and population health.

The current best available abundance estimate for the Eastern North Pacific stock of blue whales that occur off California, Oregon, and Washington is 1,647 (Carretta et al. 2014.)

As a result of commercial whaling, blue whales were listed as endangered under the Endangered Species Conservation Act of 1969. This protection was transferred to the ESA in 1973. They are still listed as endangered and consequently the Eastern North Pacific stock is automatically considered as depleted under the MMPA.

Fin whales, *Balaenoptera physalus*, like blue whales, occur mainly in offshore waters (Jefferson et al. 2011). They do, however, venture closer to shore after periodic upwelling that leads to increased krill density. Recent observations show aggregations of this, second largest of the baleen whales, year-round off southern California (Carretta et al. 2014). Fin whales feed on krill, small schooling fishes, squid, and copepods. They are not known to have a significant number of predators, but in areas where killer whales are abundant, some fin whales exhibit attack scars on their flippers, flukes, and flanks.

The organochlorines DDE, DDT, and PCBs have been identified in fin whale blubber, but at lower concentrations than in toothed whales that feed at higher levels in the food chain (Marsili and Focardi, 1996). Female fin whales contain lower burdens than males, likely due to mobilization and export of contaminants during pregnancy and lactation (Gauthier et al. 1997).

Fin whales are susceptible to ship strikes and entanglement in fishing gear (Carretta et al. 2014). Ship strikes were implicated in the deaths of seven fin whales during 2007-2011 (Carretta et al. 2013). During 2007-2011, there were an additional four injuries of unidentified large whales attributed to ship strikes. Documented ship strike deaths and serious injuries are derived from actual counts of whale carcasses and are considered minimum values (Carretta et al. 2013).

As with blue whales, the offshore drift gillnet fishery is the only fishery that is likely to pose a threat of entanglement for fin whales. One fin whale death has been observed in over 8,000 sets since 1990 when NMFS began observing the fishery (Carretta et al. 2014).

Moore and Barlow (2011) present evidence of increasing fin whale abundance in the California Current region. They predict continued increases in fin whale numbers over the next decade that may result in fin whale densities reaching "current ecosystem limits." The best available abundance estimate of fin whales in California, Oregon, and Washington waters is 3,051 (Carretta et al. 2014).

Historical whaling drastically reduced fin whale and other whale stocks. Populations began to recover with implementation of the International Whaling Commission, ESA, and the MMPA. Fin whales are listed as endangered under the ESA, and as depleted under the MMPA.

Humpback whales, *Meaptera novaeangliae*, are distinguished by their long pectoral fins (flippers) and complex, repetitive vocalizations (Jefferson et al. 2011). The migratory population of humpbacks present in California offshore waters during summer and fall ranges from Costa Rica to southern British Columbia (Carretta et al. 2014). Humpback whales feed on schools of fish and krill and reach a length of 60 ft (18 m). In the southern California feeding grounds, humpback whales feed on a wide variety of invertebrates and small schooling fish. Feeding occurs both at the surface and in deeper waters, wherever prey is abundant. Humpback whales are the only species of baleen whale that cooperate when feeding in large groups (Perrin et al. 2008). This species is known to be attacked by both killer whales and false killer whales as evidenced by toothrake scars on their bodies and fins (Jefferson et al. 2011). Humpback whales observed on the feeding grounds off Washington and California have the highest rate of rake marks of any of their observed feeding grounds.

Entanglement in fishing gear poses a threat to humpback whales throughout the Pacific Ocean. Pot and trap fisheries are the most commonly documented source of mortality and serious injury of humpback whales in U. S. west coast waters (Carretta et al. 2013). Between 2007 and 2011, there were 16 documented humpback whale interactions with pot/trap fisheries. Gillnet and unidentified fisheries accounted for 1 death and 9 serious injuries of humpback whales between 2007 and 2011 (Carretta et al. 2014). An additional number of whales are likely entangled in fishing gear from Mexican fisheries, though quantitative data are not presently available for most of these fisheries.

Humpback whales, especially calves and juveniles, are highly vulnerable to ship strikes. Younger whales spend more time at the surface, are less visible, and are found closer to shore, making them more susceptible to collisions (USDON, 2013). Eight humpback whales were reported struck by vessels with four resulting deaths between 2007 and 2011 (Carretta et al. 2013). The recorded number of serious injuries and mortality from ship strikes is a fraction of the total because additional mortality from ship strikes goes unreported.

Organochlorines, including PCBs and DDE, have been identified from humpback whale blubber (Gauthier et al. 1997). As with blue whales, these contaminants are transferred to young through the placenta, leaving newborns with contaminant loads equal to that of their mothers (Elfes et al. 2010).Humpback whales feed higher on the food chain, consuming prey carrying higher contaminant loads than the krill that blue whales feed on.

The Central North Pacific stock of humpback whales is the focus of whale-watching activities in both its feeding grounds (Alaska) and breeding grounds (Hawaii) (NMFS, 2013a). Regulations addressing minimum approach distances and vessel operating procedures are in place to help protect the whales; however, there is still concern that whales may abandon preferred habitats if the disturbance is too high (USDON, 2013).

The estimated abundance of humpback whales in the entire Pacific Basin is about 22,000 with approximately 2,000 in California and Oregon waters (Barlow et al. 2011). As a result of commercial whaling, humpback whales were listed as endangered under the Endangered Species Conservation Act of 1969, and again under the ESA in 1973. The species is still listed as endangered under the ESA and is considered as depleted under the MMPA. Based on evidence of population recovery in many areas, the species is being considered by NMFS for removal or downlisting from the ESA (NMFS, 2014d).

Prior to being hunted by man, the right whale, *Eubalena japonica*, occurred from the Bering Sea to central Baja California (NMFS, 2014b). It was targeted early for exploitation because it was slow moving, easy to approach, provided large quantities of meat, oil, and bone, and floated after being killed – thus the common name – the right whale to kill. Right whales are large baleen whales with adults about 50 ft (15 m) length and can weigh up to 14,000 lb (6,350 kg) (Perrin et al. 2008). They consume zooplankton, krill and copepods. Unlike other baleen whales, right whales are skimmers: they feed by removing prey from the water using baleen while moving with their mouth open through a patch of zooplankton. There are no reliable estimates of current abundance or trends for right whales in the North Pacific. They would be rarely sighted in southern California waters and highly unlikely in the Point Loma area.

The North Pacific right whale has been listed as endangered under the ESA since 1973 when it was listed as the "northern right whale". It was listed as a separate, endangered species in April 2008. The species is designated as depleted under the MMPA.

The sei whale, *Balaenoptera borealis*, is the fastest great whale and can reach speeds well over 20 miles per hour. Sei whales occur rarely in offshore waters in southern California (Carretta et al. 2014). They are present as early as May and June, but primarily are encountered during July to September and leave California waters by mid-October. Sei whales feed on a diversity of prey, including copepods, krill, fish, and cephalopods like squid, cuttlefish, and octopus (Jefferson et al. 2011).

The best current estimate of abundance for the eastern north Pacific stock of sei whales that occur off California, Oregon, and Washington waters out to 300 nautical miles (nm) is 126 animals (Carretta et al. 2014). Sei whales, like other large baleen whales, are subject to occasional attacks by killer whales. Based on the statistics for other large whales, it is likely that ship strikes and bycatch also pose a threat to sei whales along the west coast. The sei whale is listed as endangered under the ESA and as depleted under the MMPA.

The only great whale with teeth instead of baleen, the sperm whale, *Physeter macrocephalus*, is by far the most abundant worldwide. During the past 2 centuries, commercial whalers took about 1,000,000 sperm whales (NMFS, 2014b). Its current population is estimated at roughly one million – four times the combined total population of the other five endangered large whale species. Sperm whales attain lengths of 60 ft (18 m) and are distinguished by an extremely large head (Perrin et al. 2008). Feeding primarily on squid and fish, sperm whales can make dives of over ten thousand feet deep lasting an hour and a half. Broadly distributed in the north Pacific, sperm whales are found year-round off California, with peak abundance in summer (Carretta et al. 2014).

Contaminants including organochlorines and several heavy metals have been identified in sperm whales, but vary widely in concentration based upon life history and geographic location with northern hemisphere individuals generally carrying higher burdens (Evans et al. 2004). Unlike other marine mammals, females appear to bioaccumulate toxins at greater levels than males, which may be related to possible dietary differences between females who remain at relatively low latitudes compared to more migratory males (Wise et al. 2009).

Bycatch of sperm whales in the California swordfish drift gillnet fishery has rarely been documented since the inception of the observer program in 1990 (Carretta, 2013). This fishery has been the subject of field study every year since 1990, and through 2012 a total of 8,365 drift gillnet sets have been observed. Ten sperm whales have been recorded entangled during this time. All of the entanglements occurred from October through December in waters deeper than 4,900 ft (1,500 m), in proximity to steep continental shelf bathymetry. One sperm whale died as the result of a ship strike in Oregon in 2007 (Carretta et al. 2014).

Large populations of sperm whales exist in waters several thousand miles west and south of California, but there is no evidence that sperm whale move from there into U. S. west coast waters (Carretta et al. 2014). The most precise, recent estimate of sperm whale abundance for the California to Washington stock is 971 animals. As a result of previous whaling, sperm whales are listed as endangered under the ESA, and the California to Washington stock is considered depleted under the MMPA.

Seals and Sea Lions. The other endangered marine mammals, the Guadalupe fur seal, *Arctocephalus townsendi*, the Steller sea lion, *Eumetopias jubatus*, are occasional but uncommon visitors to San Diego offshore waters. Severely reduced by hunting in the 1800s, the Guadalupe fur seal was considered extinct by the turn of the century. A small, remnant breeding colony was discovered by Carl Hubbs of the SIO on Guadalupe Island in 1954 and the population has grown since then (Hubbs, 1956). Guadalupe fur seals feed on crustaceans, squid and fish (NMFS, 2014e). The Guadalupe fur seal breeds mainly on Guadalupe Island about 100 mi (161 km) off the Baja California coast. Guadalupe fur seals may migrate at least 230 mi (600 km) from their rookery sites, based on observations of individuals in the Southern California Bight (Carretta et al. 2014). The Guadalupe fur seal population is now in the process of recovering (Gallo, 1994).

Drift and set gillnet fisheries may cause incidental mortality of Guadalupe fur seals in Mexico and the United States. In the United States there have been no reports of mortality or injuries for Guadalupe fur seals (Carretta et al. 2014). No information is available for human-caused mortality or injuries in Mexico. The Guadalupe seal is listed as threatened under the ESA and depleted under the MMPA.

The Steller sea lion ranges from Baja California to Alaska, but prefers the colder temperate to sub-arctic waters of the North Pacific Ocean (NMFS, 2014f). It is seldom seen in southern California except near the Channel Islands. Steller sea lions are opportunistic marine predators, feeding on a variety of fish including mackerel, sculpin, rockfish, salmon, squid, and octopus (Perrin et al. 2008). Among pinnipeds, they are only surpassed in size by the walrus and elephant seal. Although the Steller sea lion may be able to avoid being hit by ships, they could be subject to entanglement in fishing gear (Carretta et al. 2005).

The Steller sea lion was listed under the ESA as threatened throughout its range in 1990. On June 4, 1997, the population west of 144° W longitude was listed as an endangered Distinct Population Segment (DPS) (the Western DPS) under the ESA; the population east of 144° W remained listed as threatened as the Eastern DPS. A Final Rule to Delist the Eastern DPS was issued on November 4, 2013 (NMFS, 2013b).

Birds. Of the seven species of endangered birds in Table II.D-4, only the California least tern (*Sterna antillarum browni*) would be regularly encountered in marine waters off Point Loma. Once common along the southern California coast, the least tern population diminished to a low of about 600 pairs in the early 1970s as a result of loss of wetland habitat and increasing human disturbance (USFWS, 2009). Implementation of mitigation measures following their classify-cation as an endangered species helped the species slowly recover. The California least tern historically nested on beaches, often near estuaries. Now, active management is required to create and maintain safe nesting sites. Fencing, signs, education, and predator control are all employed to protect the species. Least terns are generally present at nesting areas between mid-April and late September, often with two waves of nesting during this time.

California least terns are distributed along the U. S. Pacific Coast from San Francisco to Baja California (USFWS, 2014c). Foraging habitats include nearshore ocean waters, bays, and salt marshes. They plunge-dive to capture prey, usually within 1 mi (1.6 km) from shore in waters less than 60 ft (18 m) deep. Prey species include anchovies, smelt, and gobies. Peak foraging behavior typically occurs from the end of May through mid-July after chicks hatch. California least terns eggs, chicks, and adults are preyed upon by gulls, ravens, hawks, crows, rodents, raccoons, and coyotes. The California least tern was federally listed as endangered in 1970 and was listed as endangered by the state of California in 1971.

The 2012 California least tern breeding survey estimated 4,293-6,421 breeding pairs established 6,636 nests and produced 557-628 fledglings at 49 locations (Frost, 2013). The estimated number of breeding pairs in 2012 was less than recorded in 2011, which represented the lowest count recorded since 2002. The fledgling to breeding pair ratio in 2012 was approximately half that in 2011. Since 1977, this ratio has been less than 0.50 for only 13 years, which includes the last 11 years. Continuing the upward trend observed in the previous four years, chick mortality in 2012 continued to be a factor at specific sites, possibly due to limited or inappropriate food sources. In addition to avian predators, which were responsible for the highest predation rates over the last several years, coyotes also contributed to the highest predation rates documented in 2012.

The closest California least tern breeding area to the Point Loma outfall is the Naval Base Coronado. The nesting sites there accounted for an estimated 803-1,023 breeding pairs, 1,068 nests, and 17-19 fledglings in 2012 (Frost, 2013). As for the rest of California, least tern mortality due to non-predation factors at Naval Base Coronado was greater than mortality due to predation in 2012. State-wide, of non-predation egg mortality events, the highest death rate (55 percent) was attributed to abandonment prior to the expected hatching date, leading to the loss of 2,038 eggs. Abandonment post-term or failure to hatch was estimated to constitute 26 percent of non-predation state-wide mortality.

The light-footed clapper rail, *Rallus longirostris levipes*, is a hen-sized bird with long legs and toes. It has a tawny breast, gray-brown back, and gray and white striped flanks (USFWS, 2014d). They feed primarily on invertebrates such as snails, crab, insects and worms and are year-round inhabitants of coastal estuaries. Light-footed clapper rails historically ranged from Santa Barbara County to San Quintin, Baja California, Mexico. Loss and degradation of southern California wetlands resulted in the species being listed as federally endangered in 1970 and California state endangered in 1971. In the vicinity of Point Loma, light-footed clapper rails inhabit the Tijuana River Valley, the Sweetwater Marsh National Wildlife Refuge, and the San Diego River Flood Control Channel.

The light-footed clapper rail population fell to its lowest level in 1989 when only 163 pairs were recorded in eight southern California marshes. The population then slowly increased to 325 and 307 pairs censused in 1996 and 1997, respectively in 15 of 16 California coastal wetlands (Zembel et al. 1997). The thirty-fourth annual census of the light-footed clapper rail in California was conducted from 2 March to 21 June 2013 (Zembel et al. 2013). Thirty coastal wetlands were surveyed by assessing call counts from Mugu Lagoon in Ventura County, south to Tijuana Marsh National Wildlife Refuge on the Mexican border. For the second year in a row the California population of the light-footed clapper rail exceeded 500 breeding pairs. A total of 525 pairs exhibited breeding behavior in 22 marshes in 2013. This was the highest count on record, representing an increase of four pairs over the breeding population detected in 2012, and 18.5 percent larger than the former high count in 2007. The Tijuana Marsh National Wildlife Refuge was at its third highest recorded level with 105 breeding pairs, an increase of 4 percent over the 2012 breeding season but 26 percent lower than the record high of 142 pairs in 2007. The Tijuana Marsh National Wildlife Refuge comprised 20 percent of the breeding population of this rail in California.

The western snowy plover, *Charadrius alexandrines nivosus*, is a small, pale-colored shorebird with dark patches on its upper breast (USFWS, 2014e). It feeds by probing the sand at the beach-surf interface for small crustaceans and marine worms. It breeds on coastal beaches from southern Washington to southern Baja California, Mexico. In southern California, snowy plovers typically nest in association with federally endangered California least terns. The western snowy plover is threatened by habitat loss, human disturbance, and nest/egg destruction by native and introduced predators and domesticated pets. Western snowy plovers nest in San Diego Bay along the Silver Strand and at the south San Diego Bay Saltworks. They are occasional visitors to the Point Loma shoreline. A 2006 breeding season census of western snowy plovers by the USFWS observed 95 adults in San Diego Bay and Tijuana Estuary and a total of 1,723 adults state-wide (USFWS, 2007). The Pacific coast population of western snowy plovers was listed as threatened under the ESA in 1993. In 2012, a 0.6 mi (0.96 km) stretch of Coronado City Beach to the south of Point Loma was designated as western snowy plover critical habitat (USFWS, 2012).

The last four bird species in Table II.D-4 – the Guadalupe murrelet, marbled murrelet, Scripps' murrelet, and short-tailed albatross are strictly sea birds, usually found well offshore in southern California waters (USDON, 2013). These endangered birds would rarely be seen in the Point Loma area (UCSD, 2013).

Sea Turtles. Five species of sea turtles occasionally visit San Diego ocean waters: green, loggerhead, leatherback, olive Ridley, and hawksbill – all are protected under the ESA (Table II.D-4). The NMFS and the USFWS share federal jurisdiction for sea turtles, with NMFS having lead responsibility in the marine environment and USFWS having lead responsibility on nesting beaches (NMFS, 2014g; USFWS, 2014f).

Sea turtles are saltwater reptiles with streamlined bodies built for trans-oceanic navigation (Wyneken et al. 2013). Although they live most of their life in the ocean, females return to land to lay their eggs on nesting beaches. Recovery plans for the U.S. Pacific populations of sea turtles provide a wealth of information on their distribution, diet, growth, reproduction, behavior, and health (NMFS and USFWS, 1998a,b,c,d,e). These plans also discuss threats to the continued existence of sea turtles and define procedures and goals for their recovery.

All five species of sea turtles forage along the California coast in the summer and early fall when sea temperatures are warmest (Eckert, 1993). There are no known sea turtle nesting sites in the San Diego area or anywhere on the west coast of the United States (USDON, 2013).

Most commonly seen in San Diego marine waters, the east Pacific green sea turtle, *Chelonia mydas*, nests on beaches of the Pacific coast of Mexico and ranges throughout the north Pacific Ocean (NMFS, 2014h). Adults have three-foot-wide shells with a radiating pattern of brown, black, and cream colored markings and weigh about 200-300 lb (90-136 kg). The biting edge of their lower jaw is serrated. They eat algae and sea grasses. Green sea turtles are often found from July through September off the coast of California. As for the other endangered sea turtles discussed here, there is no designated green turtle critical habitat in the San Diego region.

In the past, Green sea turtles have aggregated at the southern end of San Diego Bay, attracted to the warm water effluent from a power plant (McDonald et al. 1995; McDonald et al. 2012). A 20-year monitoring program of these turtles indicated an annual abundance of between 16 and 61 turtles (Eguchi et al. 2010). Local researchers have used genetics and satellite telemetry to determine that the turtles are part of the Eastern Pacific nesting populations, and migrate thousands of miles to lay their eggs on beaches off the coast of Mexico. Within San Diego Bay, the turtles can most often be seen surfacing within the South San Diego Bay National Wildlife Refuge, which provides a protected foraging and rest area, as well as a prime study site for turtle biologists. The power plant, which had continuously operated since 1960, ceased operation in December 2010. The closure of the power plant may impact these resident turtles and alter movement patterns (Turner-Tomaszewicz and Seminoff, 2012). The green turtles' greatest threat in San Diego Bay is being hit by boats traveling over the 5-mile/hour speed limit posted throughout the southern portion of the bay (Port of San Diego, 2014).

The loggerhead turtle, *Caretta caretta*, is a reddish-brown sea turtle with a large head. Adult loggerheads average about 200-300 lb (91-136 kg) with shells about three-feet (1 m) wide (NMFS, 2014i). They take over two decades to mature and in the northern Pacific are only known to nest in southern Japan. Their diet consists of crabs, shrimp, mollusks and jellyfish. Most recorded sightings in California are juveniles (Battey 2014).

The leatherback sea turtle, *Dermochelys coriacea*, is the largest sea turtle, reaching over six-feet in diameter and weighing as much as 1,400 lb (635 kg) (NMFS, 2014j). Unlike other species which have solid shells covered with scales, the leatherbacks' shell is a bony matrix covered with a firm, rubbery skin with seven longitudinal ridges or keels (Wyneken et al. 2013). Most sea turtles are cold-blooded and prefer to live in warm waters. Leatherbacks are the exception, and are more likely to be found in colder waters at higher latitudes because of their unique ability to maintain an internal body temperature higher than that of the environment (Dutton, 2006). These large sea turtles feed mostly on jellyfish and nest in the tropics and subtropics. Along the western U. S coast, leatherbacks are mostly seen in waters over the continental slope, with greatest densities off central California (NMFS, 2013a). The majority of loggerheads observed in the eastern North Pacific Ocean are juveniles, believed to have come from nesting beaches in Japan (USDON, 2013).

The olive Ridley turtle, *Lepodochelys olivacea*, is the smallest sea turtle in Pacific waters. Their shell is heart-shaped to round and may be colored grey-brown, black, or, olive. Olive Ridleys are primarily carnivores and eat a wide variety of food including crab, shrimp, lobster, jellyfish, and tunicates (NMFS, 2014k). In San Diego waters, loggerheads, leatherbacks, and olive Ridleys are most often seen well offshore, unlike green sea turtles which tend to hug the shoreline (USDON, 2013).

Like other Pacific sea turtles, the hawksbill turtle, *Eretmochelys imbricata*, makes vast oceanic excursions and could occur off the U. S. west coast (NMFS, 2014l). Hawksbills were originally considered to be omnivores, but subsequent research revealed they are primarily specialist sponge carnivores, preferring only a few species of sponge (Vicente, 1994). There have been few hawksbill sightings north of Baja California Sur and its appearance in San Diego waters would be extremely unlikely (USDON, 2013).

Fish. In 1997, the National Marine Fisheries Service listed the southern California Evolutionary Significant Unit of West Coast steelhead (*Oncorhynchus mykiss*) as endangered (Federal Register: 18 August 1997 [Volume 62, Number 159, Pages 43937-43954]) (NMFS, 1997). In March of 1999, NMFS added nine species of salmon and steelhead to the Endangered Species list and designated critical habitat for them in 2005 (NMFS, 2005a). Though most of these are Pacific northwest species, the chinook salmon and steelhead range south to California (NMFS, 2014m). Chinook salmon are mostly encountered north of Point Conception.

Steelhead trout are usually dark-olive in color, shading to silvery-white on the underside with a heavily speckled body and a pink to red stripe running along their sides (USFWS, 2014g). Steelhead are born in freshwater streams and later move into the ocean where most of their growth occurs. After 1 to 4 years in the ocean, they return to their home freshwater stream to spawn. Some steelhead, however, spend their entire life in freshwater: these fish are called rainbow trout. Steelhead tend to move immediately offshore on entering the marine environment although, in general, steelhead tend to remain closer to shore than other Pacific salmon species (Beamish et al. 2005).

Steelhead occurred historically in all San Diego County watersheds that drain into the ocean (NMFS, 2012). Currently, steelhead in southern California range only as far south as San Mateo Creek in northern San Diego County (USDON, 2013). Both steelhead and chinook salmon are occasionally caught in ocean waters off San Diego but do not enter streams in the San Diego Metropolitan area.

Invertebrates. The white abalone, *Haliotis sorenseni*, was historically found from Punta Abreojos, Baja California, Mexico, to Point Conception, California (NMFS, 2014n). Inhabiting deeper water than any other abalone species, white abalone in southern California typically occur from 60 to 195 ft (18 to 59 m), with the highest densities between 130 and 165 ft (40 and 50 m) (Butler et al. 2006). They reproduce by broadcast spawning and reach sexual maturity at age 4 to 6 years at a size of 3 to 5 inches. Newly settled individuals feed on benthic diatoms, bacterial films, and single-celled algae found on coralline algal substrates. As they grow larger, white abalone feed on drift and attached algae. Adult white abalone can reach a shell length of up to 9 inches. Except for some isolated survivors, the species is currently distributed only around the Santa Barbara Channel Islands, San Clemente Island, and along various banks far offshore from Point Loma (Stierhoff et al. 2014).

Inhabiting deeper water initially provided white abalone a refuge from divers, but a commercial fishery began in the early 1970s and together with increasing recreational take, over-harvesting lead to the collapse of the fishery in the 1980s. The state of California suspended all forms of harvesting of the white abalone in 1996 and, in 1997, and imposed an indefinite moratorium on the harvesting of all abalone in central and Southern California (NMFS, 2008). The white abalone was federally listed as an endangered species on 29 May 2001 (NMFS, 2001). Critical habitat is not designated for white abalone.

The black abalone, *Haliotis cracherodii*, inhabits the intertidal and shallow subtidal zones where it has been easily targeted for exploitation (NMFS, 2014o). It has experienced dramatic population declines due to recreational and commercial fishing and withering syndrome disease (VanBlaricom et al. 2009). The state of California imposed a moratorium on black abalone harvesting 1993 and adopted an Abalone Recovery Management Plan 2005 (California Department of Fish and Game, 2005). There is concern that the low remaining densities of both black and white abalone may be insufficient for continued reproductive success (VanBlaricom et al. 2009).

The black abalone was proposed as a candidate for listing as an endangered species in 2005 (NMFS, 2005a) and listed as endangered under the ESA on 14 January 2009 (NMFS, 2009). Critical habitat was designated for black abalone in 2011 (NMFS, 2011). The designated critical habitat extends north of the Palos Verdes Peninsula and in waters surrounding Santa Catalina Island and the Channel Islands.

Effects of PLOO Discharge on Endangered Species. Twenty four endangered species; eight marine mammals, seven birds, five sea turtles, two fish, and two invertebrates, may occur in the Point Loma area (Table II.D-4).

Endangered species in southern California are subject to a variety of natural and human influences (Davidson et al. 2011; Van Der Hoop et al. 2013; NOAA, 2014a). Changes in wide-scale oceanographic regimes can alter endangered species foraging success through impacts on prey distributions and locations, which in turn affects reproductive success and survival (O'Shea and Odell, 2008; Simmonds and Eliott, 2009; Salvadeo et al. 2010, 2013; Fiedler et al. 2013; NMFS, 2013a). Climate shifts can transform the type and the intensity of human activities, such as fishing, shipping, oil and gas extraction, and coastal construction, all of which may have an impact on endangered species (Alter et al. 2010; Hoegh-Guldberg and Bruno, 2010; Doney et al. 2012; Hazen et al. 2012). Other potential anthropogenic stressors include noise, bioaccumulation of chemicals, overfishing, marine debris, and habitat deterioration or destruction (Dayton et al. 2003; Crain et al. 2009; Halpern et al. 2009; Jackson et al. 2011; Hilborn and Hilborn, 2012; NAVFAC, 2013). Incidence of disease, parasitism, and adverse effects from algal blooms may also pose a threat to the health of endangered species (Brodie et al. 2006; Walsh et al. 2008; Bossart et al. 2011). These impacts have the potential to alter the physiology, behavior, growth, and reproduction of individual species, shift patterns of larval dispersal and recruitment, modify the composition of ecological communities, and, change the structure, function, productivity, and resilience of marine ecosystems.

For marine mammals and sea turtles, ship strikes and fisheries bycatch (accidental or incidental catch) are the primary cause of human-related mortality in southern California ocean waters (Carretta et al. 2013; Geijer and Read, 2013). In addition to these direct effects, marine mammals and sea turtles may also be indirectly affected by noise, bioaccumulation, habitat alteration, and depletion of prey species (Redfern et al. 2013; NMFS, 2013a; NOAA, 2014a). In 1994, the MMPA was amended to formally address these issues (16 U.S.C. 1361-1407: PL103-238:108 Stat. 532).

The MMPA requires the NMFS to document human-caused mortality and injury of marine mammals as part of assessing marine mammal stocks (Roman et al. 2013; Carretta et al. 2014). A recent NMFS report summarizes records of human-caused mortality and injury from 2007 to 2011 for U. S. west coast marine mammal populations (Carretta et al. 2013).

Among marine mammals, pinnipeds were most commonly injured or killed by anthropogenic activity followed by small cetaceans and large whales. The primary causes of pinniped injury and mortality were recreational hook and line fishery interactions, shootings, and entrainment into power plant water intakes. Vessel strikes and fishery-related entanglements were the most common form of mortality and injury to whales. Net fisheries accounted for most of the injuries and mortalities for small cetaceans. Sea turtles and sea birds are also at risk of entanglement in fishing gear (Carretta and Enriquez, 2012). Impacts of commercial fisheries that utilize nets, pots, and traps are likely to be greater than the number of observed incidents because derelict gear can entangle animals for as long as it remains in the environment (EPA, 2012; Reeves et al. 2013).

Habitat deterioration and loss is an issue for almost all coastal marine mammals (Davidson et al. 2011; Roman et al. 2013). Anthropogenic noise is a potential habitat level stressor especially in areas of industrial activity or commercial ship traffic (McDonald et al. 2008; Hildebrand, 2009). Noise is a particular concern to marine mammals because many species use sound as a primary sense for navigating, finding prey, avoiding predators, and communicating with other individuals (USDON, 2013). It may induce marine mammals to leave a habitat, impair their ability to communicate, or cause stress (Rolland et al. 2012; Erbe et al. 2012). Noise can create behavioral disturbances and mask other sounds including the marine mammals' own vocalizations (Southallet al. 2012). With ecotourism on the rise, marine life viewing activities like whale watching have the potential to impact the behavior and migration of marine mammal populations (NMFS, 2013a; NOAA, 2014a).

Endangered species are also subject to bioaccumulation of toxic chemicals. Natural and synthetic chemicals enter the ocean through various sources including rivers and streams, storm drains, industrial discharges, municipal wastewater discharges, dredge and disposal activities, aerial fallout, vessel activities and spills, mineral mining, oil exploration and extraction, and through hydrothermal vents and hydrocarbon seeps (Setty et al. 2012; Hutchinson et al. 2013). Some of the chemical constituents entering the ocean remain dissolved and are distributed by ocean currents and eddies. Many are physically or chemically bound to particulate matter and settle to the bottom.

Marine organisms can absorb dissolved chemicals directly from seawater (by the gills or epidermis), and indirectly through contact with sediment, by ingesting sediment particles or suspended particulate matter, and through assimilation from food organisms (Newman, 2009; Allen et al. 2011; Laws, 2013). Chemical compounds accumulate in an organism’s tissue if they cannot be metabolized and eliminated faster than they are absorbed. Tissue concentration can also increase as these chemicals are passed through the food web from lower to higher trophic levels (Bienfang et al. 2013; Daley et al. 2014; Weis, 2014). The degree to which bioaccumulation occurs depends on the solubility, particle affinity, oxidation state, volatility, and degradability of the specific chemical (Laws, 2013). These differences determine how chemical compounds are distributed within biological communities and throughout the environment (Whitacre, 2014). The potential impacts of bioaccumulation by marine organisms include compromised immune response and disease resistance, altered behavior, diminished breeding success, developmental abnormalities, population declines via direct mortality, and shifts in the composition of communities by affecting top predators and keystone species (Newman, 2009; NAVFAC, 2013).

The species most at risk from bioaccumulation of toxic compounds are those at the highest trophic levels, especially marine mammals (O'Hara and O'Shea, 2005; Tornero et al. 2014). Marine mammals are vulnerable to bioaccumulation because they have long life spans and large blubber stores that can serve as repositories for lipophilic chemicals (Moore et al. 2013). Bioaccumulation of anthropogenic contaminants may also increase susceptibility to other stressors including parasitism and disease (O'Hara and O'Shea, 2005; Bossart, 2011).

Marine debris is a potential threat to endangered marine mammals (EPA, 2012; Howell et al. 2012). Marine debris flows into the ocean from rivers, harbors, estuaries, and, though prohibited in U. S. waters, occasionally from vessels at sea (NOAA, 2008). Ingestion of debris can have fatal consequences for whales. The stomach contents of two sperm whales that stranded in California included extensive amounts of discarded fishing netting (NMFS, 2013a). Another Pacific sperm whale contained nylon netting in its stomach when it washed ashore in 2004 (NMFS, 2013a). Seals and sea lions are also subject to entanglement in marine debris (Carreta et al. 2013). A recent study by Oregon State University found Steller sea lions entangled with rubber bands used on crab pots, hard plastic packing bands from cardboard boxes, fishing line and hooks, and other fishing gear (OSU, 2011).

Sea turtles are exposed to a wide variety of natural and anthropogenic threats (SantidriánTomillo et al. 2012; NMFS, 2013a; Wyneken et al. 2013). Nesting beaches are threatened by hurricanes and tropical storms. Hatchlings are preyed on by herons, gulls, and sharks. Juveniles and adults are eaten by sharks and other large marine predators. Sea turtles are also killed or injured by fisheries as bycatch, and by vessel strikes (Carretta et al. 2005; Hazel et al. 2007; Wallace et al. 2010; Work et al. 2010; Lewison et al. 2013). Marine debris can be detriment as well. Floating plastic garbage can be mistakenly ingested by sea turtles. Leatherback sea turtles in particular may mistake floating plastic garbage as jellyfish, an important component of the leatherback diet (Lazar and Gračan, 2011). Other marine debris, including derelict fishing gear and cargo nets, can entangle and drown all life stages (Mrosovsky et al. 2009).

All the nearshore birds in Table II.D-4 became endangered because of habitat loss and disturbance. These bay and estuarine species - California least tern, light-footed clapper rail, and western snowy plover - occasionally forage over San Diego coastal water. The primary threat to their well-being in ocean waters would be exposure to bioaccumulated toxic compounds from prey captured in the area (Arnold et al. 2007).

Regional evaluations have shown that virtually all bottom-dwelling fish populations in southern California have detectable levels of DDT and PCBs as a result of past discharge practices, now discontinued (SCCWRP, 2012). The highest concentrations are on or near the Palos Verdes shelf off Whites Point in Los Angeles, an area with highly contaminated sediments, the result of historical discharge. Fish tissue burdens of DDT and PCBs decline to the north and south across the Southern California Bight. Concentrations of chlorinated hydrocarbons in fish from reference areas are now less than 5 percent of levels measured two decades ago (Allen et al. 2011). Contaminant burdens in fish tissues at Point Loma are comparable to those at reference sites beyond the influence of the discharge (City of San Diego, 2008-2010, 2011a-2014a). Endangered birds feeding in the Point Loma area should not be exposed to a higher risk of bioaccumulation from the discharge of treated wastewater.

Of the five species of endangered sea turtles that may pass through the San Diego marine environment (Table II.D-4), the green sea turtle would be most common and the one found closest to shore. Green turtles are subject to entrainment in coastal power plants, perhaps attracted to the lush growth of algae on the cooling water intake structures (Seminoff, 2007). Green turtles have also been struck by boats and entangled in fishing gear in southern California (Carretta et al. 2005). Although capable of deep dives, most sea turtles passing San Diego would be in surface waters. They should not be exposed to the effluent plume which is normally trapped below the thermocline, especially during the summer when turtles would be most prevalent. The potential impact of discharged debris is minimized by screens in the Point Loma wastewater headworks that remove entrained material greater than an inch in diameter (see Appendix A).

The two other endangered species possibly occurring at Point Loma, the steelhead trout and black abalone, should not be jeopardized by the discharge. Steelhead trout would be transitory, and the black abalone, if present, would be well inshore of the outfall, beyond potential adverse influence.

The potential exists for wastewater discharges to the ocean to affect endangered species by altering physical, chemical, or biological conditions including: water quality, biological integrity (e.g., species abundance and diversity), food web dynamics (e.g., availability of prey), habitat suitability, and the health of organisms (e.g., bioaccumulation of toxic substances, disease, and parasitism). To evaluate such effects, the City of San Diego monitors changes in ocean conditions over space and time, and assesses any impacts of wastewater discharge or other man-made or natural influences on the local marine environment. Monitoring results are contained in Annual Monitoring Reports (City of San Diego, 2008-2014). The monitoring program has six components: coastal oceanographic conditions, water quality and plume dispersion, sediment conditions, macrobenthic communities, demersal fish and megabenthic invertebrates, and contaminants in fish tissues. The overall findings are summarized in the following paragraphs.

There has been no indication of change in any physical or chemical water quality parameter (e.g., dissolved oxygen, pH) attributable to wastewater discharge off Point Loma. Instead, fluctuations in oceanographic parameters have historically been associated with varying climate regimes and with natural events such as storm activity and the presence of plankton blooms.

Benthic conditions off Point Loma show some changes that may be expected near large ocean outfalls, though restricted to a relatively small, localized region near the discharge site. For example, sediment quality data have indicated slight increases over time in sulfide content and biological oxygen demand at sites nearest the discharge, where the physical presence of the outfall structure has caused relatively coarse sediment particles to accumulate. Other measures of environmental impact such as concentrations of sediment contaminants (e.g., trace metals, pesticides) show no patterns related to wastewater discharge.

Some descriptors of benthic community structure (e.g., abundance, species diversity) or indicators of environmental disturbance (e.g., brittle star populations) have shown temporal differences between reference areas and sites nearest the outfall. However, results from environmental disturbance indices such as the Benthic Response Index that are used to evaluate the condition of benthic assemblages indicate that benthic invertebrate communities in the Point Loma region remain characteristic of natural conditions.

Analyses of bottom dwelling fish and trawl-caught invertebrates reveal no spatial or temporal patterns that can be ascribed to effects of wastewater discharge. Instead, historical data (1991-2014) indicates that patterns of change in benthic communities are related to large-scale oceanographic events or specific site conditions (e.g., near dredge material disposal sites) (see Benthic Sediments and Organisms - Appendix C). The lack of physical anomalies and other symptoms of disease in local fish, as well as the low level of contaminants in fish tissues, are also indicative of a healthy marine environment.

Cumulative Effects. Cumulative impacts are defined in the National Environmental Protection Act (42 USC § 4321 *et seq*. and 32 CFR 775 respectively) as: the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR § 1508.7).

In general, the effects of a particular action or group of actions must meet all of the following criteria to be considered cumulative impacts:

- effects of several actions occur in a common locale or region,
- effects on a particular resource are similar in nature, such that the same specific element of a resource is affected in the same specific way, and
- effects are long-term as short-term impacts dissipate over time and cease to contribute to cumulative impacts.

The discharge of wastewater from commercial activities, including municipal wastewater treatment plants, power generating stations, industrial plants (e.g., desalination plants), and storm water from drains into open ocean waters, bays, or estuaries can introduce chemical and biological constituents potentially detrimental to estuarine and marine habitats (Perry, 2009; Hutchinson et al. 2013). These constituents include pathogens, nutrients, sediments, heavy metals, oxygen demanding substances, and toxic chemical compounds (Stein and Cadien, 2009, Setty et al. 2012). Historically, wastewater discharges have been one of the largest inputs of these constituents into coastal waters. However, wastewater discharges have been regulated under increasingly stringent requirements over the last 40 years and mass emissions of most constituents have been significantly reduced (Lyon and Sutula, 2011; SCCWRP, 2012, 2014). Nonpoint source/storm water runoff, on the other hand, has not been managed as effectively and continues to be a substantial remaining source of contamination of coastal areas and the ocean (Setty et al. 2012; Howard et al. 2014).

Human activities, such as shipping, oil and gas extraction, and coastal construction have the potential to directly or indirectly affect endangered species (Alter et al. 2010; Hoegh-Guldberg and Bruno, 2010; Doney et al. 2012; Hazen et al. 2012). Other possible cumulative threats to endangered species include degradation of water quality, habitat modification, pollution (chemicals, marine debris, etc.), introduction of exotic species, and disease (Field et al. 2003, Horn and Stevens, 2006; O'Shea and Odell, 2008; Pinnegar and Engelhard, 2008; Crain et al. 2009; Halpern et al. 2009; Hoegh-Guldberg and Bruno, 2010; Thrush and Dayton, 2010; Doney et al. 2012; Hazen et al. 2012; Howell et al. 2012; SCCWRP, 2012; NMFS, 2013a; Howard et al. 2014; Maruya et al. 2014). Cumulative impacts could alter the physiology, behavior, growth, and reproduction of individual species, shift patterns of larval dispersal and recruitment, modify the composition of ecological communities, and, change the structure, function, productivity, and resilience of marine ecosystems.

Fishing and non-fishing activities, individually or in combination, can adversely affect endangered species (Jackson et al. 2001, 2011; Dayton et al. 2003; Chuenpagdee et al. 2003; Hanson et al. 2003; Jackson, 2008; Baum and Worm, 2009; Worm et al. 2009; Norse, 2010; Hilborn and Hilborn, 2012; NMFS, 2013b; Laugen et al. 2014). Potential impacts of commercial fishing include over-fishing of targeted species, and bycatch (Dieter et al. 2003; PFMC, 2004; Hseih et al. 2006; Carretta and Enriquez, 2012; PFMC and NMFS, 2012). Indirect effects may include removal of prey (leading to declines in predator abundance), removal of predators, ghost fishing (continued catch by lost or discarded gear), and generation of marine debris (Reeves et al. 2013). Lost gill nets, purse seines, and long-lines can foul and disrupt bottom habitats (NMFS, 2013b). Recreational fishing also poses a threat because of the large number of participants and the intense, concentrated use of specific habitats (Coleman et al. 2004; Ihde et al. 2011; United Nations Food and Agricultural Organization, 2012; Arlinghaus et al. 2013).

Disturbance from ship traffic and exposure to biotoxins and anthropogenic contaminants may stress endangered species, weaken their immune systems, and make them vulnerable to parasites and diseases that would not normally compromise natural activities or be fatal (Davidson et al. 2011; Hutchinson et al. 2013; Moore et al. 2013). Natural stresses include storms and climate-based environmental shifts, such as algal blooms and hypoxia (Kim et al. 2009; SCCWRP, 2013).

A number of factors influence water quality and marine ecology in the Point Loma area. Key potential influences on water quality include the Point Loma treated wastewater discharge, regional non-point source discharges, local river outflows, and other local non-point sources such as harbors, marinas, storm drains, and urban runoff (Bartlett et al. 2004; Parnell et al. 2008; Parnell and Riser, 2012).

The discharge of treated wastewater at Point Loma could affect biological conditions by altering water or sediment quality. Water quality parameters are monitored at stations around the outfall, in the kelp bed, along the shoreline, and at reference stations to the north and south (City of San Diego, 2008-2014). Strong local currents and high initial dilution (greater than 200:1) facilitate rapid mixing and dispersion of the discharged effluent. Except in the immediate vicinity of the outfall, where minor alterations in dissolved oxygen, pH, and light transmittance may occur, changes in physical and chemical parameters in surrounding ocean waters have reflected only natural alterations in oceanographic processes (e.g., upwelling, plankton blooms) and long-term regime changes like El Niño.

Unlike dissolved components of the wastewater that are swept away by the currents, particles discharged from the outfall may settle to the ocean floor. This can change the grain size and organic content of the sediments which in turn affects the abundance and diversity of marine organisms living there. Contaminants can also be introduced since many of the potentially harmful chemicals in wastewater are bound to particles.

Alterations in sediment quality in the vicinity of the PLOO are only apparent in areas closer than 1,000 feet (300 meters) from the diffusers, where coarser sediments and higher sulfide and BOD levels have been periodically detected (City of San Diego, 2008-2014). The change in grain size may be related to turbulence created as the current flows past the pipe on the bottom, wafting away the finer particles (Diener et al. 1997). The physical presence of large ocean outfalls and associated ballast materials can alter the hydrodynamic regime in surrounding areas, thus affecting sediment movement and transport, and the resident biological communities. Although periodic small increases in sulfides and BOD near the discharge site are consistent with the deposition of organic material, concentrations of other indicators of organic loading (e.g. total organic carbon, total nitrogen, total volatile solids) organic enrichment) remain low relative to reference areas (see Appendix C – Ocean Benthic Conditions).

Concentrations of chlorinated pesticides (e.g., DDT), polychlorinated biphenyl congeners (PCBs), and polycyclic aromatic hydrocarbons (PAHs) in sediments at Point Loma are generally low, the notable exception being DDE, a breakdown product of the pesticide DDT. DDE, a legacy of historical discharge, is found in sediments throughout southern California (Mearns et al. 1991, Schiff et al. 2011). Levels of DDE at Point Loma are within the range of concentrations elsewhere in the Southern California Bight (City of San Diego, 2008-2014; Schiff et al. 2011).

There is no consistent pattern of metal concentrations in the sediments as a function of distance from the outfall - cadmium, arsenic, antimony, barium, chromium, and iron are consistently higher at the northern reference stations, while mercury, aluminum and copper are consistently higher at the southern sampling stations. Concentrations of sediment metals were highly variable, with most levels within ranges reported elsewhere in the SCB (e.g., Schiff et al. 2011). While high values of various metals have been occasionally recorded at nearfield stations, there are no discernible long-term patterns that could be associated with proximity to the outfall or the onset of wastewater discharge.

The effects of the Point Loma discharge on water quality and biological conditions are evident only in deep waters (below the euphotic zone) within or near the ZID (City of San Diego, 2008-2014). Organic enrichment of the sediments due to the outfall discharge is not occurring beyond the ZID. Contaminant loading of sediments is not evident in the discharge vicinity. Sediment chemistry is comparable to reference areas along southern California's outer continental shelf. Biological conditions do not indicate any environmentally-significant changes associated with the discharge. A balanced indigenous population of shellfish, fish and wildlife exist immediately beyond the ZID.

While significant natural variations in fish populations are observed (in response to factors such as water temperature), the Point Loma wastewater discharge is not having any significant effect on fish assemblages off Point Loma. Fish populations are healthy and lack physical abnormalities such as fin erosion or tumors. Levels of trace metals, chlorinated hydrocarbons, pesticides, and polyaromatic hydrocarbons are relatively low, with concentrations within the range found throughout the Southern California Bight. No outfall-related effects are evident from bioaccumulation data. Contaminants in fish tissues in the Point Loma area are similar to those at reference sites beyond the influence of the discharge.

The discharge of treated wastewater at Point Loma will, therefore, make a minimal, insignificant contribution to regional cumulative impacts on endangered species and their critical habitat.

Conclusions

Operation of the PLOO could potentially impact endangered species if the PLOO discharge were to cause changes in environmental conditions that affect the species or their habitat. Monitoring data and research demonstrate that the PLOO discharge does not adversely impact environmental conditions or habitat. The only discernible outfall-related effects are seen in deep waters immediately near the outfall diffuser where minor water and sediment quality alterations have been observed. Marine communities in the Point Loma area remain characteristic of natural conditions with no suggestion of ecologically-significant changes.

There is no indication of adverse impacts from operation of the PLOO on environmental conditions or biological communities that could affect the health and well-being of endangered species or threaten their critical habitat. Future flows and contaminant concentrations from the PLOO would be at or below currently permitted levels. Thus, the continued discharge of treated wastewater from the PLOO is not likely to adversely or discernibly affect endangered species or their critical habitat. Consultation with the NMFS and USFWS supports these findings (see Correspondence - Appendix V).

Consultation with Resource Agencies. To seek concurrence that the proposed, future discharge of treated wastewater from the PLOO is not likely to adversely affect endangered species or their critical habitat, the City of San Diego has submitted correspondence to the USFWS and NMFS inviting comments on the existing discharge and proposed 301(h) waiver. Copies of the correspondence are presented in Appendix V.

Critical Habitats. No critical habitats are located in the vicinity of the PLOO.

II.D.4. Are you aware of any State or Federal Laws or regulations (other than the Clean Water Act or the three statutes identified in item 3 above) or an Executive Order which is applicable to your discharge? If yes, provide sufficient information to demonstrate that your modified discharge will comply with such law(s), regulations, or order(s). [40 CFR 125.59(b)(3)]

SUMMARY: No. The PLOO discharge occurs outside of State-regulated marine waters, and the City is not aware of any state or federal laws that are applicable to the renewal of the City's 301(h) waiver application.

State Laws. PLOO discharges 7,154 meters (23,472 feet) offshore into federal waters, outside of the three-nautical-mile limit for waters controlled by the State of California. As a result, State laws apply only to the discharge as it may affect waters within the three nautical miles of the coast.

While the City is not aware state laws applicable within the discharge zone, the State of California ESA is applicable within the three nautical mile limit. As described in the response to Questionnaire Section II.D.3, the State ESA contains provisions similar to that of the federal ESA, and is administered by the CDFW. Appendix J presents information on the State ESA.

Federal Laws. The Ocean Pollution Reduction Act of 1994 (HR 5176) provided the City of San Diego with the opportunity to re-enter the 301(h) process. The law established four conditions for the City's re-entrance into the 301(h) process:

- achieve an annual average 58 percent BOD removal,
- achieve a monthly average 80 percent TSS removal,
- construct 45 mgd of recycled water treatment capacity, and
- reduce the mass emissions of solids during the period of modification.

As documented herein and in the City's prior 301(h) applications, the Point Loma WWTP discharge achieved compliance with each of these provisions.

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Section III
TECHNICAL EVALUATION

Renewal of NPDES CA0107409

Section III.A
Physical Characteristics of Discharge

Renewal of NPDES CA0107409

III. TECHNICAL EVALUATION

III.A PHYSICAL CHARACTERISTICS OF DISCHARGE

III.A.1 What is the critical initial dilution for your current and modified discharge(s) during 1) the period(s) of maximum stratification and 2) any other critical period(s) of discharge volume/composition, water quality, biological seasons, or oceanographic conditions?

SUMMARY: No modifications have been implemented to the extended PLOO since its construction, and initial dilution characteristics of the PLOO remain as documented in prior 301(h) applications. Appendix Q presents the results of initial dilution modeling conducted in 1995 to assess PLOO initial dilution characteristics. As documented in Appendix Q, critical initial dilution was concluded as occurring during maximum stratification. A median initial dilution of 338 to 1 was computed for an average Point Loma WTP flow of 240 mgd (10.51 m^3/sec). A critical "minimum month" initial dilution of 202 to 1 was computed for the 240 mgd (10.51 m^3/sec) PLOO discharge. Additional modeling conducted by EPA in 2002 confirmed the modeling results presented in Appendix Q. On the basis of the EPA modeling, Order No. R9-2009-0001 established the PLOO minimum month initial dilution at 204 to 1 (minimum month average initial dilution). This 204 to 1 initial dilution is applied for determining compliance with water quality criteria and standards for the protection of aquatic life. Order No. R9-2001-0001 also established an initial dilution of 338 to 1 (long-term median) for purposes of determining compliance with water quality criteria and standards for the protection of human health.

Appendix Q presents the results of initial dilution modeling conducted in 1995 for a PLOO flow of 240 mgd (10.51 m^3/sec). No modifications to the PLOO have been implemented since 1995, and the modeling results remain valid.

As documented in Appendix Q, two sets of long-term oceanographic data were combined for purposes of developing the PLOO initial dilution estimates. The first data set consisted of CTD (conductivity-temperature-depth) data collected during predesign studies for the extended outfall, and data from the monthly monitoring hydrocast surveys following commencement of discharge. The second data set consisted of concurrent time-series measurements of the ocean currents (at 20m depth intervals) and the temperature structure of the water column (at 5m depth intervals).

Initial dilutions were computed from the oceanographic data using a modified version of the EPA RSB initial dilution simulation model (EPA, 1994). Modifications (discussed in detail in Appendix Q) were made to the RSB model to:

- Provide solutions for certain types of density stratification that the original version was not capable of solving.
- Incorporate an input data file structure that was suitable for the large number of observations provided by the time-series measurements.
- Provide an output data file structure appropriate in format and content for subsequent programs that used the initial dilution simulation information as input data.
- Increase the accuracy of the initial dilution equation solutions.

Computed Initial Dilution - Time Series Data. The time-series measurements are based on simultaneous measurements of the density structure of the water column (via the temperature measurements) and the ocean currents. The simulations also include the daily, as well as monthly, variations in the discharge rate. Therefore, the initial dilutions calculated from this data base provide the most realistic representation of the initial dilutions associated with the two discharge rates.

The distributions of initial dilutions calculated for an annual average discharge rate of 10.51 m^3/sec (240 mgd) are summarized in Table III.A-1 (page III.A-3). As shown in Table III.A-1, for a PLOO average annual flow rate of 240 mgd (10.51 m^3/sec):

- a median flux-averaged initial dilution of 338:1 is projected, and
- eighty percent of the initial dilutions are between 223 to 1 and 544 to 1.

As detailed in Appendix Q, if the time-series density profiles are used with ocean currents set equal to zero, the median flux-averaged initial dilutions are 283 to 1 for the 240 mgd (10.51 m^3/sec) discharge rate.

Table III.A-1
Distribution of Flux-Averaged Initial Dilutions
Based on Observed Time-Series Density/Current Data
(Actual Currents - 13,757 Cases)

Probability	Computed Initial Dilution at 240 mgd PLOO Flow[1]
95-percentile	634
90-percentile	544
70-percentile	409
Median (50-percentile)	338
30-percentile	284
10-percentile	223
5-percentile	200

1 See Appendix Q for description of initial dilution model and model results. Simulation calculations include daily and monthly flow variations that result in the average annual PLOO flow of 240 mgd (10.5 m^3/sec). Also see City of San Diego (1995).

Computed Initial Dilution - CTD Data. Appendix Q also presents regulatory flux-averaged initial dilutions for conditions of zero ocean current per *California Ocean Plan* requirements. Table III.A-2 (page III.A-4) summarizes the results of computer modeling of regulatory flux-averaged initial dilutions at a PLOO flow of 240 mgd (10.51 m^3/sec). As shown in Table III.A-2, assuming that ocean currents are zero (no flow-induced enhancement of initial dilution), monthly initial dilution rates are computed at values ranging from 202 to 1 (winter conditions of maximum stratification) to 324 to 1 (summer conditions).

As documented in Appendix Q, the (annual) average of the computed initial dilutions using the CTD data set was 271:1 for a PLOO flow of 240 mgd (10.51 m^3/sec). As shown in Table III.A-2, the average regulatory initial dilution for the period January through September (using the CTD data) is 294 to 1.

As shown in comparing Tables III.A.1-1 and III.A.1-2, the median initial dilutions calculated from the time-series measurements are more conservative than the median initial dilutions computed from the CTD data and zero ocean currents. The seasonal variation in the monthly average initial dilutions computed from the time-series data is also comparable with the pattern of the dilutions computed from the CTD data (see Appendix Q). Since the simulations computed from the two different data sets involve different assumptions (e.g., density-temperature relationships, discharge variability, under sampling effects, etc.), this consistency lends support for the validity of the modeling results.

Table III.A-2
Monthly Regulatory Flux-Averaged Initial Dilutions
Based on CTD Data and Zero Ocean Currents
(State of California Ocean Plan)

Month	Computed Initial Dilution for 240 mgd PLOO Discharge[1]
January	202
February	224
March	263
April	284
May	295
June	324
July	320
August	294
September	307
October	281
November	249
December	207
Annual Average	271
Jan-Sept Average	294

1 See Appendix Q for description of initial dilution model and model results. Simulation calculations include daily and monthly flow variations that result in the average annual PLOO flow of 240 mgd (10.5 m^3/sec). Also see City of San Diego (1995).

EPA-Assigned Initial Dilution. Initial dilution simulations conducted by EPA (reported on page 19 of the EPA Tentative Decision Document dated December 2, 2008) verified the results of the PLOO computer modeling presented in Appendix Q. Based on this EPA modeling, initial dilutions for a PLOO flow of 240 mgd (10.51 m^3/sec) were determined (page 20 of the 2008 EPA Tentative Decision Document) as follows:

- 204 to 1 (minimum monthly average initial dilution), and
- 338 to 1 (long-term effective initial dilution).

In accordance with these initial dilution modeling results, Order No. R9-2009-0001 utilized an initial dilution of 204 to 1 for determining compliance with *California Ocean Plan* standards for the protection of aquatic habitat. An initial dilution of 338 to 1 is used for purposes of demonstrating compliance with *California Ocean Plan* standards for the protection of human health.

CDOM-Derived Dilution Estimates. As presented in Appendix F, Rogowski et al. (2012) utilized receiving water optical measurements of colored dissolved organic matter (CDOM) to estimate and track the presence of the PLOO plume. CDOM is naturally present in the ocean environment, but it is present in higher concentrations in the PLOO effluent, allowing CDOM to be a useful parameter for evaluating plume characteristics and tracking plume movement.

Rogowski et al. (2012) infer PLOO dilutions by comparing CDOM concentrations in the PLOO effluent (derived from a three month-analysis of the CDOM variability in the effluent) with CDOM measurements in the PLOO receiving waters. For assessing CDOM-derived dilution, a calibration curve was developed by diluting PLOO effluent with ocean water derived from Scripps Pier over dilution ratios ranging from 50:1 to 600:1. CDOM measurements obtained by an automated underwater vehicle as it passed through and near the PLOO plume were then compared to the calibration curve in order to infer plume dilutions from the CDOM measurements.

In comparing CDOM-derived dilutions with dilutions simulated under similar conditions by a plume computer model (NRFIELD, formerly called RSB), Rogowski et al. concluded that the model simulations predicted plume heights-of-rise and dilutions that were greater than the dilutions derived from the CDOM observations. Using the CDOM measurements, Rogowski et al. (see Table 7 of Appendix F) computed "minimum observed dilutions" for 21 automated underwater vehicle missions during April 2011 through April 2012. CDOM-derived "minimum observed dilutions" ranged from 103:1 for the February 28, 2011 mission to 304:1 for the November 30, 2011 mission. The CDOM-derived observations presented by Rogowski et al. depict significant variation of dilution (patchiness) within the PLOO discharge plume at any given time, in part, as a function of temporal variability and vertical shear of ocean currents.

Similar variations in dilution are depicted in Appendix Q, where initial dilution simulations using the RSB-TSI model and time-series data predicted instantaneous minimum dilutions that were as much as 40 percent lower than the corresponding "minimum month" initial dilutions that were time-averaged over a 30-day period and space-averaged throughout the discharge plume.

The term "dilution" used within Appendix F by Rogowski et al. (which refers to CDOM-derived dilution) should not be confused with the *California Ocean Plan* "minimum month[1] initial dilution" regulatory definition that is to be used for purposes of computing compliance with *California Ocean Plan* Table 1 receiving water standards. While the CDOM-derived dilutions presented within Appendix F are useful for tracking the PLOO plume and characterizing the

1 The term "minimum month initial dilution" is used herein as a synonym for the *California Ocean Plan* definition that states: "lowest average initial dilution within any single month of the year."

patchy nature of dilution at locations within and near the discharge plume, the CDOM-derived dilutions do not represent time- or space-averaged values over the entire discharge plume. Additionally, the CDOM-inferred dilutions are dependent on the assumption that CDOM characteristics in shore waters at Scripps Pier (which was used in diluting PLOO effluent to develop a CDOM calibration curve) are comparable to CDOM characteristics in offshore waters. Further issues that increase the complexity and limit the practicality for using CDOM measurements to compute *California Ocean Plan* "minimum month initial dilution" include:

- variability of CDOM in the PLOO effluent that may occur over a 30-day period,
- the natural presence and variability of CDOM in the ocean environment,
- the non-conservative nature of CDOM, and
- the practical inability of an underwater vehicle to provide time- and space-averaged measurements throughout the PLOO discharge plume throughout a 30-day period.

While computer models suffer from their own set of limitations, the calibrated and verified RSB-TSI model presented in Appendix Q remains the most useful tool for purposes of estimating minimum month initial dilution, as defined within the *California Ocean Plan*. A minimum month initial dilution of 204:1 (see Appendix Q and page F-9 of the Fact Sheet to Order No. R9-2009-0001) thus remains applicable for assessing compliance with Table 1 receiving water standards established within the *California Ocean Plan*.

III.A.2 What are the dimensions of the zone of initial dilution for your modified discharge(s)?

Guidance regarding the assigned dimensions of the zone of initial dilution (ZID) is presented on page 56 of the *Amended Section 301(h) Technical Support Document (EPA, 1995).*

No modifications to the PLOO have been implemented since its construction that affect the dimensions of ZID, and the PLOO ZID remains unchanged from the City's prior 301(h) applications.

Figure III.A-1 (page III.A-8) presents the PLOO ZID dimensions. As shown in Figure III.A-1, the ZID extends 307 feet (93.5 meters) on either side of the PLOO diffuser legs.

Appendix Q presents estimates of distances associated with completion of initial dilution at a PLOO flow of 240 mgd (10.51 m^3/sec). Table III.A-3 presents a statistical breakdown of computed distances required for completion of initial dilution.

Table III.A-3
Horizontal Downstream Distance from Outfall Ports
to the Completion of Initial Dilution

Parameter	Horizontal Downstream Distance[1] from PLOO Ports (240 mgd Flow)	
	Feet	Meters
Minimum Value	34.5	10.5
10th Percentile	82.0	25.0
20th Percentile	99.7	30.4
30th Percentile	152	46.4
40th Percentile	241	73.5
50th Percentile	294	89.7
60th Percentile	349	106.4
70th Percentile	407	123.9
80th Percentile	477	145.5
90th Percentile	582	177.4
99th Percentile	925	281.9
Maximum Value	1,799	548.3

1 Computed horizontal downstream distance from the ports to the completion of initial dilution process. Based on oceanographic data collected during 1990-1991. See Appendix Q and City of San Diego (1995).

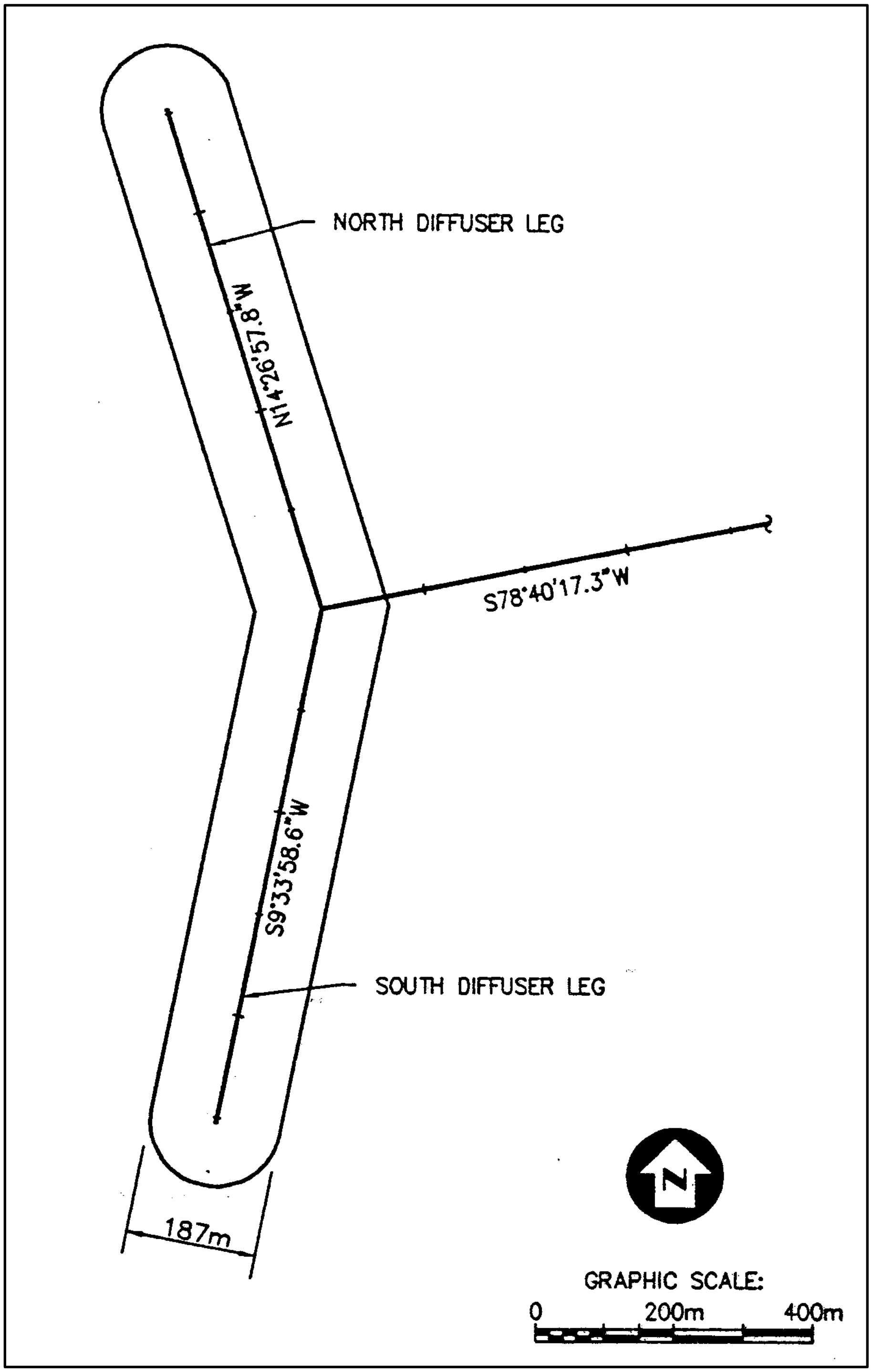

Figure III.A-1 Point Loma Ocean Outfall ZID Dimensions

III.A.3 What are the effects of ambient currents and stratification on dispersion and transport of the discharge plume/wastefield?

SUMMARY: Stratification effects will keep the wastefield submerged and subject to effects of deeper ocean currents. Ambient deeper ocean currents will help disperse the wastefield upcoast, downcoast, and to deeper waters.

Ocean currents and stratification conditions in the PLOO vicinity remain as documented in the City's prior 301(h) applications. Comprehensive predesign and oceanographic studies conducted in the 1990s to assess oceanographic conditions and plume transport for PLOO flow of 240 mgd (10.51 m^3/sec) remain valid. The effects of ambient currents and stratification on dispersion and plume transport are presented in Appendix P, and summarized below.

Appendix F presents the results of a 2012 plume tracking effort (Rogowski et al. 2012) that utilized modeling and ocean measurements to evaluate the fate of the PLOO discharge plume. Consistent with the results of the oceanographic studies conducted during the 1990s, the Rogowski et al. (2012) study (see Appendix F) determined that the PLOO plume remains contained below the ocean surface and is primarily transported upcoast and downcoast.

Stratification. The stratification of the water column and the currents in the vicinity of the discharge are discussed in detail in Appendices P and Q. The Point Loma outfall terminates in 310 to 315 feet (94 to 96m) of water. At this depth, the water column is sufficiently stratified to trap the wastefield below the surface throughout the year. The wastefield is typically confined to the depth interval between 180 to 285 feet (55m to 87m).

As documented in Appendix Q, depths to the top of the wastefield at the completion of the initial dilution process are projected to range between approximately 160 to 200 feet (48m to 61m) for an average annual discharge rate of 240 mgd (10.5 m^3/sec). Modeling presented in Appendix Q determined that the shallowest depth to the top of the wastefield during any month ranges from approximately 95 to 138 feet (29 to 42m) for a 240 mgd discharge. The monthly average depth to the bottom of the wastefield at a 240 mgd flow ranges from approximately 282 to 290 feet (86m to 88m).

Appendix F presents recent work by Rogowski et al. (2012), who evaluated ocean circulation and temperature observations for the period December 2009 through February 2012, applied a standard EPA plume buoyancy nearfield model, and utilized receiving water optical measurements of CDOM to estimate and track the presence of the PLOO plume.

Rogowski et al. (2012) concluded that the PLOO waste field never surfaced during the period of measurement (PLOO discharge flows averaged approximately 145 mgd during this time), and the shallowest depth of the waste field during the observational period was 35 meters (115 feet). Additionally, Rogowski et al. concluded (see Appendix F) that hydrographic measurements (currents and temperature) enable adequate estimations of plume trajectory and predications of plume behavior.

Ambient Net Currents. Table III.A-4 summarizes net seasonal current speeds from comprehensive pre-discharge studies conducted during January 1990 to April 1991 prior to construction of the extended outfall. Since the wastefield generated by the PLOO discharge typically lies at depths between 180 to 285 feet (55 to 87m), the net currents shown in Table III.A-4 are representative of the net currents that affect the PLOO waste plume.

As shown in Table III.A-4, net currents are predominantly longshore currents, with net current speeds ranged from 0.7 to 6.5 cm/sec. While net currents (shown in Table III.A-4 range from 0.7 to 6.5 cm/sec, instantaneous currents typically range (see Appendix P) from 7.5 to 12.5 cm/sec.

Table II.A-4
Net Current Speeds by Season[1]

Season	60m (197 ft) Depth		77m (253 ft) Depth[2]	
	Current Speed (cm/sec)	Direction[3]	Current Speed (m/sec)	Direction[3]
Winter - 1990	4.9	020	6.5	005
Winter - 1991	2.1	029	1.3	029
Spring	4.6	018	5.1	008
Summer	2.0	081	0.7	123
Fall	3.3	033	2.6	004

1 Pre-discharge net current measurements at a depth of 265 feet (81m) along the PLOO outfall. Fluctuations of these net current speed sand directions occur both on short- and long-period bases. See Appendix P. To yield the above net current speeds, typical ocean current velocities range from 7.5 to 12.5 cm/sec. Also see City of San Diego (1995).
2 Depths of 197 ft (60m) and 253 ft (77m) in 81m of water. The currents at the 77m depth may be affected by proximity to the bottom.
3 Direction heading in degrees. A heading of 000 corresponds to due north.

Temporal Characteristics of Currents. While net currents are predominantly longshore, significant short-term and long-term temporal variation in both current speed and direction occurs. The temporal characteristics of the fluctuations vary between the longshore component (parallel to the isobaths) and the cross-shore component. Table III.A-5 (page III.A-11) summarizes the results of pre-discharge studies conducted during January 1990 to April 1991 in assessing ocean current variations associated with:

- supertidal (short-term variations that vary more frequently than tidal variations),
- tidal (variations associated with tides), and
- subtidal (long-term variations that vary more slowly than tidal variations).

The transport distances associated with the temporally varying components of the currents depend on their duration (periodicity), as well as their strength. As shown in Table III.A-5, flows in the outfall vicinity are dominated by subtidal variations in the longshore component of flow. Typical cross-shore tidal excursions are on the order of a kilometer, or less. The outfall diffuser is about 4-5 km offshore from the outer edge of a kelp bed. This horizontal separation is several times greater than typical cross-shore tidal excursions.

Table III.A-5
Variances by Season and Frequency Band[1]

Season	Subtidal Frequency Band				Tidal Plus Supertidal Frequency Band			
	Longshore Variances(cm^2/sec^2)		Cross-Shore Variances (cm^2/sec^2)		Longshore Variances (cm^2/sec^2)		Cross-Shore Variances	
	60m (197 ft) Depth	77m (353 ft) Depth[2]	60m (197 ft) Depth	77m (353 ft) Depth[2]	60m (197 ft) Depth	77m (353 ft) Depth[2]	60m (197 ft) Depth	77m (353 ft) Depth[2]
Winter 1990	52.8	40.9	5.2	6.0	30.5	32.6	18.4	63.2
Winter 1991	32.9	23.8	8.4	8.6	30.8	20.6	23.5	37.3
Spring	64.0	50.9	9.7	8.1	21.1	19.5	22.2	30.4
Summer	55.5	55.9	7.2	7.0	26.5	26.7	14.5	27.2
Fall[1]	33.3	15.8	2.0	0.9	27.3	29.4	31.5	36.5

1 Pre-discharge net current measurements at a depth of 265 feet (81m) along the PLOO outfall. Fluctuations of these net current speed sand directions occur both on short- and long-period bases. See Appendix P and City of San Diego (1995).
2 Depths of 197 ft (60m) and 253 ft (77m) in 81m of water. The currents at the 77m depth may be affected by proximity to the bottom.

Transport is more effective in the longshore direction since the majority of the total variance in the longshore currents is associated with subtidal frequency variations. These fluctuations generally have periodicities ranging from a week to more than a month (Appendix P). These slowly varying fluctuations act like net currents over time-scales of a few days to weeks. It is the combination of the seasonal net flow and these slowly varying changes that is responsible for the transport of wastewater away from the outfall vicinity.

The combination of horizontal spatial separation and deep confinement (vertical separation) combines to isolate the kelp bed from intrusions of the PLOO wastefield. This is confirmed by receiving water bacteriological data that consistently show low coliform concentrations at the kelp bed stations - concentrations far below recreational body contact bacterial standards. (See Appendix I.2.)

Recent Studies. As presented in Appendix F, Rogowski et al. (2012) evaluated ocean current and thermal characteristics in the PLOO area from December 2009 through February 2012 using telemetered buoys.

Additionally, as discussed the response to Question II.B.3 (see pages II.B-67 through II.B-70) the City in 2013 deployed moored oceanographic instruments at three sites near the PLOO to collect near-continuous ocean current and temperature data. Table III.A-6 (page III.A-13) summarizes current velocities and direction at the 100 meter station near the PLOO diffuser.

As described in Section II.B.3, the dominant current mode was along a north-south axis, with occasional flow along a northwest-southeast axis. At the 60 meter depth, current flow oscillated between north and south throughout the year, with a southward flow being more common in May and August. At depths below 60 meters, flow was predominantly to the north with less oscillation, except during October when flow trended southward. Current velocities generally decreased with increasing depth.

Re-entrainment. The above-described short-term variations in longshore and cross-shore currents lead to the possibility that previously discharged effluent might be re-entrained into the initial dilution plume. Lateral re-entrainment can occur during a ocean current reversal that transports a portion of the wastefield back into the ZID. Vertical re-entrainment can occur if vertical movements of isotherms depress a portion of the wastefield into the entrainment depth interval.

Predischarge studies (see response to Question II.B.5 and Appendix R) assessed the potential for such re-entrainment. As documented in Appendix R, re-entrainment impacts on PLOO performance are minimal. Typical re-entrainment effects (see Appendix R) reduce the effective initial dilution of the PLOO wastefield by approximately 8 to 9 percent.

Ocean current and thermal stratification behavior observed in recent studies (see above and Appendix F) are in keeping with the results of the historic ocean current and density measurements presented in Appendix P. As a result of the consistency of the ocean current and thermal stratification conditions, the re-entrainment estimations presented in Appendix R remain valid for the current PLOO discharge.

Table III.A-6
Summary of 2013 Ocean Currents at PLOO 100-meter Station[1]

Season	Depth	Current Velocity (cm/second)				Direction (Degrees from North)	
		Minimum	Maximum	Mean	95% Confidence Interval	Mean	95% Confidence Interval
Winter	23	3	189	58	2	177	5
	35	1	197	59	2	146	5
	47	1	187	61	2	149	6
	59	5	163	63	2	159	6
	71	2	142	57	1	199	6
	83	3	124	45	1	132	6
	95	5	75	29	1	121	4
Spring	23	10	245	123	2	144	2
	35	11	189	82	2	144	3
	47	6	128	54	1	145	4
	59	0	110	39	1	147	5
	71	2	202	37	1	286	4
	83	6	77	30	1	97	5
	95	14	39	27	0	87	1
Summer	23	5	262	87	3	168	4
	35	1	213	56	2	163	5
	47	1	220	40	1	136	5
	59	11	198	38	1	184	6
	71	10	178	37	1	222	6
	83	1	160	27	1	84	4
	95	23	108	38	1	104	2
Fall	23	0	155	48	2	155	5
	35	0	121	48	2	121	5
	47	7	152	51	2	152	5
	59	1	179	50	2	179	6
	71	1	252	48	2	252	5
	83	0	107	40	2	107	4
	95	5	129	43	1	129	2

1 Data excerpted from *Point Loma Ocean Outfall Annual Receiving Waters Monitoring & Assessment Report, 2013* (City of San Diego, 2014a).

III.A.4 Will there be significant sedimentation of suspended solids in the vicinity of the modified discharge?

Question III.A.4 is applicable only to "small dischargers". Dischargers defined under 40 CFR 125, Subpart G as large dischargers (with 5 mgd flows or serving a population of 50,000) are required to provide a more detailed evaluation of sedimentation under Question III.A.5.

III.A.5 Sedimentation of suspended solids.

a. What fraction of the modified discharge's suspended solids will accumulate within the vicinity of the modified discharge?

SUMMARY: For a PLOO discharge flow of 240 mgd (10.5 m^3/sec) and a TSS mass emission rate of 20,000 mt/year (higher than the currently proposed mass emission rate), conservative computer simulations projected that approximately 8 to 9 percent of the suspended solids discharged from the PLOO would be deposited within an area extending approximately 8 miles (15 km) upcoast and downcoast from the discharge and about 4.3 miles (7 km) offshore from the diffuser. Visual observation of the PLOO diffuser zone indicates that these previous estimates were overly conservative, as no accumulation of outfall solids is evident in the vicinity of the PLOO. This 301(h) NPDES application proposes TSS mass emissions not to exceed 12,000 metric tons per year - a value 20 percent less than the current TSS mass emission rate of 15,000 metric tons per year allowed under Order No. R9-2009-0001.

The vertical velocity of PLOO wastewater upon discharge is approximately 0.03 ft/sec (10 cm/sec). As a result, the waste plume buoyancy carries almost all particles in the discharge upward into the waste field. The degree to which particles settle out from the waste field is dependent on the solids mass emission rate, the height of waste plume rise, ocean currents, and settling velocities of the particles.

1995 Projections of Solids Accumulation. Computer simulation rates of solids deposition and accumulation were presented in the City's 1995 301(h) application (see Appendix Q of the 1995 301(h) application). As documented in the City's 1995 waiver application, solids deposition, accumulation, and transport were assessed using two computer models:

- The EPA ATSD particle simulation model, and
- The SEDPXY solids transport model.

The fraction of solids that would accumulate in the vicinity of the PLOO diffuser was estimated for two scenarios:

Scenario 1: PLOO TSS mass emission rate of 16,500 mt/yr under average annual ocean conditions, and

Scenario 2: PLOO TSS mass emission rate of 18,100 mt/yr under critical (maximum stratification) ocean conditions.

Under Scenario 1, the EPA ATSD model projected that approximately 8.1 percent of the discharged solids are simulated as settling within a zone extending approximately 7 miles (11.3 km) upcoast and downcoast from the outfall. Under Scenario 2, the model projected that approximately 8.6 percent of the discharged solids would settle within this zone.

The SEDPXY model coupled particle settling with a program that (1) simulated the movement of parcels of wastewater using a progressive vector approach, and (2) computed solids deposition within each 33 foot by 33-foot (10 m by 10 m) model element. For each of the two model scenarios, the SEDPXY model projected that approximately 8 to 9 percent of the PLOO solids would be deposited within a 17 mile (30 km) by 8 mile (14 km) zone surrounding the outfall. (See Appendix Q of the City's 1995 301(h) application.)

Conservative Nature of 1995 Solids Deposition Projections. Both the EPA ATSD and SEDPXY models simulated a great majority of the discharged solids as being carried far from the PLOO discharge point. While only a small fraction is simulated as settling within the general area offshore from San Diego, the sedimentation model results overstate the amount of deposited solids that would actually accumulate on the ocean floor. Key reasons the models overstate solids deposition rates include:

- particle settling velocities in the current PLOO discharge are significantly slower than settling velocities that were used in the solids deposition models,
- ocean discharge mass emissions of TSS were overestimated,
- solids loss through organic uptake was neglected, and
- resuspension effects were neglected.

Overly Conservative Particle Settling Velocities. Solids deposition rates projected by both the ATSD and SEDPXY models were based on Point Loma WTP effluent settling characteristics measured in 1978 - before chemically enhanced treatment was implemented at the Point Loma WTP. As a result, solids deposition computations presented in the City's 1995 301(h) application were conservative to an extreme degree.

Demonstrating this, Table III.A-7 (page III.A-17) characterizes the difference in PLOO solids during 1978 and 2013. As shown in Table III.A-7, PLOO suspended solids are significantly less than solids concentrations in the 1978 PLOO discharge. Due to improved treatment at the Point Loma WTP, 2013 settleable solids (solids with higher settling rates) averaged 0.3 milliliters per liter during 2010-2013 - a value that is less than the 1978 values by more than a factor of seven. Settling velocities in the present-day PLOO effluent are considerably slower than those used in the

City's 1995 301(h) application. These slower settling rates translate to significantly reduced settling and accumulation of discharged solids in the vicinity of the PLOO than was projected in the City's 1995 301(h) application.

Table III.A-7
Comparison of 1978 and 2013 PLOO Effluent Solids

Year	Means of Treatment	Average Annual TSS (mg/l)	Average Annual Settleable Solids (ml/l)
1978[1]	Primary Sedimentation	134 mg/l	2.3
2013	Chemically-assisted primary sedimentation	33.5 mg/l	0.3

1 Year used for solids settling computations presented in the City's 1995 301(h) application. See Appendix Q of the City's 1995 301(h) application. (City of San Diego, 1995)

Organic Composition/Decay Was Neglected. During 2013, effluent volatile (organic) suspended solids averaged 26.6 mg/l in the PLOO discharge, while effluent TSS averaged 33.5 mg/l. Organic solids thus comprised approximately 80 percent of the total solids in the PLOO discharge during 2013. Upon discharge, organic solids are eliminated by consumption (biological uptake) or decay, resulting in reduced deposition of settled solids on the ocean bottom. The 1995 solids deposition model did not account for such organic consumption or losses.

Resuspension Effects Were Neglected. Both models presented in the 1995 301(h) application neglect the effects of resuspension. Conditions at the Point Loma outfall (sediment particle sizes, current speeds, and lack of evidence of sediment accumulation) indicate that particle resuspension is a significant factor limiting the accumulation of sediments near the Point Loma outfall diffuser.

The PLOO outfall diffuser is located near the edge of a shelf that significantly steepens to deep waters immediately west of the diffuser. As demonstrated by ocean current monitoring (see Appendix P), the near-bottom flow has an offshore component toward these deeper waters that is comparable to, or exceeding, the dominant longshore component of flow. Particles resuspended near the edge of the shelf are carried off the shelf into deeper water, promoting the loss of resuspended material from the shelf.

Erosional and resuspension effects are evidenced by (1) the fact that natural soils at the diffuser site generally consist of sands rather than clay or silt particles, and (2) sediment monitoring data and visual observations of the outfall diffuser area indicate no evidence of sediment accumulation.

Outfall ROV Visual Observations. The extended PLOO discharge was initiated in 1994, and the discharge has been continuous since that time. Visual observations of the vicinity of the PLOO by remotely operated vehicle (ROV) confirm that the solids deposition projections presented in the City's 1995 301(h) application are overly conservative. ROV surveys conducted since the outfall was constructed have not indicated evidence of solids accumulation in the vicinity of the PLOO discharge. Actual PLOO solids deposition rates and rates of accumulation are negligible, and significantly below the theoretical calculations presented in the City's prior 301(h) applications.

III.A.5 b. What are the calculated area(s) and rate(s) of sediment accumulation within the vicinity of the modified discharge(s) ($g/m^2/yr$)?

SUMMARY: The City's prior 301(h) applications presented conservative computer simulations of suspended solids deposition and transport in the vicinity of the PLOO diffuser. Results from these models indicate that solids deposition rates will decrease with distance from the outfall. Using the procedures outlined in EPA=s Amended Technical Support Document, maximum theoretical depositional flux rates in the area of the outfall diffuser were estimated at approximately 33 $g/m^2/yr$ for average annual conditions under a PLOO TSS mass emission rate of 16,500 mt/yr. Under critical 90-day conditions (and a TSS MER of 18,100 mt/year, maximum deposition rates are conservatively computed at 68 $g/m^2/year$. These simulated deposition rates are based on several conservative assumptions, including (1) assuming faster particle settling velocities, (2) neglecting organic decay/uptake, (3) neglecting resuspension, and (4) using TSS mass emission rates higher than those proposed in this 301(h) application. These compounding conservative assumptions combine to cause significantly overestimation of the rates of solids deposition and accumulation. The overly conservative nature of these modeling estimates is confirmed by sediment monitoring and visual observation of the PLOO diffuser zone which shows no evidence of sediment accumulation resulting from discharged solids.

As noted in the response to Question III.A.5a, two modeling methods were used to simulate solids deposition for the modified PLOO discharge. The response to Question III.A.5.a presents a brief description of each model.

Method 1 - EPA ATSD. As documented in Appendix Q of the City's 1995 301(h) application, the EPA ATSD model was used to simulate deposition at a PLOO discharge of 240 mgd (10.51 m^3/sec) for the following scenarios:

Scenario 1: PLOO TSS mass emission rate of 16,500 mt/yr under average annual ocean conditions, and

Scenario 2: PLOO TSS mass emission rate of 18,100 mt/yr under critical (maximum stratification) ocean conditions.

Table III.A-8 and Table III.A-9 (page III.A-20) summarizes the results solids deposition modeling for this scenario. As shown in Table III.A-8, a Scenario 1 solids deposition rate of approximately 33 $g/m^2/yr$ is simulated for a zone that extends approximately 1.1 miles (2 km) upcoast and downcoast from the PLOO diffuser.

A solids depositional rate of approximately 68 g/m^2/yr (see Table III.A-9) is simulated under critical conditions (Scenario 2) within a zone that extends approximately 0.7 miles (1.2 km) upcoast and downcoast from the PLOO diffuser.

Table III.A-8
Summary of Results of EPA ATSD Model
Fraction of Discharged Solids for 240 mgd, 16,100 mt/year Discharge[1]
Average Annual Conditions

Particle Size Group (Settling velocity range in cm/sec)	Size of Ellipse within which Average Particle in Given Size Group is Deposited			Simulated Cumulative Deposition Rate within Ellipse[3] g/m^2/yr
	Area[2] (km^2)	Length (km)	Width (km)	
> 0.1	9.9	3.94	2.87	33
0.1 - 0.01	989	39.4	28.7	0.8
0.01 - 0.006	2746	65.7	47.9	0.13
0.006 - 0.001	98,960	394	287	0.02

1 See Appendix Q of the City's 1995 waiver application for details on the ATSD modeling method and input data. To be conservative, a TSS mass emission rate of 16,500 mt/yr was used - a rate higher than the mass emission rates proposed in this 301(h) application.
2 Depositional areas from Table Q-5 of Appendix Q of the City's 1995 301(h) application.
3 Cumulative depositional flux. From Table Q-6 of Appendix Q of the City's 1995 301(h) application. (City of San Diego, 1995)

Table III.A-9
Summary of Results of EPA ATSD Model
Fraction of Discharged Solids for 240 mgd, 18,100 mt/year Discharge[1]
Critical 90-Day Period

Particle Size Group (Settling velocity range in cm/sec)	Size of Ellipse within which Average Particle in Given Size Group is Deposited			Simulated Cumulative Deposition Rate within Ellipse[3] g/m^2/yr
	Area[2] (km^2)	Length (km)	Width (km)	
> 0.1	4.6	2.53	2.45	68
0.1 - 0.01	460	25.3	24.6	2.0
0.01 - 0.006	1279	42.1	41.0	0.3
0.006 - 0.001	46,036	394	287	0.04

1 To be conservative, a TSS MER of 22,000 mt/year is used for the "critical period", even though the proposed Point Loma discharge (See "Basis of Application" in Volume II) is to discharge no more than 12,000 mt/year.
2 Depositional areas from Table Q-5 of Appendix Q of the City's 1995 301(h) application.
3 Cumulative depositional flux. From Table Q-6 of Appendix Q of the City's 1995 301(h) application. (City of San Diego, 1995)

Method 2 - SEDPXY. The City's 1995 301(h) application also presented depositional simulations using the 36,000 element SEDPXY model. (The SEDPXY model is described in detail in Appendix Q of the City's 1995 301(h) application.) The SEDPXY model offers several advantages over the EPA ATSD model, but does not account for account organic decay and resuspension. Additionally, the SEDPXY model makes use of conservative Point Loma WTP effluent settling characteristics.

Solids deposition rates projected in the SEDPXY model were significantly less than the EPA ATSD model. Under Scenario I (240 mgd, 16,100 mt/yr TSS mass emission, and average annual ocean conditions), a solids deposition rate was computed at 2 $g/m^2/yr$ within an area approximately 0.46 mi^2 (1.3 km^2) surrounding the PLOO diffuser.

Solids Accumulation Conclusions. The deposition rate predictions from the two simulation models represent the theoretical maximum flux of effluent particles settling from the water column onto the ocean bottom. Both the EPA ATSD and SEDPXY models significantly overstate the amount of deposited solids that would be deposited (and accumulate) on the ocean floor, as a result of the following conservative assumptions:

- particle settling velocities in the current PLOO discharge are significantly slower than settling velocities that were used in the solids deposition models,
- PLOO mass emissions of TSS were significantly overestimated,
- solids loss through organic uptake was neglected, and
- resuspension effects were neglected.

As documented in the response to Question III.A.5(a) (see pages III.A-15 through III.A-17) these assumptions compound to cause significant overestimation in the theoretical solids deposition rates developed using the ATSD and SEDPXY models. Sediment monitoring and visual observations by subsurface ROVs of the vicinity of the PLOO show no evidence of solids accumulation in sediments. Actual outfall solids deposition rates and rates of accumulation are thus significantly less than the theoretical calculations developed using the ATSD and SEDPXY models.

III.A.5. c. What is the fate of settleable solids transported beyond the calculated sediment accumulation area?

SUMMARY: The majority of the PLOO discharge solids are organic, and will be eliminated through biological uptake and decay. Small inorganic particles will be carried out of the discharge zone and dispersed to deeper waters where they will be dispersed and eventually aggregate into larger particles and settle.

As discussed in the response to Questions III.A.5(a) and III.A.5(b), computer modeling presented in the City's 1995 301(h) application projected that 8 to 9 percent of the discharged solids would settle in a zone located 8 miles (15 km) upcoast and downcoast from the PLOO diffuser and 4.3 miles (7 miles) offshore from the diffuser. Remaining particles were simulated as settling at greater distances from the outfall, with the slowest settling particles being carried the farthest distance.

Figures III.A-2 and III.A-3 (page III.A-23 and III.A-24) respectively present the theoretical distribution of discharged particles as a function of particle settling velocity, based on modeling studies presented in the City's 1995 301(h) application. (See Appendix Q of the City's 1995 301(h) application.)

As noted in the response to Questions III.A.5(a), the models significantly overestimate the amount of solids deposited in the outfall vicinity, as

- current PLOO particle settling velocities are significantly less than those used in the models,
- the models assumed a higher TSS mass emission rate than is proposed in this 301(h) application,
- the models neglected organic consumption (uptake) and decay, and
- the solids deposition models neglected effects of resuspension.

Particles not deposited in the outfall vicinity will either be eliminated through biological consumption and decay or transported out of the outfall zone to deep ocean waters.

Particle Settling Overview. As also noted in the City's 1995 301(h) application, the wastefield upon initial dilution typically forms at an elevation of about 85-90 feet (26-27m) above the ocean bottom. Computer modeling presented in the City's 1995 301(h) application (see Appendix Q of the 1995 application) concluded that discharged particles with settling speeds in excess of 0.002 - 0.007 cm/sec would be deposited on the shelf within several miles of the outfall.

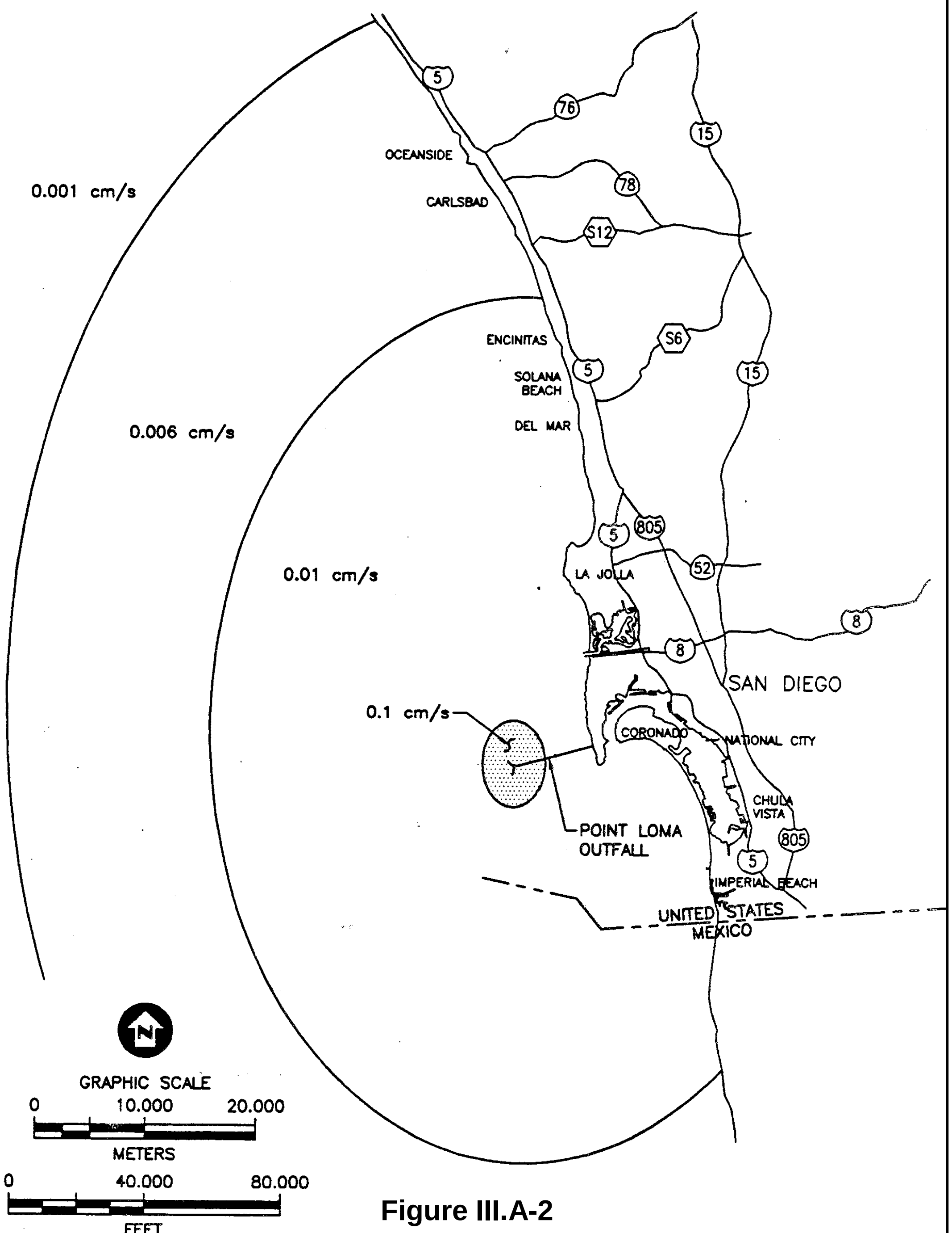

Figure III.A-2

ANNUAL AVERAGE OF
TRANSPORT DISTANCES FOR PARTICLES
WITH SETTLING SPEEDS OF 0.1, 0.01, 0.006 AND 0.001cm/s
FOR 240 MGD FLOW

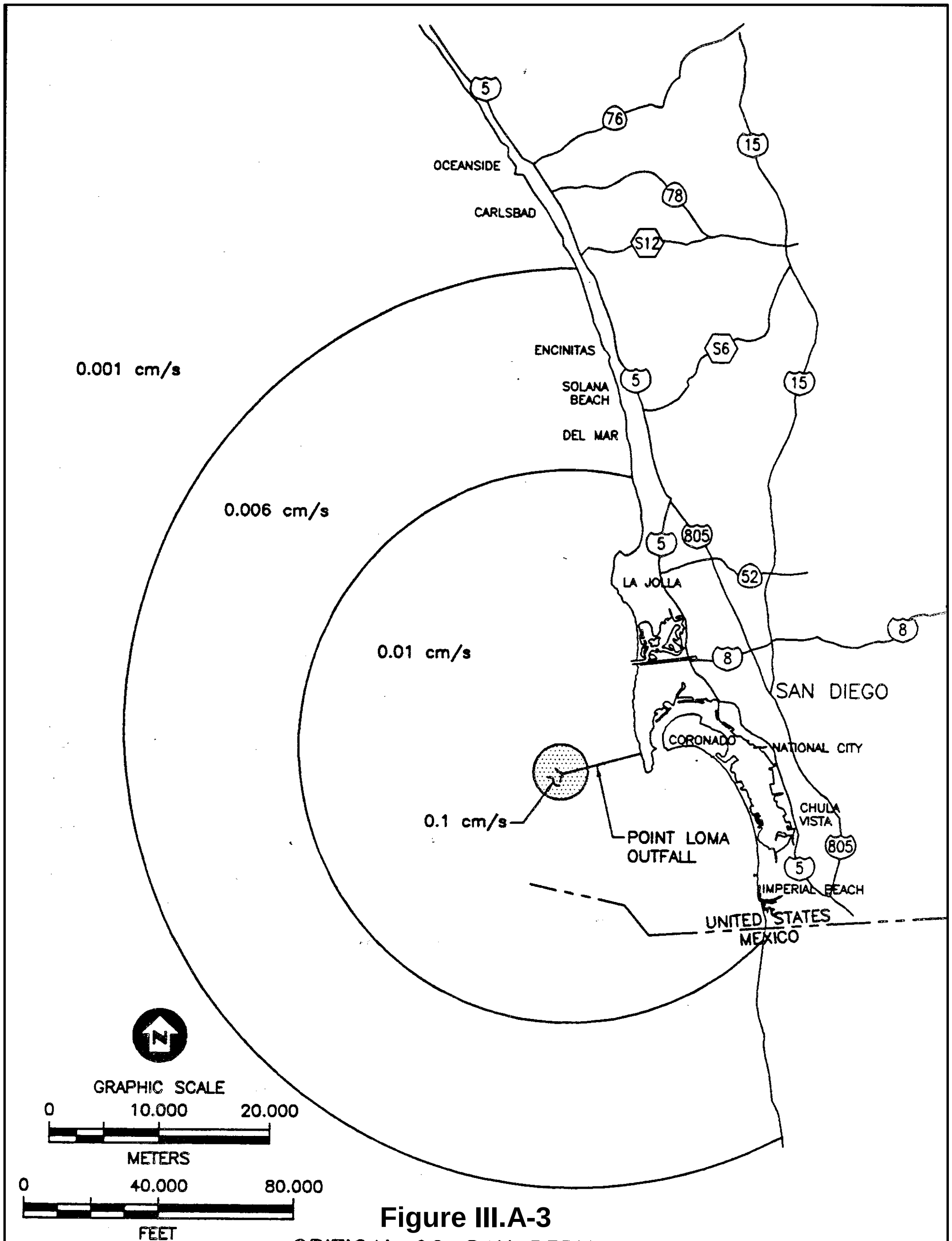

Figure III.A-3

CRITICAL 90–DAY PERIOD OF TRANSPORT DISTANCES FOR PARTICLES WITH SETTLING SPEEDS OF 0.1, 0.01, 0.006 AND 0.001cm/s FOR 240 MGD FLOW

No settling velocity studies have been conducted for the current PLOO discharge. Settling studies conducted in 1978 (before the current Point Loma WTP advanced primary treatment was initiated) concluded that approximately 90 percent of the PLOO particle mass had settling speeds slower than this 0.002 to 0.007 cm/sec threshold.

Since present day PLOO TSS and settleable solids concentrations are significantly lower than in 1978, it is probable that only a small fraction of the PLOO solids would have settling faster than 0.007 cm/sec. As a result, particle settling and accumulation within the vicinity of the PLOO outfall would be negligible. This projected lack of particle accumulation in the PLOO vicinity is consistent with visual observations of sediments using remotely operated submersibles and sediment data.

Particles transported beyond the calculated sediment accumulation area have long residence times in the water column. Approximately 30 days would be required for another 10 percent of the effluent particle mass to be deposited, assuming that the particles remain inert and settling distances do not increase.

Loss of Organic Material. During 2013, volatile (organic) suspended solids comprised 80 percent of the total suspended solids. (Effluent TSS averaged 33.5 mg/l and volatile suspended solids averaged 26.6 mg/l). As documented in the City's 1995 301(h) application, the organic portion of the discharged solids will be virtually consumed within 60 days through decay or biological uptake. Table III.A-10 (page III.A-26) summarizes how this loss of organics affects the overall mass of discharged solids.

As shown in Table III.A-10, one-quarter of the organic mass will be consumed within 3 days of discharge, and half within one week. Within one month, less than one-quarter of the total mass (organic plus inorganic) remains. By the end of two months, only the inorganic fraction of the discharged solids remain Over this two-month time frame, cross-shore transport will disperse the particles offshore and into deeper and more distant water. (See Figures III.A-2 and III.A-3 on pages III.A-23 and III.A-24.)

In addition to reducing the mass of solids, this loss of organic material also may affect the size of remaining particles. Some of the particles will be reduced in size as a result of organic loss. Discharged nutrients biologically consumed in the water column may be returned as waste products in various particle sizes. As a result of these processes, the distribution of particle settling speeds becomes more difficult to estimate as the discharge is transported farther from the outfall vicinity.

Table III.A-10
Loss of Organic Material Due to Decay/Consumption

Elapsed Time	Organic Fraction Remaining[1] (percent of total)	Total Mass Fraction Remaining[2] (percent of total)	Estimated Percent Organic[3]
0	100%	100%	71.0%
12 hours	95.1%	96.1%	70.2%
1 day	90.5%	92.4%	69.6%
3 days	74.1%	79.3%	66.4%
1 week	49.7%	59.8%	59.0%
2 weeks	24.7%	39.8%	44.1%
1 month	4.8%	23.8%	14.3%
2 month	0.2%	20.2%	0.8%

1 Percent of organic material in the PLOO discharge that remains after decay and consumption. From Appendix Q of the City's 1995 301(h) application. (City of San Diego, 1995)
2 Total mass fraction remaining after decay/consumption of organic solids. From Table Q-16, Appendix Q of the City's 1995 301(h) application. (City of San Diego, 1995)
3 Adapted from Table Q-16, Appendix Q of the City's 1995 301(h) application to reflect the fact that current volatile solids represent approximately 71 percent of total solids. (City of San Diego, 1995)

Resuspension Effects. As documented in the response to Question III.A.5(b), resuspension is a key factor in affecting the rate of accumulated solids in the PLOO vicinity. The PLOO diffuser is located at the edge of a shelf, and the ocean bottom steepens to significant depths immediately beyond the diffuser. The near-bottom flow (see description of oceanography in Appendix P) has a significant offshore component toward these deeper waters. Particles resuspended near the edge of the shelf are carried off into deeper water, promoting the loss of resuspended material from the shelf. These erosional and resuspension effects are evidenced by domination of sand particles (as opposed to more easily resuspended silt or clay particles) in the PLOO diffuser sediments.

Farfield Particle Fate. Insert solids with slow settling velocities will remain suspended in the water column as they are dispersed to greater distances (and depths) from the outfall. Ultimately, the particles will aggregate with other natural particles or will be biologically consumed and discharged as fecal pellets by zooplankton. Quantitative estimates of such particle aggregation and subsequent settling is not possible, however, due to variabilities associated with:

- alterations of particle size due to organic losses (decay and biological uptake),
- dependence of settling rates on the type and abundance of zooplankton,

- the wide range of settling speeds of the aggregated particles, and
- the wide range of particle sizes and settling speeds of fecal pellets (less than 0.002 to greater than 3 cm/sec).

In summary, particles transported out of the calculated accumulation area will become increasingly inorganic in content, and will be dispersed over an increasingly large area by the ocean currents with correspondingly low deposition rates. Since the remaining particle mass is expected to be mixed with natural particles, their contribution to the accumulation of inorganic material in the sediments outside the calculated accumulation area is expected to be minor compared with the accumulation of natural particles.

The effect of discharged particles on the farfield ocean environment will be negligible, as a result of:

- low overall discharge TSS concentrations in the PLOO discharge and low quantity of settleable solids,
- reduced (slower) effluent particle settling velocities resulting from Point Loma WTP treatment improvements,
- high organic content and associated organic losses through biological uptake and decay, significant increases in ocean bottom depths offshore from the diffuser, and
- wide dispersion of discharged solids.

Receiving water monitoring collected by the City at 36 offshore stations and 8 inshore stations confirms the lack of farfield impacts associated with discharged solids. Receiving water light transmittance values at the PLOO monitoring stations are within the range of variability that normally occur within the SCB.

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Section III.B
Compliance with
Water Quality Standards

Renewal of NPDES CA0107409

III.B COMPLIANCE WITH WATER QUALITY STANDARDS

III.B.1 What is the concentration of dissolved oxygen immediately following initial dilution for the period(s) of maximum stratification and any other critical period(s) of discharge volume/composition, water quality, biological seasons, or oceanographic conditions?

SUMMARY: Because of the high dilution achievable by PLOO, the largest dissolved oxygen depression is minimal (0.05 mg/l, or approximately 1 percent). Natural variability of DO in the ocean is significantly greater than this 0.05 mg/l value.

The City=s 1995 301(h) waiver application assessed the farfield dissolved oxygen depression for a PLOO discharge of 240 mgd. Results of this analysis remain applicable, and are updated in Appendix S and summarized below.

DO Computation per EPA Methodology. Methodology for computing dissolved oxygen depression is presented on pages B-14 through B-18 of the EPA *Amended Section 301(h) Technical Support Document* (EPA, 1994). This 1994 EPA support document presents the following equations for computing receiving water dissolved oxygen concentrations:

$$DO_f = DO_a + \frac{(DO_e - IDOD - DO_a)}{S_a} \qquad Equation\ III.B-1$$

where:

where:	DO_f	=	Final dissolved oxygen concentration (mg/l) of receiving water at the plume trapping level,
	DO_a	=	Affected ambient dissolved oxygen concentration (mg/l) immediately up current of the diffuser averaged over the tidal cycle (12.5 hours) and from the diffuser port depth to the trapping level,
	DO_e	=	Effluent dissolved oxygen (mg/l),
	$IDOD$	=	Immediate dissolved oxygen demand (mg/l),
	S_a	=	Flux averaged initial dilution, and
	DO_p	=	Ambient dissolved oxygen (mg/l) at diffuser port depth (93m).

The depression of dissolved oxygen due to wastewater after completion of initial dilution is given in percent by:

$$\Delta DO\% = 100 \cdot \frac{(DO_t - DO_e + IDOD)}{DO_t \cdot S_a} \qquad Equation\ III.B-2$$

where: DO_t = Ambient dissolved oxygen concentration (mg/l) at the trapping level.

IDOD is a difficult value to measure because the chemical test often gives unreliable answers. As a result, *Standard Methods for the Examination of Water and Wastewater* has eliminated the IDOD test since its 14th Edition. In 1994, the Point Loma WTP effluent IDOD was measured at values ranging from 0.45 to 1.74 mg/l in 1994 (nine total samples).

The 1994 EPA *Amended 301(h) Technical Support Document* suggests (page B-15 of the technical support document) assigning IDOD values on the basis of outfall travel time and effluent BOD. Table III.B-1 presents estimated PLOO travel times at the current flow of 145 mgd (7.45 m^3/sec) flow, the permitted average annual flow 240 mgd (10.51 m^3/sec), and the permitted maximum day flow of 432 mgd (15.61 m^3/sec). As shown in Table III.B-1, average PLOO travel times through the outfall (not counting the diffuser) are projected at approximately 156 minutes for 145 mgd, 94 minutes for 240 mgd, and 52 minutes for 432 mgd.

Table III.B-1
Estimated PLOO Travel Times at 240 mgd

Outfall Segment	Inside Diameter		Length		Estimated PLOO Travel Time (minutes)		
	feet	meters	feet	meters	145 mgd[1]	240 mgd[2]	432 mgd[3]
Original outfall	9.0	2.74	11,226	3,422	53.1	32.1	17.8
Extended outfall	12.0	3.66	12,246	3,732	102.9	62.2	34.5
Diffuser Section 1[4]	7.0	2.13	1,008	307.2	5.8	3.5	1.9
Diffuser Section 2[4]	5.5	1.68	852	256	3.0	1.8	1.0
Diffuser Section 3[4]	4.0	1.22	648	197.5	1.2	0.7	0.4
Total Estimated Travel Time - Outfall Only					156.0	94.3	52.3
Total Estimated Travel Time - Outfall & 3 Diffuser Legs					166.0	100.3	55.6

1 Average annual year 2013 PLOO flow was 143.8 mgd. A 145 mgd flow is presented to represent approximate current conditions.
2 Maximum average annual PLOO flow permitted by Order No. R9-2009-0001.
3 Maximum day peak wet weather PLOO flow permitted by Order No. R9-2009-0001.
4 Each of the two PLOO diffuser legs is comprised of three sections with successively smaller pipe diameters. Half the PLOO flow is assumed to go through each of the two diffuser legs.

For an outfall travel time of more than 100 minutes and an effluent BOD concentration of 100 mg/l (the 2013 Point Loma WTP BOD averaged 115 mg/l), the EPA guidance document recommends an IDOD value between 3 and 4 mg/l. (See page B-15 of the *Amended 301(h) Technical Support Document*.) In accordance with this EPA guidance, receiving water DO is conservatively computed based on:

- an effluent IDOD of 4 mg/l,
- an assumed effluent DO of zero, and
- observed receiving water DO and trapping depth measurements from 1990 and 1991 (deemed to represent critical receiving water conditions).

Results of the calculation are presented in Table III.B-2. The "worst case" computed DO depression was 0.05 mg/l.

Table III.B-2
Calculation of Dissolved Oxygen Immediately Following Initial Dilution[1]
(240 MGD)

Date of Historic DO/CTD Data Set Used in Computations[2]	Initial Dilution (S_a)	Dissolved Oxygen[3] (mg/l)				Change in DO (ΔDO)	
		Ambient at Diffuser Depth (DO_p)	Ambient at Trapping Level (DO_t)	Upcurrent Ambient (DO_a)	Final at Trapping Level (DO_f)	Difference (mg/l)	Percent Difference
Mar. 7, 1990	287	4.23	5.37	4.80	4.77	0.03	0.6 %
Apr. 17, 1990	253	4.30	4.78	4.54	4.50	0.04	0.7 %
May 23, 1990	230	3.65	4.47	4.06	4.03	0.03	0.8 %
Jun. 20, 1990	355	5.23	5.60	5.42	5.39	0.03	0.5 %
Jul. 25, 1990	238	4.35	5.20	4.78	4.79	0.05	0.7 %
Aug. 29,1990	416	5.60	6.08	5.84	5.81	0.03	0.4 %
Sept. 27,1990	409	3.99	4.68	4.33	4.31	0.02	0.5 %
Jan. 26, 1991	275	6.60	7.15	6.88	6.84	0.04	0.6 %
Feb. 7, 1991	212	4.60	5.83	5.22	5.17	0.05	0.8 %
Mar. 7, 1991	260	4.15	5.00	4.58	4.54	0.04	0.7 %
Apr. 7, 1991	258	3.63	5.18	4.41	4.37	0.04	0.7 %

1 Calculations conservatively based on IDOD = 4.0 mg/l and DO_e = 0.0 mg/l. Actual Point Loma WTP IDOD is projected to be significantly less than 4.0 mg/l.

2 Receiving water DO and thermocline data from 1990 and 1991 are representative of critical receiving water conditions.

3 Note: DO_p is the ambient dissolved oxygen (mg/l) at diffuser port depth (93m). DO_t is the ambient dissolved oxygen concentration (mg/l) at the trapping level. DO_a is the affected ambient dissolved oxygen concentration (mg/l) immediately upcurrent of the diffuser averaged over the tidal cycle (12.5 hours) and from the diffuser port depth to the trapping level. DO_f is the final dissolved oxygen concentration (mg/l) of receiving water at the plume trapping level.

During the critical period (January through March), a "worst case" DO_f value of 4.54 mg/l was computed. (See Appendix S for details associated with these DO depression calculations.) As shown in Table III.B-2, DO depression is projected at less than 1 percent throughout a wide range of naturally-occurring ambient DO concentrations and oceanographic conditions.

The conservative DO depression computations presented in Table III.B-2 and Appendix S remain valid, as (1) assumptions on PLOO effluent DO and IDOD are conservative, and (2) receiving water data from 1990-1991 remain representative of critical thermocline trapping conditions.

Receiving Water DO Concentrations. Receiving water monitoring conducted off the coast of Point Loma confirm the lack of discernible outfall-related DO depression. The City monitors receiving water DO concentrations at 36 offshore stations and 8 kelp bed stations. While receiving water DO may vary significantly as a result of naturally-occurring seasonal and long-term oceanographic conditions, no discernible outfall-related change in receiving water DO has been observed. Table III.B-3 (page III.B-5) summarizes DO measurements at the PLOO outfall monitoring stations.

As shown in Table III.B-3, observed 2013 receiving water DO values remain high throughout the water column, and are in keeping with historic DO values that were used within the above computation of theoretical DO depression. Additionally, DO concentrations at these outfalls stations are consistent with DO concentrations at upcoast and downcoast reference stations along the 100-meter-contour.

Present day (year 2013) receiving water DO concentrations are consistent with pre-discharge monitoring conducted prior to initiation of the extended PLOO discharge. As also shown in Table III.B-3, natural variability in receiving water DO concentrations is significantly greater than computed maximum 0.05 mg/l outfall-related DO depression. (Also see Figure III.B-1 on page III.B-8, which shows similar temporal variations in DO between upcoast monitoring stations, downcoast monitoring stations, and stations near the PLOO diffuser.)

Table III.B-3
Receiving Water Dissolved Oxygen in the Vicinity of the PLOO Diffuser, 2013[1]

Month	Parameter	Receiving Water Dissolved Oxygen[1] (mg/l)			
		1-20 meter Depth	21-60 meter Depth	61-80 meter Depth	81-100 meter Depth
February 2013	Minimum value	5.2	3.6	3.2	2.8
	Maximum Value	8.5	8.4	5.5	4.3
	Mean Value	7.8	5.6	4.2	3.7
May 2013	Minimum value	3.9	3.2	3.1	2.8
	Maximum Value	10.9	8.6	4.6	3.6
	Mean Value	7.8	4.8	3.6	3.3
August 2013	Minimum value	5.7	4.0	3.9	3.7
	Maximum Value	10.7	10.4	5.7	4.3
	Mean Value	8.3	5.8	4.2	4.0
November 2013	Minimum value	7.1	5.8	4.8	3.9
	Maximum Value	8.4	8.3	7.1	6.4
	Mean Value	8.0	7.1	6.2	5.6
Annual Average 2013	Minimum value	3.0	3.2	3.1	2.8
	Maximum Value	10.9	10.4	7.1	6.4
	Mean Value	7.9	5.9	4.6	4.2

1 Annual average of all PLOO ocean stations, as reported within *Point Loma Ocean Outfall Annual Receiving Waters Monitoring & Assessment Report, 2013* (City of San Diego, 2014a).

III.B.2. What is the farfield dissolved oxygen depression and resulting concentration due to BOD exertion of the wastefield during the period(s) of maximum stratification and any other critical period(s)?

SUMMARY: Because of the high dilution of the outfall, farfield DO depression is projected to not exceed 0.14 mg/l during the critical period (January through March) for a discharge flow of 240 mgd. The maximum farfield DO depression under this maximum discharge flow is projected to be 2.4 percent during the critical period.

The City-s 1995 301(h) waiver application assessed the farfield dissolved oxygen depression for a PLOO discharge of 240 mgd. Results of this analysis remain applicable, and are updated in Appendix S and summarized below.

Ocean Plan Requirements. In lieu of establishing a requirement for BOD, the *California Ocean Plan* (2012) establishes the following receiving water dissolved requirement:

> *The dissolved oxygen concentration shall not at any time be depressed more than 10 percent from that which occurs naturally, as the result of the discharge of oxygen demanding waste materials.*

This *California Ocean Plan* requirement excludes the effects on DO of the entrainment of deeper and colder ambient water (which has lower natural DO) into the plume during the initial dilution process. Accordingly, the DO depressions presented herein were developed assuming the concentration of DO in the entrained ambient water to be the same as the DO at the trapping level.

Factors Affecting Farfield DO. After the initial dilution, DO in the wastefield is further reduced as a result of nitrogenous and carbonaceous BOD demands. Time-dependent DO changes resulting from BOD demands are computed by:

$$\Delta DO_{BOD}(t) = \Delta CBOD \times (1 - e^{-k_c t}) + \Delta NBOD \times (1 - e^{-k_n t}) \qquad Equation\ III.B - 3$$

where:

$\Delta DO_{BOD}(t)$	=	the time-dependent depression of DO in the farfield waters,
$\Delta CBOD$	=	carbon-associated BOD concentration (above ambient) at the completion of initial dilution,
$\Delta NBOD$	=	nitrogen-associated BOD concentration (above ambient) at the completion of initial dilution,
k_c	=	decay rate for carbon-associated BOD, and
k_n	=	decay rate for nitrogen-associated BOD.

Farfield DO is also affected by time-dependent subsequent dilution that occurs as a result of ocean mixing beyond the ZID.

The time-dependent depression of DO in the farfield waters can be computed as follows:

$$\Delta DO_w(t) = \frac{-\Delta DO_t - \Delta DO_{BOD}(t)}{D_s(t)} \qquad Equation\ III.B-4$$

where: $\Delta DO_w(t)$ = the time-dependent depression of DO in the farfield waters,

ΔDO_t = the change in DO due to initial dilution and effluent IDOD, computed per equation III.B-2,

ΔDO_{BOD} = the time-dependent farfield DO depression resulting from nitrogenous and carbonaceous BOD demand(i.e., the reduction in the level of DO in the wastefield resulting from DO and IDOD in the effluent, DO uptake by the BOD exertion, and subsequent oceanic mixing with the surrounding higher DO water), and

$D_s(t)$ = time-dependent subsequent dilution of the wastefield due to oceanic mixing.

As documented in Appendix S, historic DO and CTD data (which are still representative of current PLOO conditions) are used as input to the above equations to estimate farfield DO depressions resulting from the PLOO discharge. Resulting farfield DO estimates for the critical period of maximum stratification are presented in Table III.B-4. As documented in Appendix S, the farfield DO depression estimates presented in Table III.B-4 are conservative.

Table III.B-4
Calculation of Farfield Dissolved Oxygen Depression Due to Waste Material
240 mgd (10.51 m^3/sec) PLOO Discharge

Date of Historic DO/CTD Data Set Used in Computation[1]	Initial Dilution S_a	Dissolved Oxygen (mg/l)		Difference ΔDO(%)[2]	Hours to Minimum Computed DO	Subsequent Dilution Factor[3]
		Ambient at Trapping Level DO_t	Difference ΔDO			
3/07/90	287	5.37	0.10	1.9	34.5	2.14
4/17/90	253	4.78	0.11	2.4	35.5	2.18
5/23/90	230	4.47	0.13	2.8	35.5	2.18
6/20/90	355	5.60	0.08	1.5	34.5	2.14
7/25/90	238	5.20	0.12	2.4	35.0	2.16
8/29/90	416	6.08	0.07	1.2	34.0	2.11
9/27/90	409	4.68	0.07	1.5	35.5	2.18
1/26/91	275	7.15	0.11	1.5	32.0	2.02
2/07/91	212	5.83	0.14	2.4	34.0	2.11
3/07/91	260	5.00	0.11	2.2	35.0	2.16
4/07/91	258	5.18	0.11	2.2	35.0	2.16

1 See Appendix S. Historic data from 1990 and 1991 used in the calculation remain applicable to characterize critical oceanographic conditions in the vicinity of the PLOO discharge.
2 Computed farfield DO depression (as a percent). See Appendix S for computation methodology.
3 Computed additional dilution factor subsequent to initial dilution due to oceanic mixing. As shown above, the Point Loma WWTP effluent is further diluted by more than a factor of two within approximately 36 hours of initial dilution. See Appendix S.

Receiving Water Dissolved Oxygen. Figure III.B-1 summarizes average DO concentrations across the 100 meter, 80 meter, 60 meter, and 18 meter contours during 2013. As shown in the figure, dissolved oxygen profiles are relatively similar across each depth contour, independent of the proximity to the PLOO. Additional DO receiving water data are presented in Table III.B-3 (page III.B-5).

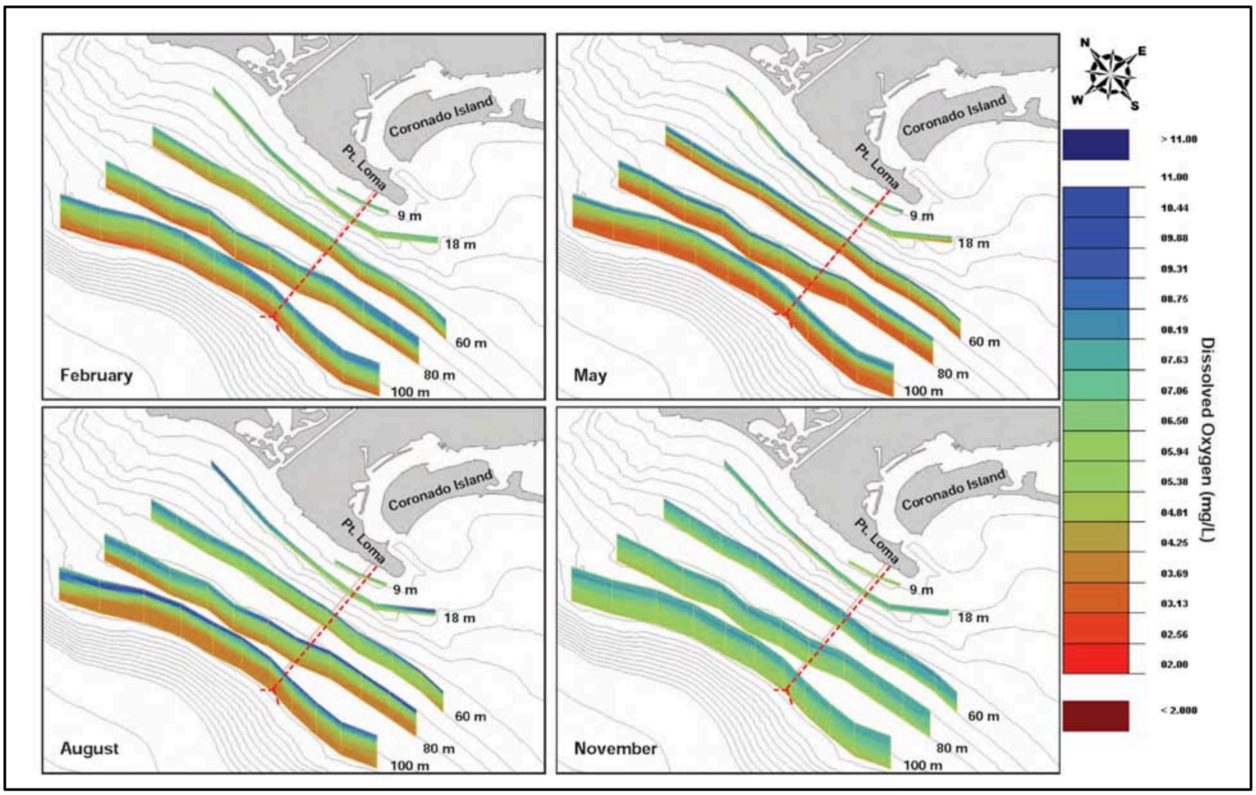

Figure III.B-1 Point Loma Receiving Water Dissolved Oxygen
(Excerpted from City of San Diego, 2014a)

III.B.3 What are the dissolved oxygen depressions and resulting concentrations near the bottom due to steady sediment demand and resuspension of sediments?

SUMMARY: Critical 90-day dissolved oxygen depression due to sediment oxygen demand is projected to be less than 0.045 mg/l. Maximum oxygen depression due to resuspension of sediments is estimated at 0.077 mg/l. Actual observed sediment deposition rates near the PLOO diffuser appear to be significantly lower than the assumed values used to compute DO depression values. Additionally, the dissolved oxygen depression computations are based on a TSS MER of 18,000 mt/year, while this 301(h) application proposes a TSS MER of 12,000 mt/year.

The City's 1995 301(h) waiver application assessed dissolved oxygen depressions due to steady sediment demand and resuspension of sediments for a PLOO discharge of 240 mgd. Results of this prior analysis remain valid (albeit highly conservative), and are summarized below and presented in Appendix S.

Steady State Oxygen Demand. As documented in Appendix S, oxygen depletion due to steady-state oxygen demand was computed using the method outlined in the *Amended 301(h) Technical Support Document*. Page B-35 of this EPA technical support document presents the following equation for computing steady-state oxygen demand:

$$\Delta DO = \frac{a \cdot S_{avg} \cdot k_d \cdot X_m}{86{,}400 \cdot U \cdot H \cdot D} \qquad Equation\ III.B-5$$

Where:
ΔDO = steady sediment oxygen depletion in (mg/l)
a = oxygen sediment stoichiometric ratio,
k_d = sediment decay constant
S_{avg} = average concentration of deposited organic sediments over the deposition area (g/m^2)
X_m = length of deposition area (m)
U = current speed (m/sec)
D = subsequent dilution associated with horizontal mixing.

Appendix S presents information on each of the above input parameters, and computes or estimates appropriate input values. Table III.B-5 (page III.B-10) summarizes the input values used in the evaluation of steady-state dissolved oxygen depression for the critical ocean conditions.

Using these input values, Table III.B-6 (page III.B-10) summarizes the results of dissolved oxygen computations (see Appendix S) for a 240 mgd discharge and TSS mass emission rate of 18,100 mt/year (a value 50 percent higher than the 12,000 mt/year TSS MER proposed within this application). As shown in Table III.B.5, the steady state dissolved oxygen depression is computed at 0.045 mg/l for an outfall discharge TSS MER of 18,100 mt/year.

Table III.B-5
Parameter Values - Steady Sediment Oxygen Demand Equation[1]

Variable	Description	Estimated Value[2]
a	Stoichiometric ratio	1.07 mg O_2/mg sediment
k_d	Sediment decay constant	0.01/day
S_{avg}	Average concentration of deposited organic sediments over the deposition area	17.14 g/m^2
X_m	Length of deposition area	2700 m
D	Dilution	1.6 to 1
U	Ocean current speed	0.029 m/sec
H	Layer thickness	2.7 m

1 Parameters for the steady-state sediment oxygen demand equation (Equation III.B-5) developed in accordance with information presented by EPA in *Amended 301(h) Technical Support Document* (EPA, 1994).

2 Parameters computed in accordance with the EPA *Amended 301(h) Technical Support Document*. See Appendix S details on each parameter. Based on a 240 mgd discharge flow and TSS MER of 18,000 mt/year.

Table III.B-6
Computed Steady Sediment Oxygen Depression[1]

Parameter	**Value**
Computed steady sediment oxygen depression	0.045 mg/l
Minimum observed dissolved oxygen at depth during 2013 at PLOO diffuser stations[2]	2.8 mg/l
Percent depression	1.6%

1 Computed in accordance with instructions presented in *Amended 301(h) Technical Support Document* (EPA, 1994). Input values for the steady sediment dissolved oxygen depression equation (Equation III.B-5) are presented in Table III.B-5.

2 Minimum receiving water DO during 2013 at 100 meter depth at the ocean monitoring stations nearest the PLOO diffuser (F29, F30, and F31). Based on a 240 mgd discharge flow and TSS MER of 18,100 mt/year.

Comparison to Minimum Ambient DO at Depth. The City monitors receiving water DO at 36 offshore stations and 8 kelp bed stations. The minimum DO observed at monitoring stations near the PLOO ZID (Stations F29, F30, and F31) during 2013 was 2.8 mg/l. The computed steady-state 0.045 mg/l dissolved oxygen depression (again, a value computed assuming a 18,100 mt/year discharge) corresponds to a depression of approximately 1.6 percent of the lowest observed year 2013 ambient DO.

Resuspension Oxygen Demand. For determining oxygen demand due to sediment resuspension, the *Amended 301(h) Technical Support Document* requires a "worst case" analysis based on all accumulated sediments being resuspended. In accordance with this technical support document, oxygen depletion due to sediment resuspension can be computed by:

$$\Delta DO = \frac{S_r}{D \cdot H} \cdot \left[1 - exp\left(\frac{-k_r t}{24}\right)\right] \qquad Equation\ III.B-6$$

where:
- ΔDO = oxygen depletion due to sediment resuspension in (mg/l)
- S_r = average organic accumulation of resuspended sediments (g/m^2)
- D = horizontal (subsequent) dilution
- H = depth of water volume containing resuspended materials (m)
- k_r = decay rate of resuspended sediments
- t = elapsed time since resuspension (hr)

Appendix S applies this equation to the City's 240 mgd PLOO discharge (at an assumed TSS mass emission rate of 18,100 mt/yr). Table III.B-7 (page III.B-12) summarizes the input values used in Appendix S for the computation of dissolved oxygen depression due to sediment resuspension.

Table III.B-8 (page III.B-12) summarizes the results of the sediment resuspension DO computations using these input values. As shown in Table III.B-8, the dissolved oxygen depression due to sediment resuspension is computed at 0.077 mg/l.

This computed DO depression due to sediment resuspension is likely a significant overestimate. Due to effluent settling velocities and ocean currents in the vicinity of the diffuser, organic accumulation near the diffuser is significantly less than the 20.9 g/m^2 value assumed in the above DO depression computation.

Table III.B-7
Estimated Parameter Values - Oxygen Demand Due to Sediment Resuspension

Variable	Description	Estimated Value[1]
S_r	Average organic accumulation of resuspended sediments	20.9 g/m^2
D	Horizontal (subsequent) dilution	0.01/day
H	Depth of water volume containing resuspended materials	Computed as function of elapsed time and vertical diffusion coefficient[2]
k	Decay rate of resuspended sediments	0.1/sec

1 Parameters estimated or computed in accordance with information provided in *Amended 301(h) Technical Support Document*. See Appendix S for details on each parameter.

2 Depth of water volume containing resuspended materials "H" is computed as a function of elapsed time and vertical diffusion coefficient (5 cm/sec^2), as follows:

$$H = \frac{\pi^{0.5}}{100}\sqrt{3600\ \times t\ \times}\,\varepsilon_z$$

Where, ε = vertical diffusion coefficient during resuspension (5 cm2/sec), and
T = elapsed time following resuspension (hours).

Table III.B-8
Computed Oxygen Depression Due to Sediment Resuspension[1]

Parameter	Value
Computed oxygen depression due to sediment resuspension[2]	0.077 mg/l
Minimum observed dissolved oxygen at 93 m depth for the January through March critical period[3]	2.8 mg/l
Percent depression	2.75%

1 Computed in accordance with instructions presented in *Amended 301(h) Technical Support Document* (EPA, 1994). Input values for the steady sediment dissolved oxygen depression equation are presented in Table III.B-7. Based on a 240 mgd discharge and TSS MER of 18,100 mt/year.

2 Computed dissolved oxygen depression due to resuspension is time-dependent. The maximum oxygen depression is computed as occurring approximately eight hours after resuspension. See Appendix S.

3 Minimum receiving water DO during 2013 at depths ranging from 80 - 100 meters at the PLOO offshore monitoring stations. (City of San Diego, 2014a)

III.B.4 What is the increase in receiving water suspended solids concentration following initial dilution of the modified discharge?

SUMMARY: The average increase in receiving water TSS concentration resulting from the 240 mgd PLOO discharge is approximately 1 to 2 percent of the natural background concentration.

The concentration of TSS at the completion of initial dilution is calculated using the following equation presented on page B-40 in the *Amended Section 301(h) Technical Support Document*:

$$SS_f = SS_a + \frac{SS_e - SS_a}{S_a} \qquad Equation\ III.B - 7$$

where SS_f = Suspended solids concentration at completion of initial dilution, mg/l.

SS_a = Affected ambient suspended solids concentration immediately upcurrent of the diffuser averaged over one-tidal period (12.5 hours) and from the diffuser port depth to the trapping level, mg/l.

SS_e = Effluent suspended solids concentration, mg/l.

S_a = Flux-averaged initial dilution (California regulatory monthly averages based on CTD data).

As noted in the response to Questionnaire Section II.A.4, the average effluent TSS concentration for the Point Loma WTP discharge during 2013 was 33.5 mg/l. During 2013, Metro System facilities achieved an average system-wide TSS removal of 90.7 percent.

As documented in the City's prior 301(h) applications, receiving water TSS concentrations vary significantly with season and natural conditions. Monitoring conducted as part of a special 1994 receiving water study showed ambient receiving water TSS concentrations ranging from 2.2 mg/l near the PLOO ZID to 11.2 mg/l at reference stations, with a depth-averaged value over a complete tidal cycle of 7 mg/l. While significant variation in receiving water TSS can occur, these 1994 values remain valid for purposes of computing TSS impacts on receiving waters.

Table III.B-9 (page III.B-14) presents computed receiving water TSS concentrations associated with the 240 mgd (10.51 m^3/sec) PLOO discharge. Values presented in Table III.B-9 are based on an ambient ocean water TSS concentration of 7 mg/l and monthly flux-averaged regulatory initial dilution values presented within Appendix Q. As shown in Table III.B-9, the PLOO discharge is projected to increase receiving water TSS concentrations by approximately 1 to 2 percent.

Recognizing that natural ambient receiving water TSS concentrations may vary significantly over both short-term and long-term time periods, Table III.B-10 (page III.B-15) presents estimated PLOO effects on receiving waters for a range of assumed receiving water TSS concentrations. The PLOO discharge is projected to increase receiving water TSS concentrations at the edge of the ZID by 0.1 to 0.2 mg/l.

Table III.B-9
Suspended Solids Concentration at the Completion of Initial Dilution
Assuming an Ambient Receiving Water TSS Concentration of 7 mg/l

Month	Year 2013 Average Monthly Point Loma WTP TSS Concentration[1] SS_e (mg/l)	Average Ambient TSS Concentration Upcurrent from Outfall Diffuser[2] SS_a (mg/l)	Initial Dilution[3] S_a	Computed Receiving Water TSS Concentration after Initial Dilution[4] SS_f (mg/l)	Increase in Receiving Water TSS concentration (mg/l)	Percent Change in Receiving Water TSS Concentration ΔSS(%)
January	34.9	7.0	206	7.14	0.14	2.0%
February	39.2	7.0	202	7.16	0.16	2.3%
March	36.6	7.0	224	7.13	0.13	1.9%
April	35.6	7.0	263	7.11	0.11	1.6%
May	37.8	7.0	284	7.11	0.11	1.6%
June	38.3	7.0	295	7.11	0.11	1.6%
July	50.4	7.0	324	7.13	0.13	1.9%
August	27.2	7.0	320	7.06	0.06	0.9%
September	24.1	7.0	294	7.06	0.06	0.9%
October	25.2	7.0	307	7.06	0.06	0.9%
November	25.5	7.0	281	7.07	0.07	1.0%
December	27.0	7.0	249	7.08	0.08	1.1%
Average	33.5	7.0	271	7.10	0.10	1.4%

1 Average of daily Point Loma WTP daily effluent TSS concentrations during the listed month. See Table II.A-6 on page II.A-22.

2 Assumed average annual receiving water TSS concentration. From monitoring work conducted in 1994 (which remains valid) presented in the City's 1995 301(h) application. (City of San Diego, 1995) See Table III.B-10 (page III.B-15) for computed receiving water TSS concentrations over a range of potential receiving water concentrations.

3 Computed mean monthly regulatory initial dilutions. (From Appendix Q).

4 Computed suspended solids concentrations per Equation III.B-7 (see page III.B-13).

Table III.B-10
Suspended Solids Concentration at the Completion of Initial Dilution
At a Range of Assumed Potential Receiving Water TSS Concentrations

Receiving Water TSS Concentration[1]	Maximum Monthly Conditions[2]		Annual Average Conditions[3]	
	Maximum Monthly Increase in Receiving Water TSS Concentration (mg/l)	Percent Change	Computed Increase in Receiving Water TSS (mg/l)	Percent Change
2.2	0.18	8.2%	0.12	5.5%
7.0	0.16	2.3%	0.10	1.4%
11.2	0.14	1.3%	0.08	0.7%

1 Range of ambient receiving water TSS concentrations upgradient from the PLOO diffuser ranged from 2.2 to 11.2 mg/l during monitoring conducted in 1994. (From the City's 1995 301(h) application.)

2 Computed as above in Table III.B-9 for the maximum month (February) conditions.

3 Computed as above in Table III.B-9 for the listed annual average conditions.

III.B.5 What is the change in receiving water pH immediately following initial dilution of the modified discharge ?

The maximum change in receiving water pH (Δ pH) immediately following initial dilution is 0.02 units, which is well below the state standard of 0.2 units.

The City's 1995 waiver application computed projected effects of a 10.5 m^3/sec (240 mgd) discharge on the pH of receiving waters. These 1995 computations were based on methodology presented in the *Amended 301(h) Technical Support Document* .

As documented in the 1995 waiver application, a maximum pH change of 0.02 pH units is projected. As a result of the high dilution provided by PLOO, the computed maximum pH change of 0.02 units is projected to be a rare event.

The computations from the 1995 waiver application for a 240 mgd discharge remain valid; no significant changes in wastewater pH are projected as part of the PLOO discharge.

III.B.6 Does (will) the modified discharge comply with applicable water quality standards for:

- **Dissolved oxygen?**
- **Suspended solids?**
- **pH?**

SUMMARY: The PLOO discharge complies with all applicable water quality standards for dissolved oxygen, suspended solids, and pH.

Dissolved Oxygen. The *California Ocean Plan* requires that dissolved oxygen (DO) concentrations not be depressed more than 10 percent as the result of oxygen demanding wastes. The response to Questionnaire Section III.B.1 assesses the DO concentration of receiving waters following initial dilution during maximum stratification.

As detailed in the response (and in Appendix S), DO after initial dilution at maximum stratification is projected to be depressed less than 0.05 mg/l. This maximum DO depression complies by a wide margin with the *California Ocean Plan* standard that receiving water dissolved oxygen not be depressed more than 10 percent.

The response to Questionnaire Section III.B.2 addresses farfield DO depression. As discussed in the response to Questionnaire Section III.B.2 (and in Appendix S), farfield DO is conservatively projected to be less than 2.4 percent - a value a factor of four less than the *California Ocean Plan* limit.

The response to Questionnaire Section III.B.3 addresses DO depression near the ocean bottom due to sediment DO demand. As presented in the response, DO depression at the bottom as a result of steady sediment DO demand is projected at 1.6 percent. Dissolved oxygen depression at the ocean bottom due to sediment resuspension is projected at 2.75 percent. Both values are within the allowable *California Ocean Plan* DO limit by a significant margin.

Suspended Solids. The *California Ocean Plan* requires that dischargers achieve a 30-day average of 75 percent removal of suspended solids from the effluent stream. The City's existing NPDES permit requires 80 percent TSS removal.

Table III.B-11 presents Metro System TSS percent removals during 2010-2013. As shown in Table III.B-11, the City achieved 100 percent compliance with the *California Ocean Plan* 75 percent removal standard and the 80 percent removal standard established by Order No. R9-2009-0001 (NPDES CA0107509).

Table III.B-11
System-Wide TSS Removal, 2010-2013

Month	System-Wide TSS Percent Removal[1,2,3]				Point Loma WWTP Effluent TSS[4] (mg/l)			
	2010[2]	2011	2012	2013	2010[2]	2011	2012	2013
Jan	83.1	87.5	87.8	89.4	35.0	40.6	46.2	34.9
Feb	87.2	87.9	88.1	88.4	36.4	37.4	44.1	39.2
Mar	88.4	88.4	89.5	90.0	36.4	34.6	38.1	36.6
Apr	89.0	88.9	90.3	90.4	36.5	37.8	37.7	35.6
May	90.3	88.4	90.8	90.3	34.1	41.5	34.1	37.8
Jun	89.1	88.4	91.4	90.0	38.7	40.9	31.9	38.3
Jul	90.1	87.9	90.4	86.6	36.4	43.5	38.5	50.4
Aug	90.6	87.9	90.2	92.3	33.9	45.6	36.1	27.2
Sep	89.7	87.1	90.5	93.0	37.1	45.7	36.1	24.1
Oct	88.5	87.1	90.9	92.8	38.9	47.0	33.8	25.2
Nov	89.0	88.3	90.0	92.8	37.1	41.8	34.5	25.5
Dec	85.1	88.0	89.2	92.4	45.3	38.8	35.4	27.0
Annual Average	88.3	88.0	89.9	90.7	37.2	41.3	37.2	33.5
Maximum Month	90.6	88.9	91.4	93.0	45.3	47.0	46.2	50.4
Minimum Month	83.1	87.1	87.8	86.6	33.9	34.6	31.9	24.1

1 TSS percent removal computed on a system-wide basis. Data from City of San Diego (2014b) for calendar year 2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.

2 Order No. R9-2009-0001 became effective on August 1, 2010. The PLOO discharge was regulated by Order No. R9-2002-0025 for the first seven months of calendar year 2010.

3 Data for calendar year 2014 were not available at the time of preparation of this report. Year 2014 data will be electronically transmitted to regulators when available in 2015.

4 Monthly average Point Loma WWTP effluent TSS concentration during the listed year and month.

In addition to establishing a 75 percent TSS removal requirement, the *California Ocean Plan* allows Regional Boards to establish TSS effluent concentrations at values not less than 60 mg/l. Order No. R9-2009-0001 establishes a monthly average effluent TSS concentration limit of 75 mg/l. As shown in Table III.B-11, Point Loma WWTP monthly average effluent TSS concentrations during 2010-2013 were well within this 75 mg/l limit.

pH. The *California Ocean Plan* requires that receiving water pH not be changed at any time more than 0.2 units from that which occurs naturally. As shown in the response to Questionnaire Section III.B.5, the PLOO discharge is projected to affect receiving water pH by less than 0.02 units. The *California Ocean Plan* establishes pH effluent limits of 6 to 9 pH units, to be achieved at all times. Table III.B-12 presents Point Loma WTP effluent pH concentrations during 2010-2013. During 2010-2013, the maximum daily Point Loma WTP effluent pH concentration was 7.83 and the minimum daily pH was 6.83. All values were within the *California Ocean Plan* standards of 6 to 9 pH units.

Table III.B-12
Point Loma WWTP Effluent pH, 2010-2013

Period	Point Loma WWTP Effluent pH[1,2,3] (pH Units)			
	2010[2]	2011	2012	2013
January	7.38	7.38	7.42	7.45
February	7.39	7.39	7.47	7.46
March	7.36	7.45	7.47	7.47
April	7.35	7.36	7.44	7.47
May	7.33	7.39	7.44	7.48
June	7.29	7.48	7.44	7.43
July	7.30	7.44	7.44	7.44
August	7.34	7.39	7.42	7.36
September	7.34	7.39	7.39	7.43
October	7.34	7.39	7.47	7.39
November	7.31	7.42	7.43	7.35
December	7.34	7.43	7.44	7.36
Annual Average	7.34	7.41	7.44	7.43
Maximum Day	7.60	7.83	7.74	7.69
Minimum Day	6.83	6.82	7.12	7.03

1 Data from City of San Diego (2011b-2014b) for calendar years 2010-2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.
2 Order No. R9-2009-0001 became effective on August 1, 2010. The PLOO discharge was regulated by Order No. R9-2002-0025 for the first seven months of year 2010.
3 Data for calendar year 2014 were not available at the time of preparation of this report. Year 2014 data will be electronically transmitted to regulators when available in 2015.

Turbidity. The *California Ocean Plan* establishes a 30-day average effluent turbidity standard of 75 Nephelometric Turbidity Units (NTU) for wastewater discharges to the ocean. The *California Ocean Plan* also establishes weekly average and instantaneous maximum standards of 100 and 225 NTU. Table III.B-13 presents Point Loma WTP effluent turbidity during 2010-2013. As shown in the table, the maximum month Point Loma WWTP effluent turbidity was 58.2 NTU, a value within the 75 NTU *California Ocean Plan* 30-day average standard. The maximum day turbidity at the Point Loma WWTP was 94.6, a value less than the weekly average *California Ocean Plan* standard of 100 NTU.

Table III.B-13
Point Loma WWTP Effluent Turbidity, 2010-2013

Period	Point Loma WWTP Effluent Turbidity[1,2,3] (NTU)			
	2010[2]	2011	2012	2013
January	37.3	33.3	42.9	36.9
February	36.3	35.5	39.1	41.3
March	34.0	33.5	37.2	38.4
April	35.8	34.4	38.9	37.8
May	37.0	38.3	39.7	42.9
June	40.3	38.8	44.3	46.6
July	40.9	42.8	51.1	58.2
August	41.4	44.1	52.7	44.0
September	40.2	45.6	45.7	37.7
October	38.7	43.4	38.8	36.2
November	38.4	38.3	39.1	34.5
December	36.9	41.1	36.0	34.4
Annual Average	38.1	39.1	42.1	40.7
Maximum Day	68.4	63.0	67.7	94.6
Maximum Month	41.4	45.6	52.7	58.2

1 Turbidity reported in NTU (Nephelometric Turbidity Units). Data from City of San Diego (2011b-2014b) for calendar years 2010-2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.

2 Order No. R9-2009-0001 became effective on August 1, 2010. The PLOO discharge was regulated by Order No. R9-2002-0025 for the first seven months of calendar year 2010.

3 Data for calendar year 2014 were not available at the time of preparation of this report. Year 2014 data will be electronically transmitted to regulators when available in 2015.

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In addition to establishing effluent turbidity limits, the *California Ocean Plan* establishes the following narrative objective for light transmittance:

> *Natural light shall not be significantly reduced at any point outside the initial dilution zone as the result of the discharge of waste.*

As discussed in Appendices F and Q, the average depth to the top of the wastefield is below 40 meters, which is well below the euphotic zone. Within this deeper zone of the PLOO waste field, natural light levels are less than 1 percent of incident light at sea surface.

As part of the City's comprehensive ocean monitoring program, depth profiles of light transmittance and chlorophyll *a* are assessed at 36 oceanographic stations and 8 kelp bed stations. These data have been presented to EPA and the Regional Board in monthly and annual reports. In accordance with an agreement with EPA, the data are not reproduced herein, but City staff are coordinating with EPA for electronic transfer of the data to regulators.

Figures III.B-2 and III.B-3 (page III.B-22) presents a graphical summary of light transmittance and chlorophyll *a* for 2013. As shown in the figures, no outfall-related differences in water clarity are in evidence.

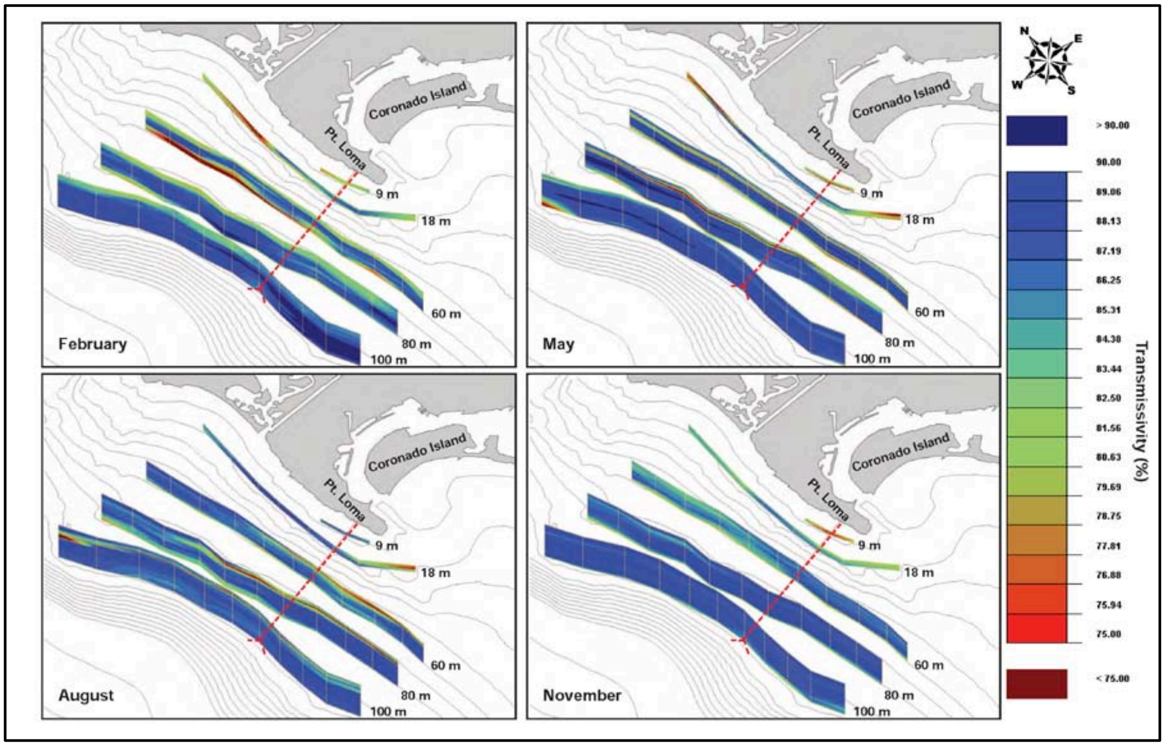

Figure III.B-2 Point Loma Receiving Water Transmissivity, 2013

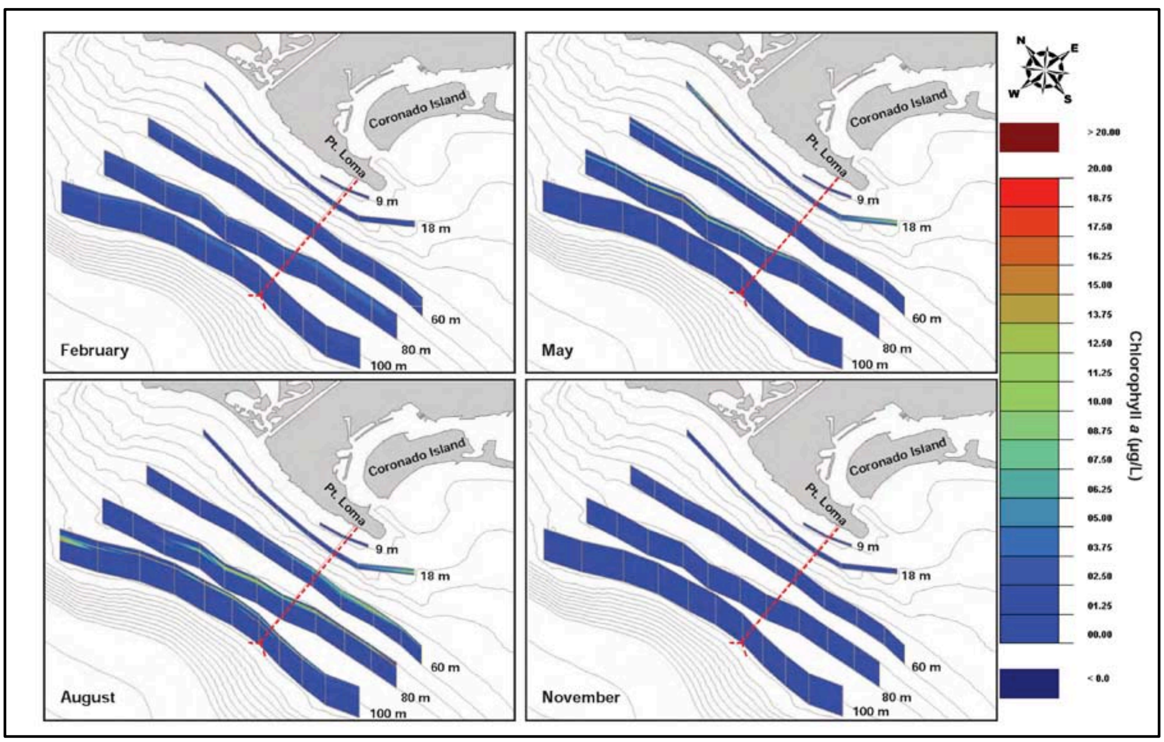

Figure III.B-3 Point Loma Receiving Water Chlorophyll ", 2013

III.B.7. Provide data to demonstrate that all applicable State water quality standards, and all applicable water quality criteria established under Section 304(a)(1) of the Clean Water Act for which there is no directly corresponding numerical applicable water quality standards approved by EPA, are met at and beyond the boundary of the ZID under critical environmental and treatment plant conditions in the waters surrounding or adjacent to the point at which your effluent is discharged. [40 CFR 125.62(a)(1)]

SUMMARY: The PLOO discharge complies with water quality objectives and criteria established by the State of California. The PLOO discharge also conforms with water quality criteria established by EPA for the protection of aquatic habitat and the protection of human health.

California Ocean Plan Effluent Limitations. The *California Ocean Plan* establishes effluent and receiving water standards for wastewater discharges within the three-mile limit off the California coast. State technology-based effluent standards for wastewater discharges to the ocean are established in Table 2 of the *California Ocean Plan*.

California Ocean Plan Table 2 Constituents. Table 2 of the *California Ocean Plan* establishes effluent limitations for grease and oil, TSS, settleable solids, turbidity, and pH. Table III.B-14 presents the *California Ocean Plan* Table 2 physical/chemical effluent standards.

Table III.B-14
California Ocean Plan Table 2 Effluent Limitations for Physical/Chemical Constituents

Constituent	Units	Ocean Plan Table 2 Effluent Limitation[1]		
		30-day Average	7-Day Average	Maximum Value
grease & oil	mg/l	25	40	75
settleable solids	Ml/l	1.0	1.5	3.0
suspended solids	% removal	75%	NS[2]	NS[2]
TSS	ml/l	1.0	1.50	3.0
turbidity	NTU	75	100	225
pH	units	6 - 9	6 - 9	6 - 9

1 From Table 2 of the 2012 *California Ocean Plan* (State Board, 2012).
2 NS indicates that the *California Ocean Plan* does not establish a standard for the listed condition.

Table III.B-15 summarizes Point Loma WTP grease and oil effluent concentrations during 2010-2013. As shown in Table III.B-15, the maximum day Point Loma WTP effluent grease and oil concentration during 2010-2013 (44.4 mg/l) was less than *California Ocean Plan* Table 2 maximum standard of 75 mg/l. The maximum observed 7-day average grease and oil concentration of 19.7 mg/l was significantly less than the *California Ocean Plan* 7-day average standard of 40 mg/l. Additionally, the maximum observed monthly average grease and oil concentration during 2010-2013 of 15.0 was significantly less than the *California Ocean Plan* 30-day average standard of 40 mg/l.

Table III.B-15
Point Loma WTP Effluent Grease and Oil Concentrations, 2010-2013

Period	Point Loma WWTP Grease and Oil[1,2,3] (mg/l)			
	2010[2]	2011	2012	2013
January	9.6	11.5	13.9	10.0
February	11.3	11.5	13.7	10.2
March	11.3	9.1	12.0	10.6
April	11.9	9.6	10.0	10.2
May	12.9	12.5	10.1	9.9
June	14.4	13.0	9.5	11.3
July	12.5	15.0	11.7	14.8
August	11.6	13.7	11.8	11.6
September	13.5	13.9	9.3	8.9
October	12.4	15.0	8.2	9.1
November	11.6	13.1	10.1	9.7
December	11.3	14.0	12.7	11.7
Annual Average	12.0	12.7	11.1	10.7
Maximum 30-Day Average[4]	14.4	15.0	13.9	14.8
Maximum 7-Day Average[5]	19.7	17.8	17.3	18.4
Maximum Single Sample	44.4	36.6	26.4	44.3

1 Data from City of San Diego (2011b-2014b) for calendar years 2010-2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.
2 Order No. R9-2009-0001 became effective on August 1, 2010. The PLOO discharge was regulated by Order No. R9-2002-0025 for the first seven months of calendar year 2010.
3 Data for calendar year 2014 were not available at the time of preparation of this report. Year 2014 data will be electronically transmitted to regulators when available in 2015.
4 Maximum observed 30-day running average during 2010-2013.
5 Maximum observed 7-day running average during 2010-2013.

Table III.B-11 (page III.B-18) documents compliance of the PLOO discharge with *California Ocean Plan* TSS percent removal requirements. The minimum 30-day average TSS percent removal during 2010-2013 was 83.1 percent, a value in excess of the minimum 75 percent 30-day average TSS removal required under the *California Ocean Plan*.

The 2012 *California Ocean Plan* allows Regional Boards to establish effluent TSS standards of no less than 60 mg/l. Order No. R9-2009-0001 establishes a 30-day average TSS effluent concentration limit of 75 mg/l. As shown in Table III.B-11 (page III.B-18), the maximum observed 30-day average TSS concentration in the Point Loma WWTP effluent during 2010-2013 was 50.4 mg/l.

Table III.B-16 summarizes Point Loma WTP settleable solids effluent concentrations during 2010-2013. During 2010-2013, the Point Loma WTP effluent achieved 100 percent compliance with the *California Ocean Plan* 30-day settleable solids standard of 1.0 ml/l, the 7-day average standard of 1.5 ml/l, and the maximum standard of 3.0 m/l.

As discussed in Section III.B.4, the PLOO discharge achieved 100 percent compliance with *California Ocean Plan* pH requirements. (See Table III.B-12 on page III.B-19.)

Table III.B-16
Point Loma WTP Effluent Settleable Solids Concentrations, 2010-2013

Period	Point Loma WWTP Settleable Solidsl[1,2,3] (milliliters/liter)			
	2010[2]	2011	2012	2013
January	0.2	0.4	0.5	0.2
February	0.2	0.3	0.5	0.3
March	0.2	0.2	0.4	0.3
April	0.3	0.1	0.2	0.2
May	0.2	0.3	0.2	0.2
June	0.4	0.4	0.2	0.4
July	0.4	0.4	0.3	0.5
August	0.6	0.5	0.3	0.4
September	0.5	0.4	0.3	0.2
October	0.4	0.6	0.2	0.2
November	0.4	0.8	0.2	< 0.1
December	0.4	0.4	0.4	0.2
Annual Average	0.3	0.4	0.3	0.3
Maximum 30-Day Average[4]	0.6	0.8	0.5	0.5
Maximum 7-Day Average[5]	1.0	1.7	1.1	1.0
Maximum Single Sample	2.0	3.1	2.2	2.0

1 Data from City of San Diego (2011b-2014b) for calendar years 2010-2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.
2 Order No. R9-2009-0001 became effective on August 1, 2010. The PLOO discharge was regulated by Order No. R9-2002-0025 for the first seven months of calendar year 2010.
3 Data for calendar year 2014 were not available at the time of preparation of this report. Year 2014 data will be electronically transmitted to regulators when available in 2015.
4 Maximum observed 30-day running average during 2010-2013.
5 Maximum observed 7-day running average during 2010-2013.

Acute Toxicity. Table 1 of the 2012 *California Ocean Plan* establishes a daily maximum receiving water acute toxicity standard of 0.3 TUa, to be achieved in receiving waters beyond the edge of the 10 percent point of the ZID. The *California Ocean Plan* requires that compliance with this receiving water toxicity limit be determined on the basis of the following equation:

$$C_a = \frac{C_e}{1+\frac{D_m}{10}} \qquad Equation\ III.B-8$$

where C_a = Receiving water acute toxicity at the edge of the 10 percent point of the ZID.
C_e = Effluent acute toxicity in TUa.
D_m = Minimum month initial dilution.

Within Order No. R9-2009-0001, the Regional Board and EPA determined that no reasonable potential existed for exceedance of the *California Ocean Plan* acute toxicity standard. Because no reasonable potential for exceedance exists, Order No. R9-2009-0001 implements the *California Ocean Plan* acute toxicity standard by establishing a Point Loma WWTP acute toxicity effluent performance goal of 6.42 TUa.

Order No. R9-2009-0001 requires the City to conduct semiannual acute toxicity tests on the Point Loma WTP effluent. Toxicity testing procedures are documented within the "Bioassay Testing" section within the NPDES permit application forms (Volume II). Acute toxicity tests are performed using *Atherinops affinis* (topsmelt) and *Mysidopsis bahia* (mysid shrimp).

Table III.B-17 (page III.B-27) summarizes the results of acute toxicity testing for the Point Loma WTP effluent conducted during 2010-2013. As shown in Table III.B-17, the maximum observed acute toxicity within the PLOO discharge during 2010-2013 4.63 TUa, and the Point Loma WWTP effluent achieved 100 percent compliance with the 2012 *California Ocean Plan* acute toxicity standard.

Chronic Toxicity. Table 1 of the 2012 *California Ocean Plan* establishes a daily maximum receiving water chronic toxicity standard of 1.0 TUc. The *California Ocean Plan* acute toxicity objective applies to receiving waters beyond the edge of the ZID. The *California Ocean Plan* requires that compliance with this receiving water toxicity limit be determined on the basis of the following equation:

$$C_a = \frac{C_e}{1 + D_m} \qquad Equation\ III.B-9$$

where: C_a = Receiving water chronic toxicity at the edge of the ZID.
C_e = Effluent chronic toxicity in TUc.
D_m = Minimum month initial dilution.

In accordance with this *California Ocean Plan* equation, Order No. R9-2009-0001 establishes a chronic toxicity effluent concentration limit of 205 TUc.

Table III.B-17
Point Loma WTP Acute Toxicity, 2010-2013[1]

Parameter	Acute Toxicity (TUa), 2010-2013[1] Maximum Daily Performance Goal is 6.42 TUa[2]	
	Atherinops affinis **(topsmelt)**	***Mysidopsis bahia*** **(shrimp)**
March 21, 2010	No test[3]	2.5
November 14, 2010	2.96	2.91
January 23, 2011	2.02	1.64
February 13, 2011	3.27	2.65
June 12, 2011	3.32	No test[4]
September 18, 2011	2.53	No test[4]
March 11, 2012	3.62	No test[4]
October 14, 2012	3.27	4.31
April 21, 2013	4.63	4.41
October 27, 2013	2.50	3.92
Minimum Value	2.02	1.64
Median Value	3.27	2.91
Maximum Value	4.63	4.41

1 Data from City of San Diego (2011b-2014b) for calendar years 2010-2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.
2 Acute toxicity monitoring was conducted per Order No. R9-2009-0001, which became effective on August 1, 2010. Order No. R9-2009-0001 does not establish an enforceable effluent concentration limit for acute toxicity, but establishes a maximum daily performance goal of 6.42 TUa. Provision VI.C.2.b of Order No. R9-2009-0001 requires the City to notify the Regional Board when the performance goal is exceeded and investigate, identify, and correct the cause of the exceedance. As shown above, all acute toxicity tests of the Point Loma WTP effluent conducted to date pursuant to Order No. R9-2009-0001 have complied with the 6.42 TUa performance goal.
3 Test conducted under monitoring requirements established in Order No. R9-2002-0025. No test was required for *Atherinops affinis* (topsmelt), as *Mysidopsis bahia (*shrimp) was determined to be the most sensitive species.
4 Test conducted under monitoring requirements established in Order No. R9-2009-0001. No test was required for *Mysidopsis bahia (*shrimp), as *Atherinops affinis* (topsmelt) was determined to be the most sensitive species.

In accordance with the monitoring requirements of Order No. R9-2009-0001, chronic toxicity monitoring during 2010-2013 included testing of four different species using six different types of tests:

- *Atherinops affinis* (topsmelt) for survival and growth,
- *Haliotis rufeuscens* (red abalone) for larval development,
- *Strongylocentrotus purpuratus* (purple urchin) for fertilization, and
- *Macrocystis pyrifera* (giant kelp) for germination and germ-tube length (development).

Table III.B-18 summarizes Point Loma effluent chronic toxicity monitoring during 2010-2013. Chronic toxicity exceeded the permit limit during only one test - July 8, 2013 for giant kelp. In accordance with the provisions of Order No. R9-2009-0001, accelerated chronic toxicity testing was implemented after this exceedance, but all subsequent toxicity values were within limits. Further, toxicity levels in the Point Loma WWTP effluent were too low during this period to allow implementation of toxicity identification protocols. As a result, the July 8, 2013 chronic toxicity test for giant kelp germination and growth appears to be an anomaly. All other chronic and acute toxicity tests during 2010-2013 complied with the permit limits of Order No. R9-2009-0001.

Table III.B-18
Statistical Summary of Point Loma WTP Chronic Toxicity, 2010-2013[1]

Parameter	Chronic Toxicity (TUc), 2010-2013[1] Daily Maximum Effluent Concentration Limit is 205 TUc[2]					
	Macrocystis pyrifera (giant kelp)		*Haliotis rufeuscens* (red abalone)	*Atherinops affinis* (topsmelt)		*Strongylocentrotus purpuratus* (purple urchin)
	Germination	Growth	Development	Survival	Growth	Fertilization
Number of Samples	62	61	47	12	12	11
Minimum Value	64	64	64	64	64	64
25th Percentile Value	64	64	64	64	64	64
50th Percentile (Median) Value	64	64	64	64	64	64
75th Percentile Value	101.5	64	64	64	64	64
Maximum Value	370[3,4]	370[3,4]	47	12	12	11
Number of. Exceedances[5]	1[4]	1[4]	0	0	0	0
Percent of Exceedances[6]	1.6%[4]	1.6%[4]	0.0%	0.0%	0.0%	0.0%

1 Data from City of San Diego (2011b-2014b) for calendar years 2010-2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.

2 Chronic toxicity monitoring was conducted per Order No. R9-2009-0001, which became effective on August 1, 2010. Table 9 of Order No. R9-2009-0001 establishes a daily maximum chronic toxicity effluent concentration limit of 205 TUc for the PLOO discharge.

3 If an exceedance of the effluent limit occurs and the source of the exceedance is unknown, Provision VI.C.2.d of Order No. R9-2009-0001 requires the City to conduct six additional chronic toxicity tests at two week intervals using the same test species. If all of these additional chronic toxicity results are within the effluent limit, testing at the normal schedule can be resumed.

4 Exceedance of the chronic toxicity limit occurred in the July 8, 2013 giant kelp chronic toxicity tests for germination and growth. In accordance with Provision VI.C.2.d of Order No. R9-2009-0001, the City collected and analyzed six additional chronic toxicity samples over the ensuing 12 week period. All subsequent chronic toxicity tests were within the effluent limit, and toxicity levels were too low to implement toxicity identification procedures. The cause of the isolated July 8, 2013 exceedance is unknown.

5 Number of chronic toxicity samples for the listed species during 2010 through 2013 that exceeded the 205 TUc effluent limit established in Order No. R9-2009-0001.

6 Percent of chronic toxicity samples for the listed species during 2010 through 2013 that exceeded the 205 TUc effluent limit established in Order No. R9-2009-0001.

Ocean Plan Receiving Water Standards - Protection of Aquatic Life. Table 1 of the *California Ocean Plan* establishes receiving water quality objectives to be achieved after completion of initial dilution (at the edge of the ZID). Table III.B-19 summarizes the general categories of *California Ocean Plan* Table 1 standards.

Table III.B-19
Categories of Regulated Parameters within Table 1 of the California Ocean Plan

Category	Targeted Compounds	Regulated Parameters	
		To Protect Against Chronic Impacts	To Protect Against Acute Impacts
Protection of marine aquatic life	Toxic organic and inorganic compounds	• 6-month median	• Daily maximum • Instantaneous maximum
Protection of human health	Toxic noncarcinogens	• 30-day average	Not applicable
	Toxic carcinogens	• 30-day average	Not applicable

The *California Ocean Plan* establishes the following equation to determine effluent concentration limits required to implement Table 1 receiving water quality objectives:

$$C_e = C_o + D_m(C_o - C_s) \qquad Equation\ III.B-9$$

where: C_e = effluent concentration limit to be established in the NPDES permit to achieve the *California Ocean Plan* Table 1 receiving water standard,

C_o = *California Ocean Plan* water quality standard to be met upon completion of initial dilution.

C_s = the background seawater concentration, to be assigned as zero except for arsenic (background concentration of 3 µg/l), copper (2 µg/l), mercury (0.0005 µg/l), silver (0.16 µg/l), and zinc (8 µg/l).

D_m = Minimum month initial dilution.

Based on this equation, Order No. R9-2009-0001 implements the *California Ocean Plan* Table 1 standards through the establishing PLOO effluent concentration limits and effluent performance goals. Performance goals are established in lieu of effluent concentration limits where the Regional Board and EPA determine that a reasonable potential does not exist for the *California Ocean Plan* Table 1 receiving water standard to be exceeded.

Table III.B-20 (page III.B-30) presents PLOO effluent limits and performance goals established within Order No. R9-2009-0001 for the protection of marine aquatic life. Table III.B-20 also presents maximum observed PLOO concentrations for these constituents during 2010-2013.

Table III.B-20
Compliance with California Ocean Plan
Objectives for Protection of Marine Aquatic Life

Constituent	Concentration (µg/l)						
	Maximum Observed PLOO Concentration[1]				Effluent Standard or Performance Goal[2]		
	2010	2011	2012	2013	6-Month Median	Maximum Daily	Instantaneous Maximum
Arsenic	1.54	1.46	0.903	1.71	1,000	5,900	16,000
Cadmium	0.53	0.9	0.87	1.13	210	820	2,100
Chromium (VI)[3]	6.0	3.8	2.8	9.0	410	1,600	4,100
Copper	46.8	44	35.9	34	210	2,100	5,700
Lead	12.1	5.95	3.0	4.0	410	1,600	4,100
Mercury	0.045	0.0292	0.0163	0.0162	8.1	33	82
Nickel	18.2	13.8	9.54	16.1	1,000	4,100	10,000
Selenium	2.23	1.59	1.15	1.61	2,100	12,000	31,000
Silver	0.60	0.74	0.60	1.21	110	540	1,400
Zinc	35.8	35.2	56.3	66.1	2,500	15,000	39,000
Cyanide	4.0	4.0	4.0	4.0	210	820	2,100
Ammonia	34,700	37,700	39,500	40,400	120,000	490,000	1,200,000
Chlorine residual	540	290	860	1,460	410[5]	1,600[5]	12,000[5]
Phenolic compounds	20.1	23.6	25.7	30.6	6,200[5]	25,000[5]	64,000[5]
Chlorinated phenolics	1.6	ND[4]	ND[4]	7.0	210[5]	820[5]	2,100[5]
Alpha endosulfan	0.016[6]	ND[4]	ND[4]	ND[4]	1.8[9]	3.7[9]	5.5[9]
Beta endosulfan	ND[4]	ND[4]	ND[4]	ND[4]			
Endrin	ND[4]	ND[4]	< 0.008[7]	0.0165[6]	0.41	0.82	1.2
Alpha HCH[10]	ND[4]	ND[4]	ND[4]	0.0014[8]	0.82[11]	1.6[11]	2.5[11]
Beta HCH[10]	ND[4]	ND[4]	ND[4]	0.020[8]			
Delta HCH[10]	0.085[6]	ND[4]	ND[4]	ND[4]			
Gamma HCH[10]	0.006[6]	ND[4]	ND[4]	ND[4]			

1 Maximum observed Point Loma WWTP effluent concentration during the listed year. Data from City of San Diego (2011b-2014b) for calendar years 2010-2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.
2 Effluent limit or performance goal established in Order No. R9-2009-0001 to implement *California Ocean Plan* Table 1 receiving water quality objectives for the protection of aquatic life. Performance goals are shown in regular font. Effluent limitations are shown in bold font. Constituents listed in order of appearance in Table 1 of the *California Ocean Plan*.
3 Total chromium used in lieu of hexavalent chromium.
4 ND indicates the constituent was not detected in any sample during the listed year.
5 Order No. R9-2009-0001 establishes an effluent limitation standard for chlorine residuals, phenolic compounds, and chlorinated phenolics. The Order establishes non-enforceable performance goals to implement all other listed *California Ocean Plan* Table 1 receiving water standards for the protection of aquatic habitat.
6 The constituent was detected in the Point Loma WWTP effluent in only one sample during the listed year.
7 The constituent was detected in one sample during the year, but at a concentration less than the MDL.
8 The constituent was detected but not quantifiable (DNQ) in one weekly effluent sample during 2013. The value was above the MDL but below the reporting limit.
9 The listed *California Ocean Plan* standards are for total endosulfan.
10 Alpha HCH, beta HCH, delta HCH, and gamma HCH are also known as alpha BHC, beta BHC, delta BHC, and gamma BHC.
11 The listed *California Ocean Plan* standards are for total HCH.

As shown in Table III.B-20, maximum observed PLOO discharge concentrations during 2010-2013 were less than corresponding maximum daily and instantaneous maximum effluent standards and performance goals established within Order No. R9-2009-0001 to implement *California Ocean Plan* Table 1 receiving water standards for the protection of aquatic habitat. The PLOO discharge also achieved 100 percent compliance with the 6-month median performance goals and effluent limitations established within Order No. R9-2009-0001.

Table III.B-21 (below) presents a breakdown of how the PLOO discharge achieved 100 percent compliance with the chlorine residual concentrations 6-month median and maximum day standards established in Order No. R9-2009-0001.

Table III.B-21
Point Loma WTP Effluent Chlorine Residual Concentrations, 2010-2013

Period	Point Loma WWTP Chlorine Residual[1,2] (mg/l)			
	2010	2011	2012	2013
January	0.14	0.08	ND	0.23
February	0.13	0.08	0.08	0.31
March	0.09	0.12	0.09	0.17
April	ND	0.09	0.26	0.06
May	ND	ND	0.04	0.11
June	ND	ND	ND	0.12
July	ND	ND	ND	0.20
August	ND	ND	0.16	0.07
September	ND	ND	ND	0.04
October	0.13	ND	0.17	0.19
November	ND	0.29	0.10	0.17
December	0.12	0.06	0.21	0.12
Maximum Value[3]	0.54	0.29	0.86	1.46
Median Value	0.08	0.10	0.10	0.14
Maximum 6-Month Mean[4]	ND	ND	ND	0.035

1 Data from City of San Diego (2011b-2014b) for calendar years 2010-2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.
2 Order No. R9-2009-0001 became effective on August 1, 2010. The PLOO discharge was regulated by Order No. R9-2002-0025 for the first seven months of calendar year 2010.
3 Maximum observed sample value during 2010-2013.
4 Maximum observed 6-month running mean during 2010-2013.

Receiving Water Standards - Protection of Human Health. *California Ocean Plan* Table 1 receiving water standards for the protection of human health are established on the basis of 30-day average values. Order No. R9-2009-0001 implements these *California Ocean Plan* Table 1 standards for the protection of human health by establishing PLOO effluent concentration standards or performance goals. Effluent performance goals are established in lieu of concentration standards for constituents deemed by EPA and the Regional Board to not represent a reasonable potential for non-compliance.

Table III.B-22 (page III.B-33) presents PLOO performance goals based on the *California Ocean Plan* receiving water standards for the protection of human health for non-carcinogens. For comparison, the table also presents maximum observed Point Loma WWTP effluent concentrations during 2010-2013. As shown in Table III.B-22, the PLOO discharge complies with all of the human health (non-carcinogen) performance goals by significant margins.

Table III.B-23 (pages III.B-34 and III.B-35) presents PLOO effluent concentration standards and effluent performance goals for human health (carcinogen) compounds. The only *California Ocean Plan* carcinogenic compounds detected in quantifiable concentrations within the Point Loma WWTP effluent in more than sample during 2010-2013 were:

- beryllium (detected in 11 of 194 samples during 2010-2013),
- 4,4'-DDE (detected in quantifiable concentrations in 3 of 192 samples during 2010-2013),
- chlorodibromomethane (detected in 7 of 48 samples during 2010-2013),
- chloroform (detected in all 47 samples during 2010-2013), and
- 1,4-dichlorobenzene (detected in quantifiable concentrations in 25 of 47 samples during 2010-2013).

As also shown in the table, the Point Loma WWTP effluent achieved 100 percent compliance with the 30-day average effluent limitations and performance goals established in Order No. R9-2009-0001 to implement *California Ocean Plan* receiving water standards for the protection of human health (carcinogens).

Table III.B-24 (page III.B-36) presents Point Loma WWTP effluent concentrations of chlorinated dibenzodioxins and dibenzofurans, expressed in TCDD equivalents. As shown in Table III.B-24, during 2010-2013, the Point Loma WWTP achieved 100 percent compliance with the TCDD effluent limitation established in Order No. R9-2009-0001.

Table III.B-22
Compliance with California Ocean Plan
Objectives for Protection of Human Health - Non-Carcinogens

Constituent	Concentration (µg/l)				
	Maximum Observed PLOO Concentration[1]				30-Day Average Performance Goal[2]
	2010	2011	2012	2013	
Acrolein	ND[4]	ND[4]	ND[4]	ND[4]	45,000
Antimony	ND[4]	6.7	ND[4]	6.7	255,000
Bis(2-chloroethoxy) methane	ND[4]	ND[4]	ND[4]	ND[4]	900
Bis(2-chloroisopropyl) ether	ND[4]	ND[4]	ND[4]	ND[4]	250,000
Chlorobenzene	ND[4]	ND[4]	ND[4]	0.725[5]	120,000
Chromium (III)[3]	6.0	3.8	2.8	9.0	3.9 E+07
di-n-butyl phthalate	ND[4]	ND[4]	ND[4]	ND[4]	720,000
1,2-dichlorobenzene	ND[4]	ND[4]	ND[4]	ND[4]	1,000,000[6]
1,3-dichlorobenzene	< 8.96[7]	< 8.96[7]	< 8.96[7]	ND[4]	
Diethyl phthalate	10.7	6.9	7.1	7.9	6.8 E+06
Dimethyl phthalate	ND[4]	ND[4]	ND[4]	ND[4]	1.8 E+08
4,6-dinitro-2-methylphenol	ND[4]	ND[4]	ND[4]	ND[4]	45,000
2,4-dinitrophenol	ND[4]	ND[4]	ND[4]	ND[4]	820
Ethylbenzene	ND[4]	ND[4]	ND[4]	1.53	840,000
Fluoranthene	ND[4]	ND[4]	ND[4]	ND[4]	3,100
Hexachlorocyclopentadiene	ND[4]	ND[4]	ND[4]	ND[4]	12,000
Nitrobenzene	ND[4]	ND[4]	ND[4]	ND[4]	1,000
Thallium	ND[4]	7.9	4.4	6.7	410
Toluene	2.93	2.16	2.52	2.53	1.7 E+07
Tributyltin	ND[4]	ND[4]	ND[4]	ND[4]	0.29
1,1,1-trichloroethane	ND[4]	ND[4]	ND[4]	ND[4]	1.1 E+08

1 Maximum observed Point Loma WWTP effluent concentration during the listed year. Data from City of San Diego (2011b-2014b) for calendar years 2010-2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.
2 Effluent performance goal established in Order No. R9-2009-0001 to implement *California Ocean Plan* Table 1 receiving water quality objectives for the protection of human health (non-carcinogens).
3 Total chromium used in lieu of hexavalent chromium.
4 ND indicates the constituent was not detected in any sample during the listed year.
5 Maximum chlorobenzene concentration during 2013 was 0.765 mg/l DNQ (detected not quantifiable).
6 Performance goal is for total dichlorobenzene.
7 The constituent was detected in one sample during the year, but at a concentration less than the MDL.

Table III.B-23
Compliance with California Ocean Plan
Objectives for Protection of Human Health - Carcinogens

Constituent	Concentration (µg/l)					
	Maximum Observed PLOO Concentration[1]				30-Day Average Effluent Limit[2]	30-Day Average Performance Goal[3]
	2010	2011	2012	2013		
Acrylonitrile	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	21
Aldrin	ND[4]	ND[4]	0.0062	ND[4]	NA[5]	35
Benzene	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	0.0045
Benzidene	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	0.014
Beryllium	0.043	0.084	ND.	ND	NA[5]	6.8
Bis (2-chloroethyl) ether	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	9.2
Bis (2-ethylhexyl) phthalate	< 8.96[7]	< 8.96[7]	< 8.96[7]	ND[4]	NA[5]	720
Carbon tetrachloride	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	180
Alpha (cis) chlordane	ND[4]	ND[4]	ND[4]	ND[4]	0.0047[8]	NA[6]
Gamma chlordane	ND[4]	ND[4]	ND[4]	ND[4]		
Oxychlordane	ND[4]	ND[4]	ND[4]	ND[4]		
Chlorodibromomethane	0.785	1.18	0.985	1.02	1,800	NA[6]
Chloroform	10.1	5.6	7.07	10.8	27,000	NA[6]
o,p-DDD (2,4'-DDD)	ND[4]	ND[4]	ND[4]	ND[4]	0.035[9]	NA[5]
o,p-DDE (2,4'-DDE)	ND[4]	ND[4]	< 0.001[7]	ND[4]		
o,p-DDT (2,4'-DDT)	ND[4]	ND[4]	ND[4]	ND[4]		
p,p-DDD (4,4'-DDD)	ND[4]	ND[4]	ND[4]	ND[4]		
p,p-DDE (4,4'-DDE)	ND[4]	ND[4]	0.0024	< 0.00255[7]		
p,p-DDT (4,4'-DDT)	ND[4]	ND[4]	ND[4]	ND[4]		
1,4-dichlorobenzene	0.925	0.825	0.645	0.61	3,700	NA[6]
3,3-dichlorobenzidene	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	1.7
1,2-dichloroethane	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	5,700
1,1-dichlroethylene	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	180
Dichlorobromomethane	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	1,300
Dichloromethane (methylene chloride)	ND[4]	ND[4]	ND[4]	ND[4]	NA	92,000
cis 1,3-dichloropropene	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	1,800
Trans-1,3-dichloropropene	ND[4]	ND[4]	ND[4]	ND[4]		
Dieldrin	ND[4]	ND[4]	ND[4]	ND[4]	0.0082	NA[6]
2,4-dinitrotoluene	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	530
1,2-diphenylhydrazine	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	33
Bromoform	ND[4]	ND[4]	ND[4]	ND[4]	27,000[10]	NA[6]
Bromomethane (methyl bromide)	ND[4]	ND[4]	ND[4]	ND[4]		
Chloromethane (methyl chloride)	ND[4]	ND[4]	ND[4]	ND[4]		
Heptachlor	ND[4]	ND[4]	ND[4]	ND[4]	0.010	NA[6]
Heptachlor epoxide	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	0.0041
Hexachlorobenzene	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	0.043
Hexachlorobutadiene	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	2,900
Hexachloroethane	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	510
Isophorone	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	150,000

Table III.B-23 is continued on page III.B-35 (Table III.B-23 footnotes follow on page III.B-35)

Table III.B-23 (continued)
Compliance with California Ocean Plan
Objectives for Protection of Human Health - Carcinogens

Constituent	Concentration (µg/l)					
	Maximum Observed PLOO Concentration[1]				30-Day Average Effluent Limit[2]	30-Day Average Performance Goal[3]
	2010	2011	2012	2013		
N-nitrosodimethylamine	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	1,500
N-nitrosodi-n-propylamine	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	78
N-nitrosodiphenylamine	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	510
Acenaphthylene	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	1.8[11]
Anthracene	ND[4]	ND[4]	ND[4]	ND[4]		
benzo (a) anthracene)	ND[4]	ND[4]	ND[4]	ND[4]		
3,4-benzofluoranthene)	ND[4]	ND[4]	ND[4]	ND[4]		
benzo (k) fluoranthene	ND[4]	ND[4]	ND[4]	ND[4]		
benzo (g,h,i) perylene	ND[4]	ND[4]	ND[4]	ND[4]		
benzo (a) pyrene	ND[4]	ND[4]	ND[4]	ND[4]		
Chrysene	ND[4]	ND[4]	ND[4]	ND[4]		
dibenzo (a,h) anthracene	ND[4]	ND[4]	ND[4]	ND[4]		
Fluorene	ND[4]	ND[4]	ND[4]	ND[4]		
ideno (1,2,3-cd) pyrene	ND[4]	ND[4]	ND[4]	ND[4]		
Phenanthrene	ND[4]	ND[4]	ND[4]	ND[4]		
Pyrene	ND[4]	ND[4]	ND[4]	ND[4]		
PCB 1016	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	0.0039[12]
PCB 1221	ND[4]	ND[4]	ND[4]	ND[4]		
PCB 1232	ND[4]	ND[4]	ND[4]	ND[4]		
PCB 1242	ND[4]	ND[4]	ND[4]	ND[4]		
PCB 1248	ND[4]	ND[4]	ND[4]	ND[4]		
PCB 1254	ND[4]	ND[4]	ND[4]	ND[4]		
PCB 1260	ND[4]	ND[4]	ND[4]	ND[4]		
PCB 1262	ND[4]	ND[4]	ND[4]	ND[4]		
1,1,2,2-tetrachloroethane	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	470
Tetrachloroethylene	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	410
Toxaphene	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	0.043
Trichloroethylene	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	5,500
1,1,2-trichloroethane	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	1,900
2,4,6-trichlorophenol	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	59
Vinyl chloride	ND[4]	ND[4]	ND[4]	ND[4]	NA[5]	7,400

1 Maximum observed Point Loma WWTP effluent concentration during the listed year. Data from City of San Diego (2011b-2014b) for calendar years 2010-2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available.
2 Effluent concentration limit established in Order No. R9-2009-0001 to implement *California Ocean Plan* Table 1 receiving water quality objectives for the protection of human health (carcinogens).
3 Effluent performance goal established in Order No. R9-2009-0001 to implement *California Ocean Plan* Table 1 receiving water quality objectives for the protection of human health (carcinogens).
4 ND indicates the constituent was not detected in any sample during the listed year.
5 Not applicable. Order No. R9-2009-0001 does not establish an effluent concentration limitation for the constituent.
6 Not applicable. Order No. R9-2009-0001 does not establish a performance goal for the constituent.
7 The constituent was detected but not quantifiable (DNQ).
8 Effluent standard applies to the sum of chlordane compounds.
9 Effluent performance goal applies to the sum of DDD, DDE, and DDT isomers.
10 Effluent performance goal applies to the sum of halomethane compounds (bromoform, bromomethane, and chloromethane).
11 Effluent performance goal applies to the sum of the listed polynuclear aromatic hydrocarbons (PAHs).
12 Effluent standard applies to the sum of PCB isomers.

Table III.B-24
Compliance with California Ocean Plan
Objectives for Protection of Human Health - TCDD Equivalents

Constituent[1]	TCDD Equivalents (µg/l)				
	Maximum Observed PLOO Concentration[2]				30-Day Average Performance Goal[3]
	2010	2011	2012	2013	
2,3,7,8-tetra CDD	ND[4]	ND[4]	ND[4]	ND[4]	8.0 E -07[2]
1,2,3,7,8-penta CDD	ND[4]	ND[4]	ND[4]	ND[4]	
1,2,3,4,7,8_hexa_CDD	ND[4]	ND[4]	ND[4]	ND[4]	
1,2,3,6,7,8-hexa CDD	ND[4]	ND[4]	ND[4]	ND[4]	
1,2,3,7,8,9-hexa CDD	ND[4]	ND[4]	ND[4]	ND[4]	
1,2,3,4,6,7,8-hepta CDD	4.8 E -09	< 7.4 E -08[5]	< 5.6 E -08[5]	< 5.5 E -08[5]	
octa CDD	3.0 E -08	1.2 E -07	< 4.6 E -08[5]	< 3.6 E -08[5]	
2,3,7,8-tetra CDF	ND[4]	ND[4]	ND[4]	ND[4]	
1,2,3,7,8-penta CDF	ND[4]	ND[4]	ND[4]	ND[4]	
2,3,4,7,8-penta CDF	ND[4]	ND[4]	ND[4]	ND[4]	
1,2,3,4,7,8-hexa CDF	ND[4]	ND[4]	ND[4]	ND[4]	
1,2,3,6,7,8-hexa CDF	ND[4]	ND[4]	ND[4]	< 4.9 E -08[5]	
1,2,3,7,8,9-hexa CDF	ND[4]	ND[4]	ND[4]	ND[4]	
2,3,4,6,7,8-hexa CDF	ND[4]	ND[4]	ND[4]	ND[4]	
1,2,3,4,6,7,8-hepta CDF	ND[4]	ND[4]	ND[4]	ND[4]	
1,2,3,4,7,8,9-hepta CDF	ND[4]	ND[4]	ND[4]	ND[4]	
Octa CDF	ND[4]	< 2.0 E -09[5]	4.0 E -09	ND[4]	

1 Chlorinated dibenzodioxin (CDD) and chlorinated dibenzofuran (CDF) compounds.
2 Maximum observed Point Loma WWTP effluent concentration during the listed year. Data from City of San Diego (2011b-2014b) for calendar years 2010-2013. 2013 is the most recent year for which a complete 12 month data set is available. Data for calendar year 2014 will be electronically transmitted to regulators under separate cover when available. TCDD equivalents are in concentrations of picograms per liter (10^{-6} µg/l), and represent the concentration of the constituent multiplied by the respective toxicity factors.
3 Effluent performance goal for the sum of chlorinated dibenzodioxins and chlorinated dibenzofurans, expressed as TCDD equivalents.
4 ND indicates the constituent was not detected in any sample during the listed year.
5 The constituent was detected but not quantifiable (DNQ).

Method Detection Limits and Compliance. As shown above, during 2010-2013 the Point Loma WWTP achieved 100 percent compliance with NPDES effluent limitations and performance goals that implement *California Ocean Plan* receiving water standards for the protection of aquatic habitat and the protection of public health. It should be noted that *California Ocean Plan* receiving water standards are established at concentrations less than achievable MDLs for several constituents. The *California Ocean Plan* requires attainment of "Minimum Levels" that represent the lowest quantifiable concentration based on proper application of method specific analytical procedures. The City's wastewater chemistry laboratory achieves MDLs that are consistent with the required Minimum Levels established in the *California Ocean Plan*.

Implementation Provision III.C.8(a) of the 2012 *California Ocean Plan* states:

> *III.C.8(a) Dischargers are out of compliance with the effluent limitation if the concentration of the pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the reported Minimum Level.*

All Point Loma WWTP effluent samples for *California Ocean Plan* constituents during 2010-2013 were either below the corresponding *California Ocean Plan*-based effluent limit/performance goal or below the reported Minimum Level.

Additional Ocean Plan Receiving Water Objectives. In addition to establishing receiving water quality objectives for toxic constituents, the *California Ocean Plan* establishes numerical receiving water quality objectives for total and fecal coliform, dissolved oxygen, and pH. The *California Ocean Plan* also established narrative objectives for physical, chemical, and biological characteristics.

Compliance of the PLOO discharge with *California Ocean Plan* standards for DO, suspended solids, and pH are addressed in the response to Questionnaire Section III.B.6. The responses to Questionnaire Section III.E.2 and Appendix I.2 documents compliance of the PLOO discharge with *California Ocean Plan* recreational body contact bacteriological standards.

Discharge to Federal Waters. While the PLOO discharges outside the three nautical mile limit of state-regulated waters, the effluent standards and performance goals of Order No. R9-2009-0001 are established on the basis of achieving compliance with *California Ocean Plan* Table 1 receiving water standards at the edge of the PLOO ZID. As a result, even though the discharge is outside state-regulated waters, the PLOO discharge is required to comply with *California Ocean Plan* Table 1 receiving water standards. Thus, state-adopted receiving water standards for the protection of aquatic habitat and the protection of human health (consumption of organisms) are in effect throughout the PLOO discharge zone, even though the PLOO discharge occurs outside the three nautical mile limit.

As documented within, the PLOO discharge complies with all applicable State of California water quality-based standards and technology-based standards.

Federal Water Quality Criteria. EPA establishes federal water quality criteria to protect marine life and human health. Current updated federal water quality criteria are located at: http://www.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm. Federal criteria applicable to the PLOO discharge include:

- acute criteria for the protection of saltwater aquatic habitat,
- chronic criteria for the protection of saltwater aquatic habitat, and
- criteria for the protection of human health (consumption of organisms).

The federal criteria do not represent standards, but provide guidance to states and tribes for establishing water quality standards. The criteria also are useful in assessing potential impacts from wastewater discharges.

Table III.B-25 (pages III.B-39 through and III.B-41 presents current EPA water quality criteria for the protection of saltwater habitat and human health (consumption of organisms). For comparison, the table also presents *California Ocean Plan* standards for these constituents.

The *California Ocean Plan* establishes water quality standards for each of the constituents addressed by EPA water quality criteria for which a reasonable potential exists for the constituents to be present in wastewater in concentrations that could potential impact beneficial uses. As shown in Table III.B-25, almost all of the EPA constituents are addressed by comparable *California Ocean Plan* water quality standards.

The *California Ocean Plan* does not establish standards for a limited number of constituents for which EPA has established criteria. Table III.B-26 (III.B-42) summarizes EPA-recommended constituents for which comparable *California Ocean Plan* standards were not established. These compounds, in part, include:

- organophosphorus pesticides such as chlorpyrifos, demeton, diazanon, guthion, and malathion,
- chlorinated pesticides such as mirex and methoxychlor, and
- less common compounds such as n-nitrosodibutylamine, n-nitrosodipyrrolidine, n-nitrosodiethylamine, and bis (chromomethyl) ether.

As shown in Table III.B-26, most of these compounds were not present in the Point Loma WWTP effluent during 2010-2013. The PLOO discharge thus complies with the EPA criteria for these constituents.

For constituents that were periodically detected in the Point Loma WWTP effluent during 2010-2013 (e.g. malathion and diazanon), the initial dilution achieved by the PLOO would ensure compliance with EPA water quality criteria.

Table III.B-25
Comparison of EPA Water Quality Criteria and California Ocean Plan Standards

CAS[1] Number	Compound	EPA Water Quality Criteria[2]			California Ocean Plan Receiving Water Standard[3]		
		Saltwater Aquatic Habitat		Human Health[4]	Saltwater Aquatic Habitat		Human Health[4]
		CMC[5] (acute)	CCC[5] (chronic)	Chronic	6-Month Median	Daily Maximum	30-Day Average
83329	Acenapthylene	NA[6]	NA[6]	990	NA[7]	NA[7]	0.0088
107028	Acrolein	NA[6]	NA[6]	9.0	NA[7]	NA[7]	220
107131	Acrylonitrile	NA[6]	NA[6]	0.25	NA[7]	NA[7]	0.1
107028	Aldrin	1.3	NA[6]	5E-005	NA[7]	NA[7]	2.2E-005
120127	Anthracene	NA[6]	NA[6]	40,000	NA[7]	NA[7]	0.0088[8]
7440360	Antimony	NA[6]	NA[6]	640	NA[7]	NA[7]	1200
7440382	Arsenic	69	36	0.14	3.0	12	NA[7]
71432	Benzene	NA[6]	NA[6]	51	NA[7]	NA[7]	5.9
92875	Benzidene	NA[6]	NA[6]	0.0002	NA[7]	NA[7]	6.9E-005
56553	Benzo (a) anthracene	NA[6]	NA[6]	0.018	NA[7]	NA[7]	0.0088[8]
50328	Benzo (a) pyrene	NA[6]	NA[6]	0.018	NA[7]	NA[7]	0.0088[8]
205992	Benzo (b) fluoranthene	NA[6]	NA[6]	0.018	NA[7]	NA[7]	0.0088[8]
207089	benzo (k) fluoranthene	NA[6]	NA[6]	0.018	NA[7]	NA[7]	0.0088[8]
319846	BHC alpha (HCH)	NA[6]	NA[6]	0.0049	0.004	0.008	NA[7]
319857	BHC beta (HCH)	NA[6]	NA[6]	0.017	0.004	0.008	NA[7]
58899	BHC gamma (Lindane)	0.16	NA[6]	1.8	0.004	0.008	NA[7]
33213659	bis (2-chloroethyl) ether	NA[6]	NA[6]	0.53	NA[7]	NA[7]	0.045
111444	bis (2-chloroisopropyl) ether	NA[6]	NA[6]	65,000	NA[7]	NA[7]	4.4
543881	bis (chromomethyl) ether	NA[6]	NA[6]	0.00029	NA[7]	NA[7]	NA[7]
108601	bis (2-ethylhexyl) phthalate	NA[6]	NA[6]	2.2	NA[7]	NA[7]	3.5
75252	Bromoform	NA[6]	NA[6]	140	NA[7]	NA[7]	130[10]
85687	Butyl benzyl phthalate	NA[6]	NA[6]	1900	NA[7]	NA[7]	NA[7]
7440439	Cadmium	40	0.53	NA	1.0	4.0	NA[7]
56235	Carbon tetrachloride	NA[6]	NA[6]	1.6	NA[7]	NA[7]	0.9
57749	Chlordane	0.09	0.04	0.00081	NA[7]	NA[7]	2.3E-005
108907	Chlorobenzene	NA[6]	NA[6]	1600	NA[7]	NA[7]	570
124481	Chlorodibromomethane	NA[6]	NA[6]	13	NA[7]	NA[7]	8.6
67663	Chloroform	NA[6]	NA[6]	470	NA[7]	NA[7]	130[10]
91587	2-chloronaphthalane	NA[6]	NA[6]	1,600	NA[7]	NA[7]	NA[7]
95578	2-chloro	NA[6]	NA[6]	150	1.0[11]	4.0[11]	NA[7]
2921992	Chlorpyrifos	0.011	0.0056	NA	NA[7]	NA[7]	NA[7]
18540299	Chromium VI	1100	1.2	NA	2.0	8.0	NA[7]
208019	Chrysene	NA[6]	NA[6]	0.018	NA[7]	NA[7]	0.0088[8]
7440508	Copper	5.0	0.63	NA	3.0	12	NA[7]
57125	Cyanide	1.0	1.0	140	1.0	4.0	NA[7]
72548	4,4'-DDD	NA[6]	NA[6]	0.00031	NA[7]	NA[7]	0.00017[9]
72559	4,4'-DDE	NA[6]	NA[6]	0.00022	NA[7]	NA[7]	0.00017[9]
50293	4,4'-DDT	0.13	0.001	0.00022	NA[7]	NA[7]	0.00017[9]
8065483	Demeton	NA[6]	0.1	NA	NA[7]	NA[7]	NA[7]
33415	Diazanon	0.82	0.82	NA	NA[7]	NA[7]	NA[7]
53703	Dibenzo (a,h) anthracene	NA[6]	NA[6]	0.018	NA[7]	NA[7]	0.0088[8]
95501	1,2-dichlorobenzene	NA[6]	NA[6]	1,300	NA[7]	NA[7]	570[13]
541371	1,3-dichlorobenzene	NA[6]	NA[6]	960	NA[7]	NA[7]	570[13]
106467	1,4-dichlorobenzene	NA[6]	NA[6]	190	NA[7]	NA[7]	570[13]
91941	3,3-dichlorobenzidene	NA[6]	NA[6]	0.028	NA[7]	NA[7]	0.0081
75274	Dichlorobromomethane	NA[6]	NA[6]	17	NA[7]	NA[7]	6.2
107062	1,2-dichloroethane	NA[6]	NA[6]	37	NA[7]	NA[7]	28
75354	1,1-dichloroethylene	NA[6]	NA[6]	7,100	NA[7]	NA[7]	0.9
156605	1,2-trans-dichloroethylene	NA[6]	NA[6]	10,000	NA[7]	NA[7]	NA[7]

Table III.B-25 is continued on the next page. Table III.B-25 footnotes are shown on page III.B-41.

Table III.B-25 (continued)
Comparison of EPA Water Quality Criteria and California Ocean Plan Standards

CAS[1] Number	Compound	EPA Water Quality Criteria[2]			California Ocean Plan Receiving Water Standard[3]		
		Saltwater Aquatic Habitat		Human Health[4]	Saltwater Aquatic Habitat		Human Health[4]
		CMC[5] (acute)	CCC[5] (chronic)	Chronic	6-Month Median	Daily Maximum	30-Day Average
88062	2,4-dichlorophenol	NA[6]	NA[6]	290	30[12]	120[12]	NA[7]
78875	1,2-dichloropropane	NA[6]	NA[6]	15	NA[7]	NA[7]	NA[7]
542756	1,3-dichloropropene	NA[6]	NA[6]	21	NA[7]	NA[7]	8.9
60571	Dieldrin	0.71	0.0019	5.4E-005	NA[7]	NA[7]	4E-005
105679	2,4-dimethylphenol	NA[6]	NA[6]	850	30[12]	120[12]	NA[7]
84662	Diethyl phthalate	NA[6]	NA[6]	44,000	NA[7]	NA[7]	33000
131113	Dimethyl phthalate	NA[6]	NA[6]	1,100,000	NA[7]	NA[7]	820000
84742	Di-n-butyl phthalate	NA[6]	NA[6]	4,500	NA[7]	NA[7]	3500
25550587	Dinitrophenols	NA[6]	NA[6]	5,300	30[12]	120[12]	NA[7]
534521	4,6-dinitro-2-methylphenol	NA[6]	NA[6]	280	30[12]	120[12]	220
120832	2,4-dinitrophenol	NA[6]	NA[6]	5,300	30[12]	120[12]	4.0
121142	2,4-dinitrotoluene	NA[6]	NA[6]	3.4	NA[7]	NA[7]	2.6
122667	1,2-diphenylhydrazine	NA[6]	NA[6]	0.2	NA[7]	NA[7]	0.16
959988	Endosulfan (alpha)	0.034	0.087	89	0.009[14]	0.018[14]	NA[7]
33213659	Endosulfan (beta)	0.034	0.0087	89	0.009[14]	0.018[14]	NA[7]
1031078	Endosulfan sulfate	NA[6]	NA[6]	89	0.009[14]	0.018[14]	NA[7]
72208	Endrin	0.37	NA[6]	0.06	0.002	0.004	NA[7]
7421934	Endrin aldehyde	NA[6]	NA[6]	0.3	0.002	0.004	NA[7]
100414	Ethylbenzene	NA[6]	NA[6]	2100	NA[7]	NA[7]	4100
206440	Fluoranthene	NA[6]	NA	140	NA[7]	NA[7]	15
86737	Fluorene	NA[6]	NA[6]	5,300	NA[7]	NA[7]	0.0088[8]
86500	Guthion	NA[6]	0.01	NA[6]	NA[7]	NA[7]	NA[7]
76448	Heptachlor	0.053	0.0036	7.9E-005	NA[7]	NA[7]	5E-005
1024573	Heptachlor epoxide	0.053	0.0036	3.9E-005	NA[7]	NA[7]	3E-005
118741	Hexachlorobenzene	NA[6]	NA[6]	2.9E-005	NA[7]	NA[7]	0.00021
87683	Hexachlorobutadiene	NA[66]	NA[6]	18	NA[7]	NA[77]	14[7]
608731	Hexachlorocyclohexane	NA	NA[6]	0.041	0.04	0.08	NA[7]
77474	Hexachlorocyclopentadiene	NA[6]	NA	1100	NA[7]	NA[7]	58
67721	Hexachloroethane	NA[6]	NA[6]	3.3	NA[7]	NA[7]	2.5
193395	Ideno (1,2,3-cd) pyrene	NA[6]	NA[6]	0.018	NA[7]	NA[7]	0.0088[8]
78591	Isophorone	NA[6]	NA[6]	960	NA[7]	NA[7]	730
7439921	Lead	210	8.1	NA[6]	2.0	8.0	NA[7]
121755	Malathion	NA[6]	0.1	NA[6]	NA[7]	NA[7]	NA[7]
7439976	Mercury	1.8	0.94	NA[6]	0.04	0.16	NA[7]
72435	Methoxychlor	NA[6]	0.03	NA[6]	NA[7]	NA[7]	NA[7]
2385855	Mirex	NA[6]	0.001	NA[6]	NA[7]	NA[7]	NA[7]
7440020	Nickel	74	8.2	4600	5.0	20	NA[7]
98953	Nitrobenzene	NA[6]	NA[6]	690	NA[7]	NA[7]	4.9
924163	Nitrosodibutylamine	NA[6]	NA[6]	0.22	NA[7]	NA[7]	NA[7]
55185	Nitrosodiethylamine	NA[6]	NA[6]	1.24	NA[7]	NA[7]	NA[7]
930552	Nitrosodipyrrolidine	NA[6]	NA[6]	34	NA[7]	NA[7]	NA[7]
62759	N-nitrosodi-n-propylamine	NA[6]	NA[6]	0.51	NA[7]	NA[7]	0.38
621647	N-nitrosodimethylamine	NA[6]	NA[6]	3.0	NA[7]	NA[7]	7.3
86306	N-nitrosodiphenylamine	NA[6]	NA[6]	6.0	NA[7]	NA[7]	2.5
84852153	Nonylphenol	NA[6]	NA[6]	1.7	30[12]	120[12]	NA[7]
608935	Pentachlorobenzene	NA[6]	NA[6]	1.5	NA[7]	NA	NA[7]
87865	Pentachlorophenol	13	7.9	3.0	1.0[11]	4.0[11]	NA[7]
108952	Phenol	NA[6]	NA[6]	1,700,000	30[12]	120[12]	NA[7]
129000	Pyrene	NA[6]	NA[6]	4,000	NA[7]	NA[7]	0.0088[8]

Table III.B-25 is continued on the next page. Table III.B-25 footnotes are shown on page III.B-41.

Table III.B-25 (continued)
Comparison of EPA Water Quality Criteria and California Ocean Plan Standards

CAS[1] Number	Compound	EPA Water Quality Criteria[2]			California Ocean Plan Receiving Water Standard[3]		
		Saltwater Aquatic Habitat		Human Health[4]	Saltwater Aquatic Habitat		Human Health[4]
		CMC[5] (acute)	CCC[5] (chronic)	Chronic	6-Month Median	Daily Maximum	30-Day Average
129000	Pyrene	NA[6]	NA[6]	4,000	NA[7]	NA[7]	0.0088[8]
7782492	Selenium	290	71	4,200	15	60	NA[7]
7440224	Silver	1.9	NA[6]	NA[6]	0.7	2.8	NA[7]
79345	1,1,2,2-tetrachloroethane	NA[6]	NA[6]	4.0	NA[7]	NA[7]	4.3
95943	1,2,4,5-tetrachlorobenzene	NA[6]	NA[6]	1.10	NA[7]	NA[7]	NA[7]
128184	Tetrachloroethylene	NA[6]	NA[6]	3.3	NA[7]	NA[7]	2.0
79005	1,1,2-trichloroethane	NA[6]	NA[6]	16	NA[7]	NA[7]	9.4
7440280	Thallium	NA[6]	NA[6]	0.47	NA[7]	NA[7]	2.0
108883	Toluene	NA[6]	NA[6]	15,000	NA[7]	NA[7]	85,000
8001352	Toxaphene	0.21	0.0002	0.00028	NA[7]	NA[7]	0.00032
79016	Trichloroethylene	NA[6]	NA[6]	30	NA[7]	NA[7]	2.0
120821	1,2,4-trichlorobenzene	NA[6]	NA[6]	70	NA[7]	NA[7]	NA[7]
95954	2,4,5-trichlorophenol	NA[6]	NA[6]	3,600	1.0[11]	4.0[11]	0.29
88062	2,4,6-trichlorophenol	NA[6]	NA[6]	2.4	1.0[11]	4.0[11]	0.29
75014	Vinyl chloride	NA[6]	NA[6]	2.4	NA[7]	NA[7]	36
7440666	Zinc	90	81	26,000	20	80	NA[7]
1746016	2,3,7,8-TCDD (dioxin)	NA[6]	NA[6]	5.1E-09	NA[7]	NA[7]	3.9E-09

1 Chemical Abstracts Service number.
2 National EPA recommended water quality criteria for the protection of aquatic life and human health is published by EPA pursuant to Section 304(a) of the Clean Water Act to provide guidance to states and tribes for use in adopting water quality standards.
3 *California Ocean Plan* receiving water standard to be achieved upon completion of initial dilution. (State Board, 2012)
4 Criteria or standard for the protection of human health for the consumption of organisms.
5 Criteria Maximum Concentration (CMC) is the estimate of the highest concentration an aquatic habitat can briefly be exposed without an unacceptable effect. Criteria Continuous Concentration (CCC) is the estimate of the highest concentration an aquatic habitat can be indefinitely exposed without resulting in unacceptable effect.
6 Not applicable. No EPA water quality criterion is established for the constituent.
7 Not applicable. No *California Ocean Plan* receiving water standard is established for the constituent.
8 Standard applies to sum of polynuclear aromatic hydrocarbons (PAHs).
9 Standard applies to sum of DDD, DDE, and DDT isomers.
10 Standard applies to sum of halomethanes (e.g. bromoform, bromomethane, and chloromethane).
11 Standard applies to sum of chlorinated phenols.
12 Standard applies to sum of non-chlorinated phenols.
13 Standard applies to sum of dichlorobenzenes (e.g. 1,2-dichlorobenzene, 1,2-dichlorobenzene).
14 Standard applies to endosulfan alpha, endosulfan beta, and endosulfan sulfate.

While several of the EPA-listed constituents (see Table III.B-26) are not specifically analyzed, compliance with the EPA criteria is virtually assured by the facts that:

- the compounds are not routinely present in municipal wastewater,
- similar (and surrogate) compounds are not present in the Point Loma WWTP effluent, and
- unreasonably high concentrations of the constituents would be required in the Point Loma WWTP effluent in order to approach the EPA water quality criteria concentrations upon completion of initial dilution.

Table III.B-26
Non-Regulated Compounds Addressed within EPA Water Quality Criteria[1]

Category	Constituents	Rationale for PLOO Compliance
Organophosphorus pesticides	• Chlorpyrifos • Demeton • Diazanon • Guthion • Malathion	These constituents are monitored monthly in the Point Loma WWTP effluent. Malathion and diazanon were occasionally detected during 2010-2013. The highest observed malathion concentration 0.65 µg/l and the highest observed diazanon concentration was 0.10 µg/l. After initial dilution, the PLOO discharge would comply with the EPA water quality criteria for these organophosphorus pesticides by a significant margin.
Chlorinated pesticides	• Mirex • Methoxychlor	Mirex and methoxychlor are monitored monthly in the Point Loma WWTP effluent and were not detected during 2010-2013.
Base Neutrals	• Butyl benzyl phthalate • 2-chloronaphthalene • 1,2-trans-dichloroethene • 1,2-dichloropropane • 1,1,2,2-tetrachloroethane • 1,2,4-trichlorobenzene	The Point Loma WWTP effluent is analyzed monthly for these compounds. None of the compounds were detected in the Point Loma WWTP effluent during 2010-2013.
	• N-nitrosodibutylamine • N-nitrosodipyrrolidine • N-nitrosodiethylamine • bis (chromomethyl) ether	The compounds are not specifically analyzed in the Point Loma WWTP effluent, but are screened as part of base/neutral analyses. The compounds are unlikely to be present in the Point Loma WWTP effluent. Similar more common compounds (e.g. n-nitrosodimethylamine and n-nitrosodiphenylamine) were not detected in the Point Loma WWTP effluent during 2010-2013.
Purgeable Compounds	• Pentachlorobenzene	Pentachlorobenzene is not specifically analyzed, but is screened as part of priority pollutant analyses. The compound is unlikely to be present in the Point Loma WWTP effluent, as more common chlorinated benzene compounds (e.g. dichlorobenzene) are rarely detected, and then at low concentrations that ensure compliance with water quality standards and criteria.

1 Constituents for which EPA has established water quality criteria but for which no corresponding *California Ocean Plan* water quality standard has been established.

NPDES Permit Requirements and Performance Benchmarks. In addition to establishing effluent performance goals that implement *California Ocean Plan* receiving water standards, Order No. R9-2009-0001 (NPDES CA0107409) establishes effluent benchmarks for use in determining which parameters require antidegradation analysis at the end of the current NPDES permit period.

An analysis of compliance with the benchmarks is presented in Chapter 2 of the Antidegradation Study portion of this 301(h) application. (See Part 3 of Volume II.) As shown in the Antidegradation Study, the City achieved compliance with all NPDES mass emission benchmarks during 2010-2013 except for non-chlorinated phenolic compounds. Analyses presented in Part 3 of Volume II demonstrates that the mass emissions of non-chlorinated phenol from the PLOO are in compliance with Tier I antidegradation regulations and that no Tier II analysis is required.

Violations of Effluent Standards During 2010-2013. The comprehensive City of San Diego monitoring program annually conducts in excess of 10,000 analyses of the Point Loma WWTP effluent discharge on hundreds of effluent samples. With the aforementioned exception of the anomalous July 8, 2013 giant kelp chronic toxicity sample, the City achieved 100 percent compliance during 2010-2013 with the:

- effluent concentration limitations and mass emission standards established in Table 8.a of Order No. R9-2009-0001 that implement the provisions of CWA Sections 301(h) and 301(j)(5),
- effluent concentrations limitations and mass emission standards established in Table 8.b of Order No. R9-2009-0001 that implement *California Ocean Plan* Table 2 technology-based standards,
- effluent concentration limitations and mass emission limitations established in Table 9 of Order No. R9-2009-0001 that implement *California Ocean Plan* Table 1 receiving water standards, and
- effluent concentration and mass emission performance goals established in Table 10 of Order No. R9-2009-0001 that implement *California Ocean* Plan Table 1 receiving water standards for constituents for which enforceable effluent standards were not established.

TSS mass emission were reduced during the effective period of Order No. R9-2009-0001, and the implementation of the system-wide chemical addition program (PRI-SC) during the past two years has allowed the Point Loma WWTP to achieve TSS concentrations that consistently approach (or go below) 30 mg/l.

III.B.8. Provide the determination required by 40 CFR 125.60(b)(2) or, if the determination has not yet been received, a copy of a letter to the appropriate agency(s) requesting the required determination.

The City has requested (see correspondence in Appendix X) that the Regional Board provide an updated determination of compliance for the PLOO discharge. A copy of this determination will be forwarded to EPA when it is received by the City.

Section III.C
Impact on Public Water Supplies

Renewal of NPDES CA0107409

III.C IMPACT ON PUBLIC WATER SUPPLIES

III.C.1. Is there a planned or existing public water supply (desalinization facility) intake in the vicinity of the current or modified discharge?

SUMMARY: No existing or planned water supply facilities are located in the vicinity of the PLOO discharge.

The only planned seawater desalination facility in San Diego County is a 50 mgd facility currently being constructed at the site of the Encina Power Station in Carlsbad, California. The Encina Power Station site is located 30 miles north of the PLOO. Under the proposed desalination plan, the Poseidon facility will divert up to 100 mgd of saline water from Agua Hedionda Lagoon via an existing Encina Power Station cooling water intake structure. Waste brine from the desalination facility will be discharged to the Pacific Ocean (surf zone discharge south of the mouth of Agua Hedionda Lagoon) via an existing Encina Power Station cooling water effluent channel.

In 2006, the Regional Board adopted a NPDES permit (Order No. R9-2006-0065, NPDES CA0109233) to regulate the Poseidon Resources Corporation discharge of waste brine to the ocean. Poseidon currently has an application on file with the Regional Board seeking renewal of NPDES CA0109233. The California Coastal Commission approved the desalination project in November 2007.

As part of oceanographic studies submitted to the Regional Board in application for the NPDES permit, computer modeling performed by Jenkins and Waysl (2001, 2004) concluded that only a small portion of the Poseidon seawater desalination brine discharge (less than 1 percent) would be re-eintrained in the Agua Hedionda Lagoon intake. The mouth of Agua Hedionda Lagoon mouth is located north of the brine discharge point, and the PLOO is a further 30 miles south. As a result, the PLOO discharge will not have any discernible effect on the proposed Agua Hedionda Lagoon seawater intake.

The Poseidon Resources Corporation seawater desalination facility proposed at Carlsbad is the only seawater desalination facility identified within long-term water plans developed by the San Diego County Water Authority. (San Diego County Water Authority, 2011)

III.C.2. If yes,

a. What is the location of the intake(s) (latitude and longitude)?

b. Will the modified discharge(s) prevent use of the intake(s) for public water supply?

c. Will the modified discharge(s) cause increased treatment requirements for the public water supply(s) to meet local, State, and EPA drinking water standards?

The question is not applicable, since no existing or planned public drinking water supply intake facilities exist or are proposed in the vicinity of the PLOO discharge.

Section III.D
Biological Impact of Discharge

Renewal of NPDES CA0107409

III.D BIOLOGICAL IMPACT OF DISCHARGE

III.D.1 Does (will) a balanced indigenous population of shellfish, fish, and wildlife exist:

- **Immediately beyond the ZID of the current and modified discharge(s)?**
- **In all other areas beyond the ZID where marine life is actually or potentially affected by the current and modified discharge?**

SUMMARY: A balanced indigenous population (BIP) exists immediately beyond the ZID of the current discharge. Additionally, given the proposed wastewater loadings and effluent quality, it is projected that a BIP will be maintained in the future.

This question is addressed in two sections. First, the City's comprehensive monitoring database on sediment quality, benthic invertebrate and trawl-caught fish communities is reviewed. On the basis of comparison of pre-discharge and post-discharge conditions, it is concluded that a BIP exists beyond the ZID for benthic invertebrate species and bottom dwelling (demersal) fishes. Existing data and evidence are reviewed to determine that discharge via the Point Loma outfall does not discernibly affect the health or population of plankton, mammals, birds, fish, or endangered species.

EVALUATION OF EXISTING CONDITIONS

To assess existing conditions, environmental monitoring data are available from the City of San Diego's Ocean Monitoring Program, which has developed over 22 years of data for the receiving waters region surrounding the PLOO. These data include pre-discharge (pre-construction and construction from July 1991 to October 1993) and post-discharge periods (January 1994 to present). As part of this 301(h) application, data for the post-discharge period covered in previous applications (1994-2006), the subsequent post-discharge period (2007-2013), and all post-discharge years combined (i.e., 1994-2013) were evaluated and compared with pre-discharge (1991-1993) conditions in accordance with direction received from EPA staff. However, in order to emphasize conditions during the five most recent years, post-discharge data in many tables and figures are summarized as 1994-2008 and 2009-2013. Data for calendar year 2014 are not yet fully available, but will be submitted according to regular NPDES permit reporting schedules. Pre- and post-discharge monitoring data are examined to explore the relationships(s) between the wastewater discharge from the Point Loma outfall and measured environmental changes.

Detailed assessments of existing sediment conditions, benthic infauna communities, and demersal fish and megabenthic invertebrate communities are presented in Appendix C.1 (Volume V), while details of the City's bioaccumulation assessment program for fish tissues are presented in Appendix D (Volume V); references within this section to various tables and figures are to those included in Appendices C.1 and D of Volume V in this application. In accordance with direction received from EPA staff, data are presented within Appendix C.1 in a format similar to that originally used by EPA in the *Tentative Decision Document* addressing the City's 1995 waiver application and subsequently in the City's 2001 and 2007 waiver applications that covered all monitoring through calendar year 2006.

Also in accordance with direction received from EPA, benthic sediment quality data, benthic infauna data, trawl-caught demersal fish and invertebrate data, and fish tissue bioaccumulation data are not reproduced herein in their entirety. Instead, the City has submitted the complete datasets to EPA in electronic format. Data in printed form have been submitted to the Regional Board and EPA Region IX in the form of monthly, quarterly, and annual monitoring reports as required by Monitoring and Reporting Program No. R9-2009-0001.

Overview and Summary of Findings. The City of San Diego's discharge of municipal wastewater into offshore marine waters is not affecting the maintenance of natural conditions in sediments and biota (benthic invertebrates and fishes) beyond the ZID of the PLOO. The City's Ocean Monitoring Program has collected and analyzed more than 4,200 benthic samples (sediments and infauna) from different monitoring stations around the PLOO and in surrounding areas from 1991 through 2013 (see Figure C.1-2 in Appendix C.1 for benthic station locations). In addition, nearly 650 otter trawls have been performed during this time to monitor demersal fish and megabenthic invertebrate communities in the region (see Figure C.1-46 in Appendix C.1 for trawl station locations), while additional trawls and rig fishing activities have been conducted to monitor the bioaccumulation of contaminants in fish tissues (see Figure D-1 in Appendix D).

Overall, 10 quarterly pre-discharge surveys (July 1991-October 1993) were conducted to assess background conditions and their temporal and spatial patterns of variability, while data from up to 59 post-discharge surveys (January 1994-July 2013) have been analyzed to detect changes that may indicate outfall related effects. Differences between sampling frequencies for the various program components and changes in the above monitoring activities over time are described in Appendices C.1 and D of this application, as well in greater detail in Appendix E, Volume IV of the City's 2007 waiver application.

After 20 years of wastewater discharge from the extended PLOO, monitoring results show that a balanced indigenous population (BIP) is maintained beyond the ZID off Point Loma. Benthic habitats beyond the ZID boundary are populated by natural communities of indigenous benthic invertebrates that are characteristic of the SCB. Key parameters such as infaunal abundance, species diversity, benthic response index (BRI), and patterns of key indicator species, are being maintained within the limits of variability that characterize natural benthic communities of the SCB continental shelf. Finally, the results of analysis of trawl-caught fish and invertebrate communities and from assessments contaminant bioaccumulation in local fish tissues show no evidence of outfall effects.

Sediment Conditions. Characteristics of ocean sediments (e.g., grain size, organic content, contaminant levels) are important factors influencing benthic communities. Sediment data are currently collected at 22 monitoring stations off the coast of Point Loma (see Figure C.1-1). Twelve of these stations are located along the 98-m discharge depth contour and represent the primary core monitoring sites for the PLOO program. In accordance with direction from EPA, sediment conditions off Point Loma were analyzed based on a total of 540 0.1-m^2 grab samples collected at these 12 primary core (outfall depth) stations. Of these samples, 60 were collected prior to discharge (1991-1993) and 480 were collected during the post-discharge period (1994-2013). The latter includes 312 samples for the period covered in the City's previous 2007 waiver application (i.e., 1994-2006) and 168 samples for the period from 2007 through 2013.

Patterns and trends for physical sediment characteristics (e.g. grain size) and concentrations of total organic carbon (TOC), total volatile solids (TVS), total nitrogen, sulfides, biochemical oxygen demand (BOD), individual trace metals, chlorinated pesticides, PCBs and PAHs in benthic sediments are discussed in detail in Appendix C.1. The following section summarizes and highlights some of the key findings regarding potential influences of the extended outfall on local sediments.

Since the extended PLOO was placed in operation, there has been little evidence of organic and contaminant loading in the region. Values for most measured parameters continue to exist at levels within the range of natural variability for the San Diego region and other SCB reference areas. The only sustained effects were restricted mostly to a few sites located within about 100-300 m of the outfall (i.e., within 200 m of the ZID). These three near-ZID sites include station E14 located near the ZID boundary just west of the center of the outfall wye, and stations E11 and E17 located off the ends of the southern and northern diffuser legs, respectively. Station E11 is located about 149 m from the southern ZID boundary, while E17 is located about 197 m from the northern ZID boundary. The effects observed at these sites include an increase in coarser sediments through time, measurable increases in sulfide concentrations, and smaller increases in BOD levels (see below).

Grain size. Differences in the composition of sediments (e.g., fine vs. coarse particles) and associated levels of organic loading can affect the burrowing, tube building and feeding abilities of infaunal invertebrates, which in turn may lead to changes in benthic community structure. Sediment grain size and the proportion of silt and clay combined (i.e., percent fines), sand and coarser particles (e.g., pebbles, gravel, shell hash) are also indicative of the local hydrodynamic regime, while other physical properties (size, shape, density, and mineralogy) interact with deposited organic particles to create new conditions in sediment carbon coupling at the boundary layer.

Grain size characteristics for sediments around the PLOO are summarized in Table C.1-2 and Figures C.1-2 and C.1-3 of Appendix C.1. Sediment composition off Point Loma is within the range of natural variability seen for other mid-shelf environments of the SCB. The percentage of fine sediments (silt and clay) averaged about 40 percent at the primary core stations during both the pre-discharge and post-discharge periods. Although differences between most sites were not significant in terms of the composition of sand, silt and clay, sediments at near-ZID station E14 have become slightly coarser since discharge began, averaging about 39 percent fines from 1991-1993 and only 32 percent fines since that time. However, this change is likely related to the movement of ballast materials used to support the outfall pipe and the presence of patchy sediments in the area. There has also been little change in grain size characteristics since the previous waiver applications in 2001 and 2007 (i.e., years 1994-2006 vs. 2007-2013). Additionally, relic reef sediments at northern reference station B12 were frequently characterized by the presence of coarse materials such as shell hash and gravel that distinguished this station from most other sites along the outfall discharge depth contour. Relatively coarse materials were also characteristic of sites located near the LA-5 dredge materials disposal site located southwest of the outfall. Overall, there were no consistent changes in sediment composition over time that might correspond to effects caused by wastewater discharge.

Sulfides.: Sediment sulfides showed a distinct outfall-related pattern at discharge depths that was restricted to the three stations located nearest the discharge area (see Table C.1-2 and Figure C.1-8 of Appendix C.1). Sulfide levels increased sharply after the discharge began at near-ZID station E14 located within a few meters of the ZID boundary west of the center of the diffuser legs, and to a lesser extent at near-ZID stations E11 and E17 located about 149-197 m from the ends of the southern and northern edges of the ZID, respectively. For example, average sulfide concentrations increased from 1.7 ppm at station E14 prior to discharge to 21.0 ppm afterwards. Overall, these values are considerably less than comparable measurements of 50-500 ppm observed off Newport Beach and Santa Monica. Additionally, there is no evidence that the small increase in sulfide concentrations off Point Loma is affecting sediment quality to the point that it will degrade the resident marine biota.

Biochemical Oxygen Demand. BOD is a measure of the level of oxidative metabolism of discharged organic material by bacteria. There was a slight increase in BOD concentrations in sediments at sites off Point Loma between the pre- and post-discharge periods (see Table C.1-2 and Figure C.1-7 of Appendix C.1). The greatest increase in sediment BOD concentrations since discharge began occurred at near-ZID station E14, although levels have decreased slightly at this site over the last five years. This pattern is consistent with predictions that a light sprinkling of organic material from the outfall might occur within or near the ZID. BOD concentrations averaged 270 ppm at outfall depths during the pre-discharge period and 309 ppm afterwards. These values are within the range of typical background levels of 250-1000 ppm for BOD in SCB sediments, and there is no evidence that BOD is causing any environmental degradation.

Overall, there is no evidence that wastewater discharge off Point Loma is affecting the quality of benthic sediments beyond the ZID to the point of degrading environmental conditions or resident marine life populations or communities.

Benthic Infauna. Benthic infaunal organisms represent excellent indicators of changes that occur in the marine environment due to the effects of wastewater discharges or other anthropogenic or natural sources. As with sediments, benthic infauna (macrofauna) data are currently collected at 22 monitoring stations off the coast of Point Loma (see Figure C.1-1 of Appendix C.1). In accordance with direction from EPA, benthic communities off Point Loma were analyzed based on a total of 1,064 0.1-m^2 grab samples collected at the 12 primary core (outfall depth) stations during January and July from 1991 through 2013. Of the samples collected at these sites, 120 were collected prior to discharge (1991-1993) and 944 were collected during the post-discharge period (1994-2013). The latter includes 620 samples for the period covered in the City's previous 2007 waiver application (i.e., 1994-2006) and 324 samples for the period from 2007 through 2013.

Patterns and trends for key benthic community parameters are discussed in detail within Appendix C.1 of this application. Benthic community parameters include number of species (species richness or species diversity), infaunal abundance, Swartz dominance, the benthic response index (BRI), abundances of major taxa (e.g., polychaetes, echinoderms, crustaceans, molluscs), abundances of various pollution sensitive, pollution tolerant or opportunistic species (i.e., bioindicators), and abundances of numerically dominant taxa (i.e., top 10 species by abundance).

Tables C.1-4 and C.1-5 of Appendix C.1 summarize and compare values for many of these parameters between the pre- and post-discharge periods and with other reference surveys. Additional comparisons of changes in the benthos were made using the BACIP statistical design (see Table C.1-6 of Appendix C.1). Outfall-related effects were evaluated in terms of the range of natural variability under reference conditions, the magnitude and spatial extent of the effect, and an assessment of the potential for adverse effects. Estimates of natural variability for benthic community parameters in the SCB have been extracted from various regional and bight-wide surveys conducted since 1985 (see Table C.1-4 of Appendix C.1). These studies include the 1985 and 1990 Southern California Coastal Water Research Project (SCCWRP) reference surveys, the 1994 Southern California Bight Pilot Project, the 1998, 2003 and 2008 SCB Regional Monitoring Programs (i.e., Bight'98, Bight'03, and Bight'08 surveys, respectively), annual region-wide surveys of the San Diego mainland shelf conducted as part of regular South Bay Ocean Outfall monitoring requirements, and tolerance intervals calculated from these latter annual regional surveys off San Diego (see Attachment C.2 of this application). The following section summarizes and highlights some of the key findings regarding potential influences of the extended outfall on local benthic infaunal communities off Point Loma.

Benthic communities near and beyond the ZID are dominated by ophiuroid-polychaete based assemblages that are prevalent throughout the SCB. Changes in these communities and populations of individual species that have occurred since monitoring began have mirrored similar changes throughout the SCB benthos. For example, the brittle star *Amphiodia urtica* and several species of polychaete worms (e.g., *Proclea* sp A, *Spiophanes duplex*, and *Phisidia sanctamariae*) were dominant species during both the pre- and post-discharge periods off Point Loma. Polychaetes continue to account for the greatest number of species and individuals overall (see Table C.1-5 of Appendix C.1). Similar assemblages dominate much of the southern California benthos, including the San Diego region, although patches of other benthic assemblages occur in areas of different sediment types. The shifts in community composition that have occurred over time off Point Loma probably represent variation in southern California assemblages related to large-scale oceanographic events (e.g., El Niño), natural population cycles and fluctuations, and habitat heterogeneity.

Although variable, infaunal communities off Point Loma have remained characteristic of undisturbed benthic habitats in terms of the number of species, number of individuals (abundance), and dominance. The values for these parameters in the PLOO region are similar to other sites off San Diego and throughout the entire SCB. In spite of this overall stability, comparisons of data from the pre- and post-discharge periods indicate a few trends. For example, there was a general increase in the total infaunal abundance and number of infaunal species in the years after wastewater discharge began (see Tables C.1-4 and C.1-5, and Figures C.1-26 and C.1-27 of Appendix C.1), although a similar pattern was already present prior to discharge. The increase in species richness was 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 (i.e., higher Swartz dominance index values; see Figure

C.1-28), another pattern contrary to known pollution effects. There did appear to be a minor shift in the relative abundance of different phyla at some stations that may be related to the discharge or physical structure of the PLOO, with echinoderms decreasing and polychaetes and mollusks increasing since discharge began. Considering the nature of the above changes, benthic communities off Point Loma are not being dominated by a few pollution tolerant species.

Other changes in the benthos near the outfall also suggest moderate effects coincident with anthropogenic activities. For example, the increased variability in number of species and infaunal abundance at near-ZID station E14 since discharge began may be indicative of community destabilization. A similar increase in BRI values at this station during the post discharge period may also be indicative of enrichment or disturbance events. However, BRI values at this and all other sites are still considered characteristic of undisturbed benthic habitats (see Figures C.1-29 and C.1-30 of Appendix C.1). Finally, the patchiness of sediments near the outfall and the corresponding shifts in assemblage structure suggest that changes in the area may be related to localized physical disturbance (e.g., shifting sediment types, freshwater input) as well as to organic enrichment.

Populations of some benthic indicator organisms did show minor changes that may correspond to organic enrichment or other disturbances, while populations of other species revealed no evidence of impact. For example, BACIP test results showed there was a significant change in the difference between ophiuroid (*Amphiodia* spp) populations that occur at the "impact" site located nearest the outfall (i.e., near-ZID station E14) and those present at the two northern reference or control sites (see Tables C.1-6 and C.1-7 of Appendix C.1). The difference in *Amphiodia* populations was due to both a decrease in numbers of this brittle star at station E14 and corresponding increases at the control stations B9 and E26 during the post-discharge period.

Although the above changes in *Amphiodia* populations at near-ZID station E14 may be related to organic enrichment, other factors such as increased predation pressure near the outfall may be important. Additionally, populations of *Amphiodia* at the two other near-ZID stations (E11 and E17) located within 200 m of the ZID, were much less affected during the post-discharge period (see Figure C.1-38 of Appendix C.1). Whether or not the observed changes in *Amphiodia* populations are related to organic enrichment, predation, or some other factor, abundances of these brittle stars off Point Loma are still within the range of natural populations in the SCB. Patterns of change in populations of the polychaete *Capitella telata*, the bivalve *Parvilucina tenuiscuplta*, and the ostracods *Euphilomedes* spp also suggest a subtle enrichment effect near the outfall (see Table C.1-7, Figures C.1-36, C.1-41, and C.1-45); however, densities of these benthic invertebrates are still within the range of natural variation for the SCB. Populations of other benthic species, including several within the polychaete genera *Mediomastus*, *Dorvillea* and *Armandia*, and the amphipod genera *Ampelisca* and *Rhepoxynius*, that have been suggested as bioindicators, have also revealed few changes that would indicate habitat degradation near the outfall.

Although some changes in benthic assemblages have occurred over time off Point Loma, these assemblages are still similar to those present prior to discharge and to natural indigenous communities of the southern California outer continental shelf. Thus, after 20 years of outfall operations, the discharge of wastewater through the PLOO has not caused any biological changes in benthic community structure that may be construed as degrading local marine habitats.

Demersal Fishes and Megabenthic Invertebrates. Demersal fishes and megabenthic invertebrates are conspicuous members of the continental shelf and slope habitats, and assessment of their communities is an important focus of ocean monitoring programs throughout the world. Trawl-caught fish and invertebrate data are currently collected at six monitoring stations located along the 100-m depth contour off the coast of Point Loma (see Figure C.1-46 of Appendix C.1). In accordance with direction from EPA, communities of these fishes and invertebrates collected at these sites were analyzed based on a total of 262 otter trawls conducted during January and July from 1991 through 2013. Of these trawls, 30 were performed prior to discharge (1991-1993) and 232 afterwards (1994-2013).

The status and changes over time of the demersal fish and megabenthic invertebrate communities off Point Loma are discussed in detail in Appendix C.1. These assessments focused on key community parameters such as the number of species (species richness), total abundances, and changes in the abundance of dominant or common species. Tables C.1-8 through C.1-11 of Appendix C.1 summarize and compare values for many of these parameters between the pre- and post-discharge periods off Point Loma and with other SCB reference surveys.

More than 87,000 fishes representing at least 84 species were collected in the above trawls from 1991 through 2013 (see Attachment C.1-A to Appendix C.1). Overall, these communities were dominated by 13 different species that combined accounted for 95% of all fishes captured over this period. The Pacific sanddab was by far the most abundant species across the region, accounting for about 55% of the total catch during the 2.5 year pre-discharge period and 48% over the past 20 years (1994-2013). Two other species that represented at least 10% of the total fish catch either before or after discharge began were plainfin midshipman (10% pre-discharge vs. 2% post-discharge) and yellowchin sculpin (6% pre-discharge vs. 11% post-discharge. Another two species represented at least 10% of the total catch restricted to the nearfield stations during the post-discharge period. These included halfbanded rockfish (3% pre-discharge vs. 14% post-discharge) and longspine combfish (4% pre-discharge vs. 10% post-discharge). The remaining eight dominant species accounted for only 1-5% of the total fish catch each. Most of these species are common in the types of soft-bottom habitats that characterize much of this region and the mainland shelf of the SCB, and there appears to be only minor differences between the pre-discharge and post-discharge periods at the nearfield and farfield sites (see Table C.1-8 of Appendix C.1).

A total of 469,595 megabenthic invertebrates, representing a least 125 species, were recorded in the above trawls conducted off Point Loma between 1991 and 2013 (Attachment C.1-B to Appendix C.1). The sea urchin *Lytechinus pictus* dominated these assemblages, accounting for about 97% of the total catch during the pre-discharge period and 91% during the post-discharge period. Other occasionally abundant species included the sea pen *Acanthoptilum* sp, the sea urchin *Stongylocentrotus fragilis*, and the brittle star *Ophiura luetkenii*. Most of the remaining species were captured infrequently and/or in low numbers, with 93 taxa being represented by fewer than 10 individuals since monitoring began. There are no temporal or spatial trends in the number of trawl-caught invertebrate species or abundances that suggest an outfall-related impact near or beyond the ZID.

Overall, analyses of temporal and spatial patterns did not reveal any effects on trawl-caught fish and invertebrate communities off Point Loma that could be attributed to the discharge of wastewater via the PLOO. Despite high variability of both types of communities, patterns of change in species richness and abundance were similar at stations near the outfall and farther away. Although abundances of dominant fish such as the Pacific sanddab declined at stations nearest the discharge site relative to overall post-discharge populations, they remained within the range of natural variability described for SCB reference areas. Additionally, no changes in fish and invertebrate community structure were detected in the nearfield assemblages that corresponded to the initiation of wastewater discharge. Finally, the lack of physical abnormalities or indicators of disease (e.g., fin rot, lesions, tumors) also suggest that fish populations have remained healthy off Point Loma since monitoring began.

Bioaccumulation of Toxic Materials. Demersal fishes can accumulate chemical contaminants from the environment, including surrounding waters, benthic sediments, and from the food they consume. The City of San Diego currently monitors the bioaccumulation of contaminants in fishes inhabiting areas surrounding the PLOO by analyzing liver tissues of species collected from four trawl zones (6 stations) and muscle tissues of species collected at two rig fishing stations (see Figure D-1 in Appendix D). These stations are located along the mainland shelf at depth ranges similar to where wastewater is discharged (98 m depth contour). Specific species are targeted for analysis based on their ecological or commercial importance.

Patterns and trends for the key bioaccumulation parameters are discussed in detail within Appendix D. Results are presented for contaminant levels of 11 trace metals, DDT, other chlorinated pesticides, and polychlorinated biphenyl compounds (PCBs) measured in 22 species of fish collected during surveys conducted between October 1995 and October 2013 (see Tables D-1, D-2 and D-3 of Appendix D). No data for polycyclic aromatic hydrocarbons (PAHs) are reported in this 301(h) application as analysis of these compounds in fish tissues have not been required for the Point Loma region since 2003 (i.e., previous results were included in the City's 2007 application).

In summary, concentrations of metals and organic compounds found within fish liver and muscle tissues are consistent with concentrations from other areas of SCB, including reference sites. Although there appears to be species-related differences in the concentrations of some of these trace metals or organic pollutants, no outfall-related effects are evident from the bioaccumulation data. The overall concentrations of most contaminants in the tissues of fish collected off Point Loma remains low. Finally, because many contaminants are only detectable in liver tissues and thus represent a very small overall amount of the mass of a fish, the potential for further bioaccumulation of these pollutants in the food chain off Point Loma is minimal.

Plankton. The City is not required to monitor plankton, but water quality data collected by the City indicate that the outfall should not have a noticeable effect on plankton. The discharge depth of the San Diego outfall traps the nutrient-laden wastewater at a depth of 40 meters or more, well below the optimum depth for phytoplankton growth (and the surface zone where most zooplankton are found). Additionally, long-term studies of the City's water quality data have shown that there is no noticeable change in water clarity, visual observations at the surface, dissolved oxygen, or changes in chlorophyll α concentrations (see Figure III.B-3 on page III.B-22). Overall, no information exists that suggests there is any discernible effect of the outfall on plankton populations.

Kelp Forests. Wastewater is discharged to the ocean via the PLOO diffusers approximately 5 km (three miles) offshore from the Point Loma kelp forest. No evidence exists that this discharge has adversely impacted the kelp bed or associated invertebrate and fish communities. Ocean monitoring data collected to date do not indicate that PLOO discharge has had any adverse impact on the kelp bed through onshore movement of bacteria, solids, or nutrients. In addition, long-term studies of the Point Loma and La Jolla kelp forests conducted by the Scripps Institution of Oceanography and dating back to the early 1970s have also shown there to be no negative effects on this nearshore ecosystem due to the discharge of wastewater via the PLOO (see Appendix G in Volume VI of this application).

Marine Birds. Only a few bird species are present in the area near the PLOO diffuser. Since the waste field will be confined to depths of 40m (130 feet) or more, it is concluded that reissuance of the modified 301(h) permit will not affect local birds populations or habits.

Endangered Species. Endangered species are discussed in Appendix J (Volume VII of this application). Key conclusions regarding endangered or threatened species include the following:

- Endangered, threatened or rare species are unlikely to be discernibly adversely affected by the proposed discharge. No detectable concentrations of total DDT or PCBs are found in the PLWTP effluent. Any existing or historic sediment concentrations of these same constituents in the offshore waters are the result of historically deposited materials or from other sources.
- Preferred prey of listed endangered species potentially found in the vicinity of the discharge are not likely to be found at the depth of the waste field. For example, northern anchovies and juvenile rockfish, which are fed upon by the brown pelican and least tern, are not encountered at 300 foot depths.

As documented in Appendix J, the PLOO discharge will not directly or indirectly impact endangered, threatened or rare species.

On the basis of information presented in Appendix J, it is concluded that few species are likely to occur within the ZID or come in contact with the discharged wastewater. No evidence exists to suggest that bioaccumulation in prey is occurring, or that marine mammal populations will be impacted by the discharge. It is concluded that the proposed modified permit will not result in any changes which would adversely impact marine mammal populations.

DETERMINATION OF A BALANCED IDIGENOUS POPULATION (BIP)

Regulations promulgated pursuant to Section 301(h) of the Clean Water Act require that modified 301(h) discharges result in the maintenance of a balanced indigenous population (BIP) beyond the boundary of the zone of initial dilution (ZID).

The data provided in Appendix C.1 support the demonstration that there is a BIP of benthic infaunal organisms and demersal fishes living in or near sediments beyond the ZID. There is conclusive evidence that communities near and beyond the ZID boundary and at reference sites are similar. For example, total abundance, diversity, species dominance and abundances generally showed similar patterns or insignificant differences between near ZID and reference areas. Remote vehicle television observations in the areas around and offshore of the Point Loma outfall (see Appendix Q of 2007 waiver application) have documented the absence of visible sedimentation within and beyond the ZID. (City of San Diego, 2007)

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 (BRI), 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.

PROJECTED FUTURE CONDITIONS

As discussed above, data from the City's comprehensive monitoring program conclusively demonstrates that a BIP exists beyond the boundaries of the ZID. Continuation of 301(h) requirements for the PLOO discharge is not projected to adversely affect a BIP beyond the ZID. Reasons for this conclusion include:

- no changes in permitted PLOO effluent concentration limits are proposed,
- no increase in permitted PLOO mass emissions are proposed,
- except for phenol, the discharge complies with applicable NPDES mass emission benchmarks which are based on mass emission rates from 1990-1995,
- the PLOO provides a high degree of initial dilution, and is highly effective in preventing deposition of sediments in and around the ZID,
- no trends are evident in the existing data that would suggest the potential for future significant changes in sediment chemistry,
- no trends are evident in the benthic data that would suggest the potential for future degradation in species diversity, abundance of organisms, dominance, or BRI,
- no trends are evident in the bioaccumulation data that would suggest the potential for future significant changes in bioaccumulation of toxic constituents in fish tissues,
- the proposed PLOO discharge will continue to comply with applicable *California Ocean Plan* water quality standards, and with federal water quality criteria for the protection of marine aquatic habitat,
- the PLOO discharge is not projected to result in discernible changes in receiving water dissolved oxygen, water clarity, or turbidity,

- the PLOO discharge is not projected to result in any discernible impacts on fish, plankton, mammals, or endangered species,
- no trends are evident that would suggest the potential for future adverse changes in sediment dissolved oxygen or receiving water dissolved oxygen, and
- a five year history of Point Loma WWTP effluent disinfection operations indicates consistent compliance with all applicable *California Ocean Plan* receiving water standards, including standards for chlorinated compounds.

Based on the combination of these factors, it is concluded that a BIP will continue to be maintained beyond the ZID for renewal of 301(h) requirements for the continued PLOO discharge.

III.D.2 Have distinctive habitats of limited distribution been impacted adversely by the current discharge and will such habitats be impacted adversely by the modified discharge?

No impacts to distinctive habitats of limited distribution will occur.

The Point Loma kelp bed is the only habitat of limited distribution in the vicinity of the PLOO. (See response to Questionnaire Section II.C.2.)

As documented in Appendix G and in the above responses to Questionnaire Section III.D.1, the PLOO discharge has not and will not adversely impact the Point Loma kelp bed.

III.D.3 Have commercial or recreational fisheries been impacted by the current discharge (e.g. warnings, restrictions, closures, or mass mortalities) or will they be impacted adversely by the modified discharge?

SUMMARY: Commercial or recreational fisheries have not been impacted by the current discharge; no impacts are projected to occur as a result of renewal of 301(h) requirements for PLWTP.

Commercial and recreational fishing activities in the Point Loma vicinity are detailed in Appendix I.1 (Volume V). Appendix I.1 also presents recent data describing the commercial and recreational catch and landed value of the catch.

As detailed in Appendix I.1, commercial and recreational fisheries off Point Loma are not adversely affected by the current PLOO discharge, and are not projected to be adversely affected by continuation of the discharge. Further, no Point Loma area fishery resources are underutilized as a result of effects from PLOO discharge. These conclusions are based on the following evidence:

- No warnings, closures, or mass mortalities of fish have occurred in either the nearshore or offshore areas of Point Loma since the initiation of the extended PLOO discharge in November 1993.
- Department of Fish and Game, State Department of Health Services, or San Diego County Department of Health Services have not issued any fishery-related health advisories for the waters in the vicinity of the extended PLOO.
- Concentrations and mass emissions of metals in the PLOO discharge have been reduced by a significant margin during the past 30 years as a result of the City's industrial and nonindustrial source control programs.
- No outfall-related violations of *California Ocean Plan* standards for coliform or toxic compounds have occurred at kelp bed stations since the extended PLOO outfall discharge was initiated in November 1993.
- As documented in Tables III.B-22 through III.B-24 (pages III.B-33 through III.B-36), the PLOO discharge complies with *California Ocean Plan* standards for the protection of public health and standards for the protection of aquatic habitat.

- As documented in Tables III.B-17 through III.B-24 (pages III.B-27-III.B-36), receiving waters in the vicinity of the extended PLOO comply with federal saltwater acute criteria, federal saltwater chronic criteria, and federal water quality criteria for the protection of public health from consumption of organisms.
- Routine trawling and collection of fish and benthic species (performed as part of the City's comprehensive receiving water quality monitoring program) have not revealed any difference in the incidence of fin erosion, fish disease, or other abnormalities between the outfall vicinity and control stations. (See response to Questionnaire Section III.D.4.)
- Bioaccumulation studies performed as part of the receiving waters monitoring program show no adverse outfall-related effects. (See Appendix D and response to Questionnaire Section III.D.4.)

III.D.4 Does the current or modified discharge cause the following within or beyond the ZID: [40 CFR 125.62(c)(3)]

- **Mass mortality of fishes or invertebrates due to oxygen depletion, high concentrations of toxics, or other conditions?**
- **An increased incidence of disease in marine organisms?**
- **An abnormal body burden of any toxic material in marine organisms?**
- **Any other extreme, adverse biological impacts?**

SUMMARY: No mass mortality, increased disease, or other extreme biological effects have occurred.

Mass Mortality of Fish. Mass mortalities of fish or invertebrates have not been reported in the area of the outfall by field marine biologists working for the City.

Incidence of Disease. All trawled fish caught in the monitoring program are visually examined for gross morphological evidence of diseases and ectoparasites. Three types of ectoparasites have been observed in recent years: leeches, the cymothoid isopod (fish lice) *Elthusa vulgaris,* and copepods (including the eye parasite *Phyryxocephalus cincinatus*). Since all but *P. cincinatus* are mobile parasites, the fish collected in a trawl sample may lose and/or acquire parasites during the normal collection, sorting, and processing of the sample.

The incidence of observed parasitism in post-discharge monitoring was within the range of incidences found prior to initiation of the discharge at the new location. Additionally, the incidences of ectoparasitism were low compared to collections in many areas of the SCB. Parasites on trawled macroinvertebrates were also rare.

No fin erosion or tumors were found on trawl caught fish in the discharge area. Further, incidences of fin lesions, other diseases and abnormalities, and parasitism were low or nonexistent. Overall, no evidence exists that the PLOO discharge causes any extreme abnormalities in fish or invertebrates.

Tissue Burden. As presented in Appendix D and summarized in response to Questionnaire Section III.D.1, the discharge from the extended outfall does not appear to cause abnormal body burden of any toxic pollutant known to have adverse effects on the organism or consumers.

The presence of PCB and DDT compounds in fish caught for bioaccumulation analyses is not attributed to the PLOO discharge, as the discharge does not contain detectable concentrations of these constituents. Further, no spatial pattern of DDT or PCB sediment contamination exists around the outfall.

Rather than being related to the outfall discharge, tissue burden levels of some trace metals, pesticides, and PCBs appear to be related to regional influences from other sources such as the LA-5 dredge disposal site.

Other Biological Impacts. No other extreme, adverse, biological impact is known to have occurred or is expected to occur. The City's monitoring program, however, will continue to examine fish and invertebrates for any such effects.

III.D.5 For discharges to saline estuarine waters:

Does or will the current or modified discharge cause substantial differences in the benthic population within the ZID and beyond the ZID?

Does or will the current or modified discharge interfere with migratory pathways within the ZID?

The question is not applicable. The PLOO does not discharge to saline estuarine waters, nor does the PLOO discharge affect any coastal saline estuarine waters.

III.D.6. For improved discharges, will the proposed improved discharge(s) comply with the requirements of 40 CFR 125.61(a) through 125.61(d)? [40 CFR 125.61(e)]

The question is not applicable. This 301(h) NPDES application is based on a current discharge, as defined by 40 CFR 125.58(h).

III.D.7. For altered discharges, will the altered discharge(s) comply with the requirements of 40 CFR 125.61(a) through 125.61(d)? [40 CFR 125.61(e)]

The question is not applicable. The proposed PLOO discharge is a current discharge, as defined by 40 CFR 125.58(h).

III.D.8. If your current discharge is to stressed waters, does or will your current or modified discharge(s): [40 CFR 125.61(f)]

a. Contribute to, increase, or perpetuate such stressed condition?

b. Contribute to further degradation of the biota or water quality if the level of human perturbation from other sources increases?

c. Retard the recovery of the biota or water quality if human perturbation from other sources decreases?

The question is not applicable. As discussed in the response to Questionnaire Section II.B.2, the PLOO does not discharge to stressed waters.

Section III.E
Impact on
Recreational Activities

Renewal of NPDES CA0107409

III.E IMPACT ON RECREATIONAL ACTIVITIES

III.E.1. Describe the existing or potential recreational activities likely to be affected by the modified discharge(s) beyond the zone of initial dilution.

SUMMARY: SCUBA diving is the primary offshore recreational activity that could potentially be impacted by the PLOO discharge. Swimming, snorkeling, and surfing also occur in nearshore waters.

A wide variety of recreational activities occur in Point Loma marine waters. These recreational activities are described in detail in Appendix I.1 (Volume VII).

The ocean shoreline along the southern portion of Point Loma is predominantly on a military reservation (Fort Rosecrans). The extreme southern portion of Point Loma is within the Cabrillo National Monument. As a result, access to the shoreline is restricted to several designated tidepooling areas within the boundaries of the national monument. Because shoreline access is limited, most recreational activities are focused on the Point Loma kelp bed and in nearshore waters. SCUBA diving is particularly popular in the kelp bed. Only limited diving occurs outside the area of the kelp bed.

Ocean recreation at Point Loma includes aesthetic enjoyment, sightseeing, sunbathing, hiking, picnicking, tide-pooling, whale watching, boating, sailing, and sport fishing. These types of activities are designated as non-contact water recreation by the Regional Board and are defined as "involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible" (Regional Board, 2012).

Ocean recreation off Point Loma also includes swimming and wading, skim boarding, water skiing and wake boarding, snorkeling, surfing, sail boarding, kite-sailing, kayaking, outrigger canoeing, paddle boarding, free diving, SCUBA diving, and personal watercraft (PWC) (jet ski) operation. These activities are designated by the San Diego Regional Water Quality Control Board as water contact recreation and are defined as "involving body contact with water, where ingestion of water is reasonably possible" (Regional Board, 2012).

The only data on specific locations of recreational activity off Point Loma comes from field observations made in the mid 1980's by Wolfson and Glinski (1986), who identified and plotted the position of individual boats and water craft during the summer of 1986. Most ocean recreation in the vicinity of Point Loma occurred in the nearshore area, with fishing and diving concentrated in the kelp bed and along its' margins. Power boating and sailing were the only recreational activities observed with any regularity beyond the outer edge of the kelp bed (1.6 km from shore). The intensity of these recreational activities rapidly diminished with increasing distance offshore.

The territorial waters of the State of California extend to 3 nautical miles (nm) offshore. The U.S. Government has exclusive jurisdiction from 3-12 nm offshore (DOALOS, 2014). Although no studies have been conducted of recreational use in federal waters off Point Loma, information is available from observations of the crews of the San Diego PUD monitoring vessels. The monitoring vessels currently average about 200 or more days per year in the coastal waters of San Diego and have been active in the area for decades.

The Point Loma WWPT ocean monitoring program conducts water quality sampling along 7.5 miles (12 km) of shoreline and at a grid of offshore stations extending from 5.4 miles (8.7 km) south of the outfall to 8.1 miles (13.1 km) north of the outfall. Figure III.E-1 (page III.E-3) presents the location of monitoring stations. The offshore sampling stations range in depth from 30 feet (9 m) to 321 feet (98 m) and extend from 0.3 miles (0.5 km) to 6.8 miles (11 km) from shore (Figure III.E-1). Figure III.E-1 also depicts the extent of California state waters (within 3 nm from shore).

Large vessels, principally Navy and Coast Guard ships, commercial carriers (cargo transports, oil tankers, barges), and cruise ships generally transit the Point Loma area beyond 5 miles offshore. Most ship traffic funnels into and out of San Diego Bay well to the south of the outfall area. Recreational vessels (fishing and pleasure boats) in federal waters off Point Loma are usually heading to or returning from offshore fishing banks and islands. Power and sail boats traversing the Point Loma area generally cruise along the outer edge of the kelp bed and are rarely seen more than a mile and a half offshore.

Recreational fishing in Point Loma ocean waters takes place primarily in the nearshore zone and in the kelp bed area. The monitoring crews report occasionally seeing commercial passenger fishing vessels (Party Boats) and sport fishing craft as far out as the decommissioned outfall (1.6 nm offshore) but practically never further offshore.

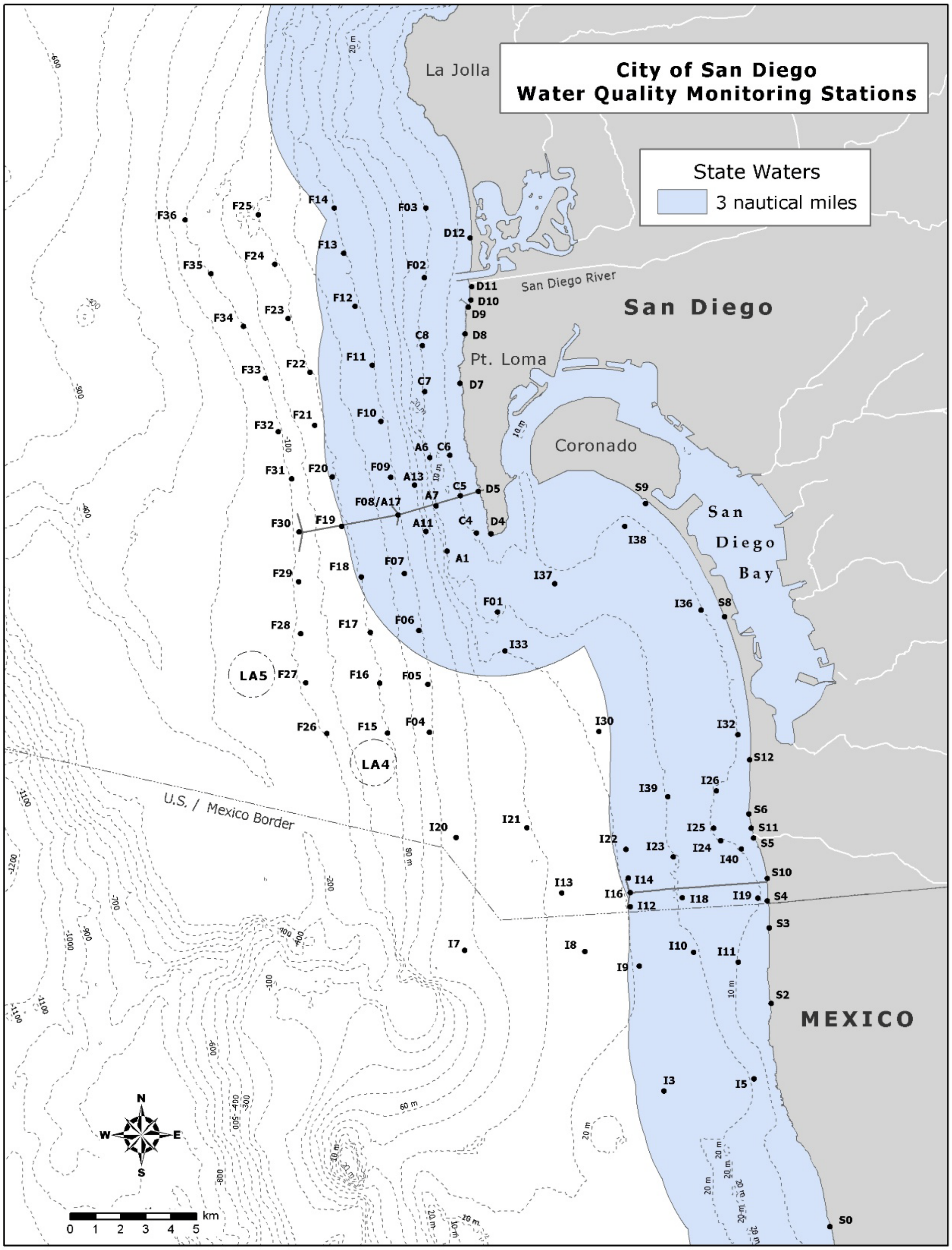

Figure III.E-1 City of San Diego Water Quality Monitoring Stations

Swimming, surfing, and snorkeling occur in shallow water, inside the kelp bed. The vast majority of PWC operators, water skiers, wake boarders, board sailors, kite boarders, kayakers, canoers, and paddle boarders are seen inshore of the kelp bed.

Recreational SCUBA diving off Point Loma is focused on the kelp bed, with dive boats rarely sighted beyond a mile and a quarter offshore. State waters transitions to federal waters at a bottom depth of about 260 feet (80 meters) off Point Loma well beyond recreational SCUBA diving limits. Table III.E.1-1 summarizes water contact recreational activities off Point Loma, based on monitoring crew observations and information presented in Appendix I.1. Virtually all swimming, surfing, diving, paddling, fishing from paddle craft, board sailing, water skiing, and PWC operation is confined to waters less than 2 nm from shore. The monitoring crews do not recall seeing a single incident of water contact recreational use occurring in federal waters.

Table III.E-1
Water Contact Recreation in the Vicinity of Point Loma

Activity	Inshore Waters	Nearshore Waters	Kelp Bed	Offshore State Waters		Federal Waters
	0 to 10 ft Depth	10 to 30 ft Depth	1000ft - 1 nm offshore	1-2 nm offshore	2-3 nm offshore	3-12 nm offshore
Swimming and wading	✓					
Skim boarding	✓					
Water skiing/ wake boarding	✓	✓				
Snorkeling	✓	✓				
Surfing	✓	✓				
Sail/Kite board	✓	✓	✓			
Kayak/canoeing	✓	✓	✓			
Paddle boarding	✓	✓	✓	✓		
Free diving		✓	✓	✓		
SCUBA diving		✓	✓	✓		
Personal water craft			✓	✓		

Overall, a number of factors combine to prevent water contact recreation from occurring in federal waters off the coast of Point Loma, including:

- lack of diving or sporting attractions in the deeper offshore waters compared to nearshore waters,
- offshore water depths that extend well beyond the range of recreational divers,
- adverse wind and current conditions in open offshore waters that create dangers for personal watercraft and self-propelled craft,
- shipping lane traffic that creates dangers for small watercraft,
- haze and fog may limit visibility of the shoreline, and
- range restrictions (fuel-related or otherwise) associated with personal watercraft and self-propelled craft.

III.E.2. What are the existing and potential impacts of the modified discharge(s) on recreational activities? Your answer should include but not be limited to a discussion of fecal coliform bacteria.

SUMMARY: The PLOO discharge complies with NPDES Permit standards and does not adversely impact recreational activities. The current discharge ensures compliance with recreational body-contact bacteriological standards at all depths (ocean surface to ocean bottom) in all State-regulated ocean waters. The renewed 301(h) waiver discharge will continue to comply with water quality standards for the protection of recreation and will not adversely impact recreational activities.

Bacteriological Standards to Protect Body-Contact Recreation. The City of San Diego analyzes seawater samples collected along the shoreline and in offshore coastal waters to characterize water quality conditions in the region and to identify possible impacts of wastewater discharge on the marine environment. To provide information about the dilution and dispersion of discharged wastewater, densities of fecal indicator bacteria (total coliform, fecal coliform and enterococcus) are measured and evaluated in context with oceanographic data. This also helps to identify other sources of bacterial contamination. Water quality monitoring also establishes compliance with the water contact standards specified in the *California Ocean Plan*, which defines bacterial, physical, and chemical water quality objectives and standards to protect beneficial uses of state ocean waters (State Board, 2012a).

Water quality standards to protect human health in recreational waters are customarily assessed by measuring the concentration of fecal indicator bacteria (FIB) to infer the presence of fecal matter and associated fecal pathogens. Fecal matter originates from the intestines of warm-blooded animals, and the presence of fecal bacteria is used as an indicator of human pathogens that can cause illness in recreational water users (Boehm and Soller, 2013; Harwood et al. 2013; EPA, 2014a). Indicator bacteria may not cause illness themselves, but have been linked to the presence of harmful pathogens (Arnold et al. 2013; EPA, 2014b). FIB are used as a surrogate for human pathogens because they are easier and less costly to measure than the pathogens themselves.

Multiple sources of potential bacterial contamination exist in the Point Loma monitoring region in addition to the wastewater outfall. Local, non-outfall sources of bacterial contamination include San Diego Bay and the Tijuana and San Diego Rivers (Svejkovsky, 2014).

Storm drain discharges and wet-weather runoff from local watersheds can also flush contaminants seaward (Colford et al. 2007; Sercu et al. 2009; Griffith et al. 2010). Additionally, beach wrack (e.g., kelp, seagrass), storm drains impacted by tidal flushing, and beach sediments can act as reservoirs, cultivating bacteria until release into nearshore waters by returning tides, rainfall, and/or other disturbances (Martin and Gruber, 2005; Yamahara et al. 2007; Phillips et al. 2011; Griffith et al. 2013). The presence of dogs and birds and their droppings has also been associated with bacterial exceedances that may impact nearshore water quality (Wright et al. 2009; Griffith et al. 2010; Araújo et al. 2014).

Receiving Water Monitoring. Table III.E-2 presents *California Ocean Plan* receiving water bacteriological standards applicable within the three nautical mile state-regulated limit. The PLOO monitoring program is designed to assess general water quality and determine the level of compliance with regulatory standards in the current NPDES discharge permit (Regional Board and EPA, 2009)

Table III.E-2
California Ocean Plan Bacteriological Standards
to Protect Body-Contact Recreation (REC-1)

Parameter	Concentration Organisms (Most Probable Number) per 100 ml	
	Single Sample Maximum[1]	30-Day Geometric Mean[1]
Total coliform	10,000[2]	1,000
Fecal coliform	400	200
Enterococcus	104	35

1 *California Ocean Plan* recreational body-contact (REC-1) bacteriological limits apply to State-regulated receiving waters that are within 1,000 feet of the shore, within the 30-foot depth contour, in designated kelp beds, or in other state-regulated ocean waters designated by Regional Boards as being subject to REC-1 (body contact recreation) use. The above receiving water standards do not apply within designated ocean outfall zones of initial dilution. State-regulated ocean waters extend from the coastline three nautical miles offshore.

2 Single sample maximum for total coliform is 1,000 organisms per 100 milliliters when the fecal coliform to total coliform ratio exceeds 10 percent.

Eight stations located in nearshore waters in the Point Loma kelp bed are monitored five times a month to determine water quality conditions and Ocean Plan compliance in areas used for recreational activities such as SCUBA diving, surfing, fishing, and kayaking. These include stations C4, C5, and C6 located near the inner edge of the kelp bed along the 9-m depth contour and stations A1, A6, A7, C7, and C8 located near the outer edge of the kelp bed along the 18-m depth contour (Figure III.E-2). The collection, handling, and laboratory analysis of the seawater samples are described in the Annual Monitoring Reports (see City of San Diego, 2014a).

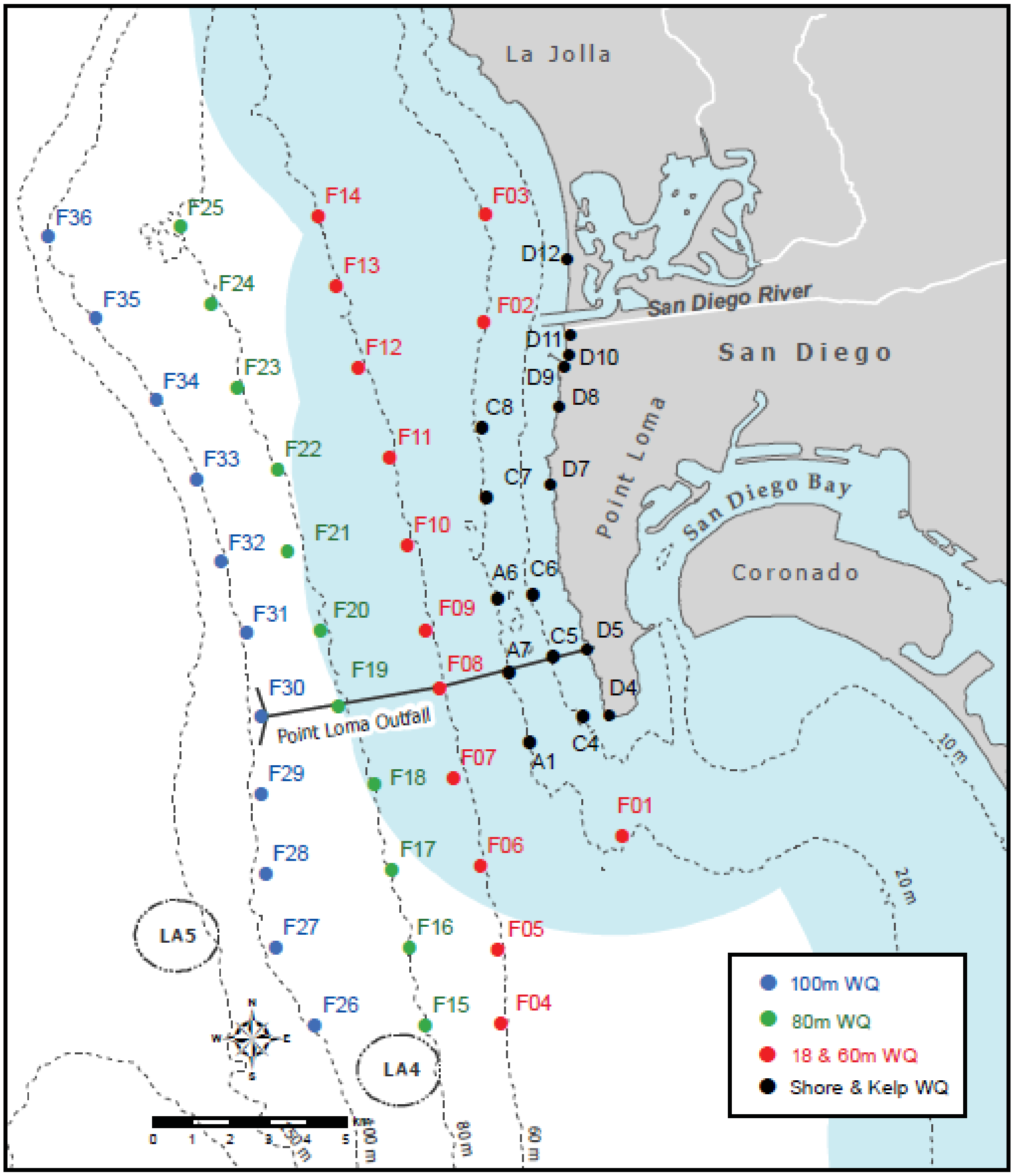

Figure III.E-2 Water Quality Monitoring Stations
Light blue shading represents California state jurisdictional waters.

An additional 36 stations ("F" stations) are located offshore of the kelp bed stations are sampled to monitor FIB levels in deeper waters and to estimate dispersion of the wastewater plume. A total of 15 of these stations (F1, F2, F3, F6, F7, F8, F9, F10, F11, F12, F13, F14, F18, F19 and F20) are located within the State-regulated three nautical mile limit. The offshore "F" stations are arranged in a grid surrounding the discharge site along or adjacent to the 18, 60, 80, and 98-m depth contours (Figure III.E-2). In contrast to shore and kelp bed stations, offshore stations are monitored on a quarterly basis during February, May, August and November with each of these quarterly surveys conducted over a 3-day period. Bacterial analyses for these offshore stations are limited to Enterococcus. Seawater samples are collected at three discrete depths at the kelp stations and 18- and 60-m offshore stations, four depths at the 80-m offshore stations, and five depths at the 98-m offshore stations. Table III.E-3 summarizes monitoring at the kelp bed and offshore stations.

Table III.E-3
Seawater Sampling Depths at Water Quality Stations

Station Type	Station Contour	Sample Depth (m)[1]								
		1	3	9	12	18	25	60	80	98
Kelp Bed Stations	9-m	✓	✓	✓						
	18-m	✓			✓	✓				
Offshore Stations	18-m	✓			✓	✓				
	60-m	✓					✓	✓		
	80-m	✓					✓	✓	✓	
	98-m	✓					✓	✓	✓	✓

1 Depths at which seawater samples are collected for bacteriological analysis at the PLOO kelp bed and offshore.
2 Includes Stations A1, A6, A7, C4, C5, C6, C7 and C8. See Figure III.E-1.
3 Includes Stations F4 through F36. See Figure III.E-1.

California Ocean Plan Compliance. Order No. R9-2009-0001, which became effective on August 1, 2010, requires the PLOO to comply with *California Ocean Plan* recreational body contact standards shown in Table III.E-2 at all locations and depths within the three nautical mile State-regulated limit. Effluent disinfection using sodium hypochlorite has been implemented at the Point Loma WWTP throughout the effective period of Order No. R9-2009-0001 to ensure compliance with the recreational body contact standards.

Appendix I.2 presents total coliform, fecal coliform, and enterococcus receiving water monitoring data during 2010-2013 and assesses compliance with the *California Ocean Plan* single sample maximum and 30-day geometric mean standards presented in Table III.E-2. As summarized in Appendix I.2, the PLOO has achieved virtual 100 percent compliance with *California Ocean Plan* total coliform, fecal coliform, and enterococcus receiving water standards since Order No. R9-2009-0001 became effective.

Table III.E-4 (page III.E-10) summarizes receiving water compliance at PLOO monitoring stations within State-regulated waters during the effective period of Order No. R9-2009-001. As shown in the table, only two of over 18,000 receiving water samples resulted in exceedances of the California Ocean Plan body-contact recreational standards, and neither of these two exceedances appear related to the PLOO discharge.

Table III.E-4
Summary of Compliance with California Ocean Plan Recreational Body Contact Standards
PLOO Kelp Bed and Shore Stations[1]

Parameter	Compliance with California Ocean Plan Body-Contact Recreational Standards at Kelp Bed and Offshore Stations[1,2]		
	Total Coliform	Fecal Coliform	Enterococcus
Total number of receiving water samples collected at kelp bed and offshore stations during 2010-2013[2]	5,840	5,846	6,518
Number of single sample maximum exceedances after August 1, 2010 effective date of Order No. R9-2009-0001[3]	1[4]	0	1[5]
Percent compliance with single sample maximum standard since August 1, 2010 effective date of Order No. R9-2009-0001[3]	> 99.9%	100%	> 99.9 %
Number of 30-day geometric mean exceedances after August 1, 2010 effective date of Order No. R9-2009-0001[3]	0	0	0
Percent compliance with 30-day geometric mean standard since August 1, 2010 effective date of Order No. R9-2009-0001[3]	100%	100	100%

1 Includes kelp bed stations and offshore stations within the State-regulated three nautical mile limit. Includes kelp bed stations A1, A6, A7, C4, C5, C6, C7 and C8, and offshore stations F1, F2, F3, F6, F7, F8, F9, F10, F11, F12, F13, F14, F18, F19 and F20.
2 See Appendix I.2 for statistical breakdown of receiving water samples.
3 Order No. R9-2009-0001, which became effective on August 1, 2010, requires the PLOO discharge to comply with *California Ocean Plan* recreational body contact standards throughout the three nautical mile State-regulated limit.
4 The total coliform exceedance occurred on 11/6/2010 at the ocean surface at Station A7. The exceedance was unlikely to be related to the PLOO discharge, as the PLOO discharge plume is typically maintained below the surface by thermal stratification during early November. Additionally, bacteria concentrations were minimal at all other depths and at all surrounding stations. Further, fecal coliform and enterococcus concentrations were negligible at the ocean surface at Station A7 at this time, and bacteria concentrations at depth were within the normal range. The exceedance is concluded as being an isolated anomaly not related to the PLOO discharge.
5 The enterococcus exceedance occurred on 8/23/2010 at the ocean surface at Station A7. The exceedance is almost certainly not related to the PLOO discharge, as the PLOO discharge plume is maintained well below the surface by strong thermal stratification during the month of August. Additionally, enterococcus concentrations at 1 and 18 meter depths were low, and concentrations of total and fecal coliform were not detectable at any depth at Station A7. Additionally, no anomalous total coliform, fecal coliform or enterococcus values occurred at any of the surrounding stations during August 2010. The exceedance is concluded as being an isolated anomaly not related to the PLOO discharge.

Shore Stations. Order No. R9-2009-0001 also requires bacteriological monitoring at seven shore stations ("D" stations). As noted in Appendix I.2, while useful for assessing impacts from storm runoff or shore-based contaminant sources, the shore "D" stations are of little benefit in assessing PLOO discharge impacts. Historic outfall receiving water data (see Appendix P) demonstrate that predominant upcoast/downcoast ocean currents maintain the PLOO discharge plume far offshore, and that thermal stratification prevents the PLOO discharge plume from surfacing throughout all but a small portion of the year. Additionally, ocean monitoring stations located between the PLOO and the shore stations consistently show compliance with *California*

Ocean Plan body contact recreational standards, demonstrating that the PLOO plume does not influence water quality at the shore stations.

Because of these factors (and the distance and depth offshore of the PLOO discharge), the shore "D" stations are not influenced by the PLOO discharge. Instead, water quality at the "D" stations is reflective of shore-based activities such as storm runoff, urban runoff, recreation, and other shore-based discharges.

During 2013, compliance at the eight shore stations in the PLOO region was 100 percent for the 30-day total coliforms, fecal coliforms, and enterococcus geometric mean standards. Compliance with the single sample maximum (SSM) standards was 100 percent for total coliforms, fecal coliforms, and the fecal:total coliform criterion, while enterococcus ranged from 98 to 100 percent (Figure III.E-3).

Monthly mean FIB densities ranged from 2 to 556 CFU/100 ml for total coliforms, 2 to 43 CFU/100 ml for fecal coliforms, and 2 to 1442 CFU/100 ml for Enterococcus (see City of San Diego, 2014a). Of the 488 seawater samples collected from shore stations during the year, five (1.0 percent of the samples) had elevated FIB, occurring at stations D7, D8, and D11 (Table III.E-5).

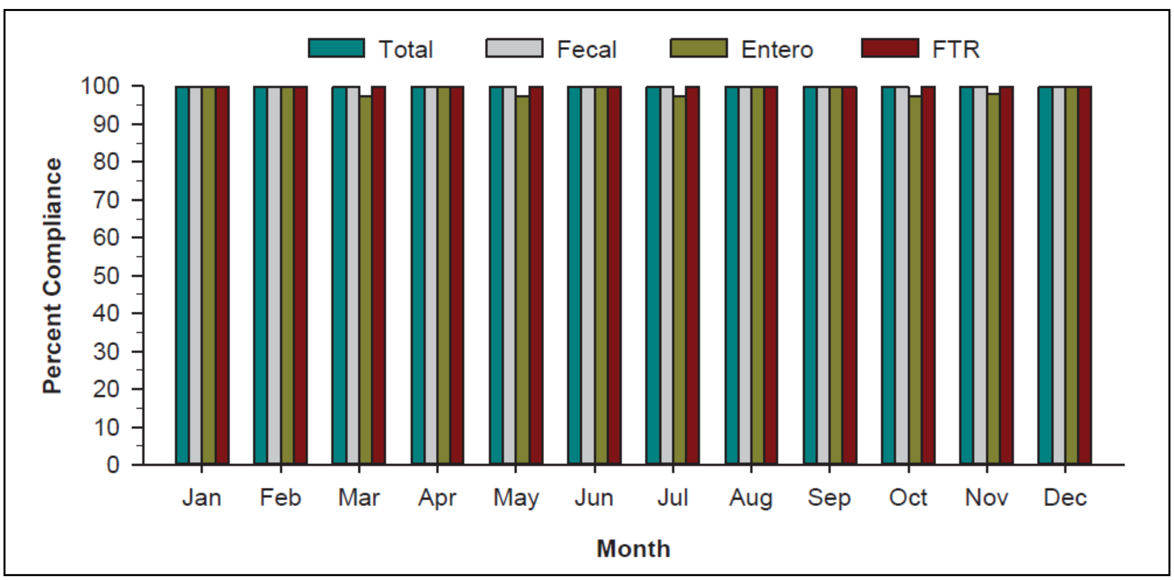

Figure III.E-3. Single Sample Bacteriological Compliance at Shore Stations during 2013

Table III.E-5
Shore Stations with Elevated FIB Densities in 2013

Shore Station	Number of Samples with Elevated FIB Densities at Shore Stations	
	October-April[1]	May-September[2]
D12	0	0
D11	1	1
D10	0	0
D9	0	0
D8	0	1
D7	2	0
D5	0	0
D4	0	0
Total Number of Exceedances	3	2
Total Number of Samples	288	200

1 Total precipitation was 5.26 inches during this period, as measured at Lindbergh Field.
2 Total precipitation was 0.31 inches during May-September 2013.

A general relationship between rainfall and elevated bacterial levels at shore stations has been evident since water quality monitoring began in the Point Loma region (Figure III.E-4). Historical data indicate that occurrence of a sample with elevated FIB was significantly more likely during the wet season than during the dry (7% versus 2%, respectively; n = 7678, $\chi^2 = 102.171$, $p < 0.0001$).

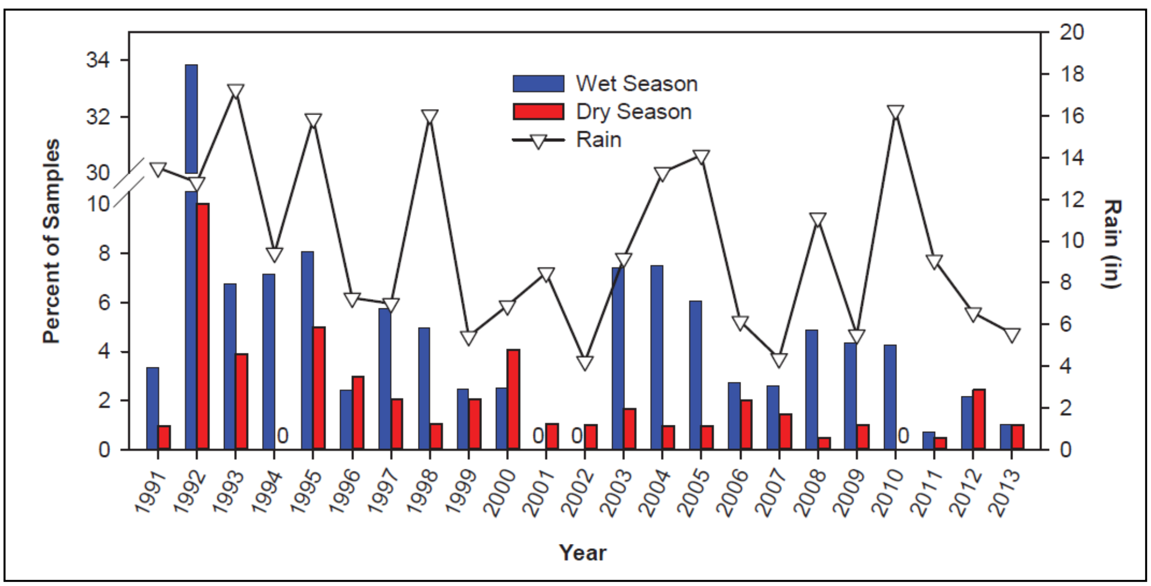

Figure III.E-4 Rainfall/Elevated FIB Densities at Shore Stations, 1991-2013
Comparison of annual rainfall to the percent of samples with elevated FIB densities in wet versus dry seasons at PLOO shore stations from 1991 through 2013. Rain data are from Lindbergh Field, San Diego, CA.

Satellite imagery during 2013 demonstrated that runoff from the San Diego River was typically restricted to the area between the shore and inside of the kelp forest (Svejkovsky, 2014). Monthly mean FIB densities at the PLOO kelp bed stations were lower than those at the shore stations, ranging from 2 to 31 CFU/100 ml for total coliforms, and 2 to 3 CFU/100 ml for fecal coliforms, while enterococcus remained at only 2 CFU/100 ml throughout the year.

This low incidence of elevated FIBs is consistent with water quality results dating back to 1994 after the outfall was extended to its present deepwater discharge site (Figure III.E-5). In contrast, FIB levels were much higher at the kelp bed stations prior to the outfall extension. No relationship between rainfall and elevated FIB levels was evident at these stations over the years, as the proportion of samples with high FIBs was similar between wet and dry seasons (~4 percent for both).

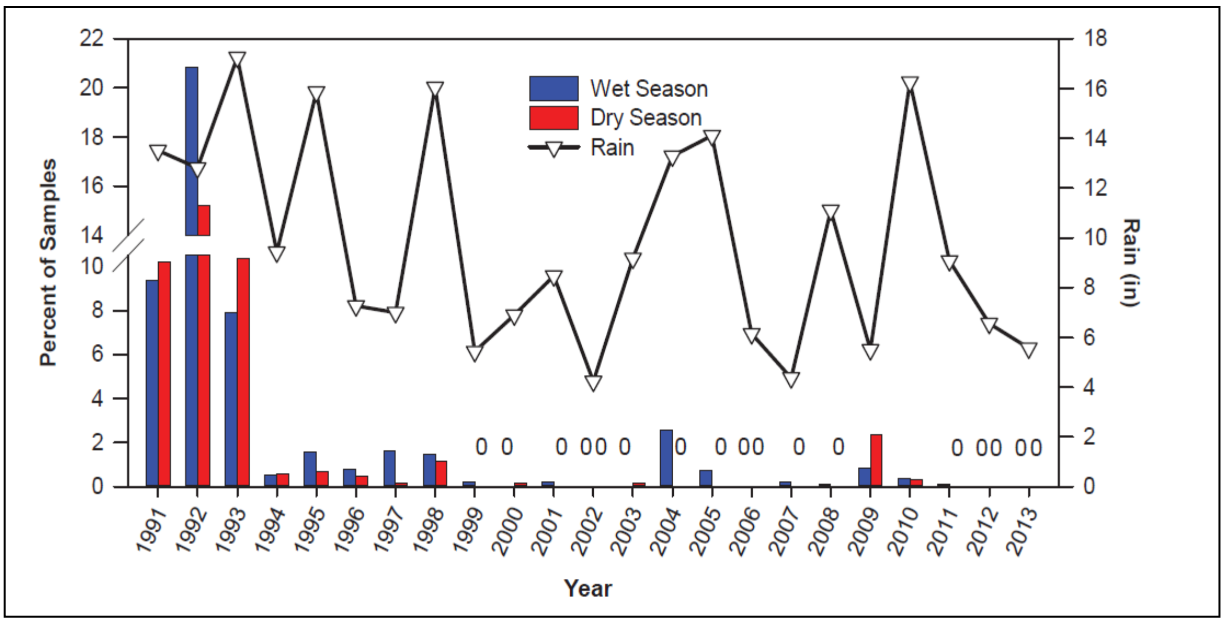

Figure III.E-5 Rainfall/Elevated FIB Densities at Kelp Bed Stations 1991-2013
Comparison of annual rainfall to the percent of samples with elevated FIB densities in wet versus dry seasons at PLOO kelp bed stations from 1991 through 2013. Rain data are from Lindbergh Field, San Diego, CA.

Offshore Stations in Federal Waters. Figure III.E-6 summarizes enterococcus sampling at PLOO stations during 2013, including stations beyond the three nautical mile State-regulated limit. As shown in Figure III.E-6, only one offshore sample (0.2 percent of the 564 samples collected) had elevated enterococcus levels greater than 104 CFU/100 ml. This elevated sample was collected at station F30 (outside the three nautical mile State-regulated limit) near the PLOO discharge site at a sample depth of 80 meters.

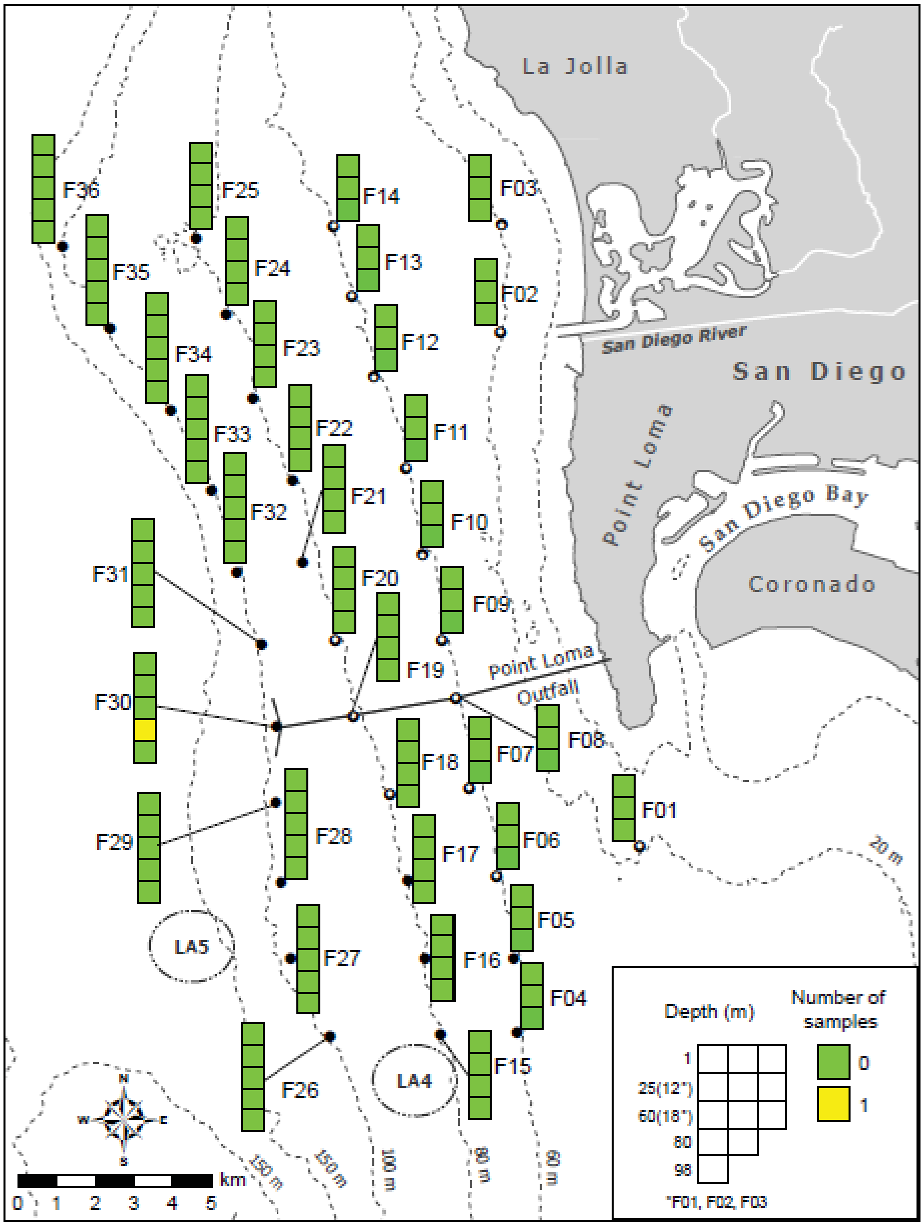

Figure III.E-6 Elevated Offshore Enterococcus Densities - 2013

Distribution of Enterococcus samples collected at offshore stations during 2013. Data are number of samples that exceeded concentrations greater than 104CFU/100 ml. Open circles indicate stations sampled within state jurisdictional waters.

As previously noted, no exceedances occurred within State jurisdictional waters (i.e., within 3 nautical miles of shore). These results suggest that the wastewater plume was restricted to relatively deep, offshore waters throughout the year. This conclusion is consistent with remote sensing observations that provided no evidence of the plume reaching surface waters in 2013 (Svejkovsky 2014).

Even before Point Loma WWTP effluent chlorination operations began in 2008, the PLOO area achieved near-100 percent compliance with *California Ocean Plan* body contact recreational standards in offshore federal waters. Less than 1 percent of the samples collected at the eleven stations located along the 100-meter discharge depth contour from 1991 through 2013 at depths less than 25 meters contained elevated levels of enterococcus (Figure III.E-7A). Over this time period, detection of elevated FIB was significantly more likely at the three stations located near the discharge zone (i.e., F29, F30, F31) than at any other 100-meter site (15% versus 5%, respectively; $n = 5020$, $\chi 2 = 154.97$, $p < 0.0001$) (Figure III.E-7B).

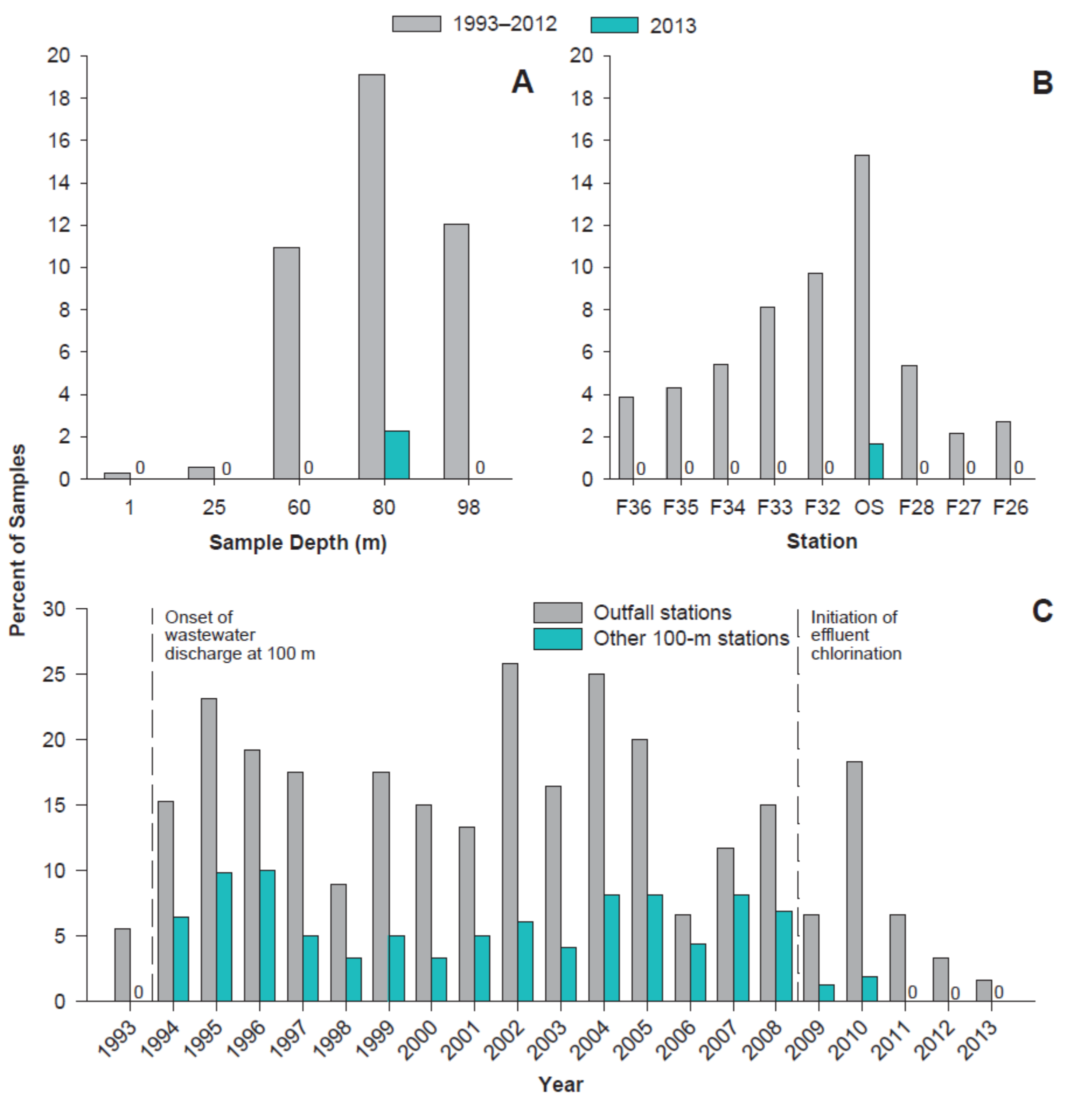

Figure III.E-7 Elevated Offshore Enterococcus Densities, 1993 - 2013
Percent of samples collected from PLOO 100-m offshore stations with elevated bacteria densities. Samples from 2013 are compared to those collected between 1993 and 2012 by (A) sampling depth, (B) station listed from north to south from left to right, and (C) year. OS = outfall stations (F29, F30, F31).

Following the implementation of Point Loma WWTP effluent chlorination in August 2008, the number of samples with elevated enterococcus also dropped significantly at these three 100-meter stations (17% before versus 7% after, $n = 1721$, $\chi 2 = 18.85$, $p < 0.0001$), as well as at the other 100-meter stations (6% before versus 0.6% after; $n = 3299$, $\chi 2 = 42.25$, $p < 0.0001$) (Figure III.E-7C).

Previous reports have indicated that the PLOO wastefield typically remains offshore and submerged in deep waters ever since the extension of the outfall was completed in late 1993 (City of San Diego, 2008, 2009, 2010, 2011a, 2012a, 2013a, 2014a; Rogowski et al. 2012, 2013). This pattern remained true for 2013 with evidence indicating that the wastewater plume was restricted to depths of 40 m or below in offshore waters. The depth of the PLOO diffuser may be the dominant factor that inhibits the plume from reaching surface waters. For example, wastewater released into these deep, cold and dense waters does not appear to mix with the upper 25 m of the water column (Rogowski et al. 2012, 2013). Finally, it appears that not only is the plume being trapped below the pycnocline, but now that effluent is undergoing partial chlorination prior to discharge, densities of indicator bacteria have dropped significantly at all offshore stations along the 100-meter depth contour, including those nearest the outfall.

Beach Water Quality. California has the most extensive and comprehensive monitoring and regulatory program for beaches in the nation (State Board, 2014a). Monitoring is performed by county health agencies, publicly owned sewage treatment plants, other dischargers along the coastal zone, environmental groups, and numerous citizen-monitoring groups.

In San Diego County, the Department of Environmental Health monitors recreational beaches and informs the public when water quality standards are exceeded (County of San Diego, 2014). This information, along with data from four other San Diego County agencies (the City of Oceanside, the City of San Diego, the Encina Wastewater Authority, and the San Elijo Joint Powers Authority) is used by Heal the Bay, a non-profit environmental group, to prepare an annual Beach Report Card™ (Heal the Bay, 2014). Heal the Bay's Beach Report Cards summarize beach water quality information by grading monitoring locations from Humboldt County to San Diego County.

In the most recent Heal the Bay's Beach Report Card, beach water quality during summer dry weather in San Diego County was generally excellent. The Tijuana Slough at the Tijuana River Mouth (C grade) was the only location to earn a grade lower than an A or B. The County's water quality grades during winter dry weather were also excellent with 98 percent of monitoring locations receiving A or B grades.

The San Diego County Department of Environmental Health posts notices and closes beaches in San Diego County when monitoring indicates bacteria levels exceed state standards. During the past seven years, the vast majority of closure events and extended durations of closure were in the vicinity of the Tijuana River (Figure III.E-8, from County of San Diego, Department of Environmental Health 2014 records). None of the beach closures were related to the operation of the PLOO.

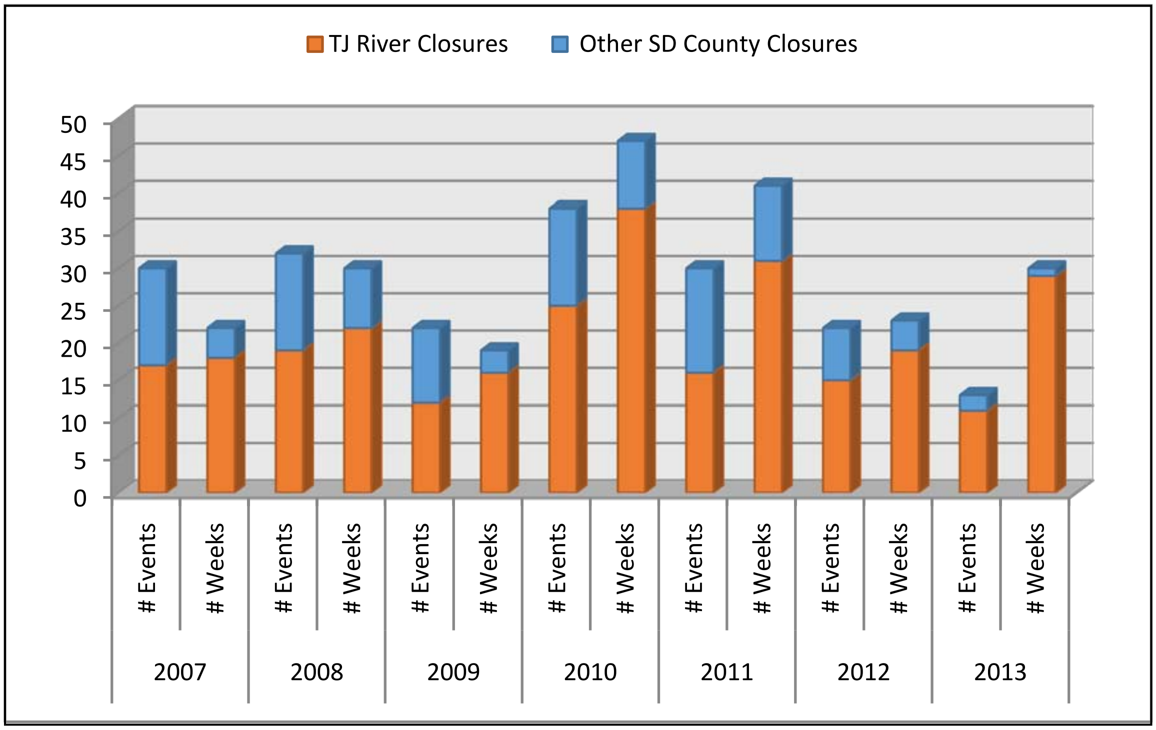

Figure III.E-8 San Diego County Beach Closures 2007-2013

The City of Imperial Beach is conducting a Bacterial Source Identification Study in the Tijuana River Watershed. The study will provide a detailed account of the sources, loads, and transport mechanisms of bacteria during both wet weather and dry weather conditions in the watershed. With the exception of short-term sewage spills and the chronic contamination emanating from the Tijuana River, elevated bacteriological levels at beaches in San Diego County appear to come from sources unrelated to the offshore discharge of treated sewage.

Beaches in San Diego with "compromised" water quality are located downstream of watersheds. Bacteria entering estuaries, bays, and the ocean originate from a wide variety of sources including natural sources such as feces from aquatic and terrestrial wildlife, and anthropogenic sources such as sewer line breaks, leaking septic systems, pets, trash, and homeless encampments. Once in the environment, bacteria also re-grow and multiply (City of San Diego and Weston Solutions, 2004; Martin and Gruber, 2005; City of San Diego and Weston Solutions 2006; McQuaig et al. 2012; Griffith et al. 2013).

During wet weather, wash-off of bacteria from land is the primary mechanism for transport of bacteria from land into the ocean (Griffith et al. 2010; Imamura et al. 2012). During dry conditions, streams in urban areas may sustain a flow even if no rainfall has occurred. These flows result from land use practices that generate urban runoff, which enters storm drains and creeks and carries bacteria into the receiving water.

The Regional Board in conjunction with other regulatory agencies and local research organizations investigated bacteriological water quality at "reference beaches" with upstream watershed consisting of at least 95 percent undeveloped lands. Because the reference beach drainage area consists almost entirely of undeveloped land, bacteria washed down to the beach come from natural, non-anthropogenic sources. Measurements during the 2004-2005 winter season showed that at four reference beaches (two in Los Angeles County, one in Orange County, and one in San Diego County) 27 percent of all samples collected within 24 hours of rainfall exceeded water quality standards for at least one indicator bacteria (i.e., a single sample bacteriological threshold was exceeded 27 percent of the time) (Schiff et al., 2005). Thus, lack of compliance with bacteriological standards at beaches downstream of watersheds is likely related to natural sources as well as anthropogenic ones.

The only shoreline sampling stations along Point Loma that have continuing episodes of non-compliance with water contact bacteriological standards (Stations D8 - D11) are located over seven miles from the PLOO in the vicinity of the mouth of the San Diego River (City of San Diego, 2008, 2009, 2010, 2011a, 2012a, 2013a, 2014a). Results of the long-term, comprehensive City of San Diego bacteriological monitoring program indicate that the PLOO wastewater plume does not contact the shoreline. Indicator bacteria detected at Ocean Beach adjacent to the San Diego River are derived from natural and urban sources washed off the land and transported to the area by freshwater flows. Thus, any public health risk along the Ocean Beach shoreline would be associated with exposure to pathogens transported from land, not from the ocean discharge of wastewater over seven miles away.

III.E.3. Are there any Federal, State, or local restrictions on recreational activities in the vicinity of the modified discharge(s)? If yes, describe the restrictions and provide citations to available references.

Appendix I.1 documents recreational activities in the vicinity of the PLOO discharge. There are no federal, state, or local restrictions on recreational activities in the vicinity of the PLOO.

III.E.4. If recreational restrictions exist, would such restrictions be lifted or modified if you were discharging a secondary treatment effluent?

No such restrictions exist that are related to the PLOO discharge.

Section III.F
Monitoring Program

Renewal of NPDES CA0107409

III.F MONITORING PROGRAM

III.F.1. Describe the biological, water quality, and effluent monitoring programs which you propose to meet the criteria of 40 CFR 125.63. Only those scientific investigations that are necessary to study the effects of the proposed discharge should be included in the scope of the 301(h) monitoring program [40 CFR 125.63(a)(1)(I)(B)].

SUMMARY: The City proposes to maintain the existing comprehensive influent, effluent, sludge, and ocean monitoring program established Monitoring and Reporting Program R9-2009-0001. Only a few minor changes are proposed to the core program regarding benthic monitoring and sediment toxicity testing. The City proposes to continue full participation in the Southern California Bight regional monitoring programs, as well as several other regional monitoring efforts. Additionally, the City will continue to pursue its enhanced ocean monitoring efforts via special projects that address more specific receiving water quality or other discharge-related issues.

Consistency with San Diego Water Board Direction. The City's comprehensive receiving water monitoring program is in keeping with the SCCWRP *Model Monitoring Program*, and is also consistent with the stated monitoring and assessment mission of the *San Diego Regional Water Board Practical Vision*, which states:

> ***Mission Statement:***
> *The mission is to ensure that monitoring and assessment programs (a) determine the status and trends of conditions in San Diego Region waters, (b) identify the causes of unsatisfactory conditions, (c) determine the effectiveness of management actions, and (d) effectively communicate key findings to the public, stakeholders, and decisions makers.*

The City's monitoring program, which covers an extensive portion of San Diego's coastal waters, is further consistent with the regional monitoring framework addressed within Regional Board Resolution No. 2012-0069, *A Resolution in Support of a Regional Monitoring Framework*, which recommends that monitoring be question-driven and include the following elements:

- assessment of water quality conditions to evaluate the viability of water quality to support beneficial uses,
- identify stressors causing any unsatisfactory conditions,
- identify the source of the primary stressors, and
- evaluate the effectiveness of actions to mitigate/eliminate the stressors.

In accordance with the *San Diego Water Board Practical Vision* and the Regional Monitoring Framework, the City of San Diego is committed to maintaining a comprehensive monitoring and reporting program and will embrace any appropriate modifications that may be required in the future. The basis for the program involves three elements:

1) a core NPDES permit compliance monitoring program that includes influent and effluent water quality monitoring, and monitoring of receiving waters, receiving water sediments, fish, and benthic species,
2) participation in regional surveys that may involve many agencies and academic organizations and provides information about the general Southern California Bight as well as its bays and estuaries, and
3) special projects designed to address and answer specific questions about some aspect of the ocean environment.

Core Monitoring Program. The details and requirements of the current core PLOO monitoring program are established in Order No. R9-2009-0001, which became effective on August 1, 2010. The City remains committed to maintaining a comprehensive and robust ocean monitoring and reporting program for the San Diego coastal region, and to coordinating with the Regional Board to further improve the program in line with the goals and objectives of the *San Diego Water Board Practical Vision* and Regional Monitoring Framework. Thus, only minor modifications are proposed to the existing monitoring program for the Point Loma region, all of which are designed to address the regional perspective included in the Regional Monitoring Framework or to address changes in the 2012 *California Ocean Plan* (see Appendix U).

Regional Surveys. The City of San Diego has been and will continue to be a full participant in the comprehensive surveys of the Southern California Bight (SCB) that are coordinated by SCCWRP approximately every five years.

Special Projects. The adaptive nature of the existing program allows for the inclusion of any special monitoring projects the City chooses to implement to assess treatability, receiving water quality, or other issues. No changes in the NPDES monitoring program are required to accommodate such special monitoring projects; such special projects can be initiated and completed within the scope of the existing program. Upon completion of a project, if it is found necessary to modify the core NPDES program to reflect the results of the project, such proposed changes can be presented to and discussed with regulators at that time.

The City of San Diego has been actively working on, collaborating with other researchers or agencies, or supporting a large number of important special projects or enhanced ocean monitoring studies over the past 10 years or more. Many of these projects were identified as the result a scientific review of the City's Ocean Monitoring Program and environmental monitoring needs for the region that was conducted by a team of scientists from the Scripps Institution of Oceanography and several other institutions (SIO, 2004), as well as in consultation with staff from the Regional Board, EPA, SCCWRP and others. Examples of special projects or enhanced monitoring efforts that have been recently completed, are presently underway, or that are just being initiated include:

- the PLOO Plume Behavior Study, which was designed to determine the characteristic fates of the PLOO wastewater plume in the coastal waters off Point Loma using a combination of observational and modeling approaches.

- Oceanographic Mooring Systems for the Point Loma and South Bay Ocean Outfalls, which involves the design and installation of a real-time ocean observing system that will span both outfall regions.

- the Deep Benthic Habitat Assessment Study, and ongoing, long-term project designed to assess the condition of deeper (greater than 200 meters) continental slope habitats off San Diego.

- Remote Sensing of the San Diego/Tijuana Coastal Region, which utilizes satellite and aerial imagery observations to better understand regional water quality conditions off San Diego. The last five annual monitoring reports for this project are included in Appendix H of this application, while a comprehensive multi-year report and paper for peer-reviewed publication are expected to be completed by the end of 2015.

- San Diego Kelp Forest Ecosystem Monitoring Project, which continues a long-term commitment by the City (funded since 1992) to support research conducted by the Scripps Intuition of Oceanography to assess the health of San Diego’s kelp forests.

Proposed Program Modifications. Only a few minor modifications or changes are proposed to the existing requirements established in Order No. R9-2009-0001. These changes are similar to those adopted recently for the SBOO monitoring program as detailed in: (a) Order No.

R9-2013-0006 as amended by Order No. R9-2014-0071 for the South Bay Water Reclamation Plant; and (b) Order No. R9-2014-0009 for the South Bay International Wastewater Treatment Plant.

These recommended changes have been discussed previously with Regional Board staff and are consistent with the goals and objectives of the Board's *Framework for Monitoring and Assessment in the San Diego Region*, the *San Diego Water Board Practical Vision*, and changes incorporated in the 2012 *California Ocean Plan*. The requested modifications include:

1) ***Core Sediment and Infauna Monitoring:*** Reduce infauna sampling at the 12 primary core and 10 secondary core benthic stations to a single sample per station to match sediment sampling. Present benthic sampling requirements are two infaunal samples and one sediment sample per station per survey. However, the second infaunal sample (replicate) is of little value since it does not have a corresponding sediment sample. A similar change was recently made to the core benthic sampling requirements for the SBOO monitoring program detailed in the Orders referenced above. Additionally, this change will provide sufficient resources to allow for addition of the random benthic survey described below.

2) ***Random Benthic Survey:*** Add a requirement for the annual survey of 40 randomly selected benthic stations each year to correspond to the existing requirement in the SBOO monitoring program. The permit language should indicate that this will be a single, joint effort of the PLOO and SBOO monitoring programs since the survey spans both regions. This change will also be consistent with the regional monitoring framework objectives.

3) ***Sediment Toxicity:*** Add a requirement for the City to prepare and submit a Sediment Toxicity Monitoring Plan for the PLOO region to implement an on-going acute sediment toxicity monitoring program for the PLOO region in conformance with the requirements of the 2012 *California Ocean Plan*. The City recommends that the permit language for this new requirement be similar to that included in the recently amended Order for the South Bay Water Reclamation Plant (i.e., Order No. R9-2013-0006 as amended by Order No. R9-20014-0071).

III.F.2 Describe the sampling techniques, schedules, and locations, analytical techniques, quality control and verification procedures to be used.

No changes in the sampling techniques, schedules, locations, analytical techniques, quality control, or verification procedures established in Order No. R9-2009-0001 (NPDES CA0107409) are recommended at this time.

The City of San Diego maintains a rigorous quality control program for sample collection and laboratory analysis. A copy of the City's *Wastewater Chemistry Laboratory Quality Assurance Report* has been submitted to EPA and the Regional Board. A copy of the City's current *Quality Assurance Manual for the Ocean Monitoring Program* has also been submitted to EPA and the Regional Board.

The quality assurance reports document sampling methods, preservation techniques, analytical techniques, quality assurance/verification procedures, statistical techniques, and taxonomic procedures. To avoid duplication, these previously submitted documents are not reproduced herein, but are incorporated by reference as part of the City’s 301(h) application.

III.F.3 Describe the personnel and financial resources available to implement the monitoring programs upon issuance of a modified permit and to carry it out for the life of the modified permit.

SUMMARY: The City has the available personnel, equipment, and financial resources to carry out the 301(h) monitoring program.

As noted in the response to Question III.F.1, the City proposes maintaining the comprehensive monitoring program established under Order No. R9-2009-0001 (NPDES Permit No. CA0107409).

This comprehensive monitoring program is administered by the City of San Diego's Environmental Monitoring and Technical Services Division. Including administrative support, the program is carried out by a staff of nearly 100 with an annual budget of approximately $13.58 million. Table III.F-1 (page III.F-5) summarizes FY 2015 program staffing for the monitoring effort. Table III.F-2 (page III.F-6) summarizes the FY 2015 program budget.

The ocean monitoring section includes a professional staff of 40, including marine biologists, microbiologists, toxicologists, laboratory technicians, data management specialists, and boat operators. As part of the ocean monitoring program, receiving water, sediment, benthic organisms, and fish are collected by two marine monitoring vessels, the *Monitor III* (42 foot-length) and the *Oceanus* (48 foot-length). The City also maintains extensive chemistry, marine, and microbiological laboratories, and a computer database.

Wastewater influent, effluent, residuals, fish tissue and sediment chemistry analyses are performed by the City of San Diego's Wastewater Chemistry Laboratory. The laboratory is currently staffed by 48 chemists, laboratory technicians, and data base management personnel.

The City's laboratories have been certified by the State of California's Environmental Laboratory Accreditation Program (ELAP). All appropriate analyses are performed according to ELAP approved methods. Southern California regional monitoring programs have been coordinated by the Southern California Coastal Water Research Project in conjunction with EPA and the various Regional Water Quality Control Boards. San Diego's laboratories have successfully participated in the regional program’s method comparability studies when required.

Resumes of key City monitoring and laboratory personnel are presented in the City's *Wastewater Chemistry Laboratory Quality Assurance Report* and *Quality Assurance Manual for the Ocean Monitoring Program*. These reports are incorporated by reference as part of the City's 301(h) application.

Table III.F-1
Summary of FY 2015 Staffing
Environmental and Technical Services Technical Division
Wastewater Chemistry Laboratory and Ocean Monitoring Program

Group	Personnel	FY 2015 Staffing
Administration	Deputy Director Business Manager Analyst Other Support Staff Safety Rep II Building Services Supervisor Building Services Technician Storekeeper I Stock Clerk	1 1 2 2 1 1 1 1 1
	Section Total	11
Ocean Monitoring Program	Program Supervisor (Sr. Marine Biologist) Sr. Biologist Marine Biologist III Biologist III Marine Biologist II Biologist II Lab Technician Assistant Lab Technician Sr. Boat Operator/Boat Operator Clerical Support	1 1 5 1 18 6 4 1 2 1
	Section Total	40
Wastewater Chemistry Laboratory	Senior Chemist Associate Chemist Assistant/Jr. Chemist Lab Technician Clerical Support	1 7 24 15 1
	Section Total	48
Program Totals		99

Table III.F-2
Summary of FY 2015 Budget
Environmental and Technical Services Technical Division
Wastewater Chemistry Laboratory and Ocean Monitoring Program

Category	Fiscal Year 2015 Budget
Personnel	$ 8,977,207
Non-Personnel	2,535,202
Contracts/Support of Research & Prof. Orgs.	2,072,059
TOTAL	$ 13,584,468

Section III.G
Effects of Discharge on Other Sources

Renewal of NPDES CA0107409

III.G EFFECTS OF DISCHARGE ON OTHER SOURCES

III.G.1. Does (will) your modified discharge(s) cause additional treatment or control requirements for any other point or nonpoint pollution source(s)?

SUMMARY: No other regional ocean discharger will be affected by the PLOO discharge.

A number of other point and non-point dischargers exist within the San Diego County region. Near-shore discharges within the United States include storm drain discharges, discharges from natural watercourses, cooling water discharges from power plants, and aquarium or mammal confinement discharges. Nearshore discharges in Mexican federal waters include a surf zone wastewater discharge from the Tijuana municipal wastewater plant.

As documented in Appendix P, ocean currents off the San Diego coast are predominantly long-shore. Since the PLOO discharge is approximately 7.2 km (4.5 miles) offshore, the discharge has virtually no impact on shoreline water quality. Conversely, the nearshore discharges (including storm runoff and storm drains) tend to move upcoast and downcoast within nearshore waters, but have little impact on offshore water quality.

While offshore waters (including waters passing through PLOO ZID) tend to remain offshore, sufficient distance exists between PLOO and other regional outfall facilities to insure that the regional discharges do not impact each other.

Table III.G-1 (page III.G-2) presents a list of existing NPDES dischargers to offshore coastal waters of San Diego County. Table II.G-2 (page III.G-3) presents a description of outfall discharge facilities. As shown in Table III.G-2, the PLOO discharge is the only deep-water ocean discharge in the region. All other San Diego County outfall discharges are to depths of 36 meters (120 feet) or less. The nearest discharge to PLOO is the South Bay Ocean Outfall; the South Bay outfall diffuser is located approximately 18 km (10 miles) southwest of the PLOO diffuser.

Three ocean outfall discharges of treated effluent occur in San Diego County north of the PLOO discharge. The three discharges account for approximately 4.2 m^3/sec (96 mgd) of undisinfected secondary and tertiary wastewater.

Table II.G-1
Regional Municipal Wastewater Discharger
Offshore Ocean Outfall Discharges

Facility	Discharger	Nature of Discharge	NPDES Permit	Permitted Flow[1]
Oceanside Ocean Outfall	City of Oceanside	Secondary and tertiary treated wastewater plus reverse osmosis brine	Order No. R9-2011-0016[2] NPDES CA0107433	1.00 m^3/sec (22.9 mgd)
	Fallbrook Public Utility District	Tertiary treated wastewater	Order No. R9-2012-0004 NPDES CA0108031	0.12 m^3/sec (2.7 mgd)
	U.S. Marine Corps Base Camp Pendleton	Secondary and tertiary treated wastewater plus reverse osmosis brine	Order No. R9-2012-0041 NPDES CA0109347	0.16 m^3/sec (3.6 mgd)
Encina Ocean Outfall	Encina Joint Powers Authority	Secondary treated wastewater[3]	Order No. R9-2011-0019 NPDES CA0107395	1.90 m^3/sec (43.3 mgd)
San Elijo Ocean Outfall	City of Escondido	Secondary treated wastewater plus industrial brine[3]	Order No. R9-2010-0086 NPDES CA0107981	0.79 m^3/sec (18.0 mgd)
	San Elijo Joint Powers Authority	Secondary treated wastewater[3]	Order No. R9-2010-0087 NPDES CA0107999	0.23 m^3/sec (5.25 mgd)
IBWC South Bay Ocean Outfall	International Boundary and Water Commission	Secondary treated wastewater	Order No.R-2014-0009[4] NPDES CA0108928	1.1 m^3/sec (25 mgd)
	City of San Diego	Secondary treated wastewater[3]	Order No. R9-2013-0006[5] NPDES CA0109045	0.66 m^3/sec (15 mgd)

1 Average daily flow limits imposed by NPDES permits. Actual discharges through the outfalls are typically less than the permitted flows.
2 As amended by Regional Board Order No. R9-2012-0042 and Order No. R9-2014-0108.
3 The discharge may occasionally contain excess tertiary treated flows or tertiary treated flows that do not meet Title 22 recycled water specifications.
4 As modified by Order No. R9-2014-0081.
5 As modified by Order No. R9-2014-0071.

Table II.G-2
Physical Characteristics of Regional Outfall Discharges

Outfall Facility	Distance from PLOO Discharge	Outfall Discharge Depth	Discharge Distance Offshore	Assigned Initial Dilution[1]	Total Permitted Flow[2]
Oceanside Ocean Outfall	60 km north (37 miles)	30 meters (100 feet)	2,400 meters (8,000 feet)	87	1.28 m^3/sec (29.1 mgd)
Encina Ocean Outfall	50 km north (32 miles)	36 meters (120 feet)	2,700 meters (9,000 feet)	144	1.90 m^3/sec (43.3 mgd)
San Elijo Ocean Outfall	37 km north (23 miles)	30 meters (100 feet)	3,000 meters 10,000 feet	237	1.02 m^3/sec (23.25 mgd)
South Bay Ocean Outfall	18 km south (10 miles)	28 meters (93 feet)	8700 meters (23,600 feet)	94.6	1.1 m^3/sec (25 mgd)

1 Initial dilution on which NPDES effluent concentration limits are based.
2 Flow limits on outfall discharges are established in NPDES permits issued by the Regional Board.

III.G.2. Provide the determination required by 40 CFR 125.63(b) or, if the determination has not yet been received, a copy of a letter to the appropriate agency(s) requesting the required determination.

The City has submitted a letter to the California Regional Water Quality Control Board, San Diego Region, requesting the determination required by 40 CFR 125.63(b). A copy of the letter is presented in Appendix V (Volume X).

Section III.H
Toxics Control Program

Renewal of NPDES CA0107409

III.H TOXICS CONTROL PROGRAM

III.H.1. a. Do you have any known or suspected industrial sources of toxic pollutants or pesticides?

As detailed in Appendices N and O (Volume IX), the City maintains an industrial source control program that:

- identifies industrial sources of toxic pollutants,
- establishes permits for industrial dischargers, and
- monitors and enforces pretreatment and source control discharge limits.

Appendix N presents a summary of the City's Industrial Waste Control Program (IWCP). Appendix O presents the 2013 annual report for the City's IWCP. As documented in Appendices N and O, industries within the City's pretreatment program are classified into the following groups based on the type of industry and characteristics of the wastestream:

Class 1: Industries subject to Federal Categorical Pretreatment Standards. These users require source control, pretreatment, or both.

Class 2: Industries which have potential toxic discharges at flows greater than 25 gpd, but are not regulated under categorical pretreatment standards. Class 2 industrial users may be regulated with numerical limits (e.g. industrial laundries or membrane manufacturers with flows in excess of 25,000 gpd) or Best Management Practices (BMPs).

Class 3: Industries which have process discharges greater than 2,500 gpd that require control of conventional pollutants. Class 3 users may be regulated with numerical limits (e.g. commercial laundries with flows in excess of 25,000 gpd, BMPs, or both).

Class 4: Dry industries, industries with sanitary discharges only, or non-CIUs with discharge flows below permit flow thresholds (25 gpd for Class 2 and 2,500 gpd for Class 3).

Class 4C: Industries that generate wastewater from a process subject to Federal Categorical Pretreatment Standards but do not discharge it to sewer.

Class 4Z: Industries that conduct a process subject to Federal Categorical Pretreatment Standards but do not generate wastewater.

Permits are issued to Class 1, 2, and 3 industrial dischargers. The IWCP also regulates through issuance of permits:

- trucked waste haulers who discharge industrial or domestic wastewater to the sewer system,
- trucked waste generators, and
- temporary groundwater dischargers, including groundwater dewatering (regulated as Class 3 dischargers) and groundwater remediation (regulated as Class 2 dischargers).

Table III.H-1 summarizes the number of regulated industries and associated industrial flows. As shown in Table III.H-1, a total of 41 industries were subject to federal categorical pretreatment standards (Categorical Industrial Users, or CIUs) as of December 31, 2013. Total flows from CIUs average approximately 0.26 mgd (0.011 m^3/sec).

Table III.H-1
Summary of Metro System CIUs and SIUs[1]

Parameter	IUs Regulated through Permits[2]	SIUs[3]	CIUs[4]
Number of Permitted Industrial Dischargers	1,318	74	41
Industrial Flows (mgd)	4.9	4.7	0.26
Industrial Flows as a Percent of total Point Loma WWTP Influent Flow[5]	3.4	3.3	0.18

1 Industrial user permit and flow data are from Table N-5 of Appendix N.
2 Number of industrial users (IUs) regulated by the IWCP through the issuance of a sewer discharge permit.
3 SIUs are Significant Industrial Users, as defined in 40 CFR 403.3. SIU totals also include regulated CIUs.
4 CIUs are Categorical Industrial Users subject to federal categorical pretreatment standards established in 40 CFR Sections 405 through 471.
5 Expressed as a percent of 2013 average annual Point Loma WWTP flow of 143.8 mgd.

As of December 31, 2013, a total of 74 industries were regulated as Significant Industrial Users (SIUs), as defined under 40 CFR 403.3. Flows from non-categorical SIUs represent a significant majority of all Metro System industrial flows. As documented in Appendices N and O, the number of CIUs and SIUs within the Metro System have significantly declined during the past 30 years.

Table III.H-2 presents a breakdown of how industrial users (IUs) are regulated within the Metro System. As shown in Table III.H-2, slightly more than 300 IUs within the Metro System are regulated as Class 1 or Class 2 dischargers. A significant majority of the permitted IUs within the Metro System are smaller dischargers who are regulated through the issuance of Best Management Practices (BMP) Discharge Authorizations.

Table III.H-2
Breakdown of Historic and Projected CIUs and SIUs[1]

Type of Control	Type of Industrial User (IU)	Number of Industries[1]
Industrial User Permit[2]	Class 1 (CIUs)	41
	Class 2	266
	Class 3	44
	Trucked Wastes[3]	112
	Groundwater Dischargers[4]	42
	Dischargers regulated through BMPs[5]	855
	Total Number of Permitted IUs	1,318[6]
Regulated as Non-Dischargers	CIUs with no industrial discharges[7]	38
	Other Class 4/5[8]	2,373

1 Number of active industrial user permits under the classification as of December 31, 2013. See Appendices N and O for details.
2 Regulated through issuance of an industrial discharge permit that establishes discharge limits, applicable treatment requirements, and/or Best Management Practices (BMPs).
3 Includes permits for trucked waste haulers.
4 Groundwater Discharge Permits are either Class 2 (Remediation) or Class 3 (Construction Dewatering) permits.
5 Dischargers regulated through BMP Discharge Authorizations.
6 Above totals are not cumulative (e.g. totals to not add up), as some dischargers may be regulated within more than one classification.
7 Facilities with categorical processes but no industrial discharge to the sewer. Facilities required to certify zero discharge and are inspected annually.
8 Active facilities that are dry or have industrial flows less than permitting thresholds where no discharge permit is required.

Table III.H-3 (pages III.H-4 through III.H-7) presents a breakdown by Standard Industrial Classification (SIC) of the Metro System industrial users. As shown in Table III.H-3, photofinishing laboratories and dry cleaners represent two-thirds of the permitted dischargers. The majority of the industrial flows are contributed by sanitary services, groundwater remediation discharges, and food preparation industries.

Table III.H-3
Current Breakdown of Industries and Flows by SIC[1]

SIC Code	Industry Classification	No. of Industrial Discharges		Industrial Discharge Flows (gpd)	
		Permit[2] Issued	Permit Not Issued[3]	Total Flow Evaluated	Permitted Average Flow
0200	Livestock production and animal specialties		6	3,462	
0700	Agricultural services	1		0	0
0740	Veterinary services	4	22	11,239	1,603
1500	Construction/trade contractors	2	27	2,463	801
2010	Meat products	1	4	22,288	22,288
2030	Canned and preserved fruits and vegetables		2		
2040	Grain mill products		1		
2050	Bakery products		5	120	
2070	Vegetables and animal oils	1		13,976	13,976
2080	Beverages (bottling companies, breweries)	1	2	24,867	730
2090	Misc food product prep (fish, snacks, misc can/ packaged	3	17	136,691	42,978
2099	Food Preparations, NEC	1	2	673,344	673,257
2300	Apparel and other products made from fibers		6	3,500	
2400	Lumber and wood products except furniture	1	5	400	400
2500	Furniture and fixtures mfg		11	6	
2600	Pulp, paper mills & paper, card- & food-board prods		3	11	
2700	Printing, publishing & allied industries	8	28	548	13
2750	Commercial printing	14	44	1,995	6
2759	Silkscreening	1	19	4,654	0
2790	Typesetting/plate making for printing trade		1	6	
2810	Industrial inorganic chemicals		2	0	
2820	Plastics, resins, synthetic rubber, manmade fibers		9	549	
2830	Drugs, pharmaceutical, biological products	13	6	38,745	2,955
2840	Soaps detergents, cleaning preparation, cosmetics		5	96	
2850	Paints, varnishes, enamels & allied products	1	28	149	149
2860	Industrial organic chemicals	2	2	4,197	2,099
2870	Agricultural chemicals: Nitrogen/ phosphate fertilizer		1	1,459	
2879	Pest-,insect-, fung-, herbicides; soil conditioners		1		
2890	Misc chemical products	1	4	1,248	1,224
2893	Mfr. printing ink		1	3	
2900	Petroleum refining and related industries		2		
2950	Asphalt paving and roofing materials		3		
2990	Misc petroleum & coal products	1		82	82
2992	Lubricating oils and greases		1		
3000	Rubber products	1	8	121	1
3080	Plastics products	1	14	16,605	275
3081	Plastic film and sheet, unsupported	2		79,883	39,942
3100	Leather products mfg.		1		
3200	Stone, clay, glass, and concrete products		17	1,452	
3300	Primary metal industries	1	2	287	286
3310	Iron & steel works, furnaces, & roll/finish mills		1		
3350	Rolling, drawing, & extruding non-ferrous metals	1	1	1,440	1,440
3360	Non-ferrous foundries/casting	1	2	220	220
3390	Metal heat-treating, metal powders & paste		6	18	
3400	Fabricated metal products, except machinery	8	61	9,619	1,064
3440	Fabricated structural metal products	1	29	330	30
3462	Iron and steel forgings		1		

Table III.H-3
Current Breakdown of Industries and Flows by SIC[1]

SIC Code	Industry Classification	No. of Industrial Discharges		Industrial Discharge Flows (gpd)	
		Permit[2] Issued	Permit Not Issued[3]	Total Flow Evaluated	Permitted Average Flow
3469	Metal stampings		2		
3471	Electroplating, plating, polishing, anodizing, coloring	3	6	980	327
3479	Coating, engraving, etching, galvanizing, enameling	7	15	4,248	605
3490	Misc fabricated metal prods: valves, wire prods, foil	1	4	476	476
3500	Manufacture of machinery except electrical		4	0	
3510	Manufacture of engines and turbines	3		4,932	1,644
3520	Farm /garden machinery and equipment		1		
3530	Construction, mining, & materials handling machinery		1	150	
3540	Metalworking machinery and equipment		10	3	
3550	Spec. industrial machines: textile, woodwork, print, paper, food		1		
3560	General industrial machines: pumps, fans, gears, furnaces, etc.		2		
3570	Manufacture of computers and office equipment	1	2	735	735
3580	Refrigeration and service industry machinery		2		
3599	Machine shops, jobbing and repair	6	55	2,420	343
3600	Electrical & electronic equipment	7	91	13,235	1,652
3601	Wave soldering	1		167	167
3630	Household appliances		1		
3640	Electric Lighting and wiring equipment		5		
3650	Household audio / video equipment; audio recording		1		
3660	Communication equip: phone, radio, TV, alarms, detectors		4	6	
3670	Manufacture of electronic components	10	22	53,133	5,241
3672	Printed Circuit Board Mfg	1	3	37,202	37,202
3674	Semiconductor and Related Devices Mfg.		5	20	
3690	Misc electrical machinery, equipment, and supplies		6	4	
3710	Manufacture vehicles and vehicle equipment	1	6	42	37
3720	Manufacture aircraft and aircraft parts	3	6	49,338	16,163
3730	Ship and boat building and repairing	9	7	39,242	4,360
3760	Guided missiles, space vehicles & parts	2		257	129
3790	Misc Transportation Equipment		2	0	
3810	Search, detect, navigate, guidance, aeronautical instruments		2	10	
3820	Lab app & analytical, optical, measure, control instruments		10	65	
3840	Surgical, medical, and dental instruments & supplies	3	6	857	245
3850	Opthalmic goods, i.e. contacts, glasses, lenses	1	3	16,641	16,561
386O	Photographic Equipment and Supplies		1	1	
3900	Miscellaneous manufacturing industries		18	518	
3910	Jewelry, silverware, and plated ware		6		
3949	Sporting and Athletic Goods, Not Elsewhere Classed		1	1,023	
4000	Railroad Transportation	1	4	15,152	632
4100	Local transportation; taxicabs, buses, rental cars	4	7	15,391	3,673
4200	Motor freight and warehousing	3	33	2,201	51
4220	Public storage		3		
4300	U.S. postal service		2	66	
4400	Water transportation (includes marinas)	1	5	7,320	550

Table III.H-3
Current Breakdown of Industries and Flows by SIC[1]

SIC Code	Industry Classification	No. of Industrial Discharges		Industrial Discharge Flows (gpd)	
		Permit[2] Issued	Permit Not Issued[3]	Total Flow Evaluated	Permitted Average Flow
4500	Air transportation, airports, terminals, services	3	12	2,467	822
4800	Telephone, television, radio broadcasting		7	1,001	
4900	Utilities (gas, electric, sanitary)	4	2	66,928	14,482
4910	Electric Services	2	2	5,682	2,841
4930	Combination electric and gas, with other services	3	2	1,245	415
4940	Water supply utilities	2	5	16,263	244
4950	Sanitary services	3	5	9,579	2,692
4953	Refuse Systems: TSDF, landfill, incinerator, sludge	1	5	329	30
4959	Groundwater remediation/construction dewatering	34	2	2,046,085	60,150
5000	Wholesale trade - durable goods	2	51	956	413
5100	Wholesale trade - nondurable goods	3	25	12,030	3,601
5200	Retail trade - Building materials & Garden Supplies		17	142	
5300	Retail trade - General Merchandise/Department Store	1	30	14	1
5400	Retail trade - Food stores		11	48	
5410	Convenience grocery stores		9	129	
5460	Retail bakeries		1		
5500	Automotive, boat, motorcycle, recreational vehicle dealer	8	55	48,455	2,800
5540	Gasoline stations	1	24	49,650	9,600
5800	Eating and drinking places		5	2,100	
5900	Miscellaneous retail stores and shops	2	76	979	1
6000	Finance, insurance and real estate		3		
7000	Hotels, motels, trailer parks and other lodging	3	65	239,286	17,285
7212	Garment pressing, laundry/cleaning elsewhere	1	14	1,090	0
7213	Commercial Laundries, Linen supply	3	7	194,477	54,342
7215	Coin operated laundries		6	14,828	
7216	Dry cleaning plants, except rug cleaning	145	40	4,800	33
7217	Carpet and upholstery cleaning		9	1,487	
7218	Industrial laundries	2	1	50,862	25,431
7220	Photographic studios (no photofinishing)		10	600	
7230	Beauty shops and barber shops		1		
7334	Photocopying & blueprinting	1	11	25	0
7335	Commercial photography		5		
7336	Commercial art, graphics design	2	16	149	0
7340	Disinfecting, exterminating and cleaning services		9	592	
7350	Equipment leasing, heavy	9	14	8,266	559
7384	Photofinishing laboratories	620	16	122	0
7389	Miscellaneous services/soft water services	6	33	24,694	2,058
7510	Car and truck rental agencies	2	20	24,536	4,680
7530	Gas stations, Auto repair shops, body shops	25	374	42,079	592
7539	Radiator repair shops	5	13	1,081	60
7540	Car washes	10	97	314,767	3,700
7549	Auto steam cleaning	5	6	8,768	1,555
7600	Misc. repair shops (welding, furniture refinish)	3	16	544	34

Table III.H-3
Current Breakdown of Industries and Flows by SIC[1]

SIC Code	Industry Classification	No. of Industrial Discharges		Industrial Discharge Flows (gpd)	
		Permit[2] Issued	Permit Not Issued[3]	Total Flow Evaluated	Permitted Average Flow
7620	Electrical repair shops		9	17	
7690	Misc. Repair shops and related services, except TW	1	6	146	23
7699	Trucked waste, domestic and industrial		2		
7800	Motion picture production and theatres		2	750	
7900	Amusement and recreation services	1	14	7,393	4,296
8000	Health services	8	36		0
8021	Dental Office		16	1	
8050	Convalescent homes and other extended nursing		15	34,150	
8060	Hospitals	17	4	128,199	7,541
8070	Medical and dental laboratories	12	68	1,270	104
8090	Clinics/outpatient care facilities	15	190	11,139	259
8100	Legal and social services and membership orgs	1			0
8200	Educational services (school, colleges etc.)	14	21	284,485	19,849
8400	Museums, botanical, zoological gardens	1		967	967
8730	Research and development, testing labs	53	74	243,724	4,588
8900	Office building		51		
9100	Executive, Legislative, General government offices	4	3	8,537	2,028
9200	Justice, Public Order, & Safety (correctional facilities)	4	4	73,933	12,856
9700	National security/ international affairs	11	5	241,275	21,894
9900	Non-classifiable establishments	1	66	812	0

1 List of Industries as of July 2014.
2 Includes Class 1, Class 2, Class 2F, Class 3, and Class 4D industrial discharge permits.
3 Includes Class 4, Class 4C, Class 4Z, Class 4F, and Class 5 dischargers. (No permits are required for these classes.)

III.H.1 b. If no, provide the certification required by 40 CFR 125.66(a)(2) for small dischargers, and required by 40 CFR 125.66(c)(2) for large dischargers.

The question is not applicable. Industrial sources of toxic pollutants exist within the Metro System service area, as documented within Appendices N and O of this 301(h) application.

III.H.1 c. Provide the results of wet and dry weather effluent analyses for toxic pollutants and pesticides as required by 40 CFR 125.66(a)(1).

The City of San Diego routinely analyzes the Point Loma WWTP influent and effluent for toxic compounds. Effluent samples are collected and analyzed on a weekly basis for metals, cyanide, ammonia, chlorinated pesticides, phenolic compounds, and PCBs. Organophosphorus pesticides, dioxin, purgeable (volatile) compounds, acrolein and acrylonitrile, base/neutral compounds, and tri-, di-, and monobutyltins are performed on a monthly basis.

Point Loma WTP influent and effluent data have previously been presented in monthly, quarterly, and annual reports submitted to the Regional Board and EPA. Through agreement with EPA, these data are not reproduced in their entirety herein, but the City is coordinating with EPA for the electronic transfer of the data. Data are also presented in the City's 2013 annual pretreatment report (Appendix O).

Toxic Inorganic Constituents. The results of the 2013 Point Loma WWTP effluent analyses were summarized in the response to Question II.A.4. Table II.A-15 (page II.A-34) presents calendar year 2013 Point Loma WWTP effluent concentrations during wet and dry weather conditions.

Table III.H-4 (page III.H-10) presents concentrations of toxic inorganic constituents (e.g. metals and cyanide) detected in the Point Loma WTP influent during wet-weather and dry-weather sample days during 2013. Wet weather statistics were computed on the basis of samples collected during days within calendar year 2013 where precipitation was observed. (See Table II.A-11 on page II.A-30 for a list of precipitation events during calendar year 2013.)

It should be noted that the statistics of the wet- and dry-weather sampling are skewed by an occasional abnormal influent value and the fact that significantly more dry-weather data are available than wet-weather data. No marked differences or trends, however, are evident in comparing the wet- and dry-weather Point Loma WTP influent concentrations.

Table III.H-4
Summary of Metals and Cyanide in Wet and Dry Conditions
Point Loma WWTP Influent - Calendar Year 2013

Toxic Inorganic Constituent	MDL[2] (Fg/l)	Wet Weather Conditions[3]					Dry Weather Conditions[4]				
		No. of Samples	Influent Concentration (µg/l)				No. of Samples	Influent Concentration (µg/l)			
			Max. Value[5]	Min. Value[6]	Mean Value[7]	Median Value[8]		Max. Value[5]	Min. Value[6]	Mean Value[7]	Median Value[8]
antimony	2.0	9	2.0	ND[9]	< 2.0[10]	ND[9]	43	4.0	ND[9]	< 2.0[10]	2.0
arsenic	2.9	9	ND[9]	ND[9]	ND[9]	ND[9]	43	6.8	ND[9]	< 2.9[10]	ND[9]
barium	0.4	9	2.02	1.06	1.40	1.43	43	1.86	0.61	1.31	1.34
beryllium	0.039	9	100	51	81.7	85.1	43	136	54.0	95.3	97.7
cadmium	0.022	9	ND[9]	ND[9]	ND[9]	ND[9]	43	0.08	ND	< 0.022[10]	ND[9]
chromium	0.53	9	ND[9]	ND[9]	ND[9]	ND[9]	43	2.48	ND	< 0.53[10]	ND[9]
cobalt	1.2	9	13	3.3	6.39	5.71	43	77	2.4	8.1	5.6
copper	0.85	9	1.77	ND[9]	< 0.85[10]	ND[9]	43	2.16	ND	0.87	0.87
lead	3.0	9	149	72	114	115	43	795	82	142	122
lithium	2.0	9	9.0	ND[9]	3.9	3.0	43	15.9	ND	4.8	4.4
mercury	0.0005	3	193	31.7	111	109	26	549	42.4	123	97.3
molybdenum	0.89	9	13.7	5.6	9.2	9.3	43	13.9	5.37	8.8	8.96
nickel	0.53	9	22.8	6.5	12.8	11.8	43	76	7.5	14.7	11
selenium	0.28	9	2.0	0.99	1.53	1.45	43	2.58	0.51	1.60	1.64
silver	0.4	9	2.9	0.4	< 0.4[10]	0.8	43	3.09	ND[9]	< 0.4[10]	1.0
thallium	3.9	9	4.6	ND[9]	< 3.9[10]	1.95	43	5.3	ND[9]	< 3.9[10]	ND[9]
vanadium	0.64	9	7.20	3.95	5.31	4.82	43	9.90	2.92	5.68	5
zinc	2.5	9	267	121	187	177	43	316	90	210	205
cyanide	2.0	9	2.0	ND[9]	< 2.0[10]	ND[9]	43	4.0	ND[9]	< 2.0[10]	2.0

1 From Point Loma WWTP monthly monitoring reports submitted to the Regional Board for calendar year 2013. (2013 is the most recent year for which a complete 12 month data set is available.) Data for calendar year 2014 will be electronically transmitted to regulators under separate cover.

2 The listed Method Detection Limit (MDL) is the predominant MDL achieved during 2013 for the listed constituent.

3 Point Loma WWTP influent sampling results during 2013 on days (see Table II.A-11 on page II.A-30) where precipitation occurred.

4 Point Loma WWTP influent sampling results during 2013 on days where no precipitation was recorded.

5 Maximum sample value during calendar year 2013 for the listed wet or dry weather conditions.

6 Minimum sample value during calendar year 2013 for the listed wet or dry weather conditions.

7 Arithmetic average of individual daily samples collected during 2013. For purposes of averaging, non-detected (ND) samples were assumed to have one-half the concentration of the referenced MDL. The above calendar year 2013 averages may differ from those reported in the 2013 Point Loma annual report, which were computed using a concentration of zero for non-detected samples.

8 Median (50th percentile) value during calendar 2013 for the listed wet or dry weather conditions.

9 ND indicates the sample was not detected at the referenced MDL.

10 Less than symbol "<x" indicates that the arithmetic average during the year was less than the referenced MDL concentration "x".

Toxic Organic Constituents. Point Loma WWTP effluent concentrations for toxic constituents are summarized in the response to Question II.A.4. Tables II.A-17 through II.A-27 (pages II.A-37 through II.A-47) presents the results of Point Loma WWTP effluent monitoring for each of these categories of toxic organic compounds. As discussed in the response to Question II.A.4, several constituents were detected in the Point Loma WWTP effluent only on rare occasions during 2013 or at concentrations below quantifiable limits, including:

- gamma chlordane (detected in 1 of 52 samples),
- 4,4'-DDE (detected in 1 of 52 samples),
- endrin (detected in 1 of 52 samples),
- alpha BHC (detected at a concentration below the quantifiable limit in 1 of 52 samples),
- beta BHC (detected at a concentration below the quantifiable limit in 1 of 52 samples),
- alpha chlordane (detected in 2 of 52 samples at a concentration below the MDL),
- 2,4'-DDE (detected at a concentration below the quantifiable limit in 1 of 52 samples),
- chlorpyrifos (detected at a concentration below the MDL in 1 of 12 samples), and
- pentachlorophenol (detected in 1 of 52 samples).

Because these constituents are rarely detected, it is not possible to present meaningful data characterizing these constituents in Point Loma WWTP effluent during wet or dry conditions.

As presented within the response to Question II.A.4, halogenated or brominated compounds detected in the Point Loma effluent during 2013 on a consistent or near-consistent basis included:

- bromodichloromethane (dichlorobromomethane),
- bromomethane (methyl bromide),
- chloroethane (ethyl chloride),
- chloromethane (methyl chloride),
- dibromochloromethane (chlorodibromomethane), and
- methylene chloride (dichloromethane).

Table III.H-5 (page III.H-12) presents a breakdown of these toxic constituents within the Point Loma WWTP influent and effluent during wet and dry weather conditions during 2013. As a result of the Point Loma WWTP effluent chlorination, concentrations of these halogenated and brominated compounds in the Point Loma WWTP effluent were consistently higher than in the Point Loma WWTP influent. As documented in the response to Question III.B.7, however, all halogenated and brominated compounds in the Point Loma WWTP effluent complied with the effluent concentration standards of Order No. R9-2009-0001 by a significant margin.

Table III.H-5
Summary of Halogenated and Brominated Organic Compounds in Wet and Dry Conditions
Point Loma WWTP Effluent and Influent - Calendar Year 2013

Toxic Inorganic Constituent	MDL[2] (Fg/l)	Wet Weather Conditions[3]					Dry Weather Conditions[4]				
		No. of Samples	Influent Concentration (µg/l)				No. of Samples	Influent Concentration (µg/l)			
			Max. Value[5]	Min. Value[6]	Mean Value[7]	Median Value[8]		Max. Value[5]	Min. Value[6]	Mean Value[7]	Median Value[8]
2013 Point Loma WWTP Effluent											
Bromodichloro-methane	0.5	4	1.08	ND[9]	0.65	0.63	8	1.26	ND[9]	< 0.5[10]	ND[9]
Bromomethane	0.7	4	1.77	ND[9]	0.71	ND[9]	8	2.32	ND[9]	1.22	1.32
Chloroethane	0.9	4	2.15	0.45	0.88	ND[9]	8	4.49	0.45	2.12	2.175
Chloroform	0.2	4	6.83	3.15	5.51	6.04	8	10.8	4.76	7.00	6.28
Chloromethane	0.5	4	18.2	1.85	7.6	5.2	8	45	4.6	19.7	20.0
Dibromochloro-methane	0.6	4	ND[9]	ND[9]	ND[9]	ND[9]	8	1.02	0.3	< 0.6[10]	0.3
Methylene Chloride	0.3	4	1.5	ND[9]	0.95	1.08	8	2.3	0.61	1.27	1.16
2013 Point Loma WWTP Influent											
Bromodichloro-methane	0.5	4	ND[9]	ND[9]	ND[9]	ND[9]	8	ND	ND	ND	ND
Bromomethane	0.7	4	ND[9]	ND[9]	ND[9]	ND[9]	8	ND	ND	ND	ND
Chloroethane	0.9	4	ND[9]	ND[9]	ND[9]	ND[9]	8	ND	ND	ND	ND
Chloroform	0.2	4	2.43	2.11	2.21	2.14	8	7.4	1.68	2.94	2.45
Chloromethane	0.5	4	ND[9]	ND[9]	ND[9]	ND[9]	8	ND	ND	ND	ND
Dibromochloro-methane	0.6	4	ND[9]	ND[9]	ND[9]	ND[9]	8	ND	ND	ND	ND
Methylene Chloride	0.3	4	2.47	0.15	1.00	0.69	8	1.33	ND	0.71	0.7

1 From Point Loma WWTP monthly monitoring reports submitted to the Regional Board for calendar year 2013. (2013 is the most recent year for which a complete 12 month data set is available.) Data for calendar year 2014 will be electronically transmitted to regulators under separate cover.

2 The listed Method Detection Limit (MDL) is the predominant MDL achieved during 2013 for the listed constituent.

3 Point Loma WWTP influent sampling results during 2013 on days (see Table II.A-11 on page II.A-30) where precipitation occurred.

4 Point Loma WWTP influent sampling results during 2013 on days where no precipitation was recorded.

5 Maximum sample value during calendar year 2013 for the listed wet or dry weather conditions.

6 Minimum sample value during calendar year 2013 for the listed wet or dry weather conditions.

7 Arithmetic average of individual daily samples collected during 2013. For purposes of averaging, non-detected (ND) samples were assumed to have one-half the concentration of the referenced MDL. The above calendar year 2013 averages may differ from those reported in the 2013 Point Loma annual report, which were computed using a concentration of zero for non-detected samples.

8 Median (50th percentile) value during calendar 2013 for the listed wet or dry weather conditions.

9 ND indicates the sample was not detected at the referenced MDL.

10 Less than symbol "<x" indicates that the arithmetic average during the year was less than the referenced MDL concentration "x".

In addition to these halogenated and brominated organic compounds, the following organic compounds were detected in the Point Loma WWTP effluent on a consistent or near-consistent basis:

- acetone,
- 2-butanone
- 1,4-dichlorobenzene,
- diethyl phthalate,
- ethylbenzene,
- MTBE (methyl tertiary butyl ether),
- malathion,
- phenol, and
- toluene.

Table III.H-6 (page III.H-14) presents a breakdown of these constituents within the Point Loma WWTP influent and effluent during wet and dry weather conditions during 2013. Table III.H-6 also presents influent and effluent concentrations for bis (2-ethylhexyl) phthalate (BEHP), which is consistently detected in the Point Loma WWTP influent, but was not detected in the Point Loma WWTP effluent during 2013.

Table III.H-6
Summary of Detected Toxic Organic Compounds in Wet and Dry Conditions
Point Loma WWTP Effluent and Influent - Calendar Year 2013

Toxic Inorganic Constituent	MDL[2] (Fg/l)	Wet Weather Conditions[3]					Dry Weather Conditions[4]				
		No. of Samples	Influent Concentration (µg/l)				No. of Samples	Influent Concentration (µg/l)			
			Max. Value[5]	Min. Value[6]	Mean Value[7]	Median Value[8]		Max. Value[5]	Min. Value[6]	Mean Value[7]	Median Value[8]
2013 Point Loma WWTP Effluent											
Acetone	4.5	4	558	334	443	440	8	3,140	333	931	610
BEHP[11]	8.96	4	ND[9]	ND[9]	ND[9]	ND[9]	8	ND[9]	ND[9]	ND[9]	ND[9]
2-butanone	6.3	4	8.59	ND[9]	< 6.3[10]	6.64	8	12.1	ND[9]	6.65	ND[9]
1,4-dichlorobenzene	0.4	4	0.61	ND[9]	0.3025	ND[9]	8	0.45	ND[9]	< 0.4[10]	ND[9]
Diethyl Phthalate	3.05	4	5.05	4.04	4.51	4.48	8	7.9	4.16	5.32	5.17
Ethylbenzene	0.3	4	ND[9]	ND[9]	ND[9]	ND[9]	8	1.53	ND[9]	0.32	ND[9]
Malathion	0.03	4	0.115	ND[9]	0.04	ND[9]	8	0.55	ND[9]	0.13	0.048
MTBE[12]	0.4	4	0.915	0.45[13]	0.68	0.67	8	0.96	ND[9]	0.58	0.49
Phenol	1.76	10	25.1	17.1	20.8	20.8	41	30.6	10.5	21.8	21.7
Toluene	0.4	4	2.53	0.91	1.47	1.23	8	2.08	0.55	1.19	1.03
2013 Point Loma WWTP Influent											
Acetone	4.5	4	704	310	510	513	8	4,700	252	1,441	563
BEHP[11]	8.96	4	29.7	ND[9]	15.8	14.6	8	30	ND[9]	10.1	7.1
2-butanone	6.3	4	10.8	ND[9]	6.01	5.05	8	11.8	ND[9]	6.17	4.79
1,4-dichlorobenzene	0.4	4	1.14	ND[9]	0.54	0.4	8	0.2	ND[9]	0.20	0.2
Diethyl Phthalate	3.05	4	5.1	3.63	4.33	4.3	8	5.5	3.4	4.20	4.19
Ethylbenzene	0.3	4	0.8	0.31[13]	0.62	0.68	8	0.82	ND[9]	< 0.3[10]	ND[9]
Malathion	0.03	4	0.115[13]	ND[9]	ND[9]	ND[9]	8	0.5	ND[9]	0.11	0.04
MTBE[12]	0.4	4	1.27	ND[9]	0.88	1.02	8	2.4	ND[9]	0.83	0.61
Phenol	1.76	10	26.5	15.1	22.7	22.8	42	32.7	16.6	24.2	24.0
Toluene	0.4	4	1.31	0.6	0.85	0.74	8	0.91	0.5	0.69	0.7

1 From Point Loma WWTP monthly monitoring reports submitted to the Regional Board for calendar year 2013. (2013 is the most recent year for which a complete 12 month data set is available.) Data for calendar year 2014 will be electronically transmitted to regulators under separate cover.
2 The listed Method Detection Limit (MDL) is the predominant MDL achieved during 2013 for the listed constituent.
3 Point Loma WWTP influent sampling results during 2013 on days (see Table II.A-11 on page II.A-30) where precipitation occurred.
4 Point Loma WWTP influent sampling results during 2013 on days where no precipitation was recorded.
5 Maximum sample value during calendar year 2013 for the listed wet or dry weather conditions.
6 Minimum sample value during calendar year 2013 for the listed wet or dry weather conditions.
7 Arithmetic average of individual daily samples collected during 2013. For purposes of averaging, non-detected (ND) samples were assumed to have one-half the concentration of the referenced MDL. The above calendar year 2013 averages may differ from those reported in the 2013 Point Loma annual report, which were computed using a concentration of zero for non-detected samples.
8 Median (50th percentile) value during calendar 2013 for the listed wet or dry weather conditions.
9 ND indicates the sample was not detected at the referenced MDL.
10 Less than symbol "<x" indicates that the arithmetic average during the year was less than the referenced MDL concentration "x".
11 BEHP is bis (2-ethylhexyl) phthalate.
12 MTBE is methyl tertiary butyl ether.
13 Constituent was detected but not quantifiable (DNQ).

III.H.1 d. Provide an analysis of known or suspected industrial sources of toxic pollutants and pesticides identified in (1)(c) above in accordance with 40 CFR 125.66(b).

As part of the City's IWCP (see Appendix N), industries that may potentially discharge toxic organic or inorganic constituents to the sewer system are surveyed, discharge permits are issued, and industrial discharges are monitored. Appendix N presents a summary of the City's pretreatment program and identifies regulated dischargers. Effluent analyses for individual SIUs are also presented in Appendix N.

The City's 2013 Annual Pretreatment Program Report (presented as Appendix O) summarizes industrial users and waste loads. The City also implements an annual system-wide non-industrial toxics survey program (see Appendix O) to further identify the sources of toxic constituents within the Metro System.

As documented within Appendices N and O, combined metal loadings from Metro System IUs have decreased by more than an order of magnitude during the past 30 years. This reduction has translated to a significant decrease in the Point Loma WWTP influent metal loads; Point Loma WWTP influent metal loads have been reduced by over 85 percent during the past 30 years. As documented within this 301(h) application, the City has achieved 100 percent compliance with applicable concentration standards for toxic pollutants and pesticides during the effective period of Order No. R9-2009-0001 (NPDES CA0107409).

The City annually reevaluates local limits to ensure protection of Metro System facilities and operators, ensure compliance with NPDES discharge standards, and ensure compliance with applicable biosolids standards. As determined in the City's 2014 annual local limits re-evaluation (presented as Attachment N1 to Appendix N), the City determined that local limits established in 1996 as part of the City's 1998 *Urban Area Pretreatment Program* remain protective and adequate.

Because of the limited IU contributions of toxic compounds within the Metro System and the overall low concentrations of toxic constituents within the Point Loma WWTP influent, it is difficult to identify any specific significant industrial contributory point sources of toxic pollutants. On the basis of pretreatment program surveys, permitting, inspections, and local limits updates, however, Table III.H-7 (page III.H-16) presents a general summary of identified or suspected sources for inorganic toxic constituents detected within the Point Loma WWTP influent.

Table III.H-7
Summary of Sources of Point Loma WTP Pollutants of Concern

Constituent	Contribution by Categorical Industries?	Contribution by Non-categorical Industrial or Commercial Facilities?	Industrial or Nonindustrial Sources[1]
antimony	Yes	No[2]	No known significant industrial sources
arsenic	No	No[2]	Pest control poisons, no known significant industrial sources
barium	Yes	Yes	Radiography
beryllium	No	No[2]	No known significant industrial sources
cadmium	Yes	Yes	Metal plating, metalworking and metal alloys, electronics and batteries
chromium	Yes	Yes	Metal plating, shipbuilding, metalworking and metal alloys
cobalt	No	Yes	Aerospace metalworking; turbine/rotor manufacturing
copper	Yes	Yes	Metal plating, working, electronics, tool manufacturing, electroplating, semiconductor manufacturing, shipbuilding, metalworking, water pipe corrosion
lead	Yes	Yes	Metal plating; metalworking, paints, batteries
lithium	No	No[2]	No known significant industrial sources
mercury	No	Yes	Orthodontics, thermostats, thermometers
nickel	Yes	Yes	Metal plating, metalworking and metal alloys
molybdenum	Yes	Yes	Aerospace metalworking, turbine/rotor manufacturing, semiconductor manufacturing
selenium	No	Yes	Water supply
silver	No	Yes	Photo processing
thallium	No	Yes	Pest control poisons, photodetectors, nuclear imaging
vanadium	No	Yes	Aerospace manufacturing; rotor/turbine manufacturing
zinc	Yes	Yes	Metal working, electronics, tool manufacturing, electroplating, circuit printing, shipbuilding, metalworking, research institutions, water pipe corrosion
cyanide	Yes	Yes	Electroplating, electronics and semiconductor manufacturing, pharmaceuticals

1 From information presented in the City's 1998 *Urban Area Pretreatment Program*. The 17th Annual Local Limits Reevaluation submitted to the Regional Board and EPA on July 1, 2014 confirms that the local limits developed as part of the *Urban Area Pretreatment Program* remain technically justified and sufficient to protect Metro System collection and treatment facilities and operators, to comply with applicable NPDES discharge standards, and to comply with applicable biosolids standards. See Appendices N and O for details on industrial users and sampling during 2013.

2 No known significant industrial sources.

Table III.H-8 presents a summary of identified or suspected sources for organic toxic constituents found in the Point Loma WWTP influent. As shown in the table, household, commercial, and industrial sources can all potentially contribute to the Point Loma WWTP influent loads for these constituents.

Table III.H-8
Summary of Sources of Point Loma WWTP Pollutants of Concern

Constituent	Potential Source		Common Uses[1]
	Industrial Sources	Household or Commercial	
Chloroform	✓	✓	Laboratory solvent, pharmaceuticals, cleaning agents, electronics degreasing
Methylene chloride	✓	✓	Paint strippers, metal degreasers, electronics cleaners, refrigerant, laboratory solvent
Acetone	✓	✓	Household and industrial solvent and degreaser, personal care products (e.g. cosmetics and nail polish removers)
EHP	✓	✓	Plasticizer used in PVC plumbing and a variety of household and industrial plastics products, including storage bags
2-butanone	✓	✓	Paints, coatings, and adhesives
1,4-dichloromethane	✓	✓	Disinfectants, disinfecting deodorizers, mothballs, disinfecting cleansers
diethyl phthalate	✓	✓	Solvents, glues/adhesives, paints, photo processing
Ethylbenzene	✓	✓	Styrene, plastics and solvents, plastic wrap
Malathion	✓	✓	Manufactured insecticide used in household, commercial, industrial, and agricultural applications.
MTBE	✓	✓	Fuel additive (oxygenating compound)
Phenolic compounds	✓	✓	Constituent of medical and household disinfectants and pharmaceuticals, laboratory solvent, electronics cleaner, constituent of paints, inks, & photo supplies
Toluene	✓	✓	Solvent-based paint and inks, laboratories, electronics cleaner, metal degreaser, paint stripper, photo supplies, antifreeze

1 From information presented in the City's 1998 *Urban Area Pretreatment Program*, local limits updates, and Metro System industrial user monitoring (summarized in Appendices N and O).

III.H.2. Provide a schedule for development and implementation of a nonindustrial toxics control program to meet the requirements of 40 CFR 125.66(d)(3).

SUMMARY: The City of San Diego continues implementation and improvement of its nonindustrial program that has been in effect since 1982. The program features a wide range of components directed toward eliminating the discharges of toxic constituents to the sewer system from nonindustrial contaminant sources.

Since 1982, the City of San Diego has maintained a nonindustrial control program aimed at reducing the introduction of nonindustrial toxic pollutants into the sewer system. Key elements of this program include:

- a Household Hazardous Waste (HHW) Program,
- a public education program,
- development and implementation of Industrial User Discharge permits and/or Best Management Practice (BMP) Discharge Authorization requirements for select commercial sectors, and
- ongoing surveys to identify contaminant sources.

Detailed descriptions of the City's HHW Program, education program, permit program, BMPs, and surveys are presented in Appendices N and O.

HHW Program Goals and Objectives. The primary goal of the City's HHW Program is to improve the quality of life in the City of San Diego. The primary focus of the City's strategies is to reduce the amount of HHW generated and to encourage proper disposal of HHW, thereby eliminating illegal and dangerous disposal practices. Overall goals of the program include:

- Educate the residents of San Diego about HHWs. Provide information enabling residents to select and use products in ways that minimize the generation of HHWs. Provide information on appropriate methods of storage and disposal.
- Provide appropriate and convenient HHW collection and disposal opportunities for all City of San Diego residents.
- Encourage and facilitate the reuse and recycling of HHWs, when feasible.

Objectives of the HHW Program include:

- Continue an active public education program to create a high level of public awareness of the proper storage and disposal of HHW and to encourage source reduction measures (such as the use of alternative household products that are less hazardous and purchasing only the quantity needed).
- Continue outreach to schools with HHW Program educational materials that provide information about household hazardous materials, their hazards and opportunities for utilizing safer alternative materials.
- Broaden teacher participation in HHW Program through workshops, conferences and teacher training.
- Maintain HHW Program outreach at community activities with presentations, booths and information distribution sites.
- Maintain public-private partnerships to enhance community and education outreach and maximize impact of outreach dollars.
- Continue sponsorship of HHW collection services, and increase the number of participants using these services.
- Determine the optimum combination of permanent HHW facilities, and one-day HHW collection events to best serve the needs of City residents, and initiate projects to implement such a system.
- Maintain a permanent HHW collection facility adjacent to the entrance to the Miramar Landfill to create a convenient HHW drop-off alternative for residents.
- Continue cooperation with privately-operated used oil and vehicle battery collection facilities that provide drop-off services for residents disposing of these HHWs. Distribute lists of these sites to increase public awareness and use of these drop-off facilities.

Appendix N (Section N.4) presents a detailed description of the City of San Diego HHW Program. Member agencies conduct separate HHW Programs for their respective areas

Public Outreach Effort. The City's public education and outreach elements are important components of the City=s non-industrial toxic pollutant reduction strategy. The response to Question III.H.3 summarizes the City's public education and outreach effort. Appendix N (Section N.4) presents a description of this program. Attachment N3 to Appendix N presents example public outreach information and materials.

Pollution Reduction Strategies for Commercial Sources. The City's IWCP continues to regulate discharges from laboratories, radiator shops, boatyards and shipyards, and engine repair/cleaning operations. The City has modified and expanded its sector specific BMP program for the management of silver-rich waste solutions generated by x-ray and photo processors; the City also developed and implemented a BMP program for the management of perchloroethylene at dry cleaning establishments.

Contaminant Source Surveys. A final element of the City's source control program is the City's quarterly collection system monitoring program to:

- identify pollutants discharged into the collection system, and
- determine the sources of the pollutants.

The collected pollutant discharge information is used identify opportunities for pollutant reduction, and to develop effective pollutant reduction strategies. The most recent contaminant source survey is summarized in the response to Question III.H.5, and described in detail in Appendix N (Section N.2).

III.H.3. Describe the public education program you propose to minimize the entrance of nonindustrial toxic pollutants and pesticides into your treatment system. [40 CFR 125.66(d)(1)]

SUMMARY: The City of San Diego proposes to continue the comprehensive public education program that has been in effect since 1985.

Since 1985, the City of San Diego has conducted an ongoing public education program to minimize the entrance of Household Hazardous Wastes into the treatment system. The City has also conducted an independent, but complementary, public education and outreach program for used oil and oil filters (Used Oil Program).

The City of San Diego uses a variety of methods to inform the public and targeted commercial sectors regarding nonindustrial toxic control pollutant issues, including:

- placing HHW education and outreach information on the City's web site,
- operating public information hotline services,
- giving presentations in English, Spanish or Vietnamese to community, business or school groups,
- participating in booths at community fairs,
- developing and distributing flyers to private businesses and City facilities where the public had access (e.g., park and recreation centers, libraries, and permit centers),
- placing ads and announcements in local and ethnic newspapers, on radio, and on television regarding the availability of HHW collection services,
- distributing inserts in local newspapers and publications by targeting areas with upcoming HHW collection events, and
- incorporating information in other flyers (e.g., community cleanup event flyers).

Appendix N (Section N.4) presents the City's public education program. Other member agencies conduct separate public education programs. Attachment N2 to Appendix N presents fact sheets, handouts, flyers, and other information used in the City's ongoing public education program. The City proposes to continue the public education programs listed above to educate citizens on proper disposal practices for nonindustrial wastes.

III.H.4. Do you have an approved industrial pretreatment program (40 CFR 125.66(c)(1)?

a. If yes, provide the date of approval.

b. If no, and if required by 40 CFR Part 403 to have an industrial pretreatment program, provide a proposed schedule for development and implementation of your industrial pretreatment program to meet the requirements of 40 CFR Part 403.

Yes. The City of San Diego industrial waste control (pretreatment) program was approved by EPA on June 29, 1982. (See Finding No. 7 of the December 2, 2008 EPA Tentative Decision Document regarding the City's prior 301(h) waiver application.) .

III.H.5. Urban area pretreatment requirement [40 CFR 125.65]

a. Provide data on all toxic pollutants introduced into the treatment works from industrial sources (categorical and noncategorical).

The City's IWCP identifies and regulates categorical and noncategorical industries that may potentially discharge toxic organic or inorganic constituents to the sewer system.

Appendix N presents a summary of the City's pretreatment program and identifies regulated dischargers. Effluent analyses for individual SIUs are also presented in Appendix N. The City's 2013 Annual Pretreatment Program Report (presented as Appendix O) summarizes industrial users and waste loads.

Attachment N1 to Appendix N presents the City's 2014 annual update of local limits for calendar year 2013. As shown in Attachment N1 to Appendix N, three categories of "pollutants of concern" are identified in the 2013 update:

1. Heavy metals addressed by existing local limits for which significant industrial sources have been identified. Metals designated as pollutants of concern on the basis of these criteria include cadmium, chromium, copper, lead, nickel and zinc.
2. Toxic organics without individual limits that are regulated by federal total toxic organics (TTOs) limits and toxic organic management plans (TOMPs). Toxic compounds designated as pollutants of concern on the basis of these criteria include:
   - bis(2-ethylhexyl) phthalate,
   - 1,4-dichlorobenzene,
   - non-chlorinated phenols,
   - toluene, and
   - chloroform.
3. Other parameters considered as "special cases", which include cyanide, lindane (BHC gamma) and silver.

As part of the annual local limits update, Point Loma WWTP influent and effluent analyses were evaluated, industrial user flows and loads were assessed, and collection system data were evaluated. Allowable headwork load analyses were conducted to determine allowable loads that were consistent with preventing pass-through, ensuring worker health and safety, preventing treatment inhibition, and ensuring compliance with effluent and sludge standards.

Attachment N1 to Appendix N presents pollutants identified through review of IU chemical lists, and notes whether the pollutant is discharged, whether an applicable pretreatment requirement exists and, if so, whether the IU is in compliance. Attachment N1 to Appendix N also presents data that show the industry-by-industry contribution of pollutants of concern, and the allocation of allowable headworks loads among the industrial sources.

On the basis of these analyses, the City (see Attachment N1 to Appendix N) concluded that current local limits are sufficiently protective and that no modifications of the current local limits are required.

b. Note whether applicable pretreatment requirements are in effect for each toxic pollutant. Are the industrial sources introducing such toxic pollutants in compliance with all of their pretreatment requirements? Are these pretreatment requirements being enforced? [40 CFR 125.65(b)(2)]

SUMMARY: Applicable pretreatment requirements are in place for each toxic pollutant, and the City's IWCP enforces compliance with local, state, and federal pretreatment standards and requirements.

Applicable Pretreatment Requirements. Applicable pretreatment requirements are in effect for each toxic pollutant. As noted, the City's Urban Area Pretreatment Program established local limits for each toxic pollutant introduced by industrial dischargers. As documented within Finding 8 of the December 2, 2008 EPA Tentative Decision on the City of San Diego's prior NPDES and 301(h) application, the Urban Area Pretreatment Program was approved by the Regional Board in August 1996 and approved by EPA on December 1, 1998.

Appendix N presents a summary of the City's pretreatment program, while Appendix O presents a copy of the 2013 program annual report. As shown in the appendices, if applicable federal categorical pretreatment standards have been established, current pretreatment permits apply the federal standards to the discharger and require monitoring to determine compliance.

Attachment N1 to Appendix N presents the update of the City's local limits for calendar year 2013. Table III.H-9 (pages III.H-26 through III.H-28) summarizes the local limits update for inorganic pollutants of concern (metals and cyanide). Local limits updates for organic pollutants of concern are presented in Attachment N1 to Appendix N.

Enforcement of Requirements. Section N.4 of Appendix N summarizes the IWCP Enforcement Response Plan, which details the escalating series of enforcement actions taken in response to noncompliance. As documented within Appendix O, the City during 2013:

- published the noncompliance of eight SIUs as having significant pretreatment violations, and
- issued 159 Notices of Violations and/or Administrative Orders against SIUs.

None of the Metro System SIUs were in significant non-compliance during 2013.

Table III.H-9
Summary of Calendar Year 2013 Update of Local Pretreatment Limits[1]
Metals and Cyanides

Pollutant	Controlling Criteria1[2]		Existing Local Limit (mg/l)	Recommended 2014 Local Limit		Comments and Proposed Actions
	Source	Value		Value (mg/l)	Type	
Arsenic	B[3]	0.00360 mg/l	NA[9]	NA[9]	--	• Heavy metal with no significant industrial sources • Arsenic is an EPA pollutant of concern, but the maximum influent/effluent concentrations significantly below the most stringent criteria
Cadmium	B[3]	0.00572 mg/l	1.0	1.0	HW[4]	• Cadmium is on EPA's list of pollutants of concern, but the maximum influent/effluent value is significantly below the most stringent criteria • Heavy metal with significant CIU industrial sources but few contributing non-categorical SIU sources • Limit contributing CIUs to federal categorical limits • Require non-contributing SIUs to inform of changes • Monitor non-categorical SIU dischargers to verify contributions and Use Contributory Flow Limits (CFLs) for contributing noncategorical SIUs • Screen new SIUs (Permit application and initial sampling) and existing SIUs with modifications
Chromium	B[3]	0.05806 mg/l	5.0	5.0	HW[4]	• Chromium is on EPA's list of pollutants of concern, but the maximum influent/effluent value is significantly below the most stringent criteria • Heavy metal with significant CIU industrial sources • Maximum effluent concentration is 12 percent of the permit benchmark • Limit contributing CIUs to federal categorical limits • Require non-contributing SIUs to inform of changes • Use CFL for contributing non-categorical SIUs • Monitor non-categorical SIU dischargers to verify contributions • Screen new SIUs (Permit application and initial
Copper	S[5]	1500 mg/kg	11.0	11.0	CFL[6]	• Copper is on EPA's list of pollutants of concern, and the maximum influent/effluent value exceeded screening criteria for sludge and the permit benchmark • Heavy metal with significant CIU industrial sources and significant residential and military background sources • Maximum Allowable Headworks Loading based on clean sludge standards • Limit contributing CIUs to federal categorical limits • Monitor non-categorical SIU dischargers to verify contributions and use CFL for contributing noncategorical SIUs • Apply investigation trigger level of 7 mg/l to Navy ship's sanitary waste to ensure no industrial through line • Screen new SIUs (Permit application and initial sampling) and existing SIUs with modifications
Cyanide[7]	B[3]	0.00642 mg/l	1.9	1.9	Interim	• Maximum effluent concentration was 62 percent of the benchmark • Keep existing interim limit • Investigate mechanisms for gains of cyanide through the treatment process

Table III.H-9
Summary of Calendar Year 2013 Update of Local Pretreatment Limits[1]
Metals and Cyanides

Pollutant	Controlling Criteria1[2]		Existing Local Limit (mg/l)	Recommended 2014 Local Limit		Comments and Proposed Actions
	Source	Value		Value (mg/l)	Type	
Lead	B[3]	0.05806 mg/l	5.0	5.0	HW[4]	• Lead is on EPA's list of pollutants of concern, but the maximum influent/effluent value is significantly below the most stringent screening criteria • Heavy metal with few industrial sources and no domestic sources • Limit contributing CIUs to federal categorical limits • Require non-contributing SIUs to inform of changes • Use CFL for contributing non-categorical SIUs • Monitor non-categorical SIU dischargers to verify contributions • Screen new SIUs (Permit application and initial sampling) and existing SIUs with modifications
Mercury	B[3]	0.00078 mg/l	NA[9]	NA[9]	--	• Mercury is on EPA's list of pollutants of concern, but the maximum influent/effluent value is significantly below the most stringent screening criteria • Heavy metal with no significant industrial sources • 2010 survey of 133 dentists in jurisdiction revealed limited compliance with voluntary recycling and amalgam separator provisions of the 2009 American Dental Association BMPs and EPA/ADA/NACWA Memorandum of Understanding • Hold development of Toxics Control measure, pending EPA's proposed federal rule for dental amalgam originally scheduled for fall 2011 but postponed to late 2014
Molybdenum	S[5]	75 mg/kg	NA[9]	NA[9]	--	• Molybdenum is on EPA's list of pollutants of concern, but the maximum influent/effluent value was significantly below the most stringent screening criteria • Do not set local limit and re-evaluate annually
Nickel	B[3]	0.0462 mg/l	13	13	CFL[6]	• Nickel is on EPA's list of pollutants of concern, and the maximum influent/effluent value exceeded the benchmark screening criteria • Heavy metal with significant CIU industrial sources, and intermittent discharges above screening threshold from several large non-categorical SIU contributory sources • Maximum effluent concentration was 35 percent of the effluent limit • Calculated limit is 9 mg/l; for calendar year 2010-2012 value was between 23 - 51 mg/l • Investigate source and possible controls at high flow noncategorical SIU intermittent dischargers • Require non-contributing SIUs to inform of changes • Monitor non-categorical SIU dischargers to verify contributions and limit contributing CIUs to federal categorical limits • Screen new SIUs (Permit application and initial sampling) and existing SIUs with modifications

Table III.H-9
Summary of Calendar Year 2013 Update of Local Pretreatment Limits[1]
Metals and Cyanides

Pollutant	Controlling Criteria1[2] Source	Controlling Criteria1[2] Value	Existing Local Limit (mg/l)	Recommended 2014 Local Limit Value (mg/l)	Recommended 2014 Local Limit Type	Comments and Proposed Actions
Selenium	B[3]	0.0018 mg/l	NA[9]	NA[9]	--	• Selenium is on EPA's list of pollutants of concern, and the maximum influent/effluent value exceeded the benchmark screening criteria • Heavy metal with no identified significant industrial sources • Domestic mass contribution was 54% of the benchmark-based Maximum Allowable Headworks Loading • Average influent concentration was 88% of the benchmark-based concentration; average effluent was 59% of the benchmark-based concentration • Do not set industrial limit
Silver	B[3]	0.01145 mg/l	BMP[8]	BMP[8]	--	• Silver is on EPA's list of pollutants of concern, but the maximum influent/effluent value was significantly below the most stringent screening criteria • Heavy metal with no significant industrial sources • Continue BMP and semi-annual self-certification for film processors. Certification indicates fixing solution is treated to required flow-based treatment efficiency or hauled for proper disposal (as described in the Code of Management Practices for Silver Dischargers) • Loads decreasing annually due to digitization of photo and X-ray processes
Zinc	B[3]	0.06971 mg/l	24	24	CFL[6]	• Zinc is on EPA's list of pollutants of concern, but the maximum influent/effluent value was significantly below the most stringent screening criteria • Heavy metal with significant industrial sources • Require non-contributing SIUs to inform of changes • Use CFL for contributing non-categorical SIUs • Monitor non-categorical SIU dischargers to verify contributions and limit contributing CIUs to federal categorical limit • Screen new SIUs (Permit application and initial sampling) and existing SIUs with modifications

1 From City of San Diego Annual Local Limits Review for the Point Loma WWTP (see Attachment N1 to Appendix N) for calendar year 2013. Also see Attachment N1 of Appendix N for local limits evaluations for toxic organic constituents.
2 Where implementation of the controlling criteria is recommended, it stands that all other criteria are protected. Thus, if the controlling criterion is the benchmark (B), all other criteria would be protected as well, such as NPDES limits, sludge quality concerns, process inhibition limitations, and/or health- and worker-safety requirements. The controlling criterion for sludge is expressed in terms of mg/kg. All other controlling criteria are expressed in terms of mg/l.
3 B indicates the controlling criteria is the NPDES benchmark concentration at a flow of 177 mgd.
4 HW indicates a hazardous waste regulatory threshold.
5 S indicates the controlling criteria is sludge quality (40 CFR 503)
6 CFL indicates a Contributory Flow Limit.
7 Total cyanide.
8 BMP indicates Best Management Practices.
9 NA indicated not applicable (no local limit)

c. If applicable pretreatment requirements do not exist for each toxic pollutant in the POTW effluent introduced by industrial sources,

- **provide a description and schedule for your development and implementation of applicable pretreatment requirements [40 CFR 125.65(c)], or**
- **describe how you propose to demonstrate secondary equivalency for each of those toxic pollutants, including a schedule for compliance, by using a secondary treatment pilot plant. [40 CFR 125.65(d)]**

SUMMARY: The City of San Diego complies with applicable urban area pretreatment requirements, and has implemented pretreatment requirements for each toxic pollutant that may affect effluent quality, sludge quality, treatment effectiveness (inhibition or pass through), and health and safety.

The question is not applicable. The City of San Diego has complied with the urban area pretreatment requirements. As set forth in 40 CFR 125.65(c), the City has established pretreatment requirements, where appropriate, for each constituent introduced to the Metro System by an industry. The resultant local limits were approved by EPA as part of the Urban *Area Pretreatment Program*. As summarized in Appendices N and O, the local limits are annually reviewed and updated. (Attachment N1 to Appendix N presents the City's annual update of the local limits for calendar year 2013.)

All industrial discharge permits include the approved local limits. In regulating industries, the City applies the lower of (1) the calculated local limit or (2) the California Title 22 hazardous waste regulatory threshold. For industries where a federal pretreatment standard has been established for a pollutant, the City applies the federal standard. Where a federal pretreatment standard does not exist, the City reviews industry sampling data to determine whether the industry discharges the pollutant at levels greater than POTW-specific background levels. Industries that discharge at greater than background levels are termed "contributors" of that pollutant, and the local limit is applied in the industry's permit. Industries determined to be non-contributors are not regulated for the pollutant in their permit.

Regardless of contributory status, the City monitors all SIUs for all pollutants for which a local limit has been developed. This monitoring then allows the City to re-evaluate the industry's contributory status at each annual inspection. If data reveals that an industry has become a "contributor" for a pollutant, the permit is modified to include local limits for that pollutant.

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Large Applicant Questionnaire

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