UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 9

75 Hawthorne Street
San Francisco, CA 94105

CITY OF SAN DIEGO'S
POINT LOMA WASTEWATER TREATMENT PLANT
APPLICATION FOR A MODIFIED NPDES PERMIT
UNDER SECTION 301(h) and 301(j)(5)
OF THE CLEAN WATER ACT

TENTATIVE DECISION
OF THE REGIONAL
ADMINISTRATOR
PURSUANT TO 40 C.F.R. PART 25
SUBPART G

I have reviewed the attached evaluation analyzing the merits of the application submitted by the City of San Diego requesting renewal of the modification to the secondary treatment requirements for the Point Loma Wastewater Treatment Plant, pursuant to Section 301(h) and 301(j)(5) of the Clean Water Act. It is my tentative decision that the City of San Diego be granted a waiver in accordance with the terms, conditions, and limitations of the attached evaluation, based on Clean Water Act Section 301(h).

My decision is based on available evidence specific to this particular discharge. It is not intended to assess the need for secondary treatment in general, nor does it reflect on the necessity for secondary treatment by other publicly owned treatment works discharging to the marine environment. This decision and the National Pollutant Discharge Elimination System (NPDES) permit implementing this decision are subject to revision on the basis of subsequently acquired information relating to the impact of the less-than-secondary treated discharge on the marine environment.

Under the procedures of permit regulations at 40 C.F.R. Part 124, public notice and comment regarding this tentative decision and accompanying NPDES permit will be made available to all interested persons. Following the public comment period on this tentative decision, a final decision will be issued under the procedures in 40 C.F.R. Part 124.

/s/ 2/27/2024

Martha Guzman, Regional Administrator

(Page intentionally blank)

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

INTRODUCTION

The City of San Diego, California (the applicant or City) has requested a renewal of its variance (sometimes informally called a "waiver" or "modification") under section 301(h) of the Clean Water Act (the Act, CWA), 33 U.S.C. section 1311(h), and the Ocean Pollution Reduction Act of 1994, 33 U.S.C. section 1311(j)(5), from the secondary treatment requirements contained in section 301(b)(1)(B) of the Act, 33 U.S.C. section 1311(b)(1)(B). The City submitted its renewal application to the U.S. Environmental Protection Agency, Southwest Region (the EPA Region 9 or EPA), in March 2022.

The variance is being sought for the E.W. Blom Point Loma Metropolitan Wastewater Treatment Plant and Ocean Outfall, a publicly owned treatment works (POTW). The applicant is seeking a 301(h) variance to discharge wastewater receiving less-than-secondary treatment to the Pacific Ocean. Secondary treatment is defined in the regulations (40 CFR Part 133) in terms of effluent quality for total suspended solids (TSS), biochemical oxygen demand (BOD), and pH. The secondary treatment requirements for effluent TSS, BOD, and pH are listed below:

TSS: (1) The 30-day average shall not exceed 30 mg/l.
(2) The 7-day average shall not exceed 45 mg/l.
(3) The 30-day average percent removal shall not be less than 85 percent.

BOD: (1) The 30-day average shall not exceed 30 mg/l.
(2) The 7-day average shall not exceed 45 mg/l.
(3) The 30-day average percent removal shall not be less than 85 percent.

pH: At all times, shall be maintained within the limits of 6.0 to 9.0 units.

40 CFR 125.58(c) defines a large applicant as serving a population of 50,000 or more, or having a discharge flow of 5 million gallons per day (MGD) or more. The City meets the criteria for a large applicant. The City is requesting a modification for only TSS and BOD. (A modification for pH is not requested.) The applicant's proposed alternative effluent limits for TSS and BOD are either shown in the application (2022) or based on facility performance data provided as supplemental information (2023) to the application, consistent with California Ocean Plan Table 4 and require:

TSS: (1) The monthly average system-wide percent removal shall not be less than 80% percent (computed in accordance with Order No. R9-2024-0004, NPDES No. CA0107409).
(2) The monthly average treatment plant effluent concentration shall not be more than 60 mg/l.
(3) The annual treatment plant loading to the ocean shall not be more than 11,999 metric tons per year during years one through four of the permit and not more than 11,998 metric tons per year during year five of the permit.[1] Mass emission limits for TSS apply

[1] If the Ocean Pollution Reduction Act II (OPRA II) is enacted, PLOO TSS mass emissions are limited to 11,500 mt/yr after December 31, 2025, and are limited to 9,942 mt/yr after December 31, 2027.

only to discharges from POTWs owned and operated by the Discharger and the Discharger's wastewater generated in the San Diego Metropolitan Sewerage System (Metro System) service area, excluding TSS contributions from Metro System flows treated in the City of Escondido and South Bay Water Reclamation Plant (SBWRP) flows discharged to the South Bay Ocean Outfall. If the Discharger is requested to accept wastewater originating in Tijuana, Mexico, treated or untreated, such acceptance would be contingent upon an agreement acceptable to the USEPA, RWQCB and Discharger. The TSS contribution from that flow would not be counted toward any mass emission limit(s).

BOD: The annual average system-wide percent removal shall not be less than 58 percent (computed in accordance with Order No. R9-2024-0004, NPDES No. CA0107409).

A concentration effluent limit for BOD (in mg/l) has not been requested by the applicant or required in NPDES permits for the 4.5 mile Point Loma Ocean Outfall. The alternative effluent limits requested by the applicant satisfy sections 301(h) and (j)(5) of the Act. The application is based on an “improved” discharge, as defined at 40 CFR 125.58(i). Facilities improvements proposed by the applicant during the period of the renewed NPDES permit are enhanced solids removal and additional reuse studies. Volume III, Large Applicant Questionnaire of the March 2022 permit application.

This document presents the findings, conclusions, and recommendations of EPA Region 9, as to whether the applicant’s proposed discharge complies with the criteria set forth in sections 301(h) and (j)(5) of the Act, as implemented by regulations at 40 CFR 125, Subpart G.

DECISION CRITERIA

Under section 301(b)(1)(B) of the Act, U.S.C. section 1311(b)(1)(B), POTWs in existence on July 1, 1977, were required to meet effluent limits based on secondary treatment as defined by the Administrator of EPA (the Administrator). Secondary treatment is defined by the Administrator in terms of three parameters: TSS, BOD, and pH. Uniform national effluent limitations for these pollutants were promulgated and included in National Pollutant Discharge Elimination System (NPDES) permits for POTWs issued under section 402 of the Act. POTWs were required to comply with these limitations by July 1, 1977.

Congress subsequently amended the Act, adding section 301(h) which authorizes the Administrator, with State concurrence, to issue NPDES permits which modify the secondary treatment requirements of the Act with respect to certain discharges. P.L. 95-217, 91 Stat. 1566, as amended by P.L. 97-117, 95 Stat. 1623; and section 303 of the Water Quality Act of 1987. Section 301(h) provides that:

> The Administrator, with the concurrence of the State, may issue a permit under section 402 [of the Act] which modifies the requirements of subsection (b)(1)(B) of this section [the secondary treatment requirements] with respect to the discharge of any pollutant from a publicly owned treatment works into marine waters, if the applicant demonstrates to the satisfaction of the Administrator that:
>
> (1) there is an applicable water quality standard specific to the pollutant for which the modification is requested, which has been identified under section 304(a)(6) of this Act;
>
> (2) such modified requirements will not interfere, alone or in combination with pollutants from other sources, with the attainment or maintenance of that water quality which assures protection of public water supplies and the protection and propagation of a balanced, indigenous population (BIP) of shellfish, fish and wildlife, and allows recreational activities, in and on the water;
>
> (3) the applicant has established a system for monitoring the impact of such discharge on a representative sample of aquatic biota, to the extent practicable, and the scope of the monitoring is limited to include only those scientific investigations which are necessary to study the effects of the proposed discharge;
>
> (4) such modified requirements will not result in any additional requirements on any other point or nonpoint source;
>
> (5) all applicable pretreatment requirements for sources introducing waste into such treatment works will be enforced;
>
> (6) in the case of any treatment works serving a population of 50,000 or more, with respect to any toxic pollutant introduced into such works by an industrial discharger for which pollutant there is no applicable pretreatment requirement in

effect, sources introducing waste into such works are in compliance with all applicable pretreatment requirements, the applicant has in effect a pretreatment program which, in combination with the treatment of discharges from such works, removes the same amount of such pollutant as would be removed if such works were to apply secondary treatment to discharges and if such works had no pretreatment program with respect to such pollutant;

(7) to the extent practicable, the applicant has established a schedule of activities designed to eliminate the entrance of toxic pollutants from nonindustrial sources into such treatment works;

(8) there will be no new or substantially increased discharges from the point source of the pollutant into which the modification applies above that volume of discharge specified in the permit;

(9) the applicant at the time such modification becomes effective will be discharging effluent which has received at least primary or equivalent treatment and which meets the criteria established under section 304(a)(1) of the Clean Water Act after initial mixing in the waters surrounding or adjacent to the point at which such effluent is discharged.

For the purposes of this subsection the phrase “the discharge of any pollutant into marine waters” refers to a discharge into deep waters of the territorial sea or the waters of the contiguous zone, or into saline estuarine waters where there is strong tidal movement and other hydrological and geological characteristics which the Administrator determines necessary to allow compliance with paragraph (2) of this subsection, and section 101(a)(2) of this Act. For the purposes of paragraph (9), “primary or equivalent treatment” means treatment by screening, sedimentation and skimming adequate to remove at least 30 percent of the biochemical oxygen demanding material and of the suspended solids in the treatment works influent, and disinfection, where appropriate. A municipality which applies secondary treatment shall be eligible to receive a permit pursuant to this subsection which modifies the requirements of subsection (b)(1)(B) of this section with respect to the discharge of any pollutant from any treatment works owned by such municipality into marine waters. No permit issued under this subsection shall authorize the discharge of sewage sludge into marine waters. In order for a permit to be issued under this subsection for the discharge of a pollutant into marine waters, such marine waters must exhibit characteristics assuring that water providing dilution does not contain significant amounts of previous discharged effluent from such treatment works. No permit issued under this subsection shall authorize the discharge of any pollutant into marine estuarine waters which at the time of application do not support a balanced, indigenous population of shellfish, fish and wildlife, or allow recreation in and on the waters or which exhibit ambient water quality below applicable water quality standards adopted for the protection of public water supplies, shellfish and wildlife, or recreational activities or such other standards necessary to assure support and

> protection of such uses. The prohibition contained in the preceding sentence shall apply without regard to the presence or absence of a causal relationship between such characteristics and the applicant's current or proposed discharge. Notwithstanding any of the other provisions of this subsection, no permit may be issued under this subsection for discharge of a pollutant into the New York Bight Apex consisting of the ocean waters of the Atlantic Ocean westward of 73 degrees 30 minutes west longitude and westward of 40 degrees 10 minutes north latitude.

EPA regulations implementing section 301(h) provide that a 301(h)-modified NPDES permit may not be issued in violation of 40 CFR 125.59(b) which requires, among other things, compliance with the provisions of the Coastal Zone Management Act (16 U.S.C. 1451 et seq.), the Endangered Species Act (16 U.S.C. 1531 et seq.), the Marine Protection Research and Sanctuaries Act (16 U.S.C. 1431 et seq.), and any other applicable provisions of State or federal law or Executive Order.

In addition, under the Ocean Pollution Reduction Act of 1994, 33 U.S.C. section 1311(j)(5)(B) and (C):

> *(B) Application. —An application under this paragraph shall include a commitment by the applicant to implement a waste water reclamation program that, at minimum, will –*
>
> > *(i) achieve a system capacity of 45,000,000 gallons of reclaimed waste water per day by January 1, 2010; and*
> >
> > *(ii) result in a reduction in the quantity of suspended solids discharged by the applicant into the marine environment during the period of the modification.*
>
> *(C) Additional conditions. —The Administrator may not grant a modification pursuant to an application submitted under this paragraph unless the Administrator determines that such modification will result in removal of not less than 58 percent of the biological oxygen demand (on an annual average) and not less than 80 percent of total suspended solids (on a monthly average) in the discharge to which the application applies.*

In the following discussion, data submitted by the applicant are analyzed in the context of the statutory and regulatory criteria.

SUMMARY OF FINDINGS

Based upon review of the data, references, and empirical evidence furnished in the application and other relevant sources, EPA Region 9 makes the following findings with regard to the statutory and regulatory criteria:

1. The applicant's proposed discharge will comply with primary treatment requirements. [CWA section 301(h)(9); 40 CFR 125.60]

2. The applicant's proposed 301(h)-modified discharge will comply with the State of California's water quality standards for natural light and dissolved oxygen. (A modification for pH is not requested.) The applicant has sent a letter to the San Diego Regional Water Quality Control Board (Regional Water Board) requesting determination that the proposed discharge complies with applicable State law including water quality standards. In 1984, a Memorandum of Understanding was signed by EPA Region 9 and the State of California to jointly administer discharges that are granted modifications from secondary treatment standards. The consolidated issuance of a NPDES permit which incorporates both the federal 301(h) variance and State permit requirements will serve as the State's certification/concurrence that the modified discharge will comply with applicable State law and water quality standards. Pursuant to 40 CFR 124.4(c)(2), EPA Region 9 and the Regional Water Board, in the exercise of their separate regulatory authorities, have jointly developed a consolidated 301(h)-modified permit. [Section 301(h)(1); 40 CFR 125.61]

3. The applicant has demonstrated it can consistently achieve State water quality standards and federal 304(a)(1) water quality criteria beyond the zone of initial dilution. [CWA section 301(h)(9); 40 CFR 125.62(a)]

4. The applicant's proposed discharge, alone or in combination with pollutants from other sources, will not adversely impact public water supplies or interfere with the protection and propagation of a balanced, indigenous population (BIP) of fish, shellfish and wildlife, and will allow for recreational activities. [CWA section 301(h)(2); 40 CFR 125.62(b), (c), (d)]

5. The applicant has a well-established monitoring program and has demonstrated it has adequate resources to continue the program. [CWA section 301(h)(3); 40 CFR 125.63]

6. The applicant has sent a letter to the Regional Water Board requesting determination that the proposed discharge will not result in any additional treatment requirements on any other point or nonpoint sources. The adoption by the Regional Water Board of a NPDES permit which incorporates both the federal 301(h) variance and State permit requirements will serve as the State's determination, pursuant to 40 CFR 125.59(f)(4), that the requirements under 40 CFR 125.64 are achieved. [CWA section 301(h)(4); 40 CFR 125.64]

7. The applicant's existing pretreatment program was approved by EPA Region 9 on June 29, 1982, and remains in effect. [CWA section 301(h)(5); 40 CFR 125.66 and 125.68]

8. The applicant has complied with urban area pretreatment requirements by demonstrating that it has an applicable pretreatment requirement in effect for each toxic pollutant introduced by an industrial discharger. The Urban Area Pretreatment Program was submitted to EPA Region 9 and the Regional Water Board in August 1996. This program was approved by the Regional Water Board on August 13, 1997 and EPA on December 1, 1998, and remains in effect. [CWA section 301(h)(6); 40 CFR 125.65]

9. The applicant will continue to develop and implement both its existing nonindustrial source control program, in effect since 1985, and existing comprehensive public education program to minimize the amount of toxic pollutants that enter the treatment system from nonindustrial sources. [CWA section 301(h)(7); 40 CFR 125.66]

10. There will be no new or substantially increased discharges from the point source of the pollutants to which the 301(h) variance applies above those specified in the permit. [CWA section 301(h)(8); 40 CFR 125.67]

11. EPA Region 9 has provided determinations to the U.S. Fish and Wildlife Service and NOAA National Marine Fisheries Service that the proposed discharge is consistent with applicable federal and State laws. The applicant will transmit a consistency certification from the California Coastal Commission that the proposed discharge is consistent with applicable coastal zone management requirements. The issuance of a final 301(h)-modified permit is contingent upon receipt of determinations that the issuance of such permit does not conflict with applicable provisions of federal and State laws. [40 CFR 125.59]

12. In its operation of the Point Loma WTP, the applicant will continue to: achieve a monthly average system-wide percent removal for TSS of not less than 80 percent and an annual average system-wide percent removal for BOD of not less than 58 percent; and has implemented a water reclamation program that will result in a reduction in the quantity of suspended solids discharged into the marine environment during the period of the 301(h) modification. The applicant has constructed a system capacity of 45 MGD of reclaimed water, thereby meeting this January 1, 2010 requirement.[2] [CWA section 301(j)(5)]

CONCLUSION

EPA Region 9 concludes that the applicant's proposed discharge will satisfy CWA sections 301(h) and (j)(5) and 40 CFR 125, Subpart G.

---

[2] House of Representatives Bill 5176 (HR 5176).

RECOMMENDATION

It is recommended that the applicant be granted a CWA section 301(h) variance in accordance with the above findings, contingent upon satisfaction of the following conditions:

1. The determination by the Regional Water Board that the proposed discharge will comply with applicable provisions of State law, including water quality standards, in accordance with 40 CFR 125.61(b)(2). The adoption by the Regional Water Board of a NPDES permit which incorporates both the federal 301(h) variance and State permit requirements will serve as the State's certification/concurrence, pursuant to 40 CFR Parts 124.53 and 124.54, that the requirements under 40 CFR 125.61(b)(2) are achieved.

2. The determination by the Regional Water Board that the proposed discharge will not result in any additional treatment requirements on any other point or nonpoint sources, in accordance with 40 CFR 125.64. The adoption by the Regional Water Board of a NPDES permit which incorporates both the federal 301(h) variance and State permit requirements will serve as the State's determination, pursuant to 40 CFR 125.59(f)(4), that the requirements under 40 CFR 125.64 are achieved.

3. The permit contains the applicable terms and conditions required by 40 CFR 125.68, for establishment of a monitoring program.

4. The determination by the California Coastal Commission that issuance of a 301(h)-modified permit does not conflict with the Coastal Zone Management Act, as amended.

5. The determination by the U.S. Fish and Wildlife Service that issuance of a 301(h)-modified permit does not conflict with applicable provisions of the federal Endangered Species Act, as amended.

6. The determination by the NOAA National Marine Fisheries Service that issuance of a 301(h)-modified permit does not conflict with applicable provisions of the federal Endangered Species Act, as amended, and the Magnuson-Stevens Fishery Conservation and Management Act, as amended.

7. Issuance of the 301(h)-modified permit assures compliance with all applicable requirements of 40 CFR 122 and 40 CFR 125, Subpart G.

DESCRIPTION OF TREATMENT SYSTEM

Treatment System

The City's treatment system is described in Volume III, Large Applicant Questionnaire section II.A, and Volume IV, Appendix A, of the 2022 application and supplemental SBWRP facility information submitted in March 2023. The San Diego Metropolitan Sewage System (Metro System) provides for the conveyance, treatment, reuse, and disposal of wastewater within a 450-square mile service area for the City of San Diego and regional participating agencies (Figure A-1). Metro System facilities include wastewater collection interceptors and pump stations, wastewater treatment and water recycling plants, sludge pipelines and solids handling facilities, and two ocean outfall systems. Metro System facilities are owned by the City of San Diego and are managed and operated by the City's Public Utilities Department (PUD). The City administers and executes contracts with each participating agency, monitors flows to the Metro System, bills and collects payments from participating agencies, and disburses all monies spent in connection with the Metro System. Wastewater collection systems that discharge to the Metro System are owned and operated by either PUD or the respective participating agencies. Current wastewater flows from the City comprise approximately 66 percent of the total Metro System flows. Remaining Metro System wastewater flows are contributed by the 12 Metro System participating agencies. Participating agency input to Metro System planning and operation is provided through the San Diego Metropolitan Wastewater Joint Powers Authority (JPA).

The following five groups of facilities comprise the Metro System: wastewater conveyance facilities; the Point Loma Wastewater Treatment Plant (WTP) and Ocean Outfall; the North City Water Reclamation Plant (NCWRP); the Metro Biosolids Center (MBC) and sludge conveyance facilities; and the South Bay Water Reclamation Plant (SBWRP) and Ocean Outfall.

There have been improvements to Metro System facilities since 1995. These include bringing online the North City Water Reclamation Plant and recycled water users in its' service area. Bringing the Metro Biosolids Center online to process biosolids from Pt. Loma WTP and the NCWRP. And bringing the South Bay Water Reclamation Plant and Ocean Outfall online, as well as recycled water users within that service area. Figure A-2 presents a schematic of existing Metro System treatment and solids handling facilities which include the: Point Loma Wastewater Treatment Plant and Ocean Outfall, North City Water Reclamation Plant, South Bay Water Reclamation Plant and Ocean Outfall, and the Metro Biosolids Center. Waste solids from the South Bay Water Reclamation Plant are conveyed to Point Loma WTP for treatment. Waste solids from Point Loma WTP and NCWRP are conveyed to the Metro Biosolids Center for dewatering and disposal.

Pump Station No. 2 is the largest and most important pump station within the Metro System. It is a reinforced concrete structure equipped with eight dry pit pumping units. With one pump serving as a standby unit, the pumping capacity is approximately 432 million gallons per day (MGD). All influent wastewater delivered to the Point Loma WTP is pumped through Pump Station No. 2, which also provides preliminary treatment in the form of coarse screening (4 units) and chemical addition. Hydrogen peroxide, sodium hydroxide, and sodium hypochlorite are added for odor and sulfide control and to assist in coagulation/sedimentation at Point Loma WTP via the regeneration of iron salts.

Point Loma WTP operates as a chemically-assisted primary treatment plant and is the terminal treatment facility discharging to the Point Loma Ocean Outfall (PLOO) and Pacific Ocean. The plant has rated capacities (with one sedimentation tank out of service) of 240 MGD annual average dry weather flow and 432 MGD peak wet weather flow. Point Loma WTP receives a blend of excess recycled water (during irrigation season), secondary treated effluent (during non-irrigation season), and waste plant streams from the 30 MGD NCWRP, return solids from the 15 MGD SBWRP, and untreated sewage from all other parts of the Metro System. The applicant states that of the approximately 140-160 MGD of total Metro System flows, the estimated contribution from industrial users of the Metro System is 2.5 percent (i.e., approximately 4.7 MGD of total Metro System industrial flow) (Section II.A.6, Volume III, of the application). The applicant states that 2018-2020 average daily volume of inflow and infiltration is 14.6 MGD, which is approximately 4 to 5 percent of the total flow into the treatment works (Volume II, EPA Form 2A, of the application).

Point Loma WTP unit process and design criteria and loadings are provided in Table A-2 of Volume IV, Appendix A, of the application. Unit processes at the Point Loma WTP include: preliminary treatment with 15-millimeter mesh mechanical self-cleaning climber screens (5 units) to remove rags, paper, and other floatable material; influent flow measurement at the Parshall flumes; chemical coagulation (ferric chloride) to enhance settling of suspended solids; aerated grit removal (6 units) including grit tanks, separators and washers; flocculant (anionic synthetic polymer and hydrogen peroxide) addition at sedimentation basin entrances to enhance settling of solids and assist in stabilization and odor control; sedimentation basins (12 units) where flocculated solids (sludge) settle to the bottom and scum floats to the surface; and sludge digestion and scum removal facilities (8 units). From the sedimentation basins, treated wastewater enters the effluent channel where the disinfectant (sodium hypochlorite) is distributed.

The following outfall conveyance facilities allow the treated effluent to be discharge to the PLOO through: (1) a direct connection with the sedimentation basins; (2) a throttling valve which regulates water surface levels in the outfall diversion structure; or (3) a bypass valve which can divert the effluent to the outfall via a vortex structure. The 7,154-meter PLOO extends approximately 7.24 kilometers (4.5 miles or 3.9 nautical miles) offshore to the edge of the mainland shelf and discharges at a depth of approximately 95 meters (312 feet). The outfall terminates in a “Y”-shaped diffuser, the center of which is located at: north latitude 32 degrees, 39 minutes, 55 seconds, and longitude 117 degrees west, 19 minutes, 25 seconds. From the outfall terminus, each leg of the diffuser extends approximately 805 meters (0.5 miles). Effluent discharge commenced at this location in November 1993.

Point Loma WTP provides onsite digestion of waste solids from the sedimentation basins with seven anaerobic digesters. Approximately 3 to 3.3 million cubic feet per day of biogas produced during the digestion process. Of this total, approximately 1.8 million cubic feet is used for fueling an onsite cogeneration facility. The remaining digester gas generated at the plant is either used to fuel boilers for digester heating, flared off, or delivered to a private customer. The private customer further cleans the gas to conform with Sempra Energy standards and exports the gas through the onsite natural gas line. Digested solids are pumped to the Metro Biosolids Center for dewatering and disposal. Dewatered solids are beneficially used as an alternate daily cover at a landfill or as a soil amendment. Screenings, grit, and scum are trucked to a landfill for disposal.

The City's recycled water operations are regulated by water reclamation requirements established by the San Diego Regional Water Board: Order No. R9-2015-0091 for the North City Water Reclamation Plant (NCWRP) and Order No. R9-2021-0015 for the South Bay Water Reclamation Plant (SBWRP). Full operation of the North City Pure Water Facility is expected to begin by December 31, 2027. At that time, it will remove 52 MGD of wastewater that would otherwise have been directed to the Point Loma WTP and produce 30 MGD of purified water suitable for potable reuse. Excess NCWRP treated wastewater is returned to the system for transport to the Point Loma WTP. Waste solids from NCWRP are directed to the Metro Biosolids Center for digestion and dewatering.

The City is in the process of designing a new Microfiltration/Reverse Osmosis (MF/RO) system intended to replace the existing Electrodialysis Reversal (EDR) units at the SBWRP, which is anticipated to be completed in mid-2026. Currently, the EDR waste stream or EDR reject water is combined with waste solids and returned to the wastewater collection system that is routed to the Point Loma WTP for treatment. Based on supplemental SBWRP facility information submitted in March 2023, the future MF/RO waste stream or RO concentrate generated at SBWRP will be discharged through the South Bay Ocean Outfall under a separate SBWRP permit (Order No. R9-2021-0011), which may result in a change to the characteristics of the wastewater sent from SBWRP to Point Loma WTP for treatment and discharge. Waste solids from the South Bay WRP will continue to be discharged to the sewer system for transport to Point Loma WTP for treatment and removal.

Metro System Improvements

The City's 2022 application is based on a current discharge, as defined at 40 CFR 125.58(h). 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 the existing Order No. R9-2017-0007 (NPDES CA0107409). The City does not request any changes in existing NPDES effluent concentration or mass emission limitations, or performance goals established in the Order as well. 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 25 years. During the next 5-year permit cycle, the applicant has also proposed the following improvements to the Metro System. See Volume IV. Appendix B. Planned Metro System Facilities Improvements, of the application. These improvements include but are not limited to: (1) upgrading Point Loma grit removal facilities; (2) upgrading equipment at Pump Station No. 2; (3) implementing refinements to the system-wide chemical addition program; and (4) designing for the storm drain diversions. In addition, the applicant is currently engaged in a comprehensive effort to implement the water reuse program called "Pure Water San Diego" which will significantly increase recycled water use, bolster regional water supplies and reduce future PLOO discharge flows and solids mass emissions. Therefore, it is also based on an improved discharge, as defined at 40 CFR 125.58(i).

As documented in Volume III, Large Applicant Questionnaire section II.A, of the application, the applicant has achieved 80% removal of TSS and 58% removal of BOD and reduced TSS mass emissions during the period of the 301(h) modification (in Tables II.A-6 and II.A-7 and Figure II.A-1 and II.A-2, Volume III of the application). Table II.A-2, Volume III of the application summarizes existing TSS mass emission rates (MERs) established in Order No. R9-2017-0007. As shown in the table, the current (year 2022) permitted PLOO TSS mass emission limit is 11,999 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 11,999 mt/year for years 1 through 4, and to 11,998 mt/year in year 5 of the renewed modified NPDES permit (see Volume II, Table 4 of the 2022 application). The program goal is to cap PLOO mass emissions at 9,942 mt/yr by the end of 2027, which would be achieved with a combination of (1) PLWTP solids offloading resulting from upstream potable reuse and treatment facilities, and (2) Maintaining chemically enhanced primary treatment at the PLWTP (no conversion of the PLWTP to traditional secondary treatment). The 9,942 mt/yr TSS mass emission rate is equivalent to what the Point Loma WTP would be allowed to discharge at its present full permitted capacity (i.e., 240 MGD) under secondary treatment standards (i.e., 30 mg/l TSS limit).

The applicant is continuing its efforts to complete Phase 1 of the Pure Water San Diego Program and to initiate 30 MGD of purified water production by December 31, 2027, and to expand Pure Water San Diego capacity to ultimately achieve 83 MGD potable reuse of by December 31, 2035 (see Volume III. Table II.A-3 of the 2022 application). The applicant has completed three planning studies as part of the *Pure Water San Diego* program in Volume IV, Appendix B. The *2012 Metropolitan Wastewater Plan* provides value in (1) forecasting future Metro System flows and loads, and (2) assessing backbone Metro System facilities improvements that can be implemented to support facilities proposed as part of Pure Water. Update of the 2012 Metropolitan Wastewater Plan is anticipated to begin within the next NPDES 5-year permit cycle as part of a larger Departmental master plan. The 2012 Recycled Water Study, which included stakeholder participation and public participation process, evaluated potential non-potable reuse via groundwater recharge and surface water augmentation. The study concludes that only limited opportunities exist for expanding the current 12 MGD annual average of non-potable reuse within the service areas of the North City WRP and the South Bay WRP. Surface water augmentation to several City of San Diego reservoirs (Miramar, San Vincente or Otay) were deemed viable candidates for creating new local water supply as well as improving water quality (reduced salinity levels) within each reservoir.

This reuse option would improve the reliability of water supplies within the San Diego Region, reduce the need for imported water, decrease salinity concentrations in the regional water supply, and reduce wastewater discharges to the ocean. Concurrent with the Recycled Water Study, the applicant initiated the multi-year Water Purification Demonstration Project to evaluate the feasibility of implementing a full-scale potable reuse project that would augment water supplies and improve water quality in local reservoirs. The Advanced Water Purification Demonstration Project featured the installation and operation of a 1 MGD demonstration Advanced Water Purification facility in June 2011 and the implementation of a comprehensive monitoring program to evaluate the quality of the purified water supply. The Water Purification Demonstration Project also convened an Independent Advisory Panel to provide expert review and feedback, and evaluated such potable reuse issues as source control, treatment performance and reliability, energy use, reservoir storage and regulatory compliance. The City’s 2013 Water Purification Demonstration Project Report concluded that full-scale potable reuse is safe and feasible, that purified water supplies will meet all applicable regulatory requirements. The project's operational testing and monitoring program has demonstrated that the advanced water purification facility can produce purified water that is comparable or superior in quality to the City's existing imported raw water supply. Data from the demonstration facility are used to inform treatment processes for Pure Water and the design of Pure Water’s North City Pure Water Facility that is anticipated to be constructed and operational during the upcoming permit cycle and is regulated under a separate NPDES permit, San Diego Regional Water Quality Control Board Order No. R9-2020-0001.

DESCRIPTION OF RECEIVING WATERS

Volume III, Large Applicant Questionnaire section II.B, of the application presents general information describing receiving waters for the Point Loma discharge. Volume X, Appendix P, of the application presents a detailed characterization of seasonal circulation patterns in the vicinity of the Point Loma discharge which was originally provided in the 1995 application. This characterization includes descriptions of regional and local bathymetry, regional currents, and currents and stratification in the Point Loma shelf area. (For reference, 1 meter is about 3.281 feet; 1 kilometer is 1,000 meters, or about 0.6214 statute miles or 0.5397 nautical miles; 1 statute mile is about 0.8684 nautical miles.)

Bathymetry

The waters of the Southern California Bight (SCB) overlie the continental borderland of southern California. The outer edge of the borderland lies about 250 to 300 kilometers offshore and is defined by a sharp change of slope at 1000 meters. The continental borderland consists of a number of offshore islands, submerged banks, submarine canyons, and deep basins. The result is an unusually narrow mainland shelf, which averages 3 kilometers in width (ranging from 1 to 20 kilometers) and ends in waters of 200 meters depth. The narrowness of the mainland shelf in the SCB makes it particularly susceptible to human activities. (Schiff et al., 2000).

The mainland shelf off Point Loma is about 6.5 kilometers wide. Within this region, a narrow rocky shelf runs parallel to the coast and extends from the shoreline to water depths of about 17 to 20 meters. The outer edge of this rocky shelf is marked by the outer edge of kelp beds where the sea floor drops sharply by about 3 to 18 meters and terminates in a relatively smooth, gently sloping plain that extends seaward. This plain continues to gently slope seaward to water depths of about 90 to 95 meters, with only minor variations in direction and width for at least 15 kilometers north and south of the PLOO. The outer edge of the mainland shelf breaks at water depths of about 110 meters, as the bottom slopes sharply downward into the Loma Sea Valley. The PLOO discharges at the outer edge of this mainland shelf. The Loma Sea Valley axis lies about 15 kilometers offshore of Point Loma at a water depth of about 370 meters.

Currents

The local ocean current circulation in the vicinity of the PLOO occurs within the larger circulation of the California Current (the major southward-flowing surface current far offshore); the Southern California Counter Current (the inner northward-flowing leg of the counter-clockwise circulating gyre between the California Current and the coast); and the California Undercurrent (a northward flow beneath the Southern California Countercurrent at depths in excess of 100 meters).

Volume III and Volume X, Appendix P, of the application provide the following general characterization of the mainland shelf currents off the coast of Point Loma: the net subsurface flow (at a depth of 40 meters at the 60 meter contour) is upcoast at approximately 3 cm/sec; the net surface flow is downcoast at approximately 6 cm/sec; the net flow 1 to 2 meters above the ocean bottom has a strong offshore component that can exceed the longshore flow velocity; more than half the variations in 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 1 to 3 kilometers; waters along the nearshore shelf are dispersed with offshore waters on time scales of weeks; and long-term variability in currents can equal or exceed the seasonal variability. In the region surrounding the PLOO, mean current velocities from 2014 through 2020 ranged from a low of 5 to 17 cm/s, with the highest velocities typically occurring in surface waters during the spring.

Stratification

The water column above the Point Loma outfall diffuser is density stratified by gradients in temperature and salinity. Salinity gradients are small for water temperatures above 11 to 12 degrees C, but they make an important contribution to the density gradients of lower temperature waters. The strongest density gradients exist during the summer in the upper portion of the water column due to the formation of a seasonal thermocline at depths that range from a few meters to tens of meters (typically around 5 to 20 meters). Surface water temperatures may reach 18 to 23 degrees C. Water temperatures are generally lowest in the late winter, when surface temperatures can fall to about 12 to 14 degrees C. During this time, the seasonal thermocline may disappear and the density gradients may be minimal. At water column depths in excess of about 45 meters, the strongest density gradients occur during the winter (typically in January). Although these density gradients are weak in comparison with the gradients existing in the upper portion of the water column during the summer, they are sufficient to trap the wastefield from the Point Loma discharge at depths of 30 meters, or more, below the surface. Modeling and receiving water monitoring data indicate that the wastefield is typically confined to the water depth interval between 55 and 87 meters. Based on CTD (conductivity, temperature depth) data from 2014-2020, approximately 96 percent of the possible plume detections were at depths of 40 m or more, and no detections were observed above a depth of 24 m. (Volume III, Large Applicant Questionnaire section III.A.3, of the application).

PHYSICAL CHARACTERISTICS OF THE DISCHARGE

Outfall/Diffuser and Initial Dilution

40 CFR 125.62(a) requires that the proposed outfall and diffuser must be located and designed to provide adequate initial dilution, dispersion, and transport of wastewater to meet all applicable water quality standards and criteria at and beyond the boundary of the zone of initial dilution (ZID). This evaluation is based on conditions occurring during periods of maximum stratification and during other periods when discharge characteristics, water quality, biological seasons, or oceanographic conditions indicate more critical situations may exist. The physical characteristics of the PLOO (including diffuser) are summarized in Volume III, Large Applicant Questionnaire section II.A.8, of the application.

In Volume III, Table II.A-30 and II.A-32 of the 2022 application, the Metro System service area projected “most probable” inflow for 2023 is 180 MGD and the wet-weather inflow is 360 MGD. The Metro System end-of-permit projected “most probable” inflow for 2029 is 185 MGD and the wet-weather inflow is 371 MGD. Projected “most probable” Metro System flows are derived from the average of recent actual flow and load values and are prorated for future years using the same incremental population and unit generation rates as the facilities planning estimates. Based on SANDAG Series 13 population forecasts, population within the Metro System service area is projected at 2.31 million in 2022 and 2.36 million in 2027.

The 1995 application for the Point Loma WTP was based on an end-of-permit projected flow of 205 MGD. The 2001 application was based on an end-of-permit projected flow of 195 MGD; in 2007 flow was projected to be 202 MGD. For the 2015 application, the Point Loma WTP end-of-permit (2022) projected annual average flow is 157 MGD. For the 2022 application (Volume III, Table II.A-31), the Point Loma WTP end-of-permit (2029) projected annual average flow is 129.7 MGD, which significantly reduced from 2027 projected flow of 158.5 MGD through the implementation of 30 MGD of upstream potable reuse. Actual and projected effluent flow rates for the Point Loma WTP during the period of the existing and proposed permit are shown in Table 1.

Because the Point Loma WTP end-of-permit projected flow of 129.7 MGD is less than the end-of-permit projected flow of 205 MGD evaluated by EPA in the 1995 and 2001, 2007, and 2015 applications, EPA believes that the projected flow of 205 MGD continues to be a reasonable estimate for evaluating initial dilutions in the 2022 application.

Chapter III of the California Ocean Plan requires that “Waste effluents shall be discharged in a manner which provides sufficient initial dilution to minimize the concentrations of substances not removed in the treatment.” This plan defines the “minimum initial dilution (Dm)” as the “… lowest average initial dilution within any single month of the year.” and specifies that “Dilution estimates shall be based on observed waste flow characteristics, observed receiving water density structure, and the assumption that no currents, of sufficient strength to influence the initial dilution process, flow across the discharge structure.”

The applicant has continued to provide two sets of initial dilution calculations employing flows of 205 MGD and 240 MGD since the 1995 RSB-TSI model assessment. For the TDDs, EPA has only reviewed predictions based on an end-of-permit projected annual average flow of 205 MGD, because it is appropriate to the end of the five-year permit period.

Table 1. Actual and projected annual average and maximum daily/peak hour discharge flows (MGD) based on long-term facilities planning for the Point Loma Ocean Outfall.

Year	Observed Flows[1]		Projected Flows[2]	
	Annual Average Flow	Maximum Daily Flow	Projected Annual Average Flow[3,4,5]	Projected Maximum Daily Flow[6,7]
2001	175	222	---	---
2002[3]	169	189	---	---
2003	170	223	---	---
2004	174	295	---	---
2005	183	325	---	---
2006	170	224	---	---
2007	161	206	---	---
2008	162	233	---	---
2009	153	209	---	---
2010	157	394	---	---
2011	156	220	---	---
2012	148	191	---	---
2013	144	187	---	---
2014	139	181	---	---
2015	132	163	---	---
2016	136	208	---	---
2017	139	287	---	---
2018	139	216	---	---
2019	144	231	---	---
2020	144	298	---	---
2021	140	180	---	---
2022	139	175	---	---
2023	153	279	---	---
2024	---	---	156.1	341.2
2025	---	---	156.8	342.8
2026	---	---	157.7	344.5
2027	---	---	158.5	346.1
2028[4]	---	---	128.9	314.1

[1] Data from monthly reports submitted to the Regional Water Board and EPA for 2001-2022. Maximum daily flow is the highest daily PLOO flow observed during the listed year.
[2] Average annual PLOO flow projections based on Metro System flow projections for long-term facilities planning. These flows are based on once in ten year storm event flows to the system. The flow projections for long-term facilities planning are conservative (overestimates that employ a factor of safety) to ensure that adequate future system capacity is maintained. Average annual PLOO flows will vary depending on hydrologic conditions, recycled water demands at the NCWRP and SBWRP and SBOO flows. This flow projection methodology is also used for Pure Water San Diego Project projections.
[3] South Bay WRP is brought online.
[4] Phase 1 of the Pure Water San Diego to initiate 30 MGD of potable reuse brought online by December 31, 2027.
[5] Phase 2 of the Pure Water San Diego will implement an additional 53 MGD of potable reuse for a total of 83 MGD to be brought online by December 31, 2035.
[6] Maximum projected daily wet-weather flow for a 10-year wet weather event.
[7] The City continues to assess wet-weather flow projections. As part of this assessment, the City is evaluating the need to add equalization storage at Pump Station Nos. 1 and 2 (or implementing alternative peak-flow management options) to increase the ability of Metro System conveyance facilities to handle potential maximum flows.

The 1995 application for the Point Loma WTP was based on an end-of-permit projected annual average flow of 205 MGD. For this flow rate, the 50th percentile, flux-averaged initial dilution was predicted as 365:1 with currents and 300:1 without currents; the 5th percentile, flux-averaged initial dilution was predicted as 215:1 with currents and 194:1 without currents (based on time series data). For the water quality objectives in Table 3 of the California Ocean Plan, the lowest 30-day average initial dilution was predicted as 204:1 without currents (based on hydrocast data). Volume X, Appendix Q, of the application. As reported in the 1995, 2002, 2009, and 2017 TDDs, EPA verified the City's estimate of initial dilution for the California Ocean Plan (204:1) by obtaining the modified RSB model and raw data used by the applicant; EPA's result for the minimum monthly average initial dilution was 195:1, for zero currents. This same initial dilution (195:1) was obtained by EPA using a selected set of model runs and EPA's version of RSB. Using EPA's UMERGE model, EPA's result for the minimum monthly average initial dilution was 179:1, for zero currents. Taken together, these independent modeling efforts by the applicant and EPA produced estimates for minimum monthly average initial dilution of 204:1, 195:1, and 179:1. The 1995 TDD concluded these values were similar given the inherent uncertainties associated with modeling and that each would provide a conservative estimate of initial dilution for evaluating compliance with Table 3 water quality objectives. EPA continues to use 204:1 for evaluating compliance with Table 3 water quality objectives in the California Ocean Plan and EPA's 304(a)(1) toxics water quality criteria for aquatic life which lack Table 3 objectives.

The 1995 TDD also evaluated the critical initial dilution with the applicant's modified RSB model and the EPA's RSB and UMERGE models using: peak 2-3 hour effluent flows (generally estimated to be 4/3 the average monthly effluent flow), all density profiles in the given month, and zero currents. This evaluation of critical initial dilution differs from the evaluation of the lowest average initial dilution within any single month specified for Table 3 water quality objectives in the California Ocean Plan. The combination yielding the lowest initial dilution was used as EPA's estimate for worst-case initial dilution. The worst-case initial dilution estimate was: 143:1 for the applicant's modified RSB model, 134:1 for EPA's RSB model, and 99:1 for the UMERGE model. This TDD continues to use the initial dilution of 99:1 to assess worst-case conditions for TSS and BOD.

Finally, the 1995 TDD calculated a long-term average initial dilution of 328:1 for evaluating compliance with EPA's toxics water quality criteria for human health (organisms only); this TDD continues to use the initial dilution of 328:1 to evaluate compliance with EPA's toxics water quality criteria for human health which lack Table 3 objectives in the California Ocean Plan.

Application of Initial Dilution to Water Quality Standards and Criteria

Based on the information summarized in the previous section, EPA concludes that: (1) the outfall and diffuser system are well designed and achieve a high degree of dilution; (2) the minimum monthly average initial dilution value of 204:1 provides a conservative estimate of initial dilution for evaluating compliance with applicable State water quality standards in Table 3 of the California Ocean Plan and EPA toxics water quality criteria for aquatic life; and (3) the long-term effective dilution value of 328:1 provides an appropriate estimate for evaluating compliance with EPA toxics water quality criteria for human health (organisms only) based on long-term exposure. As in the 2017 TDDs, this evaluation uses the initial dilution value of 99:1 to assess worst-case conditions for suspended solids and dissolved oxygen concentrations following initial dilution. The application of these initial dilution values is summarized in Table 2.

Table 2. Initial dilution values for evaluating compliance with applicable State water quality standards and EPA's 304(a)(1) water quality criteria.

Initial Dilution Type	Initial Dilution Value	Source	Applicable Water Quality Standard 40 CFR 125.62(a)
Minimum monthly average initial dilution (1995 and 2002)	204:1	California Ocean Plan	Table 3 objectives
Minimum monthly average initial dilution	204:1	Amended 301(h) Technical Support Document	304(a)(1) criteria for acute and chronic aquatic life with no Table B objectives
Long-term effective dilution	328:1	Amended 301(h) Technical Support Document	304(a)(1) criteria for human health (organisms only) with no Table 3 objectives
Worst-case (critical) initial dilution	99:1	Amended 301(h) Technical Support Document	Suspended solids and dissolved oxygen

Zone of Initial Dilution

No modifications to the PLOO have been implemented since its construction that would affect the dimensions of the zone of initial dilution. Consequently, the PLOO zone of initial dilution remains unchanged from the City's three prior applications. The zone of initial dilution extends 93.5 meters (307 feet) on either side of the PLOO diffuser legs. Volume X, Appendix Q, of the application presents estimates of distances associated with completion of initial dilution at the PLOO's design average dry weather flow of 240 MGD; Table III.A-3 in Volume III of the application, presents a statistical breakdown of computed horizontal downstream distances from outfall ports to the completion of the initial dilution process.

As previously described, the outfall terminates in a "Y"-shaped diffuser, the center of which is located at: north latitude 32 degrees, 39 minutes, 55 seconds, and longitude 117 degrees west, 19 minutes, 25 seconds. For reference, near-ZID stations F30 (for water quality monitoring) and E14 (for sediment monitoring) are located on the 98 meter (320 foot) depth contour at: north latitude 32 degrees, 39 minutes, 94 seconds, and longitude 117 degrees west, 19 minutes, 49 seconds; or 300 meters (984 feet) west of the diffuser wye. See Figures A-3 and A-4 for maps of water quality stations and sediment monitoring stations, respectively.

Dilution Water Recirculation

The effect of re-entrainment of the wastefield is to reduce the volumetric initial dilutions for the discharged effluent within the zone of initial dilution. Under CWA section 301(h)(9), in order for a 301(h) permit to be issued for the discharge of a pollutant into marine waters, such marine waters must exhibit characteristics assuring that water providing dilution does not contain significant amounts of previously discharged effluent from the treatment works.

This requirement was addressed by the City in the 1995 application. To estimate the potential for re-entrainment effects on the 30-day average concentration, the applicant made the assumption that receiving waters around the outfall contain all the wastewater discharged during a 30-day period (205 MGD for a total volume of 1.3×10^8 cubic meters). This is a very conservative assumption, as physical oceanographic models indicate the residence time for wastewater within the 30 by 12 kilometer (19 by 7.5 miles) area around the outfall is about 4.5 days. For the effluent flow of 205 MGD, the largest reductions for computed volumetric initial dilutions were around 12 percent, occurring in July and September; the smallest reductions were around 4 percent, occurring in January and February.

Based on EPA's review of 2017 through 2023 effluent data for toxics concentrations to exceed California Ocean Plan Table 3 water quality objectives and EPA water quality criteria for aquatic life and human health, these predicted reductions for initial dilution due to re-entrainment are not expected to affect discharge compliance with applicable water quality objectives and criteria.

APPLICATION OF STATUTORY AND REGULATORY CRITERIA

A. Compliance with Federal Primary Treatment, California Ocean Plan Table 4, and CWA section 301(j)(5) Requirements

Under CWA section 301(h)(9) and 40 CFR 125.60, the applicant's wastewater effluent must be receiving at least primary treatment at the time the 301(h) variance becomes effective. 40 CFR 125.58(r) specifies that primary treatment means treatment by screening, sedimentation, and skimming adequate to remove at least 30 percent of the biological oxygen demanding material and other suspended solids in the treatment works influent, and disinfection, where appropriate. In Table 4 of the California Ocean Plan, publicly owned treatment works must, as a 30-day average, remove 75 percent of suspended solids from their influent stream before discharging wastewaters to the ocean except that the effluent limitation to be met shall not be lower than 60 mg/l. Turbidity in the effluent must not exceed 75 NTU as a 30-day average, 100 NTU as a 7-day average, and 225 NTU at any time. Settleable solids in the effluent must not exceed 1.0 ml/l as a 30-day average, 1.5 ml/l as a 7-day average, and 3.0 ml/l at any time. There are no Table 4 effluent requirements for biochemical oxygen demand. Finally, CWA section 301(j)(5) specifies that the applicant must implement a wastewater reclamation program that will result in a reduction in the quantity of suspended solids discharged by the applicant into the marine environment during the period of the 301(h) modification. In addition, such modification must result in removal of not less than 80 percent of total suspended solids (on a monthly average) and not less than 58 percent of biochemical oxygen demand (on an annual average).

1. Total Suspended Solids

To comply with these requirements, the applicant has proposed the following effluent limits for total suspended solids:

TSS: (1) The monthly average system-wide percent removal shall not be less than 80% percent (computed in accordance with Order No. R9-2024-0004, NPDES No. CA0107409).

(2) The monthly average treatment plant effluent concentration shall not be more than 60 mg/l.

(3) The annual treatment plant loading to the ocean shall not be more than 11,999 metric tons per year during years one through four of the permit and not more than 11,998 metric tons per year during year five of the permit.[3] (For reference, 1 metric ton is 1,000 kilograms which is approximately 2,205 pounds.) Mass emission limits for TSS apply only to discharges from POTWs owned and operated by the Discharger and the Discharger's wastewater generated in the San Diego Metropolitan Sewerage System (Metro System) service area, excluding TSS contributions from Metro System flows treated in the City of Escondido and South Bay WRP flows discharged to the South Bay Ocean Outfall. If the Discharger is requested to accept wastewater originating in Tijuana, Mexico, treated or untreated, such acceptance would be contingent upon an agreement

[3] If OPRA II legislation is enacted, PLOO TSS mass emissions are limited to 11,500 mt/yr after December 31, 2025, and are limited to 9,942 mt/yr after December 31, 2027.

acceptable to the USEPA, RWQCB and Discharger. The TSS contribution from that flow would not be counted toward any mass emission limit(s).

EPA reviewed influent and effluent data for Point Loma WTP provided in the application and reported over the most recent 6 years (2017-2022). As shown in Table 4, the proposed monthly average limit of 60 mg/l for the Point Loma WTP effluent has been met and even lower concentrations for suspended solids in the effluent are achievable, except for the period from March to June 2022. Table 5 also shows that the monthly average percent removals for total suspended solids meet both federal primary treatment requirements of 30 percent TSS removal and California Ocean Plan Table 4 requirements of 75 percent TSS removal for the Point Loma WTP, with two exceptions in April and May 2022. Note that TSS values temporarily exceeded the permit limit of 60 mg/l and ≥ 75 percent TSS removal in 2022 due to two metro system shutdowns at the NCWRP influent pump station and at the pipeline between the Metro Biosolids Center and NCWRP. These shutdowns were required for completion of essential system upgrades for the North City Pure Water project. The City implemented corrective actions to resume normal operation, and since then the City has been in compliance with all the permit limits.

In addition to TSS data, EPA evaluated settleable solids and turbidity effluent data. As shown in Table 6, the Point Loma WTP discharge will consistently meet the permit limits for settleable solids. As shown in Table 7 and based on EPA's review of the effluent data and the City's response to permit violations which occurred in April through June 2022, EPA concludes that the turbidity limits for the Point Loma WTP effluent would be met.

Table 3. Monthly average and annual average influent concentrations (mg/l) for total suspended solids at Point Loma WTP.

Month	2017	2018	2019	2020	2021	2022
January	306	352	321	331	332	315
February	343	351	324	344	340	355
March	332	352	341	306	317	352
April	348	383	390	313	346	345
May	344	353	380	341	344	353
June	365	361	375	346	340	370
July	369	358	406	353	362	368
August	358	348	390	351	354	320
September	368	361	375	351	341	284
October	359	362	361	353	321	269
November	358	376	361	337	352	271
December	351	323	317	337	330	298
Annual Average	350	357	362	339	340	325
Maximum Month	369	383	406	353	362	370
Minimum Month	306	323	317	306	317	269

Table 4. Monthly average and annual average effluent concentrations (mg/l) for total suspended solids at Point Loma WTP, with the exceedance of the monthly average limit of 60 mg/l in red.

Month	2017	2018	2019	2020	2021	2022
January	30	35	48	34	34	42
February	34	35	41	40	34	45
March	30	35	42	34	30	84
April	32	34	42	33	30	128
May	34	36	38	32	30	118
June	39	45	38	33	33	80
July	39	39	39	33	31	41
August	42	38	38	34	37	41
September	33	38	39	32	34	42
October	34	38	46	32	31	43
November	37	40	44	36	34	39
December	52	45	33	36	38	38
Annual Average	36	38	41	34	33	62
Maximum Month	52	45	48	40	38	128
Minimum Month	30	34	33	32	30	38

Table 5. Monthly average and annual average percent removals (%) for total suspended solids at Point Loma WTP, with the violation of the monthly average permit limit of ≥75 % in red.

Month	2017	2018	2019	2020	2021	2022
January	90	90	85	90	90	86
February	90	90	87	88	90	87
March	91	90	88	89	90	76
April	91	91	89	89	91	62
May	90	90	90	91	91	66
June	89	87	90	90	90	78
July	89	89	91	91	92	88
August	88	89	90	90	90	87
September	91	89	90	91	90	84
October	91	90	87	91	90	83
November	90	89	88	89	90	85
December	85	86	89	89	89	87
Annual Average	90	89	89	90	90	81
Maximum Month	91	91	91	91	92	88
Minimum Month	85	86	85	88	89	62

Table 6. Monthly average and annual average effluent concentrations (ml/l) for settleable solids at Point Loma WTP. The monthly average effluent limit for settleable solid is 1.0 ml/l.

Month	2017	2018	2019	2020	2021	2022
January	0.4	0.3	0.3	0.3	0.2	0.1
February	0.2	0.2	0.4	0.2	0.1	0.1
March	0.2	0.4	0.5	0.2	0.2	0.4
April	0.2	0.3	0.3	0.2	0.2	0.6
May	0.3	0.2	0.4	0.1	0.1	0.9
June	0.3	0.7	0.2	0.1	0.2	0.7
July	0.3	0.4	0.3	0.2	0.1	0.2
August	0.5	0.3	0.2	0.2	0.6	0.2
September	0.1	0.4	0.4	0.2	0.2	0.2
October	0.2	0.3	0.4	0.2	0.2	0.2
November	0.4	0.3	0.4	0.2	0.2	0.3
December	0.2	0.3	0.3	0.2	0.2	0.4
Annual Average	0.3	0.3	0.4	0.2	0.2	0.4
Maximum Month	0.5	0.7	0.5	0.3	0.6	0.9
Minimum Month	0.1	0.2	0.2	0.1	0.1	0.1

Table 7. Monthly average and annual average effluent concentrations (NTU) for turbidity at Point Loma WTP, with the exceedance of the monthly average permit limit of 75 NTU in red.

Month	2017	2018	2019	2020	2021	2022
January	26	38	32	30	38	49
February	27	36	25	35	35	44
March	29	36	33	30	36	62
April	41	43	40	24	46	83
May	44	53	44	37	48	90
June	45	68	47	45	53	82
July	56	61	50	50	50	70
August	63	67	53	52	67	71
September	50	56	53	52	56	57
October	46	52	48	51	44	54
November	47	43	40	41	55	44
December	42	36	29	44	46	40
Annual Average	43	49	41	41	48	62
Maximum Month	63	68	53	52	67	90
Minimum Month	26	36	25	24	35	40

In contrast to federal primary treatment and California Ocean Plan requirements, the percent removal requirement for total suspended solids specified under CWA section 301(j)(5) is applied on a "system-wide" basis and computed in accordance with the existing permit.

Table 8. Monthly average and annual average system-wide percent removals (%) for total suspended solids. Note that monthly average system-wide % removals of TSS in red indicate non-compliance with the permit limit and the CWA section 301(j)(5) requirement of ≥80 %.

Month	2017	2018	2019	2020	2021	2022
January	90	90	86	90	90	86
February	90	90	88	89	90	87
March	91	90	88	90	91	76
April	91	91	90	89	92	63
May	91	90	90	91	92	67
June	90	87	90	91	90	79
July	90	90	91	91	92	89
August	89	89	91	91	90	88
September	91	90	90	91	90	86
October	91	90	88	91	90	85
November	90	90	88	90	91	86
December	86	87	90	90	89	87
Annual Average	90	89	89	90	91	81
Maximum Month	91	91	91	91	92	89
Minimum Month	86	87	86	89	89	63

As shown in Table 8, the monthly average system-wide percent removals for total suspended solids consistently met the CWA section 301(j)(5) requirement of not less than 80 percent removal over the permit term, except for four monitoring events during the period from March to June 2022. Please note that more than 94 % of the monitoring events (i.e., 68 out of the 72 monitoring events conducted between 2017 and 2022) are in compliance with the CWA section 301(j)(5) requirement for TSS. Non-compliance of the monthly average system-wide TSS percent removal was observed during March to June 2022, due to two metro system shutdowns that were required for completion of essential system upgrades for the North City Pure Water project and associated operation issues such as higher levels of solids being sent to the Point Loma WTP, vivianite build-up in the sludge piping, and a line break on the dewatering line. The City immediately implemented corrective actions to resolve these operation issues. Since the City resumed normal operation in July 2022, there has been no exceedance of the 80% system-wide average monthly percent removal requirement for TSS. EPA finds that the system is expected to continue to meet the CWA section 301(j)(5)(C) requirement for TSS.

To comply with the CWA section 301(j)(5) requirement to implement a wastewater reclamation program that will result in a reduction in the quantity of suspended solids discharged by the applicant into the marine environment during the period of the 301(h) modification, the applicant has brought online the 30 MGD North City WRP and the 15 MGD South Bay WRP and, as part of its “improved” discharge, has committed to bring additional recycled water users online to reduce dry-weather flows to both the South Bay Ocean Outfall and Point Loma WTP and Ocean Outfall. Evidence for reductions in the quantity of suspended solids discharged by the applicant during the period of the 301(h) modification are provided in the application (Volume II and III) which shows the actual reduction in Point Loma WTP effluent mass emissions for total suspended solids from 1995 through 2020. The application also provides projections for total suspended solids loadings from the Point Loma WTP during the period of the proposed 301(h) modification. See Figures 1 and 2 and Table 9 below.

Figure 1. Average annual PLOO TSS MERs (mt/yr) during effective five-year periods of prior NPDES permits. Note that each blue bar represents 5-year average TSS MERs during each of the prior NPDES permit terms.

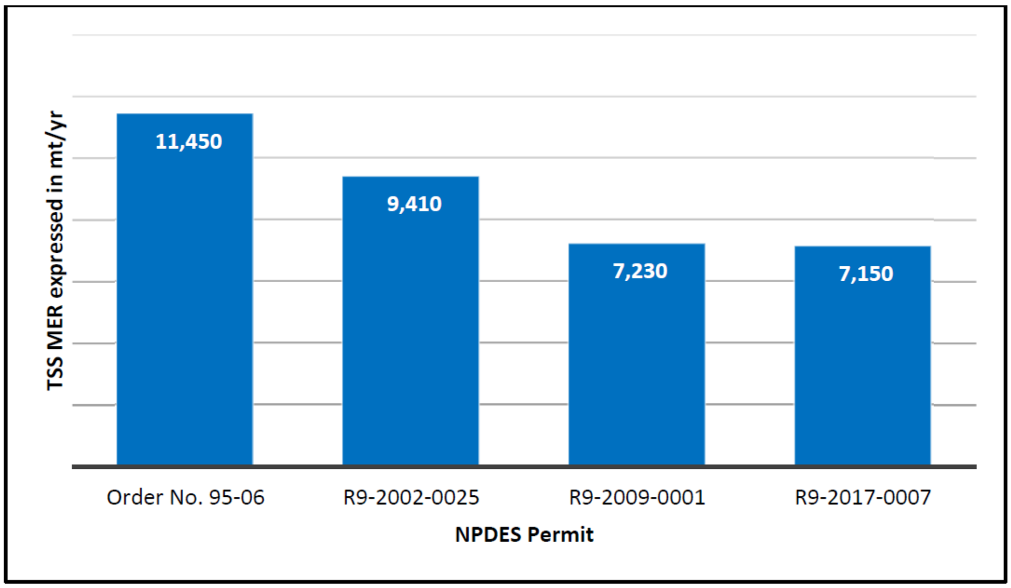


Figure 2. 10-year running average of annual TSS MERs (mt/yr) from 2000 through 2020.

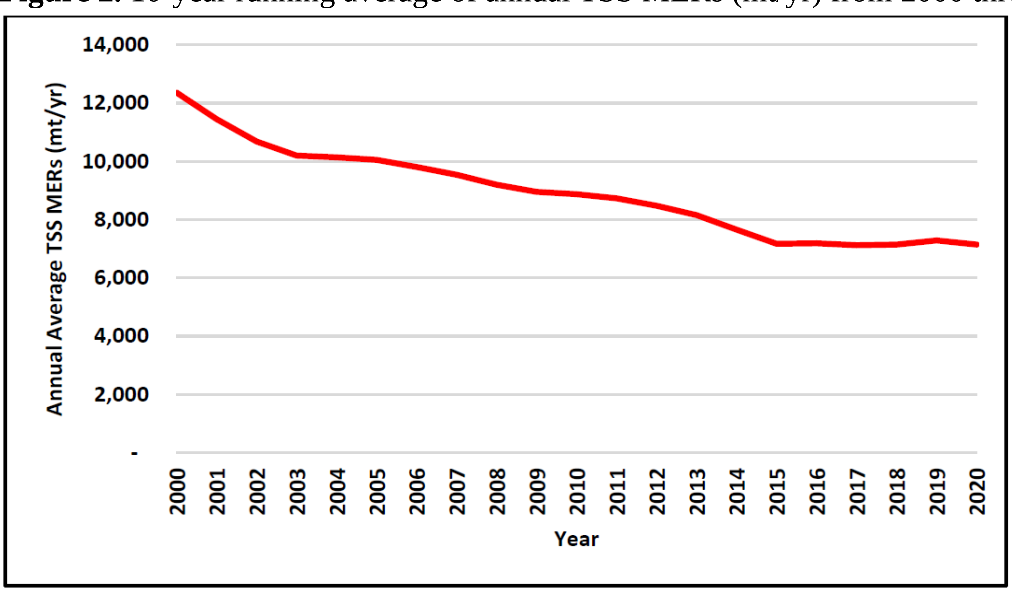


Table 9. Point Loma WTP actual and projected flows (MGD) and total suspended solids loadings (mt/year) using "most probable" flow estimates. This table reflects the total off-loading as a result of producing 30 MGD of potable reuse water by 2027 and 83 MGD by 2035.

Year	Actual Annual Average Discharge[1]	Actual TSS Mass Emissions[1]	Projected Annual Average Discharge[6,7,8,9]	Projected TSS Mass Emissions[6,7,8,9]
1995	188	11,060	---	---
1996	179	10,718	---	---
1997[2]	189	10,255	---	---
1998[3]	194	10,627	---	---
1999	175	9,130	---	---
2000[4]	174	9,036	---	---
2001	175	10,256	---	---
2002[5]	169	10,184	---	---
2003	170	9,862	---	---
2004	174	10,300	---	---
2005	183	10,229	---	---
2006	170	8,248	---	---
2007	161	7,588	---	---
2008	162	7,272	---	---
2009	153	6,658	---	---
2010	157	8,172	---	---
2011	156	8,848	---	---
2012	148	7,162	---	---
2013	144	6,674	---	---
2014	139	5,270	---	---
2015	132	5,466	---	---
2016	136	8,393	---	---
2017	139	7,112	---	---
2018	139	7,293	---	---
2019	144	8,155	---	---
2020	144	6,744	---	---
2021	140	6,371	---	---
2022	139	11,834[10]	---	---
2023	153	9,087	---	---
2024	---	---	141.8	7,447
2025	---	---	142.4	7,664
2026	---	---	143.3	7,691
2027	---	---	144.0	7,761
2028[7]	---	---	114.3	6,161
2029	---	---	115.1	6,204
2030	---	---	115.8	6,241
2031	---	---	116.6	6,285

Year	Actual Annual Average Discharge[1]	Actual TSS Mass Emissions[1]	Projected Annual Average Discharge[6,7,8,9]	Projected TSS Mass Emissions[6,7,8,9]
2032	---	---	117.4	6,490
2033	---	---	118.4	6,545
2034	---	---	119.0	6,578
2035	---	---	119.8	6,623
2036[8]	---	---	66.8	3,323
2037	---	---	67.2	3,343
2038	---	---	67.7	3,368
2039	---	---	68.1	3,383
2040	---	---	68.6	3,413

1 Flow and mass emissions data from annual reports submitted to the Regional Water Board and EPA for 1995-2022.
2 North City WRP is brought online.
3 Metro Biosolids Center is brought online.
4 International Boundary and Water Commission International Wastewater Treatment Plant is brought online and Tijuana wastewater flows to Metro System are terminated.
5 South Bay WRP is brought online.
6 Projected “most probable” Metro System flows are derived from the average of recent actual flow and load values and are prorated for future years using the same incremental population and unit generation rates as the facilities planning estimates. Future population growth projections are based on SANDAG Series 13 population forecasts.
7 In 2028, Point Loma discharge flows and loads are anticipated to decline through implementation of 30 MGD of upstream potable reuse. Based on targeted Phase 1 Pure Water San Diego potable reuse implementation goal for Dec. 31, 2027. Implementation date may be influenced by economic conditions, population, and water conservation.
8 In 2036, Point Loma discharge flows and loads are anticipated to decline through implementation of an additional 53 MGD of upstream potable reuse (total cumulative potable reuse of 83 MGD. Based on achieving the targeted Phase 2 Pure Water San Diego potable reuse implementation goal for Dec. 31, 2035. Implementation date may be influenced by economic conditions, population, and water conservation.
9 The flow and TSS mass emission projections for long-term facilities planning are conservative (over-estimates that employ a factor of safety) to ensure that adequate future system capacity is maintained. Mass emission limits for TSS apply only to discharges from publicly-owned treatment works (POTWs) owned and operated by the Discharger and the Discharger's wastewater generated in the San Diego Metropolitan Sewerage System (Metro System) service area, excluding TSS contributions from Metro System flows treated in the City of Escondido and South Bay WRP flows discharged to the South Bay Ocean Outfall. If the Discharger is requested to accept wastewater originating in Tijuana, Mexico, treated or untreated, such acceptance would be contingent upon an agreement acceptable to the USEPA, RWQCB and Discharger. The TSS contribution from that flow would not be counted toward any mass emission limit(s).
10 Two metro system shutdowns and associated operation issues occurred from March to June 2022, which resulted in a temporary increase in TSS mass emissions at the Point Loma WTP in 2022.

The applicant’s projections in Table 9 and the proposed annual mass emissions limits for total suspended solids (see Table 27) satisfy section 301(j)(5)(B)(ii) of the Act, except that footnotes regarding wastewater generated outside the Metro system are not included in TSS or other mass limits calculations and are appropriately retained from the existing permit.

Table 27 footnotes on TSS calculations are consistent with footnotes in Table 2 of the proposed modified permit and identify the potential for new sources of total suspended solids to be included in the Point Loma discharge, but these footnotes clarify that such new sources of total suspended solids would be excluded from the determination of compliance with these mass emission limits. EPA cannot determine compliance with CWA section 301(j)(5)(B)(ii) if these provisions are changed to allow additional total suspended solids loadings to be excluded from the mass emission requirements for total suspended solids. Maintaining the existing requirements in these footnotes ensures that the mass emission loadings are measured on a comparable basis so that EPA can determine that the permit requires the necessary reduction in suspended solids loadings.

Based on Table 9, EPA believes that a total suspended solids mass emission rate of 11,998 metric tons per year would be achievable during all five years of the proposed 301(h) modification. During this period, EPA recognizes that reductions in mass emissions resulting from increased water reclamation are likely to be seasonal and anticipates the potential for corresponding higher mass emission rates during wet weather months. In the future, the City needs to pursue additional water reclamation and reuse projects, including those which demand a year-round supply of reclaimed water so as to maintain long-term compliance with the decision criteria.

The mass emission limitations for TSS in the existing permit are based on the effluent limitations requested by the applicant in the 2022 301(h) application which were evaluated by USEPA. The applicant requested TSS mass emission limitations of 11,999 mt/yr for years 1 through 4 of the permit (2024 through 2028), and 11,998 mt/yr in year 5 of the permit (2029).[4] This represents a 1 mt/yr reduction in year 5 of the permit from the current mass emission limitation of 11,999 mt/yr.

2. Biochemical Oxygen Demand

To comply with federal primary treatment and CWA section 301(j)(5) requirements for biochemical oxygen demand, the applicant has proposed the following effluent limit:

BOD: The annual average system-wide percent removal shall not be less than 58 percent (computed in accordance with Order No. R9-2024-0004, NPDES No. CA0107409).

EPA reviewed influent and effluent data for Point Loma WTP based on the application and facility performance data reported over 6 recent years (2017-2022). The data for biochemical oxygen demand are summarized, as follows.

[4] If the Ocean Pollution Reduction Act II (OPRA II) is enacted, PLOO TSS mass emission will be reduced from 11,999 to 11,500 mt/yr by December 31, 2025. These mass reductions are consistent with the OPRA II legislation goal to reduce permitted TSS mass emissions to 9,942 mt/yr after December 31, 2027. An annual reduction down to 9,942 mt/yr is equivalent to levels that would have occurred if the 240-MGD Facility were to achieve secondary treatment TSS concentration standards, 30 mg/L, which is consistent with secondary treatment standards.

Table 10. Monthly average and annual average influent concentrations (mg/L) for biochemical oxygen demand at Point Loma WTP.

Month	2017	2018	2019	2020	2021	2022
January	274	315	270	323	333	332
February	290	323	241	324	347	353
March	307	327	288	302	345	333
April	328	335	328	279	391	328
May	316	336	315	317	387	325
June	317	346	319	347	350	339
July	312	335	336	359	371	332
August	318	329	399	352	372	286
September	299	331	367	338	337	256
October	303	315	334	356	319	255
November	307	326	328	354	355	263
December	320	290	299	352	322	259
Annual Average	308	326	319	334	352	305
Maximum Month	328	346	399	359	391	353
Minimum Month	274	290	241	279	319	255

Table 11. Monthly average and annual average effluent concentrations (mg/L) for biochemical oxygen demand at Point Loma WTP.

Month	2017	2018	2019	2020	2021	2022
January	100	126	117	129	129	140
February	109	134	107	138	139	147
March	111	132	123	121	137	180
April	126	136	133	102	155	212
May	125	140	127	123	149	195
June	135	151	135	138	142	166
July	135	130	139	142	150	112
August	140	135	154	137	140	96
September	119	132	147	129	129	94
October	117	125	146	138	127	104
November	123	128	135	145	145	105
December	145	128	116	137	129	104
Annual Average	124	133	132	132	139	138
Maximum Month	145	151	154	145	155	212
Minimum Month	100	125	107	102	127	94

Table 12. Monthly average and annual average percent removals (%) for biochemical oxygen demand at Point Loma WTP.

Month	2017	2018	2019	2020	2021	2022
January	63	60	57	60	61	57
February	62	58	56	57	60	58
March	64	60	57	60	60	46
April	61	59	59	63	60	35
May	60	58	60	61	61	40
June	57	56	58	60	59	51
July	57	61	59	60	60	66
August	56	59	61	61	62	66
September	60	60	60	62	62	62
October	61	60	56	61	60	58
November	60	61	59	59	59	59
December	55	56	61	61	60	59
Annual Average	60	59	59	61	60	55
Maximum Month	64	61	61	63	62	66
Minimum Month	55	56	56	57	59	35

Table 13. Monthly average and annual average system-wide percent removals (%) for biochemical oxygen demand. The BOD annual average % removal in red indicates non-compliance with the permit limit and the CWA section 301(j)(5) requirement of ≥58 %.

Month	2017	2018	2019	2020	2021	2022
January	65	61	61	63	64	58
February	65	61	57	61	63	58
March	66	63	62	62	63	46
April	65	63	62	64	63	38
May	64	62	63	65	64	43
June	62	61	62	63	62	54
July	61	65	61	64	66	69
August	61	62	61	64	65	69
September	64	63	62	65	64	66
October	65	63	60	64	62	61
November	64	64	62	62	64	62
December	59	60	64	64	62	61
Annual Average	**63**	**62**	**62**	**63**	**63**	**57**
Maximum Month	66	65	64	65	66	69
Minimum Month	59	60	57	61	62	38

As shown in Table 12, the PLWTP monthly average percent removals for BOD meet the federal primary treatment requirement of 30 percent BOD removal. In contrast to the federal primary treatment requirement, the percent removal requirement for biochemical oxygen demand specified under CWA section 301(j)(5) is applied on a "system-wide" basis and computed in accordance with the existing permit. As shown in Table 13, the annual average system-wide percent removals for biochemical oxygen demand meet the CWA section 301(j)(5) requirement of not less than 58 percent, with a single marginal under-performance of 57 % in 2022 due to two metro system shutdowns and associated operation issues. This is the first time such an exceedance of an annual average effluent limit has occurred since extension of the Point Loma Ocean Outfall was completed in 1993. Once the system was back online and the Point Loma WTP resumed normal operation on June 6, 2022, there has been no longer exceedance of the BOD annual average permit limit of 58 %. EPA finds that the system is expected to continue to meet the CWA section 301(j)(5)(C) requirement for BOD.

3. 301(h)-modified Permit Effluent Limits for TSS and BOD

Based on EPA's review of the 301(h) and (j)(5) decision criteria and the California Ocean Plan, the effluent limits in Table 14 will be incorporated into the 301(h)-modified permit:

Table 14. Effluent limits based on CWA sections 301(h) and (j)(5) and the Ocean Plan.

Effluent Constituent	Units	Annual Average	Monthly Average
TSS	System-wide % removal[1]	---	≥ 80
	Facility % removal[2]		≥ 75
	mg/l[2]	---	60
	Metric tons/year	11,999[3]	---
		11,998[4]	---
BOD_5	System-wide % removal[1]	≥ 58	---

[1] The system-wide percent removal was derived from CWA sections 301(h) and (j)(5). To be calculated on a system-wide basis, as provided in Section 7.9 of the Order (No. R9-2024-0004)/Permit (No. CA0107409).

[2] This effluent limitation was derived from the California Ocean Plan, Table 4. The Discharger shall, as an average monthly, remove 75% of suspended solids from the influent stream before discharging wastewaters to the ocean, except that the effluent limitation to be met shall not be lower than 60 mg/l.

[3] To be achieved on permit effective date through end of fourth year (2024–2028). Mass emission limits for TSS apply only to discharges from POTWs owned and operated by the Discharger and the Discharger's wastewater generated in the San Diego Metropolitan Sewerage System (Metro System) service area, excluding TSS contributions from Metro System flows treated in the City of Escondido and South Bay WRP flows discharged to the South Bay Ocean Outfall. If the Discharger is requested to accept wastewater originating in Tijuana, Mexico, treated or untreated, such acceptance would be contingent upon an agreement acceptable to the USEPA, RWQCB and Discharger. The TSS contribution from that flow would not be counted toward any mass emission limit(s).

[4] To be achieved on beginning of fifth year of permit (2029). Mass emission limits for TSS apply only to discharges from POTW owned and operated by the Discharger and the Discharger's wastewater generated in the San Diego Metropolitan Sewerage System (Metro System) service area, excluding TSS contributions from Metro System flows treated in the City of Escondido and South Bay WRP flows discharged to the South Bay Ocean Outfall. If the Discharger is requested to accept wastewater originating in Tijuana, Mexico, treated or untreated, such

acceptance would be contingent upon an agreement acceptable to the USEPA, RWQCB and Discharger. The TSS contribution from that flow would not be counted toward any mass emission limit(s).

B. Attainment of Water Quality Standards for TSS and BOD

Under 40 CFR 125.61(a) which implements CWA section 301(h)(1), there must be a water quality standard applicable to the pollutants for which the modification is requested; under 125.61(b)(1), the applicant must demonstrate that the proposed modified discharge will comply with these standards. The applicant has requested modified requirements for total suspended solids, which can affect natural light (light transmissivity) and biochemical oxygen demand which can affect dissolved oxygen concentration.

1. Natural Light

In relation to the effects of total suspended solids, the California Ocean Plan specifies that: "Natural light shall not be significantly reduced at any point outside the initial dilution zone as the result of the discharge of waste." Regional Water Boards may determine reduction of natural light by measurement of light transmissivity or total irradiance, or both. Compliance with this water quality objective is determined from samples collected at stations representative of the area within the wastefield where initial dilution is completed. The 95 m PLOO outfall depth is intended to inhibit wastewater from reaching surface waters due to thermal stratification and typically results in the plume being trapped offshore at or below depths of 40 to 60 m, below the average euphotic zone depth in the Southern California Bight region (i.e., approximately 35 m).

In the 1995 TDD, EPA predicted a maximum increase in total suspended solids of 0.5 mg/l, in the immediate area of the Point Loma discharge, based on an effluent concentration of 53 mg/l and the worst-case initial dilution of 99:1. Applying this initial dilution value to the total suspended solids effluent values in Table 4 and the applicant's estimate for ambient total suspended solids (depth-averaged over a complete tidal cycle) of 7 mg/l, the maximum increase in total suspended solids at the boundary of the zone of initial dilution should be on the order of 0.45 to 0.24 mg/l, or about 6 to 3 percent. While these estimates are larger than the applicant's estimates, the increases predicted by the mass balance model are not considered substantial given the range of natural variability in total suspended solids (2.2 to 11.2 mg/l) historically observed in the area of the discharge.

EPA also reviewed available receiving water data to assess whether or not natural light is significantly reduced by the drifting wastefield.

Under its existing NPDES permit, the City conducts the required quarterly monitoring for bacteria indicators (enterococcus, fecal coliforms, and total coliforms), at depths of 1, 25, 60, 80 and 98 meters below the surface, at a grid of 33 offshore stations located along the 98, 80 and 60 meter contours (Figure A-3). This data is used by the applicant and EPA to help identify the location of the drifting wastefield. EPA evaluated the applicant's monitoring results from January 2015 through December 2021. Bacteria indicator data indicative of the PLOO wastefield are variably found along the 98, 80, and 60 meter contours, generally at depths from 60 to 98 meters.

Under its existing NPDES permit, the City conducts the required quarterly monitoring for light transmittance, throughout the water column, at a grid of 33 offshore stations located along the 98, 80 and 60 meter contours. EPA evaluated the applicant's monitoring results from January 2015 through December 2021. As shown in Table B-1 and Figure A-5, long-term averages and standard deviations for percent transmissivity at different water depths at the near-ZID boundary and nearfield stations (F30, F29, F31) are similar to those observed for the same water depth, at farfield stations located on the 98 meter contour. Long-term averages for percent transmissivity are lower and more variable at water depths closer to the surface and at the bottom, in comparison to water depths below the euphotic zone which are frequented by the drifting wastefield. Generally, percent transmissivity is lower at stations closer to the coast, due to shoreline influences and sediment resuspension at the bottom. Based on this evaluation, EPA concludes that the Point Loma discharge does not result in a significant reduction in natural light in areas within the wastefield where initial dilution is completed.

2. Dissolved Oxygen

In relation to the effects of biochemical oxygen demand, the California Ocean Plan specifies that: "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." Compliance with this water quality objective is determined from samples collected at stations representative of the area within the wastefield where initial dilution is completed. The typical depth range of the PLOO wastefield is 60 to 80 meters below the surface which is well below the euphotic zone.

Based on a modified version of the *Amended Section 301(h) Technical Support Document* (EPA 842-B-94-007, September 1994; ATSD), the 1995 application used a modeling approach to predict the effect of the Point Loma WTP discharge on ambient dissolved oxygen concentrations. In the 1995 TDD, EPA evaluated these efforts and conducted similar modeling, using a worst-case (critical) initial dilution of 99:1, to verify the City's predictions. EPA's modeling results were slightly higher, but comparable to the applicant's results. The results of these modeling efforts are still valid for this review, as the assumptions for discharge flow (240 MGD), total suspended solids (48 mg/l), and biochemical oxygen demand (121 mg/l) remain conservative model inputs, with respect to the 2022 application. A summary of the applicant's analyses are found in the Large Applicant Questionnaire section of the application. The results of the applicant's and EPA's modeling efforts are summarized, below. EPA's analyses are found in the administrative record for the 1995 TDD.

Both the applicant and EPA use modeling efforts to evaluate the potential for: (1) dissolved oxygen depression following initial dilution during the period of maximum stratification (or other critical period); (2) farfield dissolved oxygen depression associated with biochemical oxygen demand exertion in the wastefield; (3) dissolved oxygen depression associated with steady-state sediment oxygen demand; and (4) dissolved oxygen depression associated with the resuspension of sediments (Table 15). For these calculations, the applicant uses an initial dilution of 202:1 while EPA uses the worst-case initial dilution of 99:1.

Table 15. Predicted worst-case dissolved oxygen (DO) depressions (mg/l) and percent reductions (%) performed by San Diego (1995) and EPA (1995).

Sources of Potential Oxygen Demand	San Diego	EPA
DO depression upon initial dilution (and % reduction)	0.05 mg/l (~ 1%)	0.08 mg/l (1.7%)
DO depression due to BOD exertion in the farfield (and % reduction)	0.14 mg/l (2.4%)	0.23 mg/l (5.9%)
DO depression due to steady-state sediment oxygen demand (and % reduction)	0.045 mg/l (1.5%)	0.16 mg/l (4.7%)
DO depression due to abrupt sediment resuspension (and % reduction)	0.077 mg/l (2.6%)	0.12 mg/l (3.5%)

EPA has compared these model predictions to the most recent water quality data to assess the potential for the discharge to result in dissolved oxygen depressions more than 10 percent from that which occurs naturally. Under its existing NPDES permit, the City conducts the required quarterly monitoring for dissolved oxygen, throughout the water column, at a grid of 33 offshore stations located along the 98, 80 and 60 meter contours. EPA evaluated the applicant’s monitoring results from January 2015 through December 2021. At water depths frequented by the drifting wastefield, the long-term average concentrations for dissolved oxygen are around 4 to 5 mg/l. As shown in Table B-2 and Figure A-6, the long-term average concentration for dissolved oxygen at the near-ZID boundary station (F30) is similar to long-term average concentrations measured at nearfield and farfield stations. Dissolved oxygen depression associated with sediment demand should be compared to bottom waters at around 100 m depth at the ocean monitoring stations nearest the outfall diffuser (F29, F30, and F31) which shows dissolved oxygen concentrations of 3.25 mg/l at a minimum and 4.2 mg/l at an average. This evaluation supports the conclusion that the Point Loma discharge does not result in more than a 10 percent reduction in dissolved oxygen concentrations, in areas within the wastefield where initial dilution is completed, from that which occurs naturally.

Based on the model predictions and receiving water monitoring results, EPA concludes it is unlikely that the dissolved oxygen concentration will be depressed more than 10 percent from that which occurs naturally outside the initial dilution zone, as a result of the wastewater discharge.

C. Attainment of Other Water Quality Standards and Impact of the Discharge on Shellfish, Fish and Wildlife; Public Water Supplies; and Recreation

CWA section 301(h)(2), implemented under 40 CFR 125.62, requires the modified discharge to not interfere, either alone or in combination with other sources, with the attainment or maintenance of that water quality which assures protection of public water supplies; protection and propagation of a balanced indigenous population (BIP) of shellfish, fish, and wildlife; and allows recreational activities in and on the water. In addition, CWA section 301(h)(9), implemented under 40 CFR 125.62(a), requires that the modified discharge meet all applicable EPA-approved State water quality standards and, where no such standards exist, EPA's 304(a)(1) aquatic life criteria for acute and chronic toxicity and human health criteria for carcinogens and noncarcinogens, after initial mixing in the waters surrounding or adjacent to the outfall.

1. Attainment of Other Water Quality Standards and Criteria

40 CFR 125.62(a) requires that the applicant's outfall and diffuser be located and designed to provide adequate initial dilution, dispersion, and transport of wastewater such that the discharge does not exceed, at and beyond the zone of initial dilution, all applicable State water quality standards. Where there are no such standards, individual 304(a)(1) aquatic life criteria and human health criteria must not be exceeded by the discharge. For this review, the applicable water quality standards and criteria are analyzed in four categories: pH, toxics, whole effluent toxicity, and sediment quality.

a. pH

The applicant is not requesting a 301(h) modification for pH, but the modified discharge must still meet the water quality standard for pH. The California Ocean Plan specifies that in ocean water: "The pH shall not be changed at any time more than 0.2 units from that which occurs naturally." Compliance with this water quality objective is determined from samples collected at stations representative of the area within the wastefield where initial dilution is completed. The typical depth range of the PLOO wastefield is 60 to 80 meters below the surface. Also, Table 4 in the California Ocean Plan has the effluent limit for pH: "Within the limit of 6.0 to 9.0 at all times." This requirement for pH is the same as that found in the secondary treatment regulation (40 CFR Part 133).

The City's 1995 application computed projected effects for a 240 MGD discharge on receiving water pH and a maximum change of 0.02 pH units was estimated.

Under its existing NPDES permit, the City conducts the required quarterly monitoring for pH, throughout the water column, at a grid of 33 offshore stations located along the 98, 80 and 60 meter contours. EPA evaluated the applicant's monitoring results from January 2015 through December 2021. At water depths frequented by the drifting wastefield, the long-term average for pH ranges from 7.8 to 7.9 units. As shown in Table B-3 and Figure A-7, the long-term average for pH measured at the near-ZID boundary station (F30) is similar to long-term averages measured at nearfield and farfield stations.

Under its existing NPDES permit, the City conducts the required continuous monitoring for pH in the Point Loma WTP effluent. Table III.B-12 in Volume III of the application summarizes daily pH data for the effluent during 2017 through 2020. During this period, the maximum daily value for pH was 7.48 units and the minimum daily value was 6.87 units. These levels achieve the technology based effluent limits required in both Table 4 of the California Ocean Plan and federal secondary treatment standards.

Based on the model predictions and receiving water monitoring results, it is unlikely that pH will be depressed more than 0.2 units from that which occurs naturally outside the initial dilution zone, as a result of the wastewater discharge. Also, EPA expects that technology based effluent limits for pH will be met by the applicant.

b. Toxics and Whole Effluent Toxicity

Under its existing NPDES permit, the City conducts the required effluent monitoring for the priority toxic and non-conventional pollutants listed in Table 3 of the California Ocean Plan and "remaining priority pollutants". Table 3 parameters for the protection of marine aquatic life are monitored weekly, except for chronic toxicity and radioactivity which are monitored monthly. Table 3 parameters for the protection of human heath (noncarcinogens) are monitored monthly. Table 3 parameters for the protection of human health (carcinogens) are monitored monthly, except for aldrin and dieldrin, chlordane, DDT, PCBs, and toxaphene which are monitored weekly. "Remaining priority pollutants" are monitored monthly.

Toxics

The City submitted Point Loma WTP effluent data for metals, ammonia, and toxic organic chemicals from 2017 through 2023 in electronic format, as part of the application. Table B-5 provides a summary list of the monitored chemical parameters in this submission. EPA screened this data using both the maximum method detection limit (MDL) and maximum effluent value reported by the applicant. Parameters never detected in the effluent were set aside. Table B-6 provides a summary list of parameters detected at least once in the effluent from 2017 through 2023.

Parameters detected in the effluent for the most recent 5 years of effluent data (from October 2017 through April 2023) were screened to determine which exceeded an applicable California Ocean Plan Table 3 water quality objective, or if no such objective exists, any applicable EPA 304(a)(1) water quality criterion. For Table 3 objectives, this screening was conducted using the 1995 and 2002 minimum monthly average initial dilution value of 204:1. No parameters exceeded applicable State water quality standards, or EPA's 304(a)(1) water quality criteria for protection of aquatic life and human health after initial mixing (based on the initial dilution of 204:1). See Table F-15 of the NPDES permit. The applicant achieved 100% compliance with applicable State water quality standards as well as EPA's water quality criteria for toxics. Large Applicant Questionnaire, Volume III.

EPA reviewed the sensitivity of analytical methods used by the applicant to evaluate effluent compliance with California Ocean Plan Table 3 water quality objectives after initial dilution. To do this, EPA reviewed the maximum method detection limits (MDLs) and maximum effluent concentrations for all Table 3 parameters monitored during 2017 through 2023. For Table 3 parameters which are reported as "not detected", EPA calculated estimated effluent wasteload allocations by multiplying Table 3 objectives by the respective initial dilution value. These estimated wasteload allocations are then compared to the applicant's maximum MDLs during 2017 through 2023. Based on these comparisons, EPA has determined that the MDLs for benzidine, hexachlorobenzene, PCBs, TCDD equivalents, and toxaphene are generally not low enough to evaluate effluent quality in relation to the applicable water quality objective after initial dilution (i.e., the MDL is greater than the estimated effluent wasteload allocation). EPA determined that the applicant is using MDLs as sensitive as those prescribed under 40 CFR 136, except for PCBs and TCDD equivalents, where the applicant's MDLs need to be lowered in order to achieve 40 CFR 136 levels.

Whole Effluent Toxicity

In lieu of establishing the Ocean Plan chronic toxicity limit (numerically expressed in units of TUc), the existing permit (Order No. R9-2017-0007) establishes requirements on the basis of the Test of Significant Toxicity (TST) statistical t-test approach (EPA, 2010). Under this protocol, a null hypothesis of "fail" is assigned unless the test result rejects this null hypothesis, in which test results are reported as "pass". The 2017 permit includes a requirement of "pass" for PLOO chronic toxicity tests at the discharge In-stream Waste Concentration (IWC) of 0.49% effluent (i.e., 100% divided by the dilution ratio of 204), and establishes that the "pass" chronic toxicity effluent limitation is protective of both the numeric acute and chronic toxicity objectives in the Ocean Plan. The City provided Point Loma WTP effluent data for chronic toxicity from 2017 through 2023 in electronic format, at EPA's request.

EPA reviewed these chronic toxicity data, along with the summary results for chronic toxicity provided in Volume III, Large Applicant Questionnaire, section III.B.7, of the application to determine if any test results are not compliance with a chronic toxicity permit limit of "pass". In accordance with the monitoring requirements of the existing 2017 permit, the applicant conducted biennial chronic toxicity sensitivity screening in 2018, 2020, and 2022 using three different species *Atherinops affinis* (topsmelt), *Haliotis rufescens* (red abalone), and *Macrocystis pyrifera* (giant kelp) and concluded that *Macrocystis pyrifera* (giant kelp) was determined to be the most sensitive species in both the 2018 and 2020 biennial chronic toxicity tests.

The 2017 permit requires monthly chronic toxicity monitoring using the TST statistical t-test approach for the species determined within the biennial testing to be most sensitive. During the sampling period from 2017 to 2023, 100 percent of the PLOO chronic toxicity tests for *Macrocystis pyrifera* have complied with the "pass" effluent limit established in the permit. Therefore, EPA concludes that the applicant has demonstrated that the modified discharge would meet the applicable water quality standards for toxicity after initial mixing.

Toxics Mass Emission Benchmarks and Antidegradation

In the 1995, 2003, 2009, and 2017 permits, EPA and the Regional Water Board established annual mass-based performance goals (mt/yr) for California Ocean Plan Table 3 parameters based on 95th percentile Point Loma WTP effluent data from 1990 through April 1995. For most Table 3 parameters, the numerical benchmarks are set below the levels prescribed for water quality based effluent limits. The benchmarks are designed to provide an early measure of changes in effluent quality which may substantially increase the mass of toxic pollutants discharged to the marine environment. Consistent with State and federal antidegradation policies, these benchmarks are intended to serve as triggers for antidegradation analyses during renewal of the permit.

Under 40 CFR 131.12, State antidegradation polices and implementation practices must ensure that: (1) existing uses and the level of water quality necessary to protect such uses are maintained and protected (Tier I requirement); and (2) where water quality is better than necessary to support the propagation of fish, shellfish, and wildlife and recreation in and on the water, the level of water quality shall be maintained and protected unless the permitting authority finds that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located; existing uses are fully protected; and the highest statutory and regulatory requirements are achieved for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control (Tier II requirement).

An analysis of compliance with the mass emission benchmarks in the existing permit is presented in Volume II, Part 3, of the application, which compares PLWTP mass emissions during 2017-2020 with EPA mass emission performance goals established within Table 7 of Order No. R9-2017-0007 and identifies constituents which exceed the performance goals. For constituents which exceed the Table 7 performance goals, a Tier I assessment of the level of significance of water quality impacts is performed to determine if a Tier II analysis is required. During 2017 through 2020, PLOO annual mass emissions were substantially below Table 7 mass emission performance goals for all constituents, except for non-chlorinated phenolic compounds and ammonia. See Table 4 of Volume II, Part 3, of the application. Since no increase in mass emissions is requested as part of the 2022 NPDES renewal, a Tier I antidegradation analysis not required for any of the parameters that remain compliance with mass emission performance goal benchmarks established within Table 7 of Order No. R9-2017-0007. Exceedance of the Table 7 performance goal benchmarks by non-chlorinated phenolic compounds and ammonia, however, indicate that mass emission of these two parameters have increased relative to 1990-1995 levels. Assessment is required to demonstrate that this increase in MERs (compared to 1990-1995 conditions) is consistent with State of California antidegradation regulations and federal Tier I antidegradation regulations.

Non-chlorinated Phenolic Compounds: Even though the Point Loma discharge exceeded the Table 7 mass emission performance goal for non-chlorinated phenolic compounds during all years of 2017-2020, historically, only two non-chlorinated phenolic compounds have been consistently present in the PLWTP influent and effluent: phenol and 4-methylphenol. All other non-chlorinated phenolic compounds are almost never present in the influent or effluent, and when detected are at concentrations near the detection limit. The Table 7 mass emission performance goal is based on the effluent data for phenol from 1990-1995, as phenol was the only non-chlorinated phenolic compound commonly detected in the PLWTP effluent for which monitoring was required at that time. During 1990-1995, monitoring for 4-methylphenol was not required and prior NPDES permits and the Ocean Plan did not define how to compute or report chlorinated phenolics. Order No. R9-2017-0007, however, implements a significant change in the computation of mass emission rates for non-chlorinated phenolic compounds which does not allow for a direct one-to-one comparison of MERS for non-chlorinated phenolic compounds between present-day and 1990-1995. Attachment A to Order No. R9-2017-0007 defines non-chlorinated phenolic compounds as including 4-methylphenol. In accordance with requirements of Order No. R9-2017-0007, the City now includes concentrations of 4-methylphenol in determining total non-chlorinated phenolic compounds. This change in computational procedures has resulted in a significant increase in reported PLOO concentrations and mass emission rates for non-chlorinated phenolic compounds. During 2017-2020, for example, concentrations of phenol in the PLWTP effluent averaged 33 μg/L, while concentrations of 4-methylphenol averaged approximately 45 μg/L. Therefore, direct comparison of present-day PLOO MERS for non-chlorinated phenolic compounds with prior reported values may be misleading.

While non-chlorinated phenolic compounds exceeded the mass emission benchmark established within Table 7 of Order No. R9-2017-0007, as shown in Table 6 of Volume II, Part 3, of the application, the Point Loma discharge has consistently complied with the water quality-based performance goals (both concentration- and mass emission goals) established within Table 6 of Order No. R9-2017-0007. Performance goals for non-chlorinated phenolic compounds established in Table 6 of Order No. R9-2017-0007 implement *California Ocean Plan* water quality objectives established for the protection of marine aquatic life (see Table 3 of the Ocean Plan). By achieving compliance with the water quality-based performance goals for non-chlorinated phenolic compounds, the PLOO discharge complies with 100 percent of the allowable *California Ocean Plan* receiving water objectives for non-chlorinated phenolics for the protection of marine aquatic life, which is consistent with "a level of significance test" established in Provision VI.C.2.e of Order No. R9-2009-0001 where water quality impacts are deemed "not significant" if projected receiving water quality beyond the zone of initial dilution is less than 50 percent of the *California Ocean Plan* receiving water standard.

Ammonia-Nitrogen: Average annual mass emissions for ammonia have increased slightly since 2015, which appears to correlate with an increase in the influent concentrations for ammonia due to the implementation of successful water conservation efforts within the Metro System service area. While the Point Loma discharge slightly exceeded the Table 7 mass emission performance goal for ammonia-nitrogen during years 2018, 2019, and 2020, ammonia concentrations in the effluent during 2017-2020 complied with all water quality-based concentration performance goals established within Table 6 of Order No. R9-2017-0007 by a significant margin. See Table 7 of Volume II, Part 3, of the application. Performance goals for ammonia-nitrogen established in Table 6 of Order No. R9-2017-0007 implement *California Ocean Plan* Table 3 water quality objectives established for the protection of marine aquatic life. By achieving compliance with the Table 6 water quality-based performance concentration and mass emission goals for ammonia-nitrogen, the PLOO discharge complies with all applicable Ocean Plan receiving water standards for ammonia-nitrogen for the protection of marine aquatic life.

Based on the analysis above, the existing PLOO discharge complies with Tier 1 antidegradation regulations, and no Tier 2 socioeconomic analysis is required for non-chlorinated phenolic compounds and ammonia. By complying with NPDES permit concentration and mass emission limits and *California Ocean Plan* receiving water standards, the PLOO discharge is consistent with maintaining the existing high quality of water necessary to support beneficial use, and the PLOO discharge will not unreasonably affect present or anticipated beneficial uses. The PLOO discharge is thus in conformance with antidegradation provisions established within State Board Resolution No. 68-16.

Large Applicant's Questionnaire – page III. B-40. "As shown in the Antidegradation Study (see Part 3 Volume II of the application.), the City achieved compliance with all NPDES mass emission benchmarks during 2017-2020 except for non-chlorinated phenolic compounds and ammonia-nitrogen. Analyses presented in Part 3 of Volume II demonstrates that the mass emissions of non-chlorinated phenolics and ammonia from the PLOO are in compliance with Tier I antidegradation regulations and that no Tier II analysis is required."

The existing annual mass emission benchmarks will be retained in the reissued permit as a basis for evaluating future changes in effluent quality and mass loading.

EPA concludes that the modified discharge will attain applicable water quality standards and criteria for toxics and whole effluent toxicity, based on the very low rates of effluent excursions above water quality objectives for toxics and chronic toxicity. Consistent with State policy, appropriate requirements for toxics and whole effluent toxicity will be included in the permit. Water quality based effluent limits will be established for all California Ocean Plan Table 3 parameters where effluent data show the reasonable potential to exceed water quality objectives for toxics and whole effluent toxicity. The effluent will be monitored for all Table 3 parameters and other priority pollutants following the regular schedule set in the existing permit. The results of the effluent monitoring program will be evaluated against the annual mass emission benchmarks to protect the Point Loma WTP headworks and achieve permit compliance with water quality standards.

In accordance with 40 CFR 125.62, EPA concludes that the modified discharge will allow for the attainment or maintenance of water quality which assures protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife.

c. Sediment Quality

Accumulation of solids in and beyond the vicinity of the discharge can have adverse effects on water usage and biological communities. 40 CFR 125.62(a) requires that following initial dilution, the diluted wastewater and particles must be dispersed and transported such that water use areas and areas of biological sensitivity are not adversely affected.

In relation to solids, Chapter II of the California Ocean Plan contains the following water quality objective for physical characteristics of marine sediments: "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." In addition, Chapter II of the California Ocean Plan contains the following water quality objectives for chemical characteristics of marine sediments: "The concentration of organic materials in marine sediments shall not be increased to levels that would degrade marine life."; "Nutrient materials shall not cause objectionable aquatic growths or degrade indigenous biota."; and "The dissolved sulfide concentration of waters in and near sediments shall not be significantly increased above that present under natural conditions."

Applicants must predict seabed accumulation due to the discharge of suspended solids into the receiving water. The approach for large dischargers needs to consider the process of sediment deposition, decay of organic materials, and resuspension and anticipated mass emissions for the permit term.

In 1995, the applicant used a sediment deposition model (SEDPXY) to predict the rates of suspended solids and organic matter deposition and accumulation around the outfall. The model was run under two scenarios, assuming effluent flow rates of 205 (end-of-permit for 1995 application) and 240 MGD (design capacity) and solids mass emission rates of 14,073 and 16,476 MT/yr, respectively. In the 1995 TDD, EPA estimated sediment deposition using the 1994 ATSD sediment deposition model which was run assuming an effluent flow rate of 205 MGD and a solids mass emission rate of 13,600 MT/yr. In the 2002 TDD, EPA adjusted its modeling for the solids mass emission rate of 15,000 MT/yr.

The predictions generated using the ATSD model are likely to be different from the applicant's SEDPXY model due to differences in the use of current meter data, bathymetry, trapping depth distributions, the size and resolution of the modeling grid, and the use of different assumptions regarding the rate which effluent particles settle (e.g., the settling velocities used by EPA were about two times higher than those used by the applicant). As a result of these differences, the ATSD model predicts a greater number of particles settling over a smaller area and is the more conservative result. These data are summarized in Table 16.

Table 16. Results of sediment deposition modeling performed by San Diego (1995) and EPA (1995 and 2002).

Parameter	San Diego	EPA
Effluent flow rate (MGD)	205 – 240	205 – 240
Mass of particles (MT/yr)	14,073 – 16,476	13,600 – 15,000
Mass of particles (lbs/day)	85,000 – 99,512	n/a
Area modeled (km^2)	360	200
Percent of particles settling in area modeled (%)	8.3 – 8.1	12
Area modeled around the diffuser (km^2)	0.01	0.25
Annual solids deposition rate ($g/m^2/yr$)	152 – 174	254 – 280
Critical 90-day solids deposition rate (g/m^2/90-day)	45 – 51	72 – 79
Annual organic deposition rate ($g/m^2/yr$)	122 – 139	203 – 224
Critical 90-day organic deposition rate (g/m^2/90-day)	37 – 57	58 – 64
Steady-state organic accumulation (g/m^2)	**33 – 38**	**56 – 62**

Modeled estimates for annual solids deposition rate ranged from 152 to 280 $g/m^2/yr$ and the critical 90-day solids deposition rate ranged from 45 to 79 $g/m^2/yr$.

Although a portion of the settled solids is inert, the organic fraction of the settled solids is a primary concern around outfalls. Assuming that effluent solids are 80% organic matter (USEPA, 1994), modeled estimates for annual organic deposition rate ranged from 122 to 224 $g/m^2/yr$ and the critical 90-day solids deposition rate ranged from 37 to 64 $g/m^2/yr$. Although not strictly comparable, a reasonable estimate of organic carbon flux from the water column associated with primary and secondary production in Southern California is 26 to 62 g $C/m^2/yr$ (Nelson et al., 1987).

Estimates of steady-state organic accumulation ranged from 33 to 62 g/m^2, over the area modeled. The steady-state accumulation of organic matter in sediments is a function of the rate that organic matter is deposited and the rate at which it decays. Both the applicant and EPA used several conservative assumptions, including (1) significantly higher solids concentrations than actually occur, (2) higher concentrations of settleable particles than actually occur, (3) faster particle settling velocities than those that actually occur, (4) solid loss through organic decay/uptake was neglected, (5) resuspension effects were neglected, and (6) higher TSS mass emission rates than those proposed in the 2022 301(h) application (i.e., the 2020 TSS mass emission rate of less than 7,000 Mt/yr). These compounding conservative assumptions combine to cause significant 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. Hendricks and Eganhouse (1992) estimated a background accumulation rate for solids of 103 g/m2/yr, about one-sixth of their estimate for solids deposition. Applying this ratio to the model results in Table 16 for annual organic deposition rate ($g/m^2/yr$), yields estimates for organic accumulation rate ranging from 20 to 37 $g/m^2/yr$ and steady-state organic accumulation rate ranging from 5 to 10 g/m^2. Empirical evidence suggests that steady-state organic accumulations less than 50 g/m^2 have minimal effects on benthic communities (USEPA, 1982).

To both evaluate whether significant accumulation is actually occurring in the area of the outfall and identify trends, EPA examined sediment monitoring data for pre-discharge (1991-1993) and post-discharge monitoring surveys (1994-2020) conducted at the depth of the outfall along the 98 meter contour (Figure A-4). (Under its existing NPDES permit, the City conducts the required semi-annual monitoring, during January and July, at 12 primary core benthic monitoring stations located along the 98-meter depth contour and a total of 10 secondary benthic monitoring stations located along the 88 and 116 meter depth contours.) For perspective, values from the 98 meter stations are compared with San Diego regional surveys and the Southern California Bight regional surveys conducted from 1994 to 2018 (Volume V, Appendix C1, of the March 2022 application) .

Sediment Grain Size Characteristics

Information about sediment grain size characteristics (e.g., particle size, percent fines) and the dispersion of sediment particles at a survey site is indicative of hydrodynamic regimes and allows for better interpretation of chemical and biological data collected at the site. The percentage of fine particles (silt and clay) for all 98 meter stations during the pre-discharge and discharge periods averaged 40 percent and 41 percent, respectively. Sediments at near-ZID station E14 have become slightly coarser since discharge began, averaging about 39% fines overall in 1991−1993 and only 32% fines since that time. The applicant reports that the slight increase in mean particle size observed at near-ZID station E14 is likely related to the movement of ballast material used to support the outfall pipe and the presence of patchy sediments in the area. The applicant also notes that sediments at northern reference station B12 are frequently characterized by the presence of very course material (shell hash and gravel) which distinguishes this station from other 98 meter stations. Consequently, this review uses northern reference station B9 as the primary reference station for making comparisons.

The mean particle size at station B9 during the pre-discharge and post-discharge periods is 0.054 mm and 0.060 mm, respectively. During these two periods, percent fine particles at station B9 are about 42 percent and 47 percent, respectively. For mid-shelf sediments (30-120 meters) summarized for the Southern California Bight regional survey in 2018, the area-weighted mean for fine sediments is 35 percent. Figure C.1-2 in Volume V, Appendix C, of the application summarizes percent fines in sediments for the San Diego Coastal region during the period of the discharge (1995-2020).

Overall, there appears to be little change over time in sediment grain size characteristics relative to the outfall. The year-to-year variation in sediment grain size characteristics observed at station E14 are likely due to the movement of outfall ballast material.

Organic Loading Indicators

Concentrations of total organic carbon, total volatile solids, total nitrogen, biochemical oxygen demand, and sulfides are measured as indicators of organic enrichment in benthic sediments. Total organic carbon and total volatile solids represent more direct measurements of carbon imported as fine particulate matter.

Total Organic Carbon: Total organic carbon is a direct measure of the amount of organic carbon in sediments. Figure A-9 summarizes percent total organic carbon in sediment (% wt.) at each 98 meter station, during July, from 1991 through 2021. There does not appear to be a spatial trend in percent total organic carbon at these stations; however, total organic carbon concentrations at northern station B12 have been highly variable, comparisons to summer survey data from the other outfall depth sites revealed no discharge related spatial or temporal patterns. For January and July surveys, the mean percent total organic carbon for all 98 meter stations during the pre-discharge period (1991-1993), the most recent discharge period (2014-2020), and the all post-discharge period is about 0.53 percent, 0.57 percent, and 0.66 percent, respectively. During the pre- and post-discharge periods, the mean percent total organic carbon at near-ZID station E14 is 0.47 percent and 0.44 percent, respectively, while levels at northern reference station B9 are 0.58 percent and 0.69 percent, respectively. For mid-shelf sediments summarized for the 2008 Southern California Bight regional survey, the area-weighted mean and 95% confidence interval for total organic carbon is 0.75±0.19 percent. These data do not suggest an outfall related effect. Table C1-4 and Figure C1-4 in Volume V, Appendix C1, of the application summarize percent total organic carbon in sediments for the San Diego Coastal region during the period of the discharge (1991-2020).

Total Volatile Solids: Total volatile solids is a measure of organic carbon and nitrogenous matter in sediments. Figure A-10 summarizes percent total volatile solids in sediment (% wt.) at each 98 meter station, during July, from 1991 through 2021. For January and July surveys, the mean percent total volatile solids for all 98 meter stations during the pre-discharge (1991-1993), the most recent discharge period (2014-2020), and the all post-discharge period is about 2.15 percent, 2.03 percent, and 2.31 percent, respectively. These levels are typical of background conditions that occur in sediments up to 200 m depth in the SCB (Bascom et al. 1979), which indicate that wastewater discharge via the outfall has not had any impact in terms of total volatile solids. During the pre- and post-discharge periods, the mean percent total volatile solids at near-ZID station E14 is about 2.07 percent and 1.79 percent, respectively, while levels at northern reference station B9 are about 2.37 percent and 2.92 percent, respectively. Average total volatile solids concentrations have decreased slightly nearest the outfall since discharge began, with values at near-ZID station E14 remaining lower to sites located farther away since that time. These data suggest that there is no discharge related effect. Table C1-4 and Figure C1-5 in Volume V, Appendix C, of the application summarize percent total volatile solids in sediments for the San Diego Coastal region during the period of the discharge (1991-2020).

Biochemical Oxygen Demand: Biochemical oxygen demand is an indirect measure of organic enrichment in sediments. Figure A-11 summarizes biochemical oxygen demand concentrations in sediment (mg/kg or ppm) at each 98 meter station, during July from 1991 through 2021. At these stations, discharge period levels are slightly higher than pre-discharge levels and year-to-year concentrations measured at each station are quite variable. For January and July surveys, the mean biochemical oxygen demand concentrations for all 98 meter stations during the pre-discharge (1991-1993), the most recent discharge period (2014-2020), and the all post-discharge period are 270 parts per million (ppm), 287 ppm, and 304 ppm, respectively. During the pre- and post-discharge periods, the mean biochemical oxygen demand concentrations at near-ZID station E14 are 254 ppm and 405 ppm, respectively, while concentrations at northern reference station B9 are 301 ppm and 309 ppm, respectively. These data suggest that a small amount of organic enrichment is occurring close to the outfall diffuser. However, these values were well within the range of typical background concentrations of 250−1,000 ppm that have been reported for SCB sediments (e.g., Bascom 1979), and were similar to mean values of 319 ppm that was reported for regional stations sampled at mid-shelf depths off San Diego. Tables C1-2 and C1-4 and Figure C1-7 in Volume V, Appendix C, of the application summarize BOD concentrations in sediments for the San Diego Coastal region during the period of the discharge (1991-2020).

Sulfides: Sulfides are a byproduct of anaerobic digestion of organic material by sulfur bacteria and measured in sediments as an indicator of hypoxic/anoxic conditions created by the decomposition of organic matter that are averse to benthic organism. Figure A-12 summarizes total sulfide concentrations in sediment (mg/kg or ppm) at each 98 meter station, during July, from 1991 through 2021. At these stations, discharge period levels are generally higher than pre-discharge levels and year-to-year concentrations measured at stations close to the outfall (i.e., E17, E14, and E11) are distinctly higher and quite variable. (Note that station E14 is located about 103 meters west of the outfall wye at the edge of the ZID, and stations E17 and E11 are located about 150 to 200 meters from the edge of the southern and northern ZID boundaries, respectively.) For January and July surveys, the mean sulfide concentrations for all 98 meter stations during the pre-discharge (1991-1993), the most recent discharge period (2014-2020), and the all post-discharge period are 1.6 ppm, 8.2 ppm, and 6.2 ppm, respectively. During the pre- and post-discharge periods, the mean sulfide concentrations at near-ZID station E14 are 2.1 ppm and 23.5 ppm, respectively, while concentrations at northern reference station B9 are 0.9 ppm and 3.1 ppm, respectively. These data suggest that a distinct outfall related pattern near the PLOO and small amount of organic enrichment is occurring close to the outfall diffuser. However, there is no evidence that the relatively small increase in sulfide concentrations near the PLOO discharge site is affecting sediment quality to the point that it will degrade the resident marine biota. Table C1-4 and Figure C1-8 in Volume V, Appendix C, of the application summarize sulfide concentrations in sediments for the San Diego Coastal region during the period of the discharge (1991-2020).

Total Nitrogen: Figure A-13 summarizes percent total nitrogen in sediment (% wt.) at each 98 meter station, during July, from 1991 through 2021. For January and July surveys, the mean percent total nitrogen for all 98 meter stations during the pre-discharge (1993), the most recent discharge period (2014-2020), and the all post-discharge period is about 0.04 percent, 0.05 percent, and 0.05 percent, respectively. During the pre- and post-discharge periods, the mean percent total nitrogen at near-ZID station E14 is about 0.03 percent and 0.04 percent, respectively, while during these two periods, levels at northern reference station B9 are about 0.05 percent and 0.06 percent, respectively. Comparison of data for the winter and/or summer surveys indicated no pattern consistent with an outfall eff ect. Table C1-4 and Figure C1-6 in Volume V, Appendix C, of the application summarize percent total nitrogen in sediments for the San Diego Coastal region during the period of the discharge (1991-2020).

Modeling predictions indicate that deposition and accumulation rates associated with the Point Loma Ocean Outfall are not likely to have negative effects on benthic communities beyond the zone of initial dilution. Monitoring results for sediment parameters associated with organic enrichment suggest a mixed picture relative to the potential for biological effects close to the outfall diffuser. Only biochemical oxygen demand and sulfides are elevated at near-ZID station E14; sulfides are variably elevated at nearfield stations E17 and E11. However, as described below, monitoring results for biological indicators of organic enrichment lead EPA to conclude that significant effects on the benthic macrofauna community are not occurring in areas beyond the zone of initial dilution. EPA also concludes that the modified discharge complies with applicable California Ocean Plan water quality objectives for chemical characteristics of marine sediments.

Trace Metals and Toxic Organics

Chapter II of the California Ocean Plan contains the following water quality objective for chemical characteristics in marine sediments: “The concentration of substances set forth in Chapter II, Table B, in marine sediments shall not be increased to levels which would degrade indigenous biota.”

To both evaluate whether trace metals and toxic organic compounds are found at elevated concentrations in the area of the outfall and identify trends, EPA examined sediment monitoring data for pre-discharge (1991-1993) and discharge monitoring surveys (1994-2021) conducted during July, at the depth of the outfall along the 98 meter contour (see Figure A-4). Ten metals, total DDTs, total PCBs, and total PAHs were reviewed. For perspective, parameter concentrations from the 98 meter stations are compared with non-regulatory NOAA sediment quality guidelines developed for the National Status and Trends Program (NOAA, 1999) and the Southern California Bight regional survey in 2018 (see Table 17). The sediment quality guideline concentrations provided by NOAA represent the 10th percentile (or ERL, Effects Range-Low) and 50th percentile (or ERM, Effects Range-Median) of a toxicological effects database that has been compiled by NOAA for each parameter. The ERL is indicative of the concentrations below which adverse effects rarely occur and the ERM is representative of the concentrations above which effects frequently occur. The method detection limits (MDLs) for parameters monitored in sediments at the 98 meter stations are presented in the City's 2020-21 biennial receiving water monitoring reports for the Point Loma Ocean Outfall.

Table 17. NOAA sediment quality guidelines, area-weighted means and 95% confidence intervals for mid-shelf (30-120 meters) sediments summarized for the Southern California Bight regional survey in 2018, and the applicant's method detection limits during 2020.

Parameter	NOAA ERL	NOAA ERM	Bight'18	MDL range in 2020
Arsenic (ppm)	8.2	70.7	4.4	0.152
Cadmium (ppm)	1.2	9.6	0.6	0.018-0.073
Chromium (ppm)	81	370	28	0.049-0.102
Copper (ppm)	34	270	7	1.19
Lead (ppm)	46.7	218	6	0.1
Mercury (ppm)	0.15	0.71	0.05	0.003-0.0145
Nickel (ppm)	20.9	51.6	12	0.1-0.28
Selenium (ppm)	---	---	0.8	0.213-0.434
Silver (ppm)	1.0	3.7	0.1	0.133
Zinc (ppm)	150	410	45	0.384
Total DDTs (ppt)	1,580	46,100	13,000	See Volume IX, Appendix M, of the application.
Total PCBs (ppt)	22,700	180,000	4,300	
Total PAHs (ppb)	4,022	44,792	67.0	

Trace Metals

Table II.A-13 in Volume III of the application includes summary data for trace metals monitored in the Point Loma WTP effluent during calendar year 2020, which the applicant selected as the representative year for data record between 2014 and 2020. Known or suspected industrial and nonindustrial sources for pollutants of concern found in the Point Loma WTP effluent are summarized in Table III.H-8 and H-9, Volume III of the application. Table 4 in Volume II of the application estimates 2017 through 2020 mean annual mass emissions (in metric tons per year) for California Ocean Plan Table 3 parameters discharged from the Point Loma Ocean Outfall; for this calculation, the applicant multiplies the annual average effluent concentration by the annual average discharge flow.

Arsenic. The applicant reports that arsenic is detected in 26 of 53 effluent samples during the representative year 2020 (Table II.A-12, Volume III of the application). Identified sources are pest control poisons. The 2020 mean annual mass emission rate for the Point Loma WTP discharge is 0.15 metric tons per year; the annual mass emissions for arsenic have remained relatively constant. Figure A-14 summarizes arsenic concentrations in sediment at each 98 meter station, during July, from 1991 through 2021 and arsenic levels in sediment are also presented in Figure C1-10 in Volume V, Appendix C, of the application. At these stations, discharge period levels are slightly higher than pre-discharge levels; these increases are most pronounced at near-ZID station E14 and northern reference station B9. For January and July surveys, the mean arsenic sediment concentrations for all 98 meter stations during the pre-discharge (1991-1993), the most recent discharge period (2014-2020), and the all post-discharge period are 2.4 ppm, 2.6 ppm, and 3.1 ppm, respectively. During the pre- and post-discharge periods, the mean arsenic concentrations at near-ZID station E14 are 2.2 ppm and 3.1 ppm, respectively, while concentrations at northern reference station B9 are 2.1 ppm and 3.3 ppm, respectively. These concentrations are below the ERL threshold and similar to the average background level for mid-depth sediments summarized for the 2018 Southern California Bight survey.

Cadmium. The applicant reports that cadmium is detected in 27 of 53 effluent samples during the representative year 2020. Identified sources are metal plating, metalworking and metal alloys, electronics, and batteries. The 2020 mean annual mass emission rate for the Point Loma WTP discharge is 0.020 metric tons per year; the annual mass emissions for cadmium have generally decreased. Cadmium concentrations in sediment at each 98 meter station, during July, from 1991 through 2013 are provided in Figure C1-12 in Volume V, Appendix C of the application. At these stations, discharge period levels are much lower than pre-discharge levels; the elevated and variable levels recorded during the pre-discharge period are no longer observed and the applicant explains that the frequent detections which begin during the most recent discharge period are due to an improved method detection limit. For January and July surveys, the mean cadmium concentrations for all 98 meter stations during the pre-discharge (1991-1993), the most recent discharge period (2014-2020), and the all post-discharge period are 2.6 ppm, 0.1 ppm, and 0.3 ppm, respectively. During the pre- and post-discharge periods, the mean cadmium concentrations at near-ZID station E14 are 1.9 ppm and 0.3 ppm, respectively, while concentrations at northern reference station B9 are 3.3 ppm and 0.4 ppm, respectively. Concentrations for the most recent discharge period are well below both the ERL threshold and the average background level for mid-depth sediments summarized for the 2018 Southern California Bight survey.

Chromium. The applicant reports that chromium is detected in 26 of 53 effluent samples during the representative year 2020. Identified sources are metal plating, shipbuilding, and metalworking and metal alloys. The 2020 mean annual mass emission rate for chromium (VI) in the Point Loma WPT discharge is < 0.15 metric tons per year; the annual mass emissions for chromium have decreased. Chromium concentrations in sediment at each 98 meter station, during July, from 1991 through 2020 are provided in Figure C1-13 in Volume V, Appendix C of the application. At these stations, discharge period levels are similar to pre-discharge levels. For

January and July surveys, the mean chromium concentrations for all 98 meter stations during the pre-discharge (1991-1993), the most recent discharge period (2014-2020), and the all post-discharge period are 17.3 ppm, 16.3 ppm, and 16.9 ppm, respectively. During the pre- and post-discharge periods, the mean chromium concentrations at near-ZID station E14 are 15.8 ppm and 14.0 ppm, respectively, while concentrations at northern reference station B9 are 21.8 ppm and 22.1 ppm, respectively. These concentrations are far below both the ERL threshold and the average background level for mid-depth sediments summarized for the 2018 Southern California Bight survey.

Copper. The applicant reports that copper is 100% detected in 53 of 53 effluent samples during the representative year 2020. Identified sources are metal plating, electronics, tool manufacturing, electroplating, semiconductor manufacturing, shipbuilding, metalworking, and water pipe corrosion. The 2020 mean annual mass emission rate for copper in the Point Loma WPT discharge is 2.53 metric tons per year; the annual mass emissions for copper have generally decreased. Figure A-15 summarizes copper concentrations in sediment at each 98 meter station, during July, from 1991 through 2021 and copper levels in sediment are also presented in Figure C1-14 in Volume V, Appendix C, of the application. At these stations, discharge period levels are lower or similar to pre-discharge levels; levels at southern reference station E2 (near the LA-5 dredge materials disposal site) are generally elevated when compared to other 98 meter stations. For January and July surveys, the mean copper concentrations for all 98 meter stations during the pre-discharge (1991-1993), the most recent discharge period (2014-2020), and the all post-discharge period are 7.4 ppm, 4.9 ppm, and 7.2 ppm, respectively. During the pre- and post-discharge periods, the mean copper concentrations at near-ZID station E14 are 6.7 ppm and 6.6 ppm, respectively; while concentrations at northern reference station B9 are 6.8 ppm and 8.4 ppm, respectively. These concentrations are below the ERL threshold and similar to the average background level for mid-depth sediments summarized for the 2018 Southern California Bight survey. Concentrations at southern farfield station E2 are below the ERL threshold, but slightly higher than the average background level for the Southern California Bight survey.

Lead. The applicant reports that lead is detected in 29 of 53 effluent samples during the representative year 2020. Identified sources are metal plating, metalworking, paints, and batteries. The 2020 mean annual mass emission rate for lead in the Point Loma WPT discharge is 0.139 metric tons per year; the annual mass emissions for lead have generally decreased. Lead concentrations in sediment at each 98 meter station, during July, from 1991 through 2020 are provided in Figure C1-16 in Volume V, Appendix C, of the application. At these stations, the discharge period levels appear lower than pre-discharge levels. For January and July surveys, the mean lead concentrations for all 98 meter stations during the pre-discharge (1991-1993), the most recent discharge period (2014-2020), and the all post-discharge period are 6.9 ppm, 3.3 ppm, and 4.7 ppm, respectively. During the pre- and post-discharge periods, the mean lead concentrations at near-ZID station E14 are 5.1 ppm and 3.5 ppm, respectively, while concentrations at northern reference station B9 are 5.8 ppm and 5.6 ppm, respectively. These concentrations are below the ERL threshold and similar to the average background level for mid-depth sediments summarized for the 2018 Southern California Bight survey. There were no clear patterns relative to the outfall. Instead, lead levels within the PLOO monitoring region have generally been highest at southern station E2 located near the LA-5 dredge materials disposal site.

Mercury. The applicant reports that mercury is detected in 53 of 53 effluent samples during the representative year 2020. Identified sources are orthodontics, thermostats, and thermometers. The 2020 mean annual mass emission rate for mercury in the Point Loma WPT discharge is 0.0015 metric tons per year; the annual mass emissions for mercury have continually decreased. Figure A-16 summarizes mercury concentrations in sediment at each 98 meter station, during July, from 1991 through 2021, and mercury levels in sediment are also presented in Figure C1-18 in Volume V, Appendix C, of the application. At these stations, discharge period levels are similar to pre-discharge levels and quite variable from year-to-year; levels at southern reference station E2 (near the LA-5 dredge materials disposal site) are generally elevated when compared to other 98 meter stations. For January and July surveys, the mean mercury concentrations for all 98 meter stations during the pre-discharge (1991-1993), the most recent discharge period (2014-2020), and the all post-discharge period are 0.034 ppm, 0.020 ppm, and 0.027 ppm, respectively. During the pre- and post-discharge periods, the mean mercury concentrations at near-ZID station E14 are 0.015 ppm and 0.020 ppm, respectively, while concentrations at northern reference station B9 are 0.011 ppm and 0.028 ppm, respectively. These concentrations are below both the ERL threshold and the average background level for mid-depth sediments summarized for the 2018 Southern California Bight survey. Concentrations at southern farfield station E2 are below the ERL threshold and similar to the average background level for the Southern California Bight survey.

Nickel. The applicant reports that nickel is detected in 53 of 53 effluent samples during the representative year 2020. Identified sources are metal plating, metalworking, and metal alloys. The 2020 mean annual mass emission rate for nickel in the Point Loma WPT discharge is 0.879 metric tons per year; the annual mass emissions for nickel have remained relatively constant. Nickel concentrations in sediment at each 98 meter station, during July, from 1991 through 2020 are provided in Figure C1-19 in Volume V, Appendix C, of the application. At these stations, discharge period levels are similar to pre-discharge levels. For January and July surveys, the mean nickel concentrations for all 98 meter stations during the pre-discharge (1991-1993), the most recent discharge period (2014-2020), and the all post-discharge period are 6.9 ppm, 6.0 ppm, and 7.1 ppm, respectively. During the pre- and post-discharge periods, the mean nickel concentrations at near-ZID station E14 are 7.2 ppm and 7.1 ppm, respectively, while concentrations at northern reference station B9 are 7.3 ppm and 8.0 ppm, respectively. These concentrations are below both the ERL threshold and the average background level for mid-depth sediments summarized for the 2018 Southern California Bight survey.

Selenium. The applicant reports that selenium is detected in 25 of 53 effluent samples during the representative year 2020. Identified sources are water supply. The 2020 mean annual mass emission rate for selenium in the Point Loma WPT discharge is 0.13 metric tons per year; the annual mass emissions for selenium have continually decreased. Selenium concentrations in sediment at each 98-meter station, during July, from 1991 through 2020 are provided in Figure C1-20 in Volume V, Appendix C, of the application. At these stations, discharge period levels are similar to pre-discharge levels. For January and July surveys, the mean selenium concentrations for all 98 meter stations during the pre-discharge (1991-1993), the most recent discharge period (2014-2020), and the all post-discharge period are 0.3 ppm, 0.3 ppm, and 0.3 ppm, respectively. During the pre- and post-discharge periods, the mean selenium concentrations at near-ZID station E14 are 0.4 ppm and 0.3 ppm, respectively, while concentrations at northern reference station B9 are 0.4 ppm and 0.3 ppm, respectively. These concentrations are well below the average background level for mid-depth sediments summarized for the 2018 Southern California Bight survey. There is no ERL threshold for selenium.

Silver. The applicant reports that silver is detected in 26 of 53 effluent samples during the representative year 2020. Silver has historically been present in wastewater as a result of its use in photography and dentistry. The 2020 mean annual mass emission rate for silver in the Point Loma WPT discharge is 0.01 metric tons per year; the annual mass emissions for silver have remained relatively constant. Silver concentrations in sediment at each 98 meter station, during July, from 1991 through 2020 are provided in Figure C1-21 in Volume V, Appendix C, of the application. At these stations, silver has rarely been detected. For January and July surveys, the mean silver concentration for all 98 meter stations during the pre-discharge (1991-1993), the most recent discharge period (2014-2020), and the all post-discharge period are 3.5 ppm, 35.3 ppm, and 1.8 ppm, respectively. During the most recent discharge period, silver was not detected at both near-ZID station E14 and northern reference station B9, and all silver concentrations except in 2018 are generally below both the ERL threshold and the average background level for mid-depth sediments summarized for the 2018 Southern California Bight survey.

Zinc. The applicant reports that zinc is detected in 53 of 53 effluent samples during the representative year 2020. Identified sources are metalworking, electronics, tool manufacturing, electroplating, circuit printing, shipbuilding, metalworking, research institutions, and water pipe corrosion. The 2020 mean annual mass emission rate for zinc in the Point Loma WPT discharge is 5.2 metric tons per year; the annual mass emissions for zinc have remained relatively constant. Figure A-17 summarizes zinc concentrations in sediment at each 98 meter station, during July, from 1991 through 2021, and zinc levels in sediment are also presented in Figure C1-22 in Volume V, Appendix C, of the application. At these stations, discharge period levels are similar to pre-discharge levels. For January and July surveys, the mean zinc concentrations for all 98 meter stations during the pre-discharge (1991-1993), the most recent discharge period (2014-2020), and the all post-discharge period are 28.0 ppm, 25.9 ppm, and 28.2 ppm, respectively. During the pre- and post-discharge periods, the mean zinc concentrations at near-ZID station E14 are 25.2 ppm and 23.4 ppm, while concentrations at northern reference station B9 are 31.6 ppm and 37.3 ppm, respectively. These concentrations are below both the ERL threshold and the average background level for mid-depth sediments summarized for the 2018 Southern California Bight survey.

Toxic Organics

Total DDTs. DDT and its derivatives are pesticides that were banned for most uses in the U.S. in 1972, but still allowed as partial active ingredient in some actively used pesticides. The applicant reports that DDT and its derivatives were generally not detected in effluent samples from 2017 through 2020. (Note that in 2020, the highest reported method detection limit for DDT and its derivatives in effluent is 8.52 ng/l.)

Figure A-18 summarizes concentrations in sediment for total DDTs at each 98 meter station, during July, from 1991 through 2021, and total DDT levels in sediment are also presented in

Figure C1-23 in Volume V, Appendix C, of the application; sediment concentrations of total DDT have remained low, with mean detected values of 2,022 and 1,208 parts per trillion (ppt) during the pre- and post-discharge periods, respectively. Exceptionally high DDT values (17,830–44,830 ppt) were reported on three occasions at outfall depths off Point Loma, including at northern reference station B9 in winter 1999 and summer 2014, and at southern farfield station E2 in summer 1995 (Figure A-18). During the most recent discharge period (2014-2020), the mean concentrations for total DDTs at all 98 meter stations, at near-ZID station E14, and at northern reference station B9 are 564 ppt, 243 ppt, and 1,939 ppt. (In 2020, the method detection limits for DDT and its derivatives in sediment ranged from 400 to 700 ppt.) During this period, individual station concentrations are well below both the ERL threshold and the average background level for mid-depth sediments summarized for the 2018 Southern California Bight survey.

Total PCBs. PCBs are synthetic organic chemicals used as coolants and lubricants in transformers and capacitors; they were banned from industrial use in the U.S. in 1977 but are still allowed as partial ingredient for some current use compounds. PCBs were not historically detected in PLWTP effluent and remained undetected from 2014 through 2020. (In 2020, the highest reported method detection limit for PCBs in effluent was 0.763 µg/l.)

Total PCBs concentrations in sediment at each 98 meter station, during July, from 1998 through 2020 are provided in Figure C1-24 in Volume V, Appendix C; No PCB Aroclors were detected in sediments at PLOO primary core stations from 1991 through 1998. Detection rates of PCB increased over each post-discharge period (1% to 49%) likely due to improved instrumentation. Overall, PCBs concentrations are only rarely detected at these stations. For January and July surveys, the mean concentration for total PCBs at all 98 meter stations during the most recent discharge period (2014-2020) is 836 ppt. (In 2020, the method detection limit for all but three of the 41 monitored PCB congeners is 700 ppt.) During this period, the mean concentration at near-ZID station E14 is 92 ppt and northern reference station B9 is 250 ppt. During the most recent discharge period, all individual station concentrations are well below both the ERL threshold and the average background level for mid-depth sediments summarized for the 2018 Southern California Bight survey.

Total PAHs. PAHs are a group of 100 different chemicals formed during the incomplete burning of coal, oil and gas, garbage, or other organic substance. They are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides. The applicant reports that PAHs are generally not detected in effluent samples. (In 2020, the highest reported method detection limit for PAHs in effluent was 0.728 µg/l).

Figure A-19 summarizes concentrations in sediment for total PAHs at each 98 meter station, during July, from 1991 through 2021, and total PAH levels in sediment are also presented in Figure C1-26 in Volume V, Appendix C, of the application. At these stations, pre-discharge period levels are almost always “not detected”, until 1993 when method detection limits are improved; subsequently, PAHs are usually detected at each station. (In 2020, the method detection limit for PAHs is 700 ppt.) Historically, PAHs have been detected most frequently in sediments from station E2; these have largely been attributed to short dumps intended for the LA-5 dredged materials disposal site. However, an exceptionally high total PAH value of 3,024 ppb was reported from farfield station E23 during summer 2004. Overall, there were no patterns in PAH distributions surrounding the PLOO that could be attributed to wastewater discharge. For January and July surveys, the mean concentration for total PAHs at all 98 meter stations during the most recent discharge period (2014-2020) is 33 parts per billion (ppb). During this period, the mean concentration is 8 ppb at near-ZID station E14 and 11 ppb at northern reference station B9. During the most recent discharge period, all individual station concentrations are below both the ERL threshold and the average background level for mid-depth sediments summarized for the 2018 Southern California Bight survey.

Based on this review, EPA concludes that the chemical characteristics in sediments beyond the zone of initial dilution are not changed by the modified discharge such that toxic substances in Table 3 of the California Ocean Plan are increased to levels which would degrade indigenous biota.

2. Impact of the Discharge on Public Water Supplies

Implementing CWA section 301(h)(2), 40 CFR 125.62(b) specifies that the discharge must allow for the attainment and maintenance of water quality that assures protection of public water supplies. Appendix III, Large Applicant Questionnaire section III.C, of the application describes an existing seawater desalination facility in San Diego County. The Claude “Bud” Lewis Carlsbad Desalination Plant (CDP) is a 50 MGD facility located about 30 miles north of the PLOO discharge (Regional Water Board Order No. R9-2019-0003, as amended by Order No. R9-2020-0004, NPDES No. CA0109233). Based on the expected ability of the Point Loma WTP discharge to meet water quality standards, oceanographic studies using computer modeling submitted as part of the CDP’s permit application, and the distance to the nearest desalination facility, EPA concludes that the applicant’s proposed modified discharge will have no effect on the protection of public water supplies and will not interfere with the use of planned or existing public water supplies.

An additional seawater desalination facility is proposed in South Orange County, approximately 60 miles north of the PLOO discharge. The proposed South Coast Water District Doheny Ocean Desalination Project would produce up to 5 MGD of potable supply and would feature subsurface slant wells beneath the ocean floor for its source supply. As with the CDP in Carlsbad, the PLOO discharge (or other regional municipal ocean outfall discharges north of the PLOO) will not have any discernible effect on the Doheny Desalination Project (SOCWA, 2020).

3. Impact of the Discharge on Shellfish, Fish, and Wildlife

Implementing CWA section 301(h)(2), 40 CFR 125.62(c)(1) through (3) specify that the modified discharge must allow for the attainment or maintenance of water quality which assures protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife. A balanced indigenous population must exist immediately beyond the zone of initial dilution of the applicant’s modified discharge; and in all other areas beyond the zone of initial dilution where marine life is actually or potentially affected by the discharge. Conditions within the zone of initial dilution must not contribute to extreme adverse biological impacts, including, but not limited to, the destruction of distinctive habitats of limited distribution, the presence of disease epicenters, or the stimulation of phytoplankton blooms which have adverse effects beyond the zone of initial dilution. The term “balanced indigenous population” is defined at 40 CFR 125.58 and means an ecological community which exhibits characteristics similar to those of nearby, healthy communities existing under comparable but unpolluted environmental conditions; or may reasonably be expected to become re-established in the polluted water body segment from adjacent waters if sources of pollution were removed. Also, Chapter II of the California Ocean Plan contains the following water quality objective for biological characteristics of ocean waters: “Marine communities, including vertebrate, invertebrate, and plant species, shall not be degraded.” For this review, biological data collected by the applicant are analyzed in three categories: phytoplankton, benthic infauna, and fish and epibenthic invertebrates.

a. Phytoplankton

Wastewater discharges from ocean outfalls may influence the abundance and distribution of plankton in two important ways. Effluent particulates may rise into the euphotic zone and inhibit light penetration, thereby reducing phytoplankton primary productivity. Also, nutrient loading can cause an increase in the abundance of undesirable species. The California Ocean Plan specifies that in ocean water: “Natural light shall not be significantly reduced at any point outside the initial dilution zone as the result of the discharge of waste.” and “Nutrient materials shall not cause objectionable aquatic growths or degrade indigenous biota.” There are no numerical water quality objectives for nutrients in the California Ocean Plan. Compliance with these water quality objectives is determined from samples collected at stations representative of the area within the wastefield where initial dilution is completed.

In order to implement the biological opinion issued by the NOAA National Marine Fisheries Service in 2022, the existing NPDES permit was modified in August 2022 to require nutrients monitoring in the influent and effluent. In addition, the City is required to conduct a euphotic zone study and a phytoplankton stimulation study to determine the depth of the euphotic zone in the receiving water and evaluate whether nutrients from the discharge plume reach the euphotic zone and thereby potentially stimulate phytoplankton productivity, including harmful algal blooms.

Since EPA has not yet received phytoplankton stimulation monitoring results, EPA has reviewed parameters monitored by the applicant that relate to phytoplankton productivity and standing stock, such as effluent total suspended solids, light transmittance, effluent ammonia, and chlorophyll a. Attachment T1 in Volume XIII, Appendix T, of the 1995 application describes the plankton communities found in waters off San Diego County and summarizes studies on phytoplankton conducted on a regional scale in the Southern California Bight. Based on the water quality modeling result for total suspended solids concentrations at the completion of initial dilution under worst case conditions and monitoring data for light transmittance throughout the water column, EPA concludes that the Point Loma discharge does not result in a significant reduction in natural light in areas within the wastefield where initial dilution is completed. This indicates that the discharge of total suspended solids should not result in a significant change in the productivity or standing stock of phytoplankton.

Total ammonia-nitrogen (NH_4^+-N and NH_3-N) in an effluent discharge may affect phytoplankton productivity and standing stock because nitrogen is a limiting nutrient in coastal waters of the Southern California Bight. Effluent data for ammonia-nitrogen are summarized, as follows.

Table 18. Annual average, maximum month, and minimum month effluent concentrations for total ammonia-nitrogen (mg/l) at Point Loma WTP.

Month	2015	2016	2017	2018	2019	2020	2021	2022
Annual Average	37.8	39.5	40.3	43.0	41.8	41.7	40.1	40.8
Maximum Month	40.2	40.4	42.6	43.9	45.8	45.0	42.2	43.9
Minimum Month	35.9	38.0	34.2	41.2	34.9	38.9	38.3	37.8

Based on the effluent concentrations in Table 18 and the minimum monthly average initial dilution of 204:1 estimates for ammonia at the completion of initial dilution range from 0.1 to 0.2 mg/l. Such concentrations in the euphotic zone may have the potential to stimulate phytoplankton productivity around an outfall, as natural background concentrations for ammonia within the euphotic zone of the Southern California Bight are typically an order of magnitude lower (Eppley et al., 1979).

However, based on the euphotic zone study Phase 1 report submitted in June 2023, the PLOO discharge plume is typically trapped offshore at or below depths of 40 to 60 m, which is below the average euphotic zone depth in the Southern California Bight (SCB) region (i.e., approximately 35 m). Through a combination of stratification and dilution at the PLOO (i.e., in excess of 100:1 and monthly average dilutions of 204:1), plume nutrients are unlikely to be mixed into the euphotic zone for primary producers to assimilate into their biomass. In addition, recent analysis of subsurface chlorophyll-*a* (a proxy for phytoplankton abundance and primary productivity) corroborates these assumptions, where peaks in chlorophyll-a concentration at depths of 25 m to 36 m (Nezlin et al. 2018) indicate production occurs above the 40-60 m PLOO wastewater plume ceiling. During fall months, when the euphotic zone depth extends deepest (up to 60 m; City of San Diego Data 1994-2003) and the PLOO discharge has the highest chance to contribute nutrients to the euphotic zone, phytoplankton blooms and HABs are generally not observed (City of San Diego, 2023). In contrast, during spring and summer months, when algal blooms are most prevalent in the SCB region (Smith et al. 2018), thermal stratification is strongest and plume trapping depths are greatest (Bartlett et al. 2004). This coincides with periods over which the euphotic zone depth in the SCB region and San Diego is observed to be the shallowest (i.e., 10-20 meters). Therefore, it is assumed that the PLOO contribution of nutrients to the euphotic zone is weakest when algal blooms are most prevalent in the region. Consequently, PLOO effluent nutrients likely have minimal effect on phytoplankton production during much of the year, with regional ocean dynamics being a more significant driver.

Under its existing NPDES permit, the City conducts the required quarterly monitoring for chlorophyll a, throughout the water column, at a grid of 33 offshore stations located along the 98, 80 and 60 meter contours. EPA evaluated the applicant’s monitoring results from January 2015 through December 2021. At water depths frequented by the drifting wastefield, the long-term average for chlorophyll a range from 0.1 to 3.9 µg/l. As shown in Table B-4 and Figure A-8, the long-term average for chlorophyll a measured at the near-ZID boundary station (F30) is similar to long-term averages measured at nearfield and farfield stations.

Based on the 2023 euphotic zone study, the water quality modeling results for total suspended solids and ammonia concentrations at the completion of initial dilution, and monitoring data for light transmittance and chlorophyll a throughout the water column evaluated in this review, EPA concludes that total suspended solids and nutrient materials in the Point Loma discharge will not result in a significant change in the productivity or standing stock of phytoplankton, will not cause natural light to be significantly reduced beyond the initial dilution zone, and will not cause objectionable aquatic growths or degrade indigenous biota.

b. Benthic Macrofauna

Organisms with limited mobility that live in bottom sediments are used as indicators of the condition of marine environments because they respond to many different types of environmental stress and their responses integrate environmental conditions over time. Under its existing NPDES permit, the City conducts the required semi-annual monitoring, during January and July, at 12 primary stations located at the depth of the outfall along the 98 meter contour and a total of 10 secondary stations located along the 88 and 116 meter contours.

To evaluate the condition of the benthic macrofauna community in the area of the outfall and identify trends, EPA examined benthic macrofauna monitoring data for pre-discharge (1991-1993) and post-discharge monitoring surveys (1994-2020) conducted during July, at the depth of the outfall along the 98 meter contour (Figure A-4). EPA agreed with the applicant’s approach to compare near-ZID station E-14 (nearfield site) to stations B-9 and E-26 (farfield sites). Station E-14 is closest to the diffuser and most likely to be impacted by the wastewater discharge. Stations B-9 and E-26 are farthest from the outfall and considered reference or control sites.

Statistics and trends for species richness, species diversity, total abundance of all taxa, and a Southern California Bight benthic index are reviewed and summarized below. Results for three pollutant tolerant indicator taxa: *Euphilomedes* spp., *Parvilucina tenuisculpta*, and *Capitella* “*capitata*” (a species complex) are provided (further below) since these three taxa combined make up approximately 82% of total infauna taxa collected in sediment samples. EPA agreed with much of the evaluation provided in the application and some graphs and tables are replicated in this TDD.

Table B-17 [adapted from Application Table C1-5] provides summary values for benthic infauna abundance, species richness (no. of species), Swartz dominance, diversity (H'), and benthic response index (BRI) values for the Point Loma Ocean Outfall benthic stations. Data are presented for pre-discharge conditions (1991−1993) vs. post-discharge conditions (2014-2020). Mean values for all stations are presented for direct comparison with mean values for near-ZID station E-14 and reference site B-9. For both E-14 and B-9, the mean values for four indicators (i.e., species richness, Swartz dominance, Diversity and BRI) increase from pre-discharge conditions to most recent post-data conditions; this suggests more influence due to regional effects than potential impacts only near-ZID station E-14.

Species Richness
One potential indicator of environmental degradation would be reduction in benthic species diversity near an outfall; this can be examined by species richness values. Comparing mean values for all stations within same timeframe show nearly equivalent increases; 66 for all sites in 1991-1993 and 77 for all sites in 2014-2020. The species richness mean values for stations E-14 and B-9 also nearly equivalent or slightly increase from 63 to 69 and from 68 to 85, respectively. This comparison suggests that benthic species diversity is increasing at all sites since 1993, including the reference site as well as the 'impacted' site nearest outfall, and wastewater discharge via the Point Loma outfall is not causing any reduction in the number of benthic species in the area, indicating a lack of negative environmental impact.

Dominance
Another potential indicator of environmental degradation would be dominance by a certain few benthic species, indicated by decreasing dominance or diversity values at each site over time. Dominance actually decreased (index values increased) off Point Loma after the initiation of wastewater discharge. Swartz Dominance mean values in pre-discharge dates were 18 for all sites, whereas recent post-discharge (2014-2020) mean values are 24 for all sites. Comparing mean values for near ZID station E-14 and control station B-9 within same timeframe show nearly equivalent increases from 18 to 18 and from 20 to 30, respectively. Thus, post-discharge benthic communities in the region were characterized by more even distribution of species than prior to the discharge. Diversity (H') values show similar trends to Swartz Dominance values. It is clear the benthic infauna communities around the Point Loma outfall at station E-14 are not being numerically dominated by a few pollution tolerant species.

Benthic Response Index
The Benthic Response Index (BRI) is an index developed by the Southern California Coastal Water Research Project as part of the Southern California Bight Pilot Project (Smith et al., 2001). Index values below 25 suggest "reference condition" and those in the range of 25 to 33 represent a "minor deviation from reference condition". A "loss in biodiversity" is set at an index value of 34. Index values greater than 44 indicate a "loss in community function". "Defaunation" is set at an index value of 72. Validation has shown that the BRI is most accurate from water depths of 31 to 200 meters which includes the middle and outer continental shelf (Ranasinghe, 2007) and the water depth of the Point Loma outfall.

Figure A-20 (adapted from Application Figure C1-32) provides a trend analysis of BRI values at three sites (Stations B-9, E-26 and E-14) between 1991 and 2020. Overall, BRI values have remained below 25 at all sites except near-ZID station E-14. The highest BRI occurred at station E-14 nearest the outfall, where values have become elevated relative to sites B-9 and E-26 since 1994. While BRI values at station E-14 have steadily increased over time, most values have still been less than 34, which represent "minor deviation from reference condition" that is not indicative of degraded benthic habitats. The few higher BRI values at station E-14 between 35 and 37.4 reported over the past three surveys (winter 2017-winter 2018). Although these data suggest an outfall related pattern, changes in benthic communities reflected in the elevated BRI values have been a highly localized, temporary in nature, and along with other community metrics discussed in this section, are not considered indicative of degraded benthic habitats.

Pollution Tolerant Indicator Taxa

For this review, EPA examined three pollution tolerant indicator taxa (i.e., *Euphilomedes* spp., *Parvilucina tenuisculpta*, and *Capitella* "*telata*" Species Complex) used to evaluate organic enrichment around outfalls.

Euphilomedes spp. Crustaceans known to be tolerant of organic enrichment are ostracods in the genus, *Euphilomedes* spp. (comprised of *E. carcharodonta*, *E. producta*, *E. longiseta*, and *E.* sp.). Figure A-21 (replicated from Figure C1-43 of Volume V, Appendix C of the 2022 application) summarizes the average abundance of *Euphilomedes* spp. per 0.1 m^2 at each 98 meter station, during July, from 1991 through 2020. At these stations, the discharge period mean is similar to the pre-discharge mean and year-to-year averages generally trend lower with distance from the outfall. Mean abundance for all 98 meter stations in July during the pre-discharge (1991-1993) and most recent discharge period (2014-2020) is 17 and 11, respectively. During these two periods, mean abundance at near-ZID station E-14 is 17 and 22, respectively, while mean abundance at northern reference station B-9 is 22 and 1, respectively. The applicant notes that *Euphilomedes* spp. abundances above the upper tolerance bound of the abundance tolerance interval are frequently observed at other 98 meter stations and suggests this may be due to region-wide influences unrelated to the outfall. (Figure C1-43 of Volume V, Appendix C, of the application). EPA agrees that while an outfall related pattern appears to occur at near-ZID station E-14, cyclical patterns in abundance suggest other factors may be influencing *Euphilomedes* spp. at 98 meter stations beyond the zone of initial dilution.

Parvilucina tenuisculpta. A mollusc known to be tolerant of organic enrichment is the bivalve, *Parvilucina tenuisculpta*. It is found in high abundances in areas of moderate organic enrichment. Figure A-22 (replicated from Figure C1-47 of Volume V, Appendix C of application) summarizes the average abundance of *Parvilucina tenuisculpta* per 0.1 m^2 at each 98 meter station, during July, from 1991 through 2020. At these stations, the discharge period mean is similar to the pre-discharge mean and year-to-year averages at near-ZID station E-14 are generally elevated when compared to other 98 meter stations. Mean abundance for all 98 meter stations in July during the pre-discharge (1991-1993) and most recent discharge period (2014-2020) is 3 and 2, respectively. During these two periods, mean abundance at near-ZID station E-14 is 1 and 6, respectively, while mean abundance at northern reference station B-9 is 4 and 2, respectively.

Capitella "*telata*" Species Complex. A polychaete known to be tolerant of organic enrichment and other disturbances is *Capitella* "*telata*". According to the applicant, background abundances are generally near zero, in the Southern California Bight, but may reach densities of 100 per 0.1 m^2 in areas of excessive organic deposits. Figure A-23 (replicated from Figure C1-38 of Volume V, Appendix C of application) summarizes the average abundance of *Capitella* "*capitata*" per 0.1 m^2 at each 98 meter station, during July, from 1991 through 2020. At these stations, the post-discharge period mean is higher than the pre-discharge mean and year-to-year averages at near-

ZID station E-14 are generally much higher when compared to other 98 meter stations. Mean abundance for all 98 meter stations in July during the pre-discharge (1991-1993) and most recent discharge period (2014-2020) is 0 and 2, respectively. During these two periods, mean abundance at near-ZID station E-14 is 0 and 15, respectively, while mean abundance at northern reference station B-9 is 0 and 0, respectively. This increase in abundance is likely due to organic enrichment around the outfall.

A comparison of pre-discharge and post-discharge data for the Point Loma region indicates some general trends.

- Patterns of species richness and infauna abundances suggest an overall increase in number of species at all stations across the San Diego Region.
- Polychaetes continue to account for the greatest number of species and individuals. This has been observed throughout the Southern California benthos, including mainland shelf depths along the San Diego coastal region.
- Patterns of change in populations of the polychaete *Capitella*, the bivalve *Parvilucina* and ostracods of the *Euphilomedes* suggest an organic enrichment effect near the outfall; however, densities of these organisms are still within the range of natural variation for the Southern California Bight.
- Benthic infauna communities are not numerically dominated by a few pollutant tolerant species as would be expected if there were an adverse environmental impact.

The shifts in community composition that have occurred over time probably represent variation in southern California assemblages related to such things as large scale oceanographic events, (e.g. El Nino/La Nina conditions), stochastic natural events, or natural population fluctuations.

In conclusion, there appear to be no impacts to benthic macrofauna associated with the accumulation of toxic substances discharged from the outfall. Based on the evidence described in this section, EPA concludes that conditions beyond the zone of initial dilution are not degraded in compliance with the California Ocean Plan and support an ecological community which exhibits characteristics similar to those of nearby, healthy communities existing under comparable but unpolluted environmental conditions.

c. Demersal Fish

Chapter II of the California Ocean Plan contains the following water quality objective for biological characteristics of ocean waters: “Marine communities, including vertebrate, invertebrate, and plant species, shall not be degraded.” Demersal (bottom dwelling) fish communities are inherently variable due to their mobility and the influences of natural and anthropogenic factors. Under its existing NPDES permit, the City conducts the required semi-annual monitoring, during January and July, at six stations in trawl zones located at the depth of the outfall along the 98 meter contour. Nearfield stations SD12 and SD10 are within 1.2 kilometers of the outfall. Northern farfield stations SD14 and SD13 are located approximately 8 kilometers north of the outfall and southern farfield stations SD8 and SD7 are located approximately 9 kilometers south of the outfall. Station SD8 is located within a couple of kilometers of EPA-designated dredge materials disposal site LA-5 while station SD7 is located within one kilometer of non-active dredge materials disposal site LA-4 (Figure A-24).

EPA did not reanalyze the raw data for demersal fish submitted with the application. Rather, to evaluate the condition of demersal fish in the area of the outfall and identify trends, EPA reviewed the applicant's analyses of monitoring data for pre-discharge (1991-1993) and post-discharge monitoring surveys (1994-2020), conducted during January and July, along the 98 meter contour.

Table 19 summarizes two indicator parameters of fish community structure calculated by the applicant. The average number of fish species (species richness) collected per trawl over the 20 year monitoring period ranges from 6 to 26. Over the pre-discharge and post-discharge periods, the average number of species has increased from 13 to 15 in the nearfield and 14 to 16 in the farfield. Year-to-year fish abundances (total catch) are quite variable and have increased in both the nearfield and farfield, since discharge began. The applicant reports that much of this variability is due to fluctuations in the populations of dominant species (e.g., Pacific Sanddab) and sporadically abundant species (e.g., Longspine Combfish and Stripetail Rockfish). Table C1-10 and Figure C1-51 in Volume V, Appendix C, of the 2022 application. Values for species richness and total abundance are within the range of natural variability observed for the Southern California Bight regional surveys and suggest no outfall-related trends. Table C1-9 in Volume V, Appendix C, of the 2022 application.

Table 19. Applicant's summary for total number of species and total abundance of demersal fishes at trawl zone stations during the pre-discharge (1991-1993) and post-discharge (1994-2020) periods. Data are expressed as means with ranges in parentheses.

Indicator Parameter	Pre-discharge Period		Discharge Period	
	Nearfield	Farfield	Nearfield	Farfield
Species Richness	13 (8-19)	14 (9-22)	15 (6-21)	16 (9-26)
Total Abundance	208 (63-399)	217 (51-453)	406 (44-2,322)	332 (50-1,060)

As shown in Table 20, the applicant reports that, generally, the same fish species are present and abundant during the pre-discharge and post-discharge periods. These species represent 90-95% of the total abundance of fishes caught from 1991 through 2020. Overall, the demersal fish assemblage in the area of the outfall is dominated by Pacific Sanddab which is common in soft-bottom habitats of the Southern California Bight mainland shelf.

Table 20. Applicant's summary for percent abundance of demersal fish species at all trawl zone stations during pre-discharge (1991-1993) and post-discharge (1994-2020) periods. Data are expressed as the percent of total abundance per trawl.

Common Name	Percent Abundance	
	Pre-discharge Period	Post-discharge Period
Pacific Sanddab	55	47
Plainfin Midshipman	10	2
Yellowchin Sculpin	6	9
Longspine Combfish	4	7
Dover Sole	4	5
Stripetail Rockfish	4	3
Longfin Sanddab	3	2
Pink Seaperch	3	1
Halfbanded Rockfish	2	11
Shortspine Combfish	2	2
California Lizardfish	1	4
English Sole	1	1
California Tonguefish	1	1

The City's analysis in the application shows that Pacific sanddab comprise a slightly smaller proportion of the nearfield fish assemblage during the post-discharge period, than prior to the discharge, while the proportion of Pacific sanddab remains similar over time in the farfield. In contrast, yellowchin sculpin comprise a larger proportion of both the nearfield and farfield fish assemblages during the discharge period, than prior to the discharge. The applicant suggests that these changes may be due, in part, to cyclic population fluctuations and region-wide increases in water temperature observed during El Nino years. Ordination and classification analysis of fish abundance data from 1991 through 2020 seem to confirm that the differences in local fish assemblages over time appear in large part related to region-wide changes in water temperature, even though some cluster groups are in proximity to the two dredge materials disposal sites.

The applicant reports that evidence of parasitism or physical abnormalities (fin rot, discoloration, skin lesions, tumors) in fish populations off Point Loma has remained low, since monitoring began in 1991. The copepod eye parasite occurs in Pacific sanddab at a low percentage. An ecoparasitic cymothioid isopod is observed loose in some trawls and is known to be especially common on sanddab in southern California waters.

EPA concludes there are no apparent spatial or temporal trends in the total number of fish species or abundances of fishes that suggest an outfall-related impact.

4. Impact of the Discharge on Recreational Activities

This section describes the impact of the modified discharge on recreational activities. Under 40 CFR 125.62(d), the applicant's modified discharge must allow for the attainment or maintenance of water quality which allows for recreational activities beyond the zone of initial dilution, including, without limitation, swimming, diving, boating, fishing, and picnicking, and sports activities along shorelines and beaches. The requirement to protect recreational activities applies beyond the zone of initial dilution, in both federal and State waters. Both the bioaccumulation of toxic pollutants in fish tissues (liver or muscle) and water contact recreational activities and compliance with bacteriological water quality standards and criteria are discussed. The applicant’s monitoring data are reviewed to assess whether the discharge will protect recreational activities.

a. Bioaccumulation and Fish Consumption

Chapter II of the California Ocean Plan contains the following water quality objectives for the biological characteristics of ocean waters: “The natural taste, odor, and color of fish, shellfish, or other marine resources used for human consumption shall not be altered.” and “The concentrations of organic materials in fish, shellfish, or other marine resources used for human consumption shall not bioaccumulate to levels that are harmful to human health.”

Bioaccumulation is a process by which chemical contaminants undergo uptake and retention in organisms via various pathways of exposure. For example, fishes can accumulate contaminants through adsorption and absorption of dissolved chemicals in the water or through ingestion or assimilation of contaminants in food. Once a contaminant is incorporated into the tissues of an organism, it may resist metabolic excretion and accumulate. Higher trophic level organisms may then feed on contaminated prey and further concentrate the contaminant in their tissues. This process can lead to concentrations of contaminants in fish tissue that are of ecological and human health concern.

Under its existing NPDES permit, the City conducts the required semi-annual monitoring at six stations in four trawl zones during January and July and the required annual monitoring at two rig (hook and line) fishing stations during October. The stations are located at the depth of the outfall along the 98 meter contour. The bioaccumulation monitoring program has two components: (1) liver tissue is analyzed for trawl-caught fish and (2) muscle tissue is analyzed for hook and line-caught fish.

Fish collected in trawls are representative of the general demersal fish community and certain species are targeted for analysis based on their prevalence in the community. Chemical analysis of liver tissue in these fishes indicates which contaminants may be bioaccumulating through this community. For bioaccumulation analyses, the six trawl fishing stations are grouped into four trawl zones (Figure A-24). Trawl zone 1 (TZ1) represents the nearfield and is defined as the area within a 1 kilometer radius of stations SD12 and SD10; both stations are within 1.2 kilometers of the outfall. Trawl zone 2 (TZ2) represents the northern farfield and is defined as the area within a 1 kilometer radius of stations SD14 and SD13; both stations are approximately 8 kilometers north of the outfall. Trawl zone 3 (TZ3) represents the southern farfield and is defined as the area centered within a 1 kilometer radius of station SD8. Station SD8 is located within a couple of kilometers of EPA-designated dredge materials disposal site LA-5. Trawl zone 4 (TZ4) represents the southernmost farfield and is defined as the area centered within a 1 kilometer radius of station SD7. Station SD7 is located within one kilometer of non-active dredge materials disposal site LA-4. Both stations SD8 and SD7 are within approximately 9 kilometers of the outfall.

Fish species collected by rig fishing represent a typical sport fisher's catch and are considered of recreational and commercial importance. Fish muscle tissue is analyzed because it is the tissue most often consumed by humans and may have public health implications. There are two rig fishing locations (Figure A-24). Station RF1 is located in the nearfield close to the northern end of the diffuser leg while station RF2 is located in the northern farfield.

The applicant reports all tissue sample values in terms of milligrams per kilogram wet weight (mg/kg ww), or microgram per kilogram wet weight (µg/kg ww).

Fish Liver Tissues

To evaluate bioaccumulation in the area of the outfall and identify trends, EPA examined toxics concentrations in the liver tissue of trawl-caught fish species that were sampled in October during the discharge period (1995-2021). Five flatfish species (bigmouth sole, Dover sole, English sole, hornyhead turbot, longfin sanddab, and Pacific sanddab) examined over this period by EPA.

Arsenic. Figure A-25 summarizes the annual average concentration of arsenic in flatfish livers, during October, from 1995 through 2021. The applicant began using a more sensitive method detection limit in 2003. There is no spatial or temporal pattern in arsenic concentrations in liver that suggests an outfall-related effect. During the discharge period (1995-2020), the mean concentration of arsenic in sanddab liver tissues is 4.92 mg/kg ww at nearfield station TZ1, 5.19 mg/kg ww at northern farfield station TZ2, and 4.09 mg/kg ww and 4.36 mg/kg ww at southern farfield stations TZ3 and TZ4, respectively. See Table C5-6, Volume V, Appendix C, of the 2022 application.

Mercury. Figure A-26 summarizes the annual average concentration of mercury in flatfish livers, during October, from 1995 through 2021. The applicant began using a slightly less sensitive method detection limit (0.012 µg/l changed to 0.03 µg/l) in 2003. There is no spatial or temporal pattern in mercury concentrations in liver that suggests an outfall-related effect. During the discharge period (1995-2020), the mean concentration of mercury in sanddab liver tissues is 0.106 mg/kg ww at nearfield station TZ1, 0.079 mg/kg ww at northern farfield station TZ2, and 0.104 mg/kg ww and 0.110 mg/kg ww at southern farfield stations TZ3 and TZ4, respectively. See Table C5-3, Volume V, Appendix C, of the 2022 application.

Selenium. Figure A-27 summarizes the annual average concentration of selenium in flatfish liver, during October, from 1995 through 2021. The applicant began using a more sensitive method detection limit in 2003. There is no spatial or temporal pattern in selenium concentrations in liver that suggests an outfall-related effect. During the discharge period (1995-2020), the mean concentration of selenium in sanddab liver tissues is 1.03 mg/kg ww at nearfield station TZ1, 1.16 mg/kg ww at northern farfield station TZ2, and 1.05 mg/kg ww and 1.08 mg/kg ww at southern farfield stations TZ3 and TZ4, respectively. See Table C5-18, Volume V, Appendix C, of the 2022 application.

Total DDT. Figure A-28 summarizes the annual average concentration of total DDT in flatfish livers, during October, from 1995 through 2021. DDT was detected in 98% of liver tissue samples from trawl-caught fishes, at concentrations of 35 to 4,252 µg/kg ww. There is no spatial or temporal pattern in total DDT concentrations in liver that suggests an outfall-related effect. Total DDT in fishes from the PLOO monitoring region were largely composed of p,p-DDE. During the discharge period (1995-2020), the mean concentration of total DDT in sanddab liver tissues is 649.0 µg/kg ww at nearfield station TZ1, 589.5 µg/kg ww at northern farfield station TZ2, and 531.7 µg/kg ww and 702.7 µg/kg ww at southern farfield stations TZ3 and TZ4, respectively. During the period 1995 through 2021, total TTD concentrations in flatfish livers at all trawl zone stations appear to be decreasing over time. See Table C5-26, Volume V, Appendix C, of the 2022 application.

Total PCBs. Figure A-29 summarizes the annual average concentration of total PCBs in flatfish livers, during October, from 1995 through 2021. PCB was detected in 96% of liver tissue samples from trawl-caught fishes, at concentrations of 14 to 5,320 µg/kg ww. During the discharge period (1995-2020), the mean concentration of total PCBs is 445.4 µg/kg ww at nearfield station TZ1, 298.7 µg/kg ww at northern farfield station TZ2, and 524.7 µg/kg ww and 388.2 µg/kg ww at southern farfield stations TZ3 and TZ4, respectively. See Table C5-29A, Volume V, Appendix C, of the 2022 application. There is no spatial or temporal pattern in total PCB concentrations in liver that suggests an outfall-related effect. EPA notes that on average, total PCB concentrations in sanddab livers are an order of magnitude higher than in other flatfish species analyzed by the applicant. During the period 1995 through 2021, total PCB concentrations in flatfish livers at southern farfield station TZ3 (near the active dredge materials disposal site, LA-5) are noticeably higher than at other trawl zone stations during most years, but appear to be decreasing over time.

Because there are no noticeable effects of the outfall for these chemicals, the contributions of the discharge are minimal.

Fish Muscle Tissues

To evaluate bioaccumulation in the area of the outfall and identify trends, EPA examined toxics concentrations in the muscle tissue of rig-caught fish species that were sampled in October during the discharge period (1995-2021) (Figure A-24). Table B-8 shows the twelve fish species (rockfish and scorpionfish) examined over this period by EPA. Total arsenic, mercury, selenium, total chlordane, total DDT, and total PCBs are reviewed. To address public health concerns, pollutant concentrations for these detections were compared to available U.S. EPA recommended screening values for recreational fishers and California Office of Health Hazard Assessment fish contaminant goals for sport fish.

U.S. EPA has developed recommended target analyte screening values for recreational fishers (USEPA, 2000). These screening values are defined as concentrations of analytes in fish or shellfish tissue that are of potential public health concern and are used as threshold values against which levels of contamination in similar tissues collected from the ambient environment can be compared (Table 21). Exceedance of these screening values should be taken as an indication that more intensive site-specific monitoring and/or evaluation of human health risk should be conducted.

Table 21. Selected U.S. EPA recommended target analyte screening values for recreational fishers. Based on fish consumption rate of 17.5 grams per day, 70 kilograms body weight (all adults), and, for carcinogens, 10^{-5} risk level, and 70-year lifetime.

Target Analyte	Screening Values (mg/kg)	
	Noncarcinogens	Carcinogens (RL=10^{-5})
Arsenic (inorganic)	1.2	0.026
Mercury (methylmercury)	0.3[1]	---
Selenium	20	---
Total chlordane (sum of cis- and trans-chlordane, cis- and trans-nonachlor; and oxychlordane)	2.0	0.114
Total DDT (sum of 4,4'- and 2,4'- isomers of DDT, DDE, and DDD)	2.0	0.117
Total PCBs (sum of congeners or Aroclors)	0.08	0.02

[1] Based on EPA's tissue-based 304(a)(1) water quality criterion for human health (USEPA, 2001).

The California Office of Environmental Health Hazard Assessment (OEHHA) is the agency solely responsible for evaluating the potential public health risks of chemical contaminants in sport fish and issuing State advisories, when appropriate. EPA is unaware of any sport fish advisories in the area off Point Loma issued by OEHAA. OEHAA has developed both advisory tissue levels and fish contaminant goals for seven common contaminants in California sport fish (Klasing and Brodberg, 2008). Fish contaminant goals are estimates of contaminant levels in fish that pose no significant health risk to individuals consuming sport fish as a standard consumption rate of eight ounces per week (32 grams per day), prior to cooking, over a lifetime (Table 22). Unlike advisory tissue levels, these goals are based solely on public health considerations relating to exposure to each individual contaminant, without regard to economic considerations, technical feasibility, or the counterbalancing effects of fish consumption.

Table 22. Selected Fish Contaminant Goals for selected fish contaminants based on cancer and non-cancer risk using an 8 ounce per week (prior to cooking) consumption rate (32 grams per day).

Contaminant	Fish Contaminant Goal (µg/kg, wet weight)
Chlordane [$(mg/kg/day)^{-1}$]	5.6
DDTs [$(mg/kg/day)^{-1}$]	21
Methylmercury (mg/kg-day)	220

Contaminant	Fish Contaminant Goal (µg/kg, wet weight)
PCBs [(mg/kg/day)$^{-1}$]	3.6
Selenium (mg/kg-day)	7,400

Arsenic. Figure A-30 summarizes the annual average concentration of total arsenic in rockfish muscle, during October, from 1995 through 2021. There is no spatial or temporal pattern in arsenic concentrations in muscle that suggests an outfall-related effect. The applicant began using a more sensitive method detection limit in 2003. As shown in Table C5-6, Volume V, Appendix C, of the 2022 application, during the discharge period (1995-2020), the concentrations of total arsenic in rockfish muscle tissues ranged from 0.4 to 13.5 mg/kg ww at nearfield station RF1 (total n=66) and 0.4 to 11.4 mg/kg ww at farfield station RF2 (total n=72). These total arsenic concentrations cannot be directly compared to the EPA screening values, since those screening values (1.2 and 0.026 mg/kg) are for inorganic arsenic tissue concentrations. Studies have shown inorganic arsenic is approximately 10% of total arsenic in finfish muscle (Schoof, et. al, 1999). There is no OEHHA fish contaminant goal for arsenic.

Mearns et al. (1991) reported that in the Southern California Bight, arsenic occurs in the edible tissues of fish, squid, lobster, and crab and the liver of some fish in concentrations ranging from about 0.1 to over 50 mg/kg ww and tissue concentrations were the same or higher in remote areas compared to urban areas. The authors concluded that the source of arsenic to these organisms is probably "natural", due to hydrothermal springs, and further research was necessary to assess health risks to humans that consume seafood at such levels.

From October 2017 through April 2023, arsenic concentrations in the Point Loma WTP effluent generally range between <1.84 and 2.14 µg/l; these concentrations will meet EPA's 304(a)(1) water quality criterion for human health, 0.14 µg/l, at the boundary of the zone of initial dilution. Because there is no noticeable effect of the outfall, the contribution of the discharge is minimal.

Mercury. Because analysis of total mercury is less expensive than that for methylmercury, total mercury is analyzed and assumed to be 100 percent methylmercury for the purpose of risk assessment. Figure A-31 summarizes the annual average concentration of mercury in rockfish muscle, during October, from 1995 through 2021. The applicant began using a slightly less sensitive method detection limit (0.012 µg/l changed to 0.03 µg/l) in 2003. There is no spatial or temporal pattern in mercury concentrations in muscle that suggests an outfall-related effect. During the discharge period (1995-2020), the concentrations of mercury in rockfish muscle tissues ranged from 0.027 to 0.790 mg/kg ww at nearfield station RF1 (total n=66) and 0.020 to 0.648 mg/kg ww at farfield station RF2 (total n=70). See Table C5-3, Volume V, Appendix C, of the 2022 application. Although some relatively high mercury values (>0.5 mg/kg) were recorded at station RF1, these were limited to five rockfish muscle samples collected over just three years (2002–2004). In some years, average concentrations of total mercury are above the EPA screening value of 0.3 mg/kg and the OEHHA fish contaminant goal of 0.220 mg/kg ww for methylmercury. Average concentrations are sometimes above OEHHA advisory tissue levels based on non-cancer risk using an 8 ounce serving size (prior to cooking) once or more per week (Klasing and Brodberg, 2008).

Mearns et al. (1991) has identified mercury as a contaminant of concern in the Southern California Bight, but concludes that since the highest levels of mercury are seen in fish from areas located far from known sources, it does not appear that mercury from coastal waste discharges is responsible for the concentrations observed in fish.

From October 2017 through April 2023, the applicant used more sensitive analytical methods for detecting mercury in effluent, this resulted in lower detection levels (MDL 0.4 – 1.1 ng/L). The mercury effluent concentrations during this period range from 1.94 – 59.4 ng/L, and these effluent results are low enough to evaluate the applicant’s ability to achieve compliance, following initial dilution, with California Ocean Plan Table 3 water quality objectives for mercury of 0.04 µg/l. Because there is no noticeable effect of the outfall, the contribution of the discharge is minimal.

Selenium. Figure A-32 summarizes the annual average concentration of selenium in rockfish muscle, during October, from 1995 through 2021. The applicant began using a more sensitive method detection limit in 2003. There is no spatial or temporal pattern in selenium concentrations in muscle that suggests an outfall-related effect. During the discharge period (1995-2020), the concentrations of selenium in rockfish muscle tissues ranged from 0.18 to 0.82 mg/kg ww at nearfield station RF1 (total n=66) and 0.14 to 0.88 mg/kg ww at farfield station RF2 (total n=72). See Table C5-18, Volume V, Appendix C, of the 2022 application. Annual average concentrations are below the EPA screening value of 20 mg/kg and the OEHHA fish contaminant goal of 7.4 mg/kg ww.

Total Chlordane. Figure A-33 summarizes the annual average concentration of total chlordane in rockfish muscle, during October, from 1995 through 2021. There is no spatial or temporal pattern in total chlordane concentrations in muscle that suggests an outfall-related effect. During the discharge period (1995-2020), the concentrations of total chlordane in rockfish muscle tissues ranged from 0.0 to 2.4 µg/kg ww at all RF stations. These concentrations are well below the EPA screening values of 2,000 and 114 µg/kg ww and the OEHHA fish contaminant goal of 5.6 µg/kg ww.

Total DDT. Figure A-34 summarizes the annual average concentration of total DDT in rockfish muscle, during October, from 1995 through 2021. There is no spatial or temporal pattern in total DDT concentrations in muscle that suggests an outfall-related effect. During the discharge period (1995-2020), the concentrations of total DDT in rockfish muscle tissues ranged from 0.3 to 217.3 µg/kg ww with the mean concentration of 15.7 µg/kg ww at nearfield station RF1 (total n=63) and 0.3 to 117.3 µg/kg ww with the mean concentration of 11.9 µg/kg ww at farfield station RF2 (total n=69). See Table C5-26, Volume V, Appendix C, of the 2022 application. These concentrations are well below or rarely above the EPA screening values of 2,000 and 117 µg/kg ww, but exceeded the OEHHA fish contaminant goal of 21 µg/kg ww in muscle tissue samples from at least six rockfish and scorpionfish species. DDT levels in exceedance of the OEHHA fish contaminant goal are not uncommon in sport fish from other areas of the San Diego region, including the Coronado Islands (City of San Diego 2020a). These values are below all OEHHA advisory tissue levels based on non-cancer risk using an 8 ounce serving size (prior to cooking) once or more per week (Klasing and Brodberg, 2008).

From October 2017 through April 2023, total DDT concentrations in the Point Loma WTP effluent generally are reported as "not detected" (291 of 291 samples). The method detection limits for DDTs range from 0.00063 to 0.1 µg/l. EPA's recommended minimum quantitation levels for the homologues of DDT and its metabolites are 0.1 µg/l using EPA method 608; Appendix II of the California Ocean Plan requires dischargers to achieve more stringent minimum levels. Because there is no noticeable effect of the outfall, the contribution of the discharge is minimal.

Total PCBs. Figure A-35 summarizes the annual average concentration of total PCBs in rockfish muscle, during October, from 1995 through 2021. There is no spatial or temporal pattern in total PCB concentrations in muscle that suggests an outfall-related effect. During the discharge period (1995-2020), the concentrations of total PCBs in rockfish muscle tissues ranged from 0.5 to 64.5 µg/kg ww with the mean concentration of 11.2 µg/kg ww at nearfield station RF1 (total n=63) and 0.2 to 69.0 µg/kg ww with the mean concentration of 8.2 µg/kg ww at farfield station RF2 (total n=69). See Table C5-29A, Volume V, Appendix C, of the 2022 application. These concentrations are generally below the EPA screening values of 80 and 20 µg/kg ww, but exceeded the OEHHA fish contaminant goal of 3.6 µg/kg ww in seven species. As with total DDT, elevated levels of PCB over the OEHHA fish contaminant goal are not uncommon in sport fish from other areas of the San Diego region (City of San Diego 2020). These values are usually below OEHHA advisory tissue levels based on non-cancer risk using an 8 ounce serving size (prior to cooking) once or more per week (Klasing and Brodberg, 2008).

From October 2017 through April 2023, total PCB concentrations in the Point Loma WTP effluent are reported as "not detected" (313 of 313 samples) where the method detection limit ranges from 0.09 to 5.0 µg/l, based on the measured Arochlor. EPA concludes that these method detection limits need to be lowered in order to achieve 40 CFR 136 levels and to further quantify actual mass emissions of PCBs from the PLOO to the region. However, neither the applicant's nor EPA's method detection limits are low enough to evaluate the applicant's ability to achieve compliance, following initial dilution, with California Ocean Plan Table 3 water quality objectives for total PCBs. Because there is no noticeable effect of the outfall, the contribution of the discharge is minimal.

Based on this review of fish liver and muscle tissues, EPA finds that the improved modified discharge will comply with California Ocean Plan water quality objectives for biological characteristics of ocean waters. EPA concludes that the improved modified discharge will allow for the attainment or maintenance of water quality which allows for recreational activities (fishing) beyond the zone of initial dilution.

b. Water Contact Recreation

Under 40 CFR 125.62(d), the applicant's modified discharge must allow for the attainment or maintenance of water quality which allows for recreational activities beyond the zone of initial dilution. The requirement to protect recreational activities applies beyond the zone of initial dilution, in both federal and State waters. This section of the TDD discusses the EPA-approved water quality standards that apply in State waters and the recreational activities and 304(a)(1) water quality criteria that apply in federal waters beyond the zone of initial dilution. The applicant's monitoring and laboratory data are reviewed to assess whether the improved modified discharge will protect recreational activities.

State Waters

Within State waters off Point Loma, most water contact recreational activities are centered around the Point Loma kelp beds and in nearshore waters. The shoreline along the southern portion of Point Loma is predominantly on a military reservation (Fort Rosecrans) and the extreme southern portion of the peninsula is within the Cabrillo National Monument. Shoreline access in these areas is limited to designated tidepool areas within the boundaries of the national monument.

The State Water Resources Control Board (State Water Board) has established bacteriological standards in ocean waters of the State used for water contact recreation. Ocean waters are the territorial marine waters of the State as defined by California law. The outer limit of territorial seas generally extends offshore to 3 nautical miles. “Water Contact Recreation” or “REC-1” is a beneficial use of the State and is defined to include uses of water for recreational activities involving body contact with water where ingestion of water is reasonably possible; these uses include, but are not limited to, swimming, wading, water-skiing, skin and SCUBA diving, surfing, white water activities, fishing, and use of natural hot springs. “REC-1” is designated as an existing beneficial use of coastal waters named the Pacific Ocean, in the California Ocean Plan and Water Quality Control Plan for the San Diego Basin (San Diego RWQCB, 1994).

CWA sections 303(i) and 502(21), together require the adoption of water quality criteria for all coastal waters designated by States for use for swimming, bathing, surfing, or similar water contact activities, even if, as a factual matter, the waters designated for swimming are not frequently or typically used for swimming (69 Fed. Reg. 67219-20, 67222, November 16, 2004). Consistent with this requirement, on November 16, 2004, EPA promulgated recreational water quality criteria for coastal waters in cases where States had failed to do so; these criteria apply where States have designated coastal waters for water contact recreation, but do not have in place EPA-approved bacteria criteria that are as protective as EPA's 1986 recommended 304(a)(1) criteria for bacteria (69 Fed. Reg. 67218, November 16, 2004). This promulgation applies the criteria at 40 CFR 131.41(c)(2) to waters designated marine coastal recreational waters in California, excluding the Los Angeles Regional Water Quality Control Board (69 Fed. Reg. 67243, November 16, 2004). In 2005, the State Water Board adopted revised bacteria criteria for ocean waters of the State. Effective February 14, 2006, the revised California Ocean Plan specifies that within the zone bounded by the shoreline and 1,000 feet from the shoreline or the 30-foot depth contour (whichever is further) and in areas outside this zone used for water contact sports as determined by the Regional Water Board (i.e., waters designated as REC-1), including kelp beds, the bacterial objectives in Table 23 shall be maintained throughout the water column. The State has excluded the initial dilution zone for wastewater outfalls.

Table 23. Bacterial water quality objectives in the California Ocean Plan, Tables 1 and 2, for State waters designated REC-1.

Indicator	Magnitude	
Fecal coliform	30-day Geometric Mean (per 100 ml)	Single Sample Maximum (per 100 ml)
	200	400
Enterococcus[1]	6-week rolling Geometric Mean (cfu/100 ml)[2]	Statistical Threshold Value[3] (cfu/100 ml)
	30	110

[1] Based on National Epidemiological and Environmental Assessment of Recreational Water gastrointestinal illness rate (NGI) of 32 per 1,000 water contact recreaors.
[2] cfu = colony forming units
[3] The statistical threshold value (STV) shall not be exceeded by more than 10 percent of the samples collected in a calendar month, calculated in a static manner.

Federal Waters

EPA has developed 304(a)(1) ambient water quality criteria for bacteria which are recommended to protect people from gastrointestinal illness for primary contact recreation, or similar full body contact activities, in recreational waters (*Recreational Water Quality Criteria*, EPA 820-F-12-058, 2012), but EPA has not directly promulgated water quality standards for marine recreational activities in federal waters located offshore beyond 3 nautical miles. For these waters, the water use is defined by the CWA section 101(a)(2) interim goal to provide water quality for recreation in and on the water, wherever attainable. EPA describes the "primary contact recreation" use as protective when the potential for ingestion of, or immersion in, water is likely. Activities usually include swimming, water-skiing, skin-diving, surfing, and other activities likely to result in immersion (*Water Quality Standards Handbook*, EPA-823-B-94-005a, 1994). The 2012 Recreational Water Quality Criteria (RWQC) is based on two estimated illness rates and associated geomean and statistical threshold values shown in Table 24. Therefore, EPA has reviewed the actual uses of federal waters surrounding the Point Loma Ocean Outfall to determine where such activities occur. Where such uses occur, they are protected by EPA's water quality criteria for bacteria in Table 24.

Table 24. Recommended 2012 RWQC for enterococcus in federal waters where primary contact recreation occurs (EPA, 2012).

Enterococci	Geometric Mean[1] (cfu/100mL)	Statistical Threshold Value[2] (cfu/100mL)
Estimated Illness Rate: 36 individuals /1,000 primary contact recreators	35	130
Estimated Illness Rate: 32 individuals /1,000 primary contact recreators	30	110

[1] GM value is not to be exceeded in any 30-day interval.
[2] STV is not to be exceeded greater than 10 percent in the same 30-day interval.

Table III.E-1, Volume III. Large Applicant Questionnaire, of the 2022 application shows water contact recreational activities occurring in ocean waters off Point Loma and at shoreline, kelp bed, and offshore water quality monitoring stations. Volume VII, Appendix H.4, of the application shows where water contact recreation takes place off Point Loma, based on the City's recreational use assessment and record of visual observations during monitoring events. In the vicinity of the Point Loma discharge, the applicant has documented no federally-defined primary contact recreational activities occurring in waters beyond 3 nautical miles; therefore, EPA has determined that federal waters beyond the zone of initial dilution are not currently required to achieve the 304(a)(1) water quality criteria for bacteria. However, within 3 nautical miles of the shoreline, the applicant's improved modified discharge must achieve California Ocean Plan bacteriological standards for water contact recreation throughout the water column.

Data Assessment

Under its existing NPDES permit, the City conducts the required monitoring for bacteria indicators (enterococcus, fecal coliforms, and total coliforms) at 52 stations shown in Figure A-3. Quarterly monitoring is conducted at a grid of 33 offshore stations located along the 98, 80, and 60 meter contours (at depths of 1, 25, 60, 80 and 98 meters below the surface); and at 3 offshore stations located along the 18 meter contour (at depths of 1, 12 and 18 meters). Five times per month, monitoring is conducted at 5 kelp bed stations located along the 18 meter contour (at depths of 1, 12 and 18 meters) and at 3 kelp bed stations located along the 9 meter (30 foot) contour (at depths of 1, 3 and 9 meters). Weekly monitoring is conducted at 8 shoreline stations. EPA evaluated only the enterococcus monitoring results, since enterococcus is the most sensitive bacteria indicator of three species mentioned above. That is, some enterococcus exceedances occurred when other coliform results did not exceed criteria and enterococcus exceedances co-occurred with fecal or total coliform exceedances. EPA evaluated results from January 2015 through December 2021 for shoreline, kelp bed stations, and offshore stations.

The water depth at the outer edge of the kelp bed lying inshore from the Point Loma outfall is about 16 to 17 meters and the water depth at the outer edge of the San Diego bight (along an extension of the Point Loma coastline) is about 40 to 45 meters. Based on dilution modeling for the wastewater plume using time series data, the height-of-rise to the average level of minimum dilution varies from about 20 to 31 meters above the bottom, corresponding to water depths of 62 to 74 meters. The height-of-rise to the average top of the wastefield varies from about 30 to 40 meters above the bottom, corresponding to water depths of about 54 to 64 meters. The maximum height-of-rise to the top of the wastefield during a month varies from about 50 to 64 meters above the bottom, corresponding to depths of about 30 to 44 meters. Figure Q-18 in Volume X, Appendix Q, of the application.

As shown in Table B-9, statistical threshold value enterococcus objectives at shoreline stations exhibit low exceedance rates (1.5 percent). As shown in Tables B-10, 6-week geometric mean enterococcus objectives at shoreline stations also exhibit low exceedance rates (2 percent). The applicant attributes these exceedances to surface runoff rather than the outfall plume. EPA agrees with this conclusion because of the lack of elevated concentrations at stations in the kelp bed and because modeling and monitoring results indicate that the outfall plume remains submerged in the offshore zone.

As shown in Tables B-11 and B-12, enterococcus objectives at kelp bed stations exhibit very low exceedance rates at all depths (less than 1 percent). Tables B-13 and B-14 for enterococcus samples in offshore State waters show exceedances mostly confined to depths below 25 meters (i.e., at 60 m or 80 m). Tables B-15 and B-16 show a similar pattern with elevated enterococcus densities restricted to sub-surface waters.

The 2022 application is based on an improved discharge and continued effluent disinfection to achieve these California Ocean Plan standards in State waters prior to permit reissuance. On November 13, 2007, the City submitted a request to the Regional Water Board to initiate operation of prototype effluent disinfection facilities to achieve compliance with bacteriological water quality standards in State waters. On August 13, 2008, the Regional Water Board approved modifications associated with operation of the City's proposed prototype effluent disinfection facilities at Point Loma WTP. The City began adding sodium hypochlorite to the effluent discharge on September 3, 2008.

Based on this review, EPA finds that the improved modified discharge, as defined at 40 CFR 125.58(i) will meet bacterial water quality standards in State waters. EPA also finds that federal waters are not required to achieve the 304(a)(1) water quality criteria for bacteria because federally-defined primary contact recreational activities are not occurring in waters beyond 3 nautical miles. The reissued permit will require the City to record and report any primary contact recreational activities observed in federal waters, during offshore water quality monitoring surveys. The Regional Water Board and EPA conduct routine reviews of the City's discharge monitoring reports to assess compliance with the existing permit and water quality standards. EPA concludes that the improved modified discharge will allow for the attainment or maintenance of water quality which allows for recreational activities beyond the zone of initial dilution, including, without limitation, swimming, diving, picnicking, and sports activities along shorelines and beaches.

5. Additional Requirements for Improved Discharge

Under 40 CFR 125.62(e), an application for a 301(h)-modified permit on the basis of an improved discharge must include a demonstration that such improvements have been thoroughly planned and studied and can be completed or implemented expeditiously; detailed analyses projecting changes in average flow rates and composition of the discharge which are expected to result from proposed improvements; an assessment of the current discharge required by 40 CFR 125.62(a) through (d); and a detailed analysis of how the planned improvements will comply with 40 CFR 125.62(a) through (d).

Under Part A.11 of EPA Form 3510-A2, Description of Treatment, the applicant states that effluent disinfection is being implemented and will continue to be operational during the renewal timeframe of the NPDES permit. The applicant also states that dechlorination is not necessary, as chlorine residual is consumed during outfall transport. Under Part B.5 of EPA Form 3510-A2, the applicant explains that chlorination is being implemented to ensure compliance with

California Ocean Plan recreational body-contact standards throughout the water column in State-regulated waters.

Volume IV, Appendix B, of the application describe the City's proposed projects for an improved discharge, including but not limited to: Pump Station 2 reliability improvements, chemical addition improvements, onsite industrial stormwater diversions, PLWTP scum injection projects, PLWTP replacement of main sludge pumps, a coastal erosion monitoring program, PLWTP vivianite mitigation from the digester feed piping, PLWTP onsite chlorine generation through an electrolysis process, PLWTP digester cleaning, PLWTP distributed control system upgrade project, NCWRP flow equalization basin and process equipment improvements, MBC equipment upgrades, and metropolitan sewer interreceptor repairs.

Based on preliminary information provided in the updated application, EPA concludes that the applicable requirements under 40 CFR 125.62(e) have been met.

D. Establishment of a Monitoring Program

Under 40 CFR 125.63 which implements CWA section 301(h)(3), the applicant must have a monitoring program that is designed to provide data to evaluate the impact of the modified discharge on the marine biota; demonstrate compliance with applicable water quality standards or criteria, as applicable; measure toxic substances in the discharge; and have the capability to implement these programs upon issuance of the 301(h)-modified permit. The frequency and extent of the monitoring program are to be determined by taking into consideration the applicant's rate of discharge, quantities of toxic pollutants discharged, and potentially significant impacts on receiving water, marine biota, and designated water uses.

The applicant has a well-established monitoring program, including core monitoring, regional surveys, and special monitoring projects. The existing monitoring program was developed jointly by the Regional Water Board, EPA, and the applicant. The program is described in Volume VII, Appendix K, of the application. The City has consistently implemented the agreed upon monitoring program.

The applicant has proposed to include quarterly monitoring requirements for colored dissolved organic matter (CDOM), total alkalinity (TA), and spectrophotometric pH at designated offshore stations. In sediments and fish tissues, the applicant has proposed to add chemical analyses of polybrominated diphenyl ethers (PBDEs or BDEs). In addition, the applicant has added special monitoring requirements for nutrients, flame retardants, and per- and polyfluoroalkyl substances (PFAS) to its existing effluent monitoring program. EPA and the Regional Water Board will review the applicant's existing monitoring program and revise it as appropriate. These monitoring revisions will be included in the 301(h)-modified permit, as conditions for monitoring the impact of the discharge. EPA finds that the applicant has proposed a monitoring program which meets CWA section 301(h) requirements and has the resources to implement the program.

E. Impact of Modified Discharge on Other Point and Non-Point Sources

Under 40 CFR 125.64 which implements CWA section 301(h)(4), the applicant's proposed modified discharge must not result in the imposition of additional treatment requirements on any other point or non-point sources. For previous applications, the Regional Water Board has determined that the Point Loma discharge will not have an effect on any other point or non-point source discharges. There are a number of point and non-point source discharges within the San Diego Region; however, the PLOO is the only deep water discharge in the San Diego Region. All other San Diego Region discharges are to depths of 36 meters or less. The nearest discharge to the PLOO is the South Bay Ocean Outfall located approximately 18 kilometers southwest of the PLOO at a depth of 28 meters. For the 2022 application, the City has submitted a letter to Regional Water Board requesting the required determination. The granting of the 301(h) variance by EPA's Regional Administrator is contingent upon a determination by the Regional Water Board that the proposed discharge will not result in any additional treatment requirements on any other point or nonpoint sources.

F. Toxics Control Program

In accordance with 40 CFR 125.66, the applicant must design a toxics control program to identify and ensure control of toxic pollutants and pesticides discharged in the effluent. The applicant's Industrial Wastewater Control Program (for industrial toxics control) and the Household Hazardous Waste Program (for nonindustrial toxics control) are described, below.

1. Chemical Analysis

Under 40 CFR 125.66(a)(1), the applicant is required to submit chemical analyses of its current discharge for all toxic pollutants and pesticides defined in 40 CFR 125.58(aa) and (p). The analyses must be performed on two 24-hour composite samples (one dry weather and one wet weather). The City conducts influent and effluent monitoring following sampling schedules specified in the existing permit. Effluent samples are collected and analyzed on a weekly basis for metals, cyanide, ammonia, chlorinated pesticides, phenolic compounds, and PCBs. Analyses for organophosphate pesticides, dioxin, purgeable (volatile) compounds, acrolein and acrylonitrile, base/neutral compounds, and butyl tins are performed on a monthly basis. Influent and effluent monitoring data have been previously reported in monthly, quarterly, and annual reports to the Regional Water Board and EPA. The City submitted Point Loma WTP effluent data from 2015 through 2021 in electronic format, as part of the application. Based on influent and effluent data during 2020, the applicant indicates that there are no significant differences or evident trends in effluent quality between wet weather and dry weather conditions. These data are summarized by the City in tables III.H-3 and III.H-4, Volume III. Large Applicant Questionnaire, of the 2022 application. Table 25 lists the commonly detected toxic inorganic and organic constituents in the Point Loma WTP effluent during 2020.

Table 25. Commonly detected toxic inorganic and organic constituents in the Point Loma WTP effluent during 2020.

Inorganic Toxic Constituent	Organic Toxic Constituent
Antimony	2-methylnaphthalene
Arsenic	4-methylphenol
Barium	Benzene
Cadmium	Bis(2-ethylhexyl) phthalate
Chromium	Bromodichloromethane (Dichlorobromomethane)
Cobalt	Chloroform (trichloromethane)
Copper	Chloroethane
Lead	Chloromethane
Lithium	Dibromochloromethane (chlorodibromomethane)
Mercury	Diethyl phthalate
Molybdenum	Ethylbenzene
Nickel	Malathion
Selenium	Methylene chloride
Silver	Phenol
Vanadium	Toluene
Zinc	

Based on this information, EPA concludes that the applicant has met the requirement at 40 CFR 125.66(a)(2).

2. Toxic Pollutant Source Identification

Under 40 CFR 125.66(b), the applicant must submit an analysis of the known or suspected sources of toxic pollutants and pesticides identified in 40 CFR 125.66(a) and, to the extent practicable, categorize the sources according to industrial and nonindustrial types. As part of the City's industrial source control program, industries that may potentially discharge toxic organic or inorganic constituents into the Metro System are surveyed, discharge permits are issued, and industrial discharges are monitored. The applicant also performs an annual system-wide nonindustrial toxics survey program to further identify sources of toxic constituents within the Metro System. A summary of identified or suspected sources, sorted by categorical industries or non-categorical industrial/commercial facilities, for effluent pollutants of concern are listed in Volume III of the application.

Based on this information, EPA concludes that the applicant has met the requirement at 40 CFR 125.66(b).

3. Industrial Pretreatment Requirements

Under 40 CFR 125.66(c), an applicant that has known or suspected industrial sources of toxic pollutants must have an approved pretreatment program, in accordance with 40 CFR 403. EPA approved the City's industrial pretreatment program, called the Industrial Wastewater Control Program, on June 29, 1982. The City's pretreatment program is summarized in Volume IX, Appendix M, of the application. In 2020, of the approximately 144 MGD of wastewater flow, the estimated contribution from Metro System industrial users is 2.4 percent. The program's active permit inventory includes: 36 categorical industrial users subject to federal categorical pretreatment standards (CIUs) and 38 additional significant industrial users subject to federal reporting requirements and local limits (i.e., total 74 significant industrial users (SIUs)); 35 facilities with federally regulated processes where zero discharge is confirmed annually; and 913 non-categorical industrial users subject to applicable best management practices. The effectiveness of the Industrial Wastewater Control Program in reducing influent pollutant loadings is summarized in Appendix N. Local limits are reviewed annually and Volume IX, Appendix N, of the application contains the applicant's 2020 annual local limits re-evaluation for Point Loma WTP. This review notes that the City's current local limits methodology facilitates a proactive planning approach to controlling pollutants which may become a problem in the future for the Point Loma WTP headworks and permit.

Based on this information, EPA concludes that the applicant has met the requirement at 40 CFR 125.66(c).

4. Nonindustrial Source Control Program

Under 40 CFR 125.66(d), implementing CWA section 301(h)(7), the applicant must submit a proposed public education program and implementation schedule designed to minimize the entrance of nonindustrial toxic pollutants and pesticides into its POTW; and develop and implement additional nonindustrial source control programs, at the earliest possible schedule. These programs and schedules are subject to revision by the Regional Administrator during permit review and reissuance and throughout the term of the permit.

The applicant proposes to continue implementing and improving its nonindustrial source control program that has been in effect since 1982. The aim of this program is to reduce the introduction of nonindustrial toxic pollutants into the sewer system. Key elements of this program include: a Household Hazardous Waste Program; a public education program; development and implementation of Discharger permits and/or Best Management Practice Discharge Authorization requirements for select commercial sectors; and ongoing surveys to identify contaminant sources. Detailed descriptions of these program elements are presented in Volume IX, Appendix M, of the application.

Based on this information, EPA concludes that the applicant has met the requirement at 40 CFR 125.66(d).

G. Urban Area Pretreatment Program

Under 40 CFR 125.65, implementing CWA section 301(h)(6), applicants serving a population of 50,000 or more and having one or more toxic pollutants introduced into the POTW by one or more industrial dischargers must comply with urban area pretreatment program requirements. A POTW subject to these requirements must demonstrate it either has in effect a program that achieves secondary equivalency, as described at 40 CFR 125.65(d), or that industrial sources introducing waste into the treatment works are in compliance with all applicable pretreatment requirements, including numerical standards set by local limits, and that it will enforce these requirements. The applicant is subject to this regulation.

In the 1995 application, the City indicated it would comply with urban area pretreatment program requirements by demonstrating that it has applicable pretreatment requirements in effect. The City submitted its Urban Area Pretreatment Program to EPA in 1996; the program was approved by the Regional Water Board on August 13, 1997 and by EPA on December 1, 1998.

As explained the preamble to the revised CWA section 301(h) regulations (59 Fed. Reg. 40642, August 9, 1994):

> "EPA intends to determine a POTW's continuing eligibility for a 301(h) waiver under section 301(h)(6) by measuring industrial user compliance and POTW enforcement activities against existing criteria in the Agency's National Pretreatment Program. … In 1989, EPA established criteria for determining POTW compliance with pretreatment implementation obligations. One element of these criteria is the level of significant noncompliance of the POTW's industrial users. The General Pretreatment Regulations (part 403) identify the circumstances when industrial user noncompliance is significant. The industrial user significant noncompliance (SNC) criteria are set out in 40 CFR 403.8(f)(2)(vii) and address both effluent and reporting violations.
>
> For pretreatment purposes, a POTW's enforcement program is considered adequate if no more than 15 percent of its industrial users meet the SNC criteria in a single year. … In addition, a POTW is also considered in SNC if it fails to take formal appropriate and timely enforcement action against any industrial user, the wastewater from which passes through the POTW or interferes with the POTW operations.
>
> In enforcing the pretreatment programs, POTWs are expected to respond to respond to industrial user noncompliance using local enforcement authorities in accordance with an approved enforcement response plan (ERP) which is required of all approved pretreatment programs (see 40 CFR 403.5). POTWs including 301(h) POTWs, with greater than 15 percent of their users in SNC, or which fail to enforce appropriately against any single industrial user causing pass through or interference, are deemed to be failing to enforce their pretreatment program. …

> … EPA believes that the combination of industrial user compliance and POTW enforcement provides an appropriate measure of the POTW's eligibility for the 301(h) waiver under section 301(h)(6)."

The "1989 criteria" discussed in the preamble are found in a September 27, 1989 memorandum, from James R. Elder to EPA Regional Water Division Directors, entitled "FY 1990 Guidance for Reporting and Evaluating POTW Noncompliance with Pretreatment Implementation Requirements" (Elder, 27 September 1989 memorandum).

Although the 1994 preamble for the urban area pretreatment program refers to "industrial users" when discussing the 15 percent noncompliance criteria, the "1989 criteria" only apply to "significant industrial users". This term is defined at 40 CFR 403.3(t) and includes all industrial users subject to categorical standards and other industrial users designated by the POTW. Also, the Agency has issued clarifying guidance explaining that the significant noncompliance criteria at 40 CFR 403(f)(2)(vii) apply to only significant industrial users, rather than all industrial users. Consequently, in the context of the urban area pretreatment program, EPA views the 15 percent noncompliance criteria to include only significant industrial users in significant noncompliance which have not received at least one formal enforcement action from the POTW. EPA believes that the combination of industrial user compliance and POTW enforcement provides an appropriate measure of a POTW's eligibility for a variance under CWA section 301(h)(6).

The City's Enforcement Response Plan (ERP) is described in Volume IX, Appendix M, Chapter 4 - Enforcement, of the 2022 application. The second level of formal enforcement is an Administrative Notice and Order which may be issued when an industrial user: fails to take any significant action to establish compliance within 30 days of receiving a Notice of Violation; fails to establish full compliance, beginning on the 91st day after receiving a Notice of Violation; is in significant noncompliance status; or violates a Compliance Findings of Violation and Order.

EPA recognizes that a specific enforcement response to a violation must be decided on a case-by-case basis; however, for most cases, EPA believes that an administrative notice and order, as described in the City's Enforcement Response Plan, are appropriate when significant industrial users are in significant noncompliance.

The local limits approved by EPA as part of the City's urban area pretreatment program were included in all industrial discharge permits by December 1997. As a consequence of any new local limits, some significant industrial users may need time to come into compliance. In such cases, EPA expects the City to issue a Compliance Findings of Violation and Order which is the first level of formal enforcement in the City's Enforcement Response Plan. The order shall contain a schedule for achieving compliance with the new local limits. Significant industrial users receiving such orders will not be included in the 15 percent noncompliance criteria.

Table 26 provides summary statistics regarding the applicant's compliance rates with respect to significant industrial users and how the applicant had applied the definition of significant noncompliance to significant industrial users failing to achieve compliance with all applicable regulations. The summary statistics in Table 28 indicate the applicant is meeting the 15 percent noncompliance criteria.

Table 26. Summary of significant industrial users (SIUs) in significant noncompliance (SNC) percentage status.

Parameter	2014	2015	2016	2017	2018	2019	2020
Number of SIU Permitted Outfalls	119	125	118	114	123	127	129
Number of Outfalls in Consistent Compliance	102	103	101	96	102	101	100
Number of Outfalls in Inconsistent Compliance	13	15	13	13	10	14	11
Number of Outfalls in SNC	4	7	4	6	11	12	18
Percentage (%) of Total Number of SIUs in SNC	3.4 % (4/119)	5.6	3.4 %	5.3 %	8.9 %	9.4 %	13.9 %

Federal pretreatment regulations at 40 CFR 403.8(f)(5) require the City to develop and implement an enforcement response plan. This plan must contain procedures indicating how the City will investigate and respond to instances of industrial user noncompliance. The City has an enforcement response plan and is applying that plan as required by federal regulations. The City is taking enforcement actions as necessary and the rate of significant noncompliance among significant industrial users is less than the 15 percent criterion.

EPA finds that the applicant’s urban area pretreatment program is acceptable, in the context of applicable 301(h) requirements. The 301(h)-modified permit will require an annual rate of significant noncompliance for significant industrial users that is no more than 15 percent of the total number of the applicant’s significant industrial users. In addition, the applicant reported no instances of interference or pass-through. Consequently, enforcement against industrial users regarding those problems was not necessary and no Administrative Penalty Orders were issued.

Based on this information, EPA concludes that the applicant has met the requirement at 40 CFR 125.65.

H. Increase in Effluent Volume or Amount of Pollutants Discharged

Under 40 CFR 125.67, which implements CWA section 301(h)(8), no modified discharge may result in any new or substantially increased discharges of the pollutant to which the modification applies above the discharge specified in the 301(h)-modified permit. In addition, the applicant must provide projections of effluent volume and mass loadings for any pollutants to which the modification applies, in five year increments, for the design life of the facility.

CWA section 301(j)(5) requires the City to remove not less than 58 percent of the biochemical oxygen demand (on an annual average) and not less than 80 percent of total suspended solids (on a monthly average). The City must also implement a wastewater reclamation program that, at minimum, will result in a reduction in the quantity of suspended solids discharged into the marine environment during the period of the modification. The projected end-of-permit (2029) annual average effluent flow is 130 MGD under facilities planning projections. The NPDES permit proposes the following effluent limits for total suspended solids and biochemical oxygen demand.

Table 27. Effluent limits based on CWA sections 301(h) and (j)(5).

Effluent Constituent	Units	Annual Average	Monthly Average
TSS	% removal[1]	---	≥ 80
	metric tons/year	11,999[2]	---
		11,998[3]	---
BOD_5	% removal[1]	≥ 58	---

[1] To be calculated on a system-wide basis, as provided in Section 7.9 of the Order (No. R9-2024-0004)/Permit (No. CA0107409), which is carried over from Addendum No. 1 to Order No. R9-2017-0007.

[2] To be achieved on permit effective date through end of fourth year of permit (2024 – 2028). Applies only to TSS discharges from POTWs owned and operated by the Discharger and the Discharger’s wastewater generated in the Metro System service area; does not apply to wastewater (and the resulting TSS) generated in Mexico which, as a result of upset or shutdown, is treated at and discharged from Point Loma WTP.

[3] To be achieved on beginning of the fifth year of permit (2029). Applies only to TSS discharges from POTWs owned and operated by the Discharger and the Discharger’s wastewater generated in the Metro System service area; does not apply to wastewater (and the resulting TSS) generated in Mexico which, as a result of upset or shutdown, is treated at and discharged from Point Loma WTP.

According to the applicant, the design life of Metro System treatment facilities varies among the treatment components. Onsite mechanical equipment may have a design life of 20 years, while concrete structures may last for 50 years or more. In responding to 40 CFR 125.67, the applicant uses a design life of 20 years to project flow and mass loads. Table II.A-31 in Volume III of the 2022 application provides projections for Metro System flow and mass loads for total suspended solids and biochemical oxygen demand, in one year increments, through 2041. This table also provides flow and total suspended solids load projections for the PLOO discharge. Table 28 summarizes these projections for the term of the proposed permit (2024-2029).

Table 28. Point Loma Ocean Outfall flow (MGD) and BOD and TSS mass loading (mt/yr) projections using facilities planning flow estimates during the term of the proposed permit.

Year	Projected Annual Average Flow	Projected BOD Mass Emissions	Projected TSS Mass Emissions	Proposed TSS Mass Emission Effluent Limits
2023	155.4	28,700	9,360	11,999

Year	Projected Annual Average Flow	Projected BOD Mass Emissions	Projected TSS Mass Emissions	Proposed TSS Mass Emission Effluent Limits
2024	156.1	28,500	9,230	11,999
2025	156.8	28,500	9,240	11,999
2026	157.7	28,700	9,300	11,999
2027	158.5	29,000	9,540	11,999
2028	128.9	23,600	7,760	11,999
2029	129.7	23,700	7,790	11,998

The applicant's projections in Table 28 and proposed effluent limits in Table 27 satisfy the applicable requirements. Based on Table 28, EPA believes that a total suspended solids mass emission rate of 11,999 metric tons per year for first four years and 11,998 metric tons per fifth year would be achievable during the five years of the proposed 301(h) modification. During this period, EPA recognizes that reductions in mass emissions resulting from increased water reclamation are likely to be seasonal and anticipates the potential for corresponding higher mass emission rates during wet weather months. In the future, the City needs to pursue additional water reclamation and reuse projects, including those which demand a year-round supply of reclaimed water so as to maintain long-term compliance with this decision criterion.

I. Compliance with Other Applicable Laws

Under 40 CFR 125.59(b)(3), a 301(h)-modified permit shall not be issued where such issuance would conflict with applicable provisions of State, local, or other federal laws or Executive Orders.

1. Coastal Zone Management Act

A 301(h)-modified permit shall not be issued where such issuance would conflict with the federal Coastal Zone Management Act, as amended. In accordance with this law, an applicant must receive State certification that the modified discharge complies with applicable portions of the approved State coastal zone management program, or the State waives such certification.

During the course of adoption of the 301(h)-modified NPDES permit by the Regional Water Board, the applicant will transmit correspondence requesting a determination from the California Coastal Commission, San Diego Coast Region, that the existing and proposed Point Loma WTP discharge are consistent with applicable coastal zone management requirements. The issuance of a 301(h)-modified permit for the Point Loma WTP discharge is contingent upon the California Coastal Commission certification.

2. Marine Protection, Research and Sanctuaries Act

A 301(h)-modified permit shall not be issued where such issuance would conflict with the federal Marine Protection, Research and Sanctuaries Act, as amended. In accordance with this law, a 301(h)-modified permit may not be issued for a discharge located in a marine sanctuary designated pursuant to Title III, if the regulations applicable to the sanctuary prohibit issuance of such a permit.

The PLOO is not located in a marine sanctuary, although more than a dozen protected marine areas exist within San Diego County. Two of these areas (San Diego-La Jolla Ecological Reserve and San Diego Marine Life Refuge), located approximately 21 to 22 kilometers (69 to 72 feet) north of the discharge point, have been designated by the State Water Board as “Areas of Special Biological Significance”. The discharge of wastewater to these zones is prohibited by the California Ocean Plan. A detailed description of protected areas in the vicinity of the PLOO is found in Volume VII, Appendix H, of the application. EPA believes that given the distance to protected areas, pollutants discharged from the PLOO will be diluted to background levels by the time the wastefield approaches any of these protected areas.

3. Endangered Species Act

A 301(h)-modified permit shall not be issued where such issuance would conflict with Section 7 of the Endangered Species Act, as amended. This law is administered by the U.S. Fish and Wildlife Service and the NOAA National Marine Fisheries Service (collectively, the Services).

According to the Services, 29 listed and candidate species may occur in the vicinity of Point Loma. Operation of the PLOO could affect these species by altering physical, chemical, or biological conditions, including: habitat suitability, water quality, biological integrity, food web dynamics, or the health of organisms. EPA determined that the modified discharge would have no effect on listed bird species; may affect but is not likely to adversely affect listed fish species, black abalone, sea star, and whale species (i.e., right whale, sei whale, and sperm whale); and is likely to adversely affect listed sea turtles, white abalone, seal, and whale species (i.e., blue whale, fin whale, gray whale, and humpback whale). These effect determinations are explained in the biological evaluation.

EPA has provided determinations to the Services that the modified discharge is consistent with the federal Endangered Species Act. The issuance of a 301(h)-modified permit for the Point Loma WTP discharge is contingent upon coordination or, if necessary, consultation with the Services.

4. Magnuson-Stevens Fisheries Conservation and Management Act

A 301(h)-modified permit shall not be issued where such issuance would conflict with the federal Magnuson-Stevens Fishery Conservation and Management Act, as amended (the MSA).

According to the applicant, the marine environment in the vicinity of Point Loma supports a wide variety of commercial fisheries that are protected and managed through the "Essential Fish Habitat" provisions of the MSA. The fisheries management plans (FMPs) for species that could occur in the Point Loma area are the Pacific Groundfish FMP (83 species), the Coastal Pelagic Species FMP (6 species), and the U.S. West Coast Fisheries for Highly Migratory Species (13 species). According to the applicant, the PLOO could have two types of effects on fisheries: physical impacts associated with the presence of the pipeline and diffusers on the ocean bottom, and biological impacts associated with the release of various contaminants from the PLOO discharge. Based upon the effect analysis, EPA has determined that the modified discharge would have an adverse effect on Essential Fish Habitat for federally managed fish species.

EPA has requested a determination by the National Marine Fisheries Service that the modified discharge is consistent with the Magnuson-Stevens Fishery Conservation and Management Act. The issuance of a 301(h)-modified permit for the Point Loma WTP discharge is contingent upon the NMFS' determination.

J. State Determination and Concurrence

In accordance with 40 CFR 125.59(i)(2), no 301(h)-modified permit shall be issued until the appropriate State certification/concurrence is granted or waived, or if the State denies certification/concurrence, pursuant to 40 CFR 124.54.

The PLOO discharges beyond the 3 nautical mile State waters limit, into federal waters. Therefore, EPA has primary regulatory responsibility for the discharge. However, in May 1984, a Memorandum of Understanding was signed between EPA and the State of California to jointly administer discharges that are granted 301(h) modifications from federal secondary treatment standards. Under California's Porter-Cologne Water Quality Control Act, the Regional Water Boards issue waste discharge requirements which serve as NPDES permits. The consolidated issuance of a 301(h)-modified NPDES permit for the Point Loma WTP discharge which incorporates both the federal 301(h) variance and State waste discharge requirements will serve as the State's concurrence, pursuant to 40 CFR 124.54.

(Page intentionally blank)

REFERENCES

Bartlett D., Dayton P., Franks P., Levin L., Parnell E., Shaffer L., and Winant C. 2004. Point Loma Outfall Project. City of San Diego Ocean Monitoring Program, Public Utilities Department, Environmental Monitoring and Technical Services Division, San Diego, CA.

Bascom, W., A.J. Mearns, and J.Q. Word. 1979. Establishing boundaries between normal, changed, and degraded areas. In: Southern California Coastal Water Research Project Annual Report, 1978. Long Beach, CA. pp. 81-95.

City of San Diego. 1995. 301(h) Application for Modification of Secondary Treatment Requirements, Point Loma Ocean Outfall. City of San Diego Metropolitan Wastewater Department, Environmental Monitoring and Technical Services Division, San Diego, CA.

City of San Diego. 2001. NPDES Permit Application and 301(h) Application for Modification of Secondary Treatment Requirements, Point Loma Ocean Outfall. Appendices G and H. City of San Diego Metropolitan Wastewater Department, Environmental Monitoring and Technical Services Division, San Diego, CA.

City of San Diego. 2007. Application for Renewal of NPDES CA0107409 and 301(h) Modified Secondary Treatment Requirements, Point Loma Ocean Outfall. Appendices G and H. City of San Diego Metropolitan Wastewater Department, Environmental Monitoring and Technical Services Division, San Diego, CA.

City of San Diego. 2014. Cooperative Agreement in Support of Pure Water San Diego. City of San Diego, San Diego Coastkeeper, San Diego County Surfrider, Coastal Environmental Rights Foundation, San Diego Audubon Society.

City of San Diego. 2015. Application for Renewal of NPDES CA0107409 and 301(h) Application for Modification of Secondary Treatment Requirements for Biochemical Oxygen Demand and Total Suspended Solids, Point Loma Ocean Outfall and Point Loma Wastewater Treatment Plant. Appendixes I, J and K. City of San Diego Public Utilities Department, Environmental Monitoring and Technical Services Division, San Diego, CA.

City of San Diego. 2021. Biennial Receiving Waters Monitoring and Assessment Report for the Point Loma and South Bay Ocean Outfalls, 2018–2019. City of San Diego Ocean Monitoring Program, Public Utilities Department, Environmental Monitoring and Technical Services Division, San Diego, CA. March 2021. https://www.sandiego.gov/sites/default/files/2018_2019_biennial_report_new.pdf

City of San Diego. 2022. Report of Waste Discharge and Application for Renewal of NPDES CA0107409 and 301(h) Modified Secondary Treatment Requirements, Point Loma

Wastewater Treatment Plant and Ocean Outfall. Volumes I-X. City of San Diego, Public Utilities Department. Submitted to: U.S. Environmental Protection Agency. March 2022.

City of San Diego. 2022. Biennial Receiving Waters Monitoring Report for the Point Loma and South Bay Ocean Outfalls, 2020-2021. City of San Diego Ocean Monitoring Program, Public Utilities Department, Environmental Monitoring and Technical Services Division, San Diego, CA. June 2022. https://www.sandiego.gov/sites/default/files/compressed_2020-2021_biennial_receiving_waters_monitoring_report.pdf

City of San Diego. 2023. Supplemental SBWRP Facility Information to Application for Renewal of NPDES CA0107409 and 301(h) Modified Secondary Treatment Requirements, Point Loma Wastewater Treatment Plant and Ocean Outfall. City of San Diego, Public Utilities Department. March 24, 2023 emails to Peter Kozelka, U.S. Environmental Protection Agency.

City of San Diego. 2023. City of San Diego Response to EPA’s Technical Questions. City of San Diego, Public Utilities Department. October 27 and 30, 2023 emails to Julie Song, U.S. Environmental Protection Agency.

City of San Diego. 2023. Euphotic Zone Study – Phase 1 Report, City of San Diego Point Loma Wastewater Treatment Plant, Ocean Monitoring Program, Environmental Monitoring and Technical Services Division, San Diego, CA. June 30, 2023.

Elder, J.R. September 27, 1989. Memorandum to EPA Regional Water Management Division Directors titled: FY 1990 Guidance for Reporting and Evaluating POTW Noncompliance with Pretreatment Implementation Requirements. U.S. Environmental Protection Agency, Washington D.C.

Eppley, R.W., E.H. Renger, W.G. Harrison, and J.J. Cullen. 1979. Ammonium distribution in Southern California coastal waters and its role in the growth of phytoplankton. Limnol. Oceanogr., 24(3):495-509.

Hendricks, T.J. and R. Eganhouse. 1992. Modification and verification of sediment deposition models. Technical Report 265. Prepared for California State Water Resources Control Board, Contract 7-192-250-0. Southern California Coastal Water Research Project, Long Beach, CA. 331 pp.

Klasing, S. and R. Brodberg. 2008. Development of Fish Contaminant Goals and Advisory Tissue Levels for Common Contaminants in California Sport Fish: Chlordane, DDTs, Dieldrin, Methylmercury, PCBs, Selenium, and Toxaphene. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Sacramento, CA. https://oehha.ca.gov/media/downloads/fish/report/atlmhgandothers2008c.pdf

Mearns, A.J., M. Matta, G. Shigenaka, D. MacDonald, M. Buchman, H. Harris, J. Golas, and G. Lauenstein. 1991. Contaminant Trends in the Southern California Bight: Inventory and Assessment. NOAA Technical Memorandum NOS ORCA 62. National Oceanic and Atmospheric Administration, Seattle, WA.

Nelson, J.R., J.R. Beers, R.W. Eppley, G.A. Jackson, J.J. McCarthy, and A. Souter. 1987. A particle flux study in the Santa Monica – San Pedro Basin off Los Angeles: Particle flux, primary production, and transmissometer survey. Cont. Shelf Res. 7:307-328.

Nezlin N.P., McLaughlin K., Booth J.A.T., Cash C.L., Diehl D.W., Davis K.A., Feit A., Goericke R., Gully J.R., Howard M.D., Johnson S., Latker A.K., Mengel M.J., Robertson G.L., Steele A., Terriquez L., Washburn L., and Weisberg S.B. 2018. Spatial and temporal patterns of chlorophyll concentration in the southern California bight. Journal of Geophysical Research: Oceans 123: 231-245.

NOAA. 1999. Sediment Quality Guidelines developed for the National Status and Trends Program (6/12/1999). 12 pp. https://rais.ornl.gov/documents/ECO_BENCH_NOAA.pdf

Ranasinghe, J.A., A.M. Barnett, K. Schiff, D.E. Montagne, C. Brantley, C. Beegan, D.B. Cadien, C. Cash, G.B. Deets, D.R. Diener, T.K. Mikel, R.W. Smith, R.G. Velarde, S.D. Watts, and S.B. Weisberg. 2007. Southern California Bight 2003 Regional Monitoring Program: III. Benthic Macrofauna. Technical Report 529. Southern California Coastal Water Research Project, Costa Mesa, CA. https://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/529_B03_Benthic.pdf

San Diego RWQCB. 1994. Water Quality Control Plan for the San Diego Basin (Basin Plan). California Regional Water Quality Control Board, San Diego Region, San Diego, CA. http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/index.shtml.

San Diego RWQCB and USEPA. April 2017. Order No. R9-2017-0007 and National Pollutant Discharge Elimination System Permit No. CA0107409, City of San Diego, E.W. Blom Point Loma Metropolitan Wastewater Treatment Plant and Ocean Outfall. https://www.waterboards.ca.gov/rwqcb9/board_decisions/adopted_orders/2017/R9-2017-0007.pdf

San Diego RWQCB and USEPA. August 2022. Order No. R9-2022-0078, Addendum No. 1 to Order No. R9-2017-0007, and National Pollutant Discharge Elimination System Permit No. CA0107409, City of San Diego, E.W. Blom Point Loma Metropolitan Wastewater Treatment Plant and Ocean Outfall. https://waterboards.ca.gov/sandiego/board_decisions/adopted_orders/2022/r9_2022_0078.pdf

Schiff, K.C., M.J. Allen, E.Y. Zeng, and S.M. Bay. 2000. Southern California. Marine Pollution Bulletin 41(1-6):76-93. https://ftp.sccwrp.org/pub/download/DOCUMENTS/JournalArticles/333_scb.pdf

Schiff, K., K. Maruya, and K. Christenson. 2006. Southern California Bight 2003 Regional Monitoring Program: II. Sediment Chemistry. Technical Report 492. Southern California Coastal Water Research Project, Westminster, CA. https://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/492_B03_sed_chem.pdf

Schoof, RA, and LJ Yost, J Eickhoff, EA Crecilius, DW Cragin, DM Meacher, and DB Menzel. 1999. *A Market Basket Survey of Inorganic Arsenic in Food*. Food and Chem. Toxic. 37: 839—846.

Smith, J., Connell, P., Evans, R. H., Gellene, A. G., Howard, M. D., Jones, B. H., Kaveggia, S., Palmer, L., Schnetzer, A. & Seegers, B. N. 2018. A decade and a half of Pseudo-nitzschia spp. and domoic acid along the coast of southern California. Harmful algae 79, 87-104.

Smith, R.W., M. Bergen, S.B. Weisberg, D. Cadien, A. Dalkey, D. Montagne, J. Stull, and R.G. Velarde. 2001. Benthic response index for assessing infaunal communities on the Southern California mainland shelf. Ecological Applications 11(4):1073-1087.

SOCWA (South Orange County Wastewater Authority). 2020. Amended Report of Waste Discharge, Renewal of NPDES CA0107417, San Juan Creek Ocean Outfall with Inclusion of Doheny Desalination Project Brine Discharge.

SWRCB. 2019. Water Quality Control Plan, Ocean Waters of California (California Ocean Plan), Revised 2019. California State Water Resources Control Board, Sacramento, CA. https://www.waterboards.ca.gov/water_issues/programs/ocean/docs/oceanplan2019.pdf

USEPA. 1982. Revised Section 301(h) Technical Support Document. EPA 430/9-82-011. U.S. Environmental Protection Agency, Office of Water Operations, Washington, D.C.

USEPA, 1986. Ambient Water Quality Criteria for Bacteria. U.S. Environmental Protection Agency, Washington D.C. Office of Water. EPA 4405-84-002.

USEPA. 1994. Discharges into Marine Waters; Modification of Secondary Treatment Requirements; Final Rule. U.S. Environmental Protection Agency, Washington, D.C. Federal Register: August 9, 1994, Vol. 59, No. 152, pp. 40642-40669.

USEPA. 1994. Amended Section 301(h) Technical Support Document. EPA 842-B-94-007. U.S. Environmental Protection Agency, Office of Wetlands, Oceans and Watersheds, Washington, D.C.

USEPA. 1995. Tentative decision document: City of San Diego's application for 301(h) discharge from the E.W. Blom Metropolitan Wastewater Treatment Plant and Ocean Outfall. U.S. Environmental Protection Agency, Region IX, San Francisco.

USEPA. 2000. Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories. Volume 1: Fish Sampling and Analysis. Third Edition. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. https://www.epa.gov/sites/default/files/2018-11/documents/guidance-assess-chemical-contaminant-vol1-third-edition.pdf

USEPA. 2001. Water Quality Criteria: Notice of Availability of Water Quality Criterion for the Protection of Human Health: Methylmercury; Final Rule. U.S. Environmental Protection Agency, Washington, D.C. Federal Register: January 8, 2001, Vol. 66, No. 5, pp 1344-1359. https://www.govinfo.gov/content/pkg/FR-2001-01-08/pdf/FR-2001-01-08.pdf

USEPA, 2004. Water Quality Standards for Coastal and Great Lakes Recreation Waters; Final Rule. U.S. Environmental Protection Agency, Washington D.C. Federal Register: November 16, 2004, Vol. 69, No. 220. pp. 67218-67243. https://www.federalregister.gov/documents/2004/11/16/04-25303/water-quality-standards-for-coastal-and-great-lakes-recreation-waters

USEPA, 2012. Recreational Water Quality Criteria. U.S. Environmental Protection Agency, Washington D.C. Office of Water. EPA 820-F-12-058. December 2012. https://www.epa.gov/wqc/2012-recreational-water-quality-criteria

USEPA. 2017. Technical Decision Document: City of San Diego's Point Loma Wastewater Treatment Plant Application for a Modified NPDES Permit under Section 301(h) and (j)(5) of the Clean Water Act. U.S. Environmental Protection Agency, Region IX, San Francisco.

APPENDIX A – FIGURES

LIST OF FIGURES

Figure A-1. Map of the San Diego Metropolitan Sewage System service area

Figure A-2. Schematic of the existing Metro System treatment and solids handling facilities.

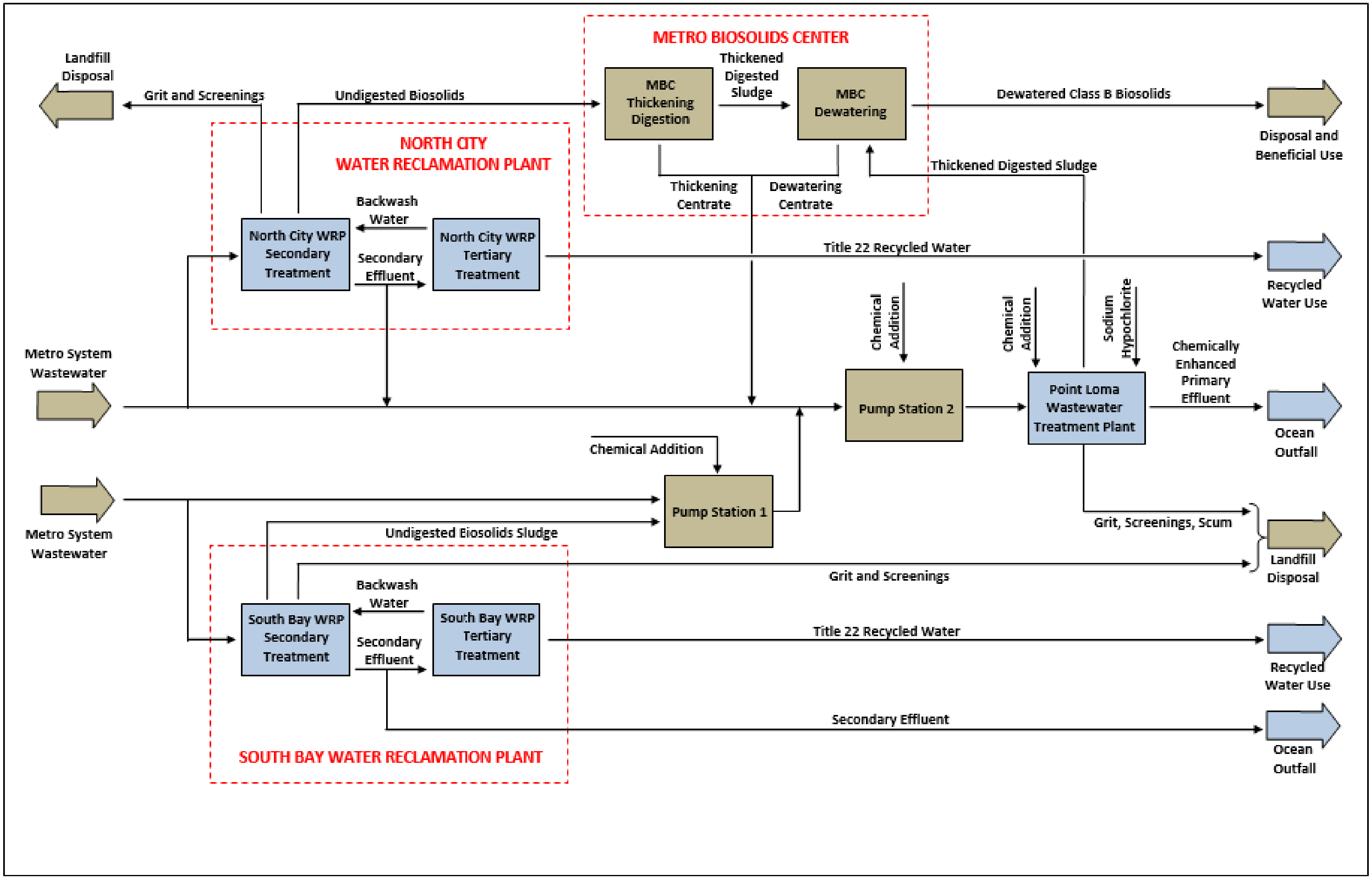


Figure A-3. Map of water quality monitoring station locations in offshore, kelp bed, and shoreline areas.

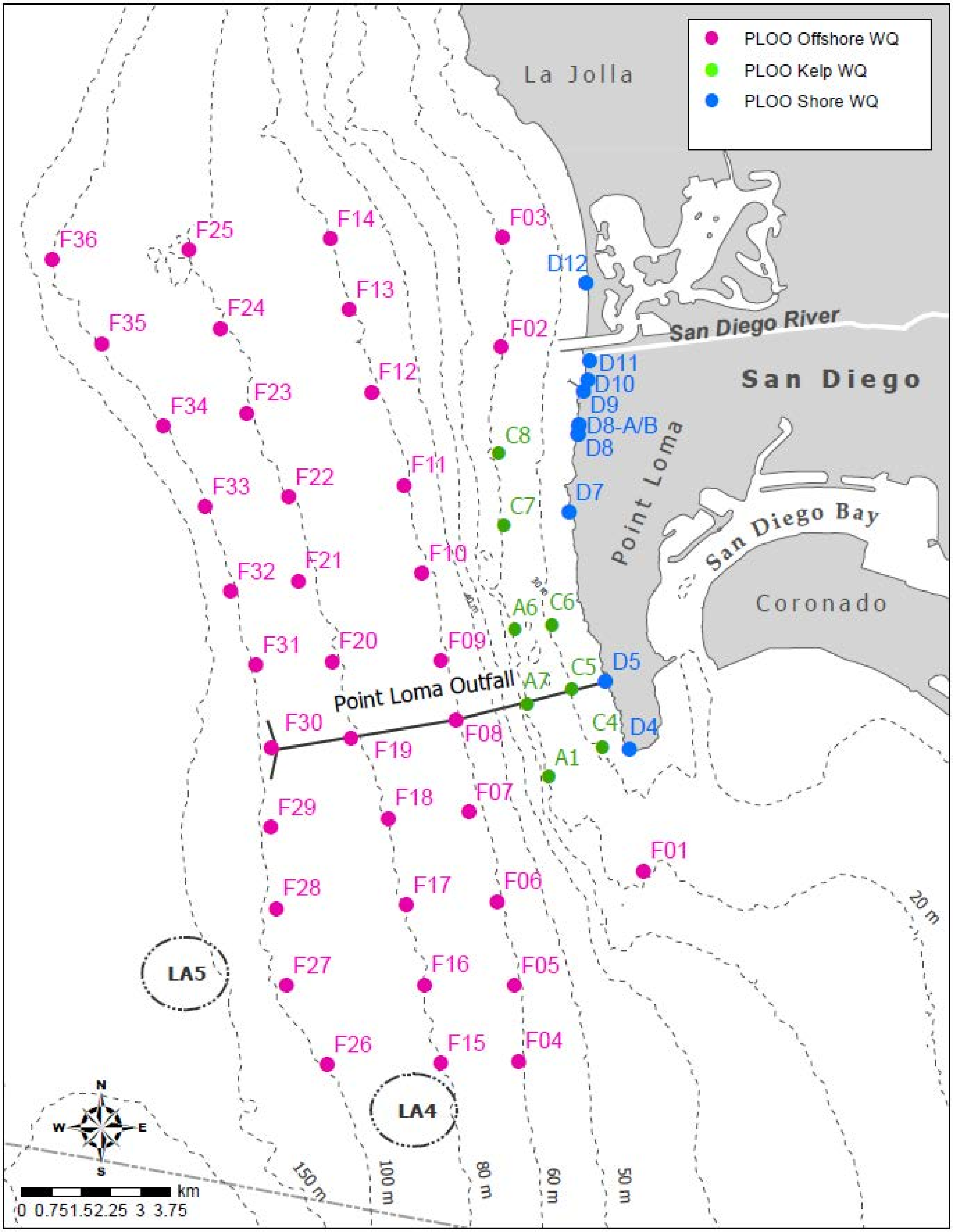


Figure A-4. Map of sediment chemistry and benthic macrofauna monitoring station locations in offshore area.

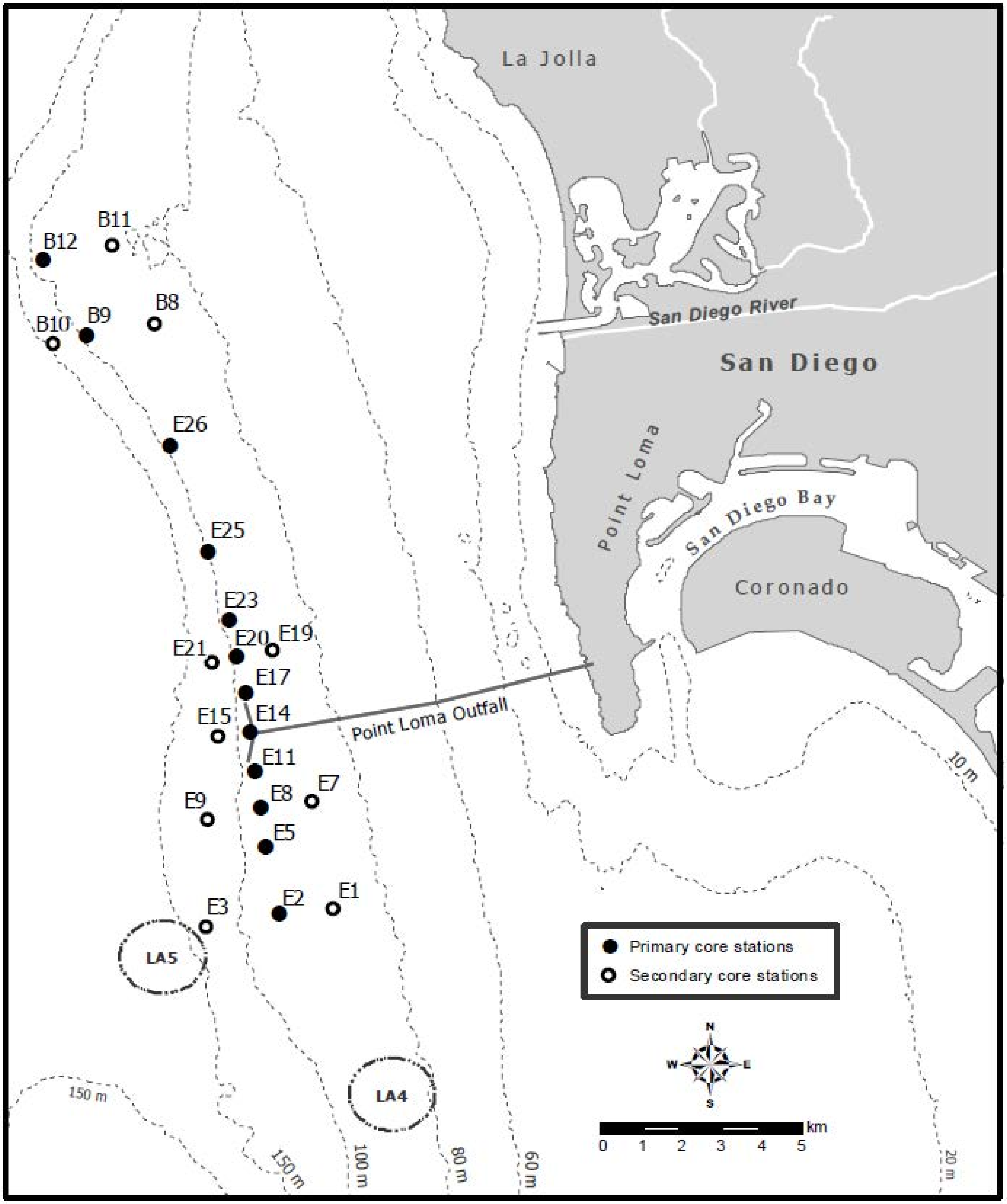


Figure A-5. Long-term average and standard deviation for percent transmissivity at 20, 60, 80, and 100 meter contours (January 2015 through December 2021)

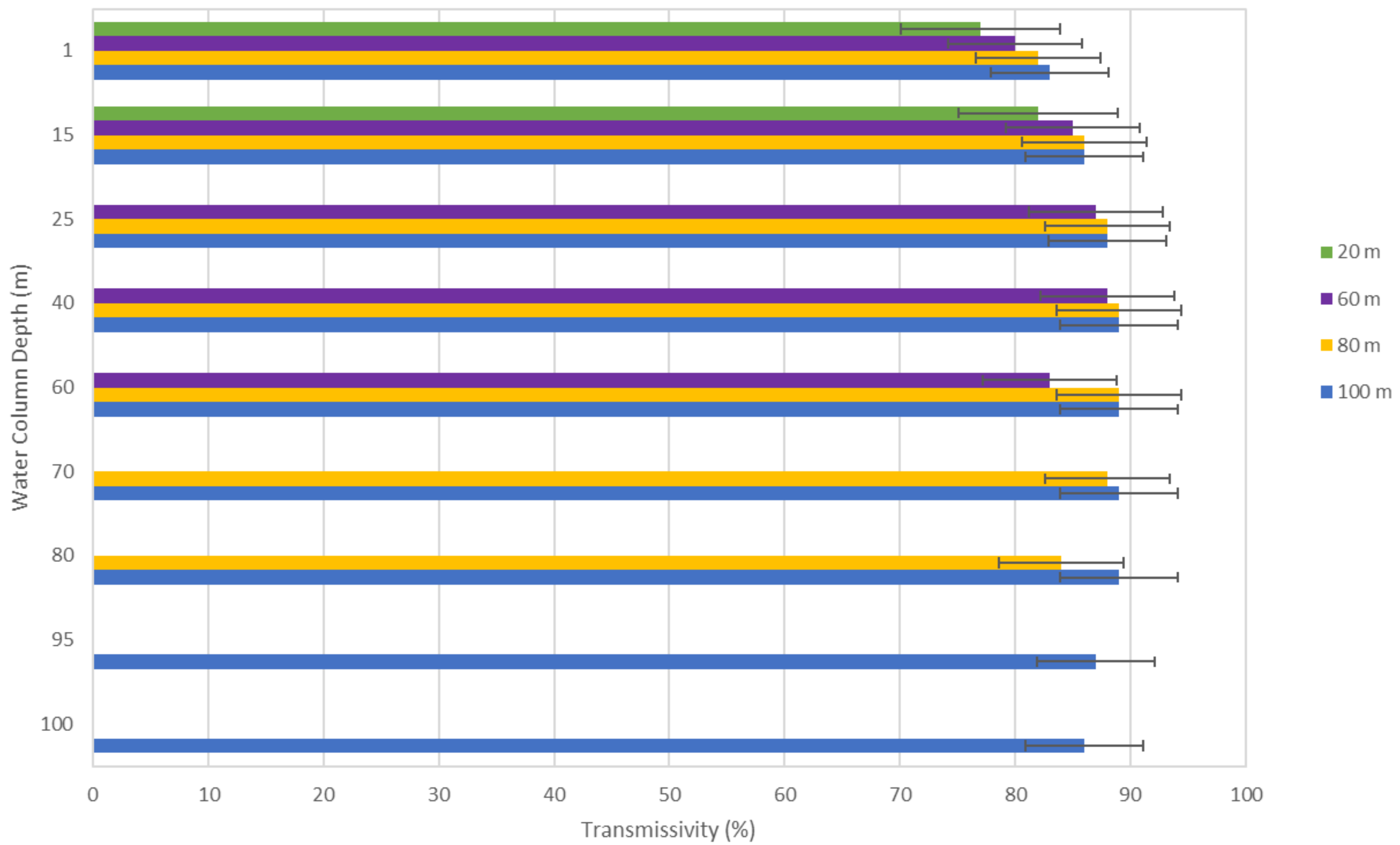


Figure A-6. Long-term average and standard deviation for dissolved oxygen at 20, 60, 80, and 100 meter contours (January 2015 through December 2021)

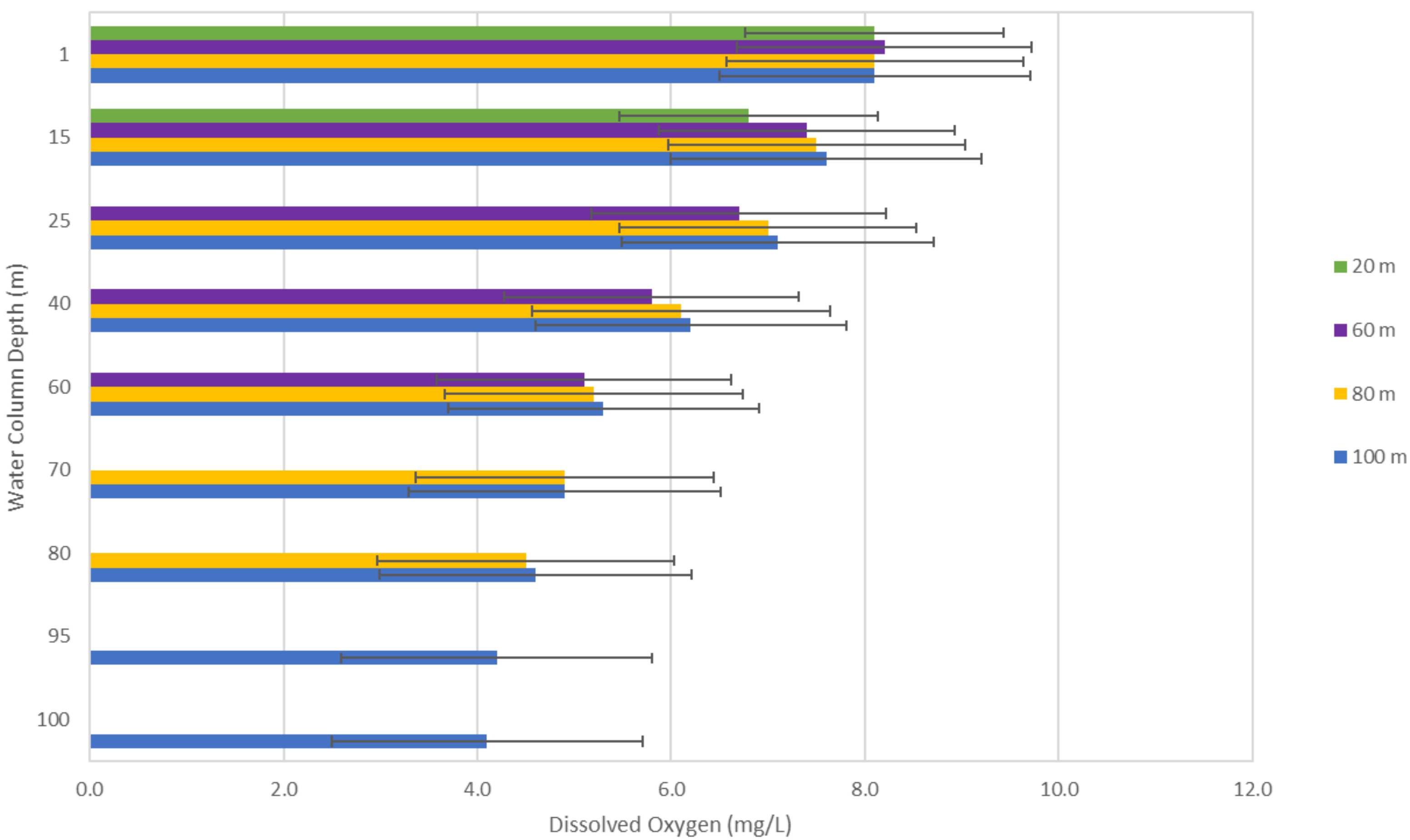


Figure A-7. Long-term average and standard deviation for pH at 20, 60, 80, and 100 meter contours (January 2015 through December 2021)

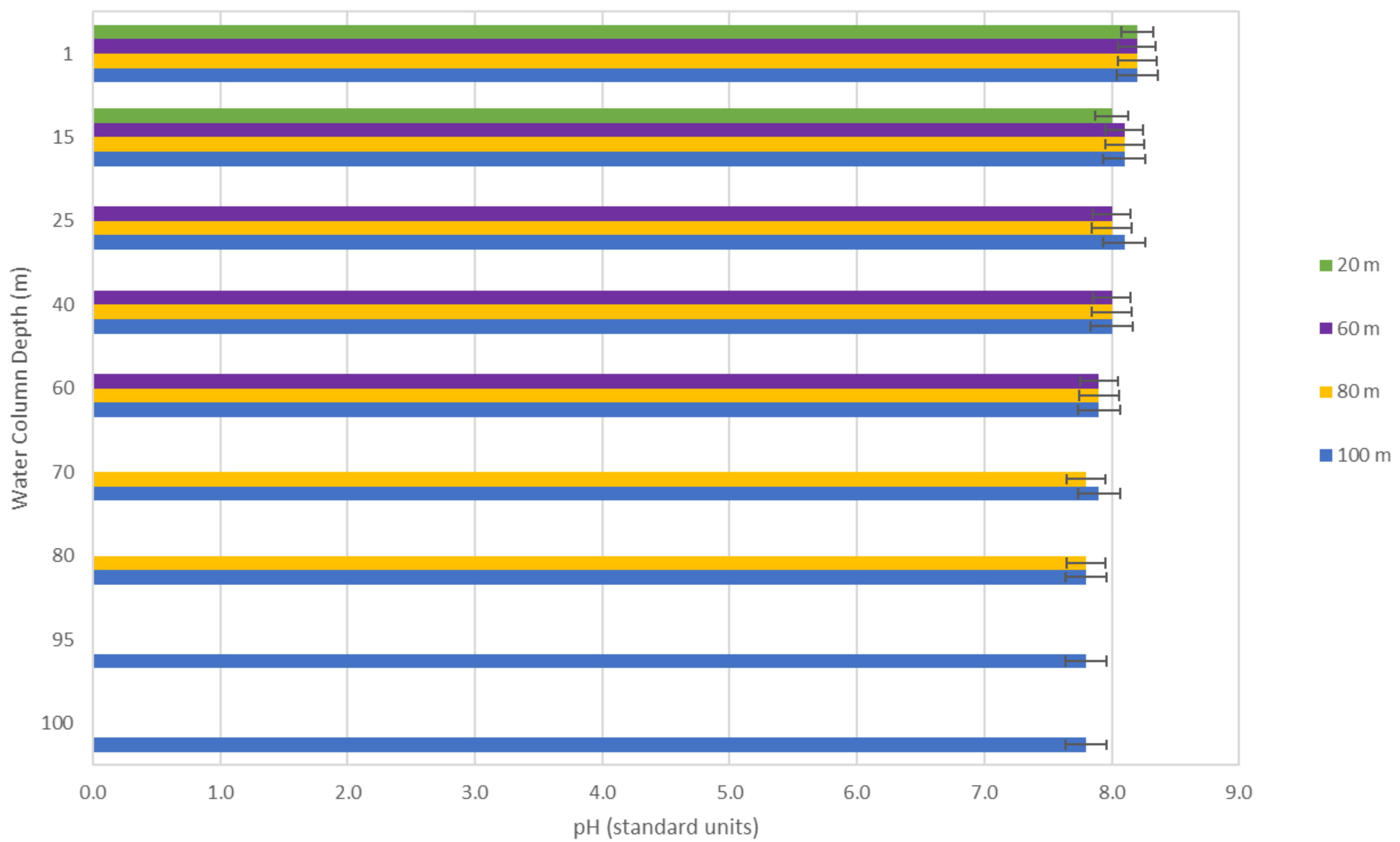


Figure A-8. Long-term average and standard deviation for chlorophyll *a* at 20, 60, 80, and 100 meter contours (January 2015 through December 2021)

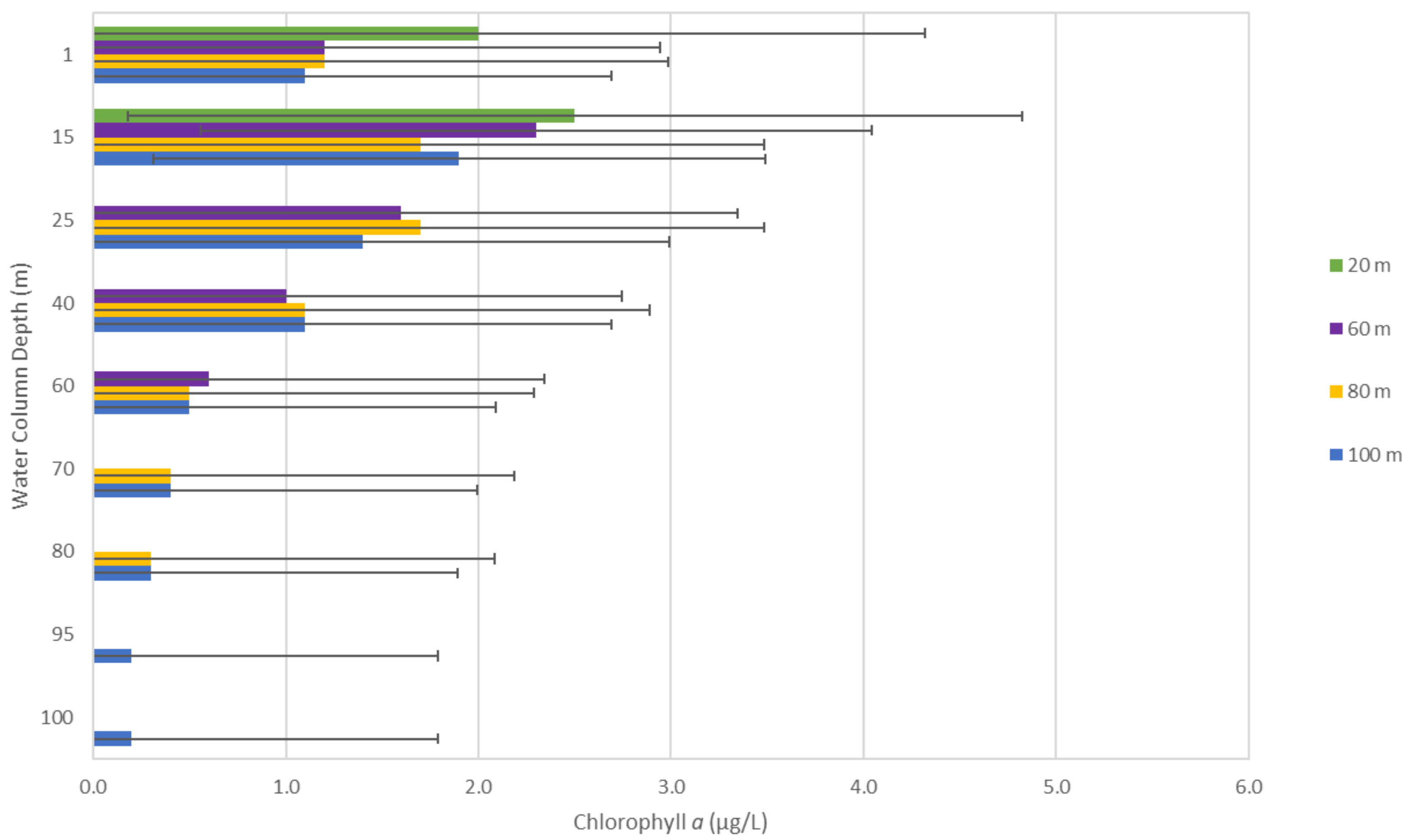
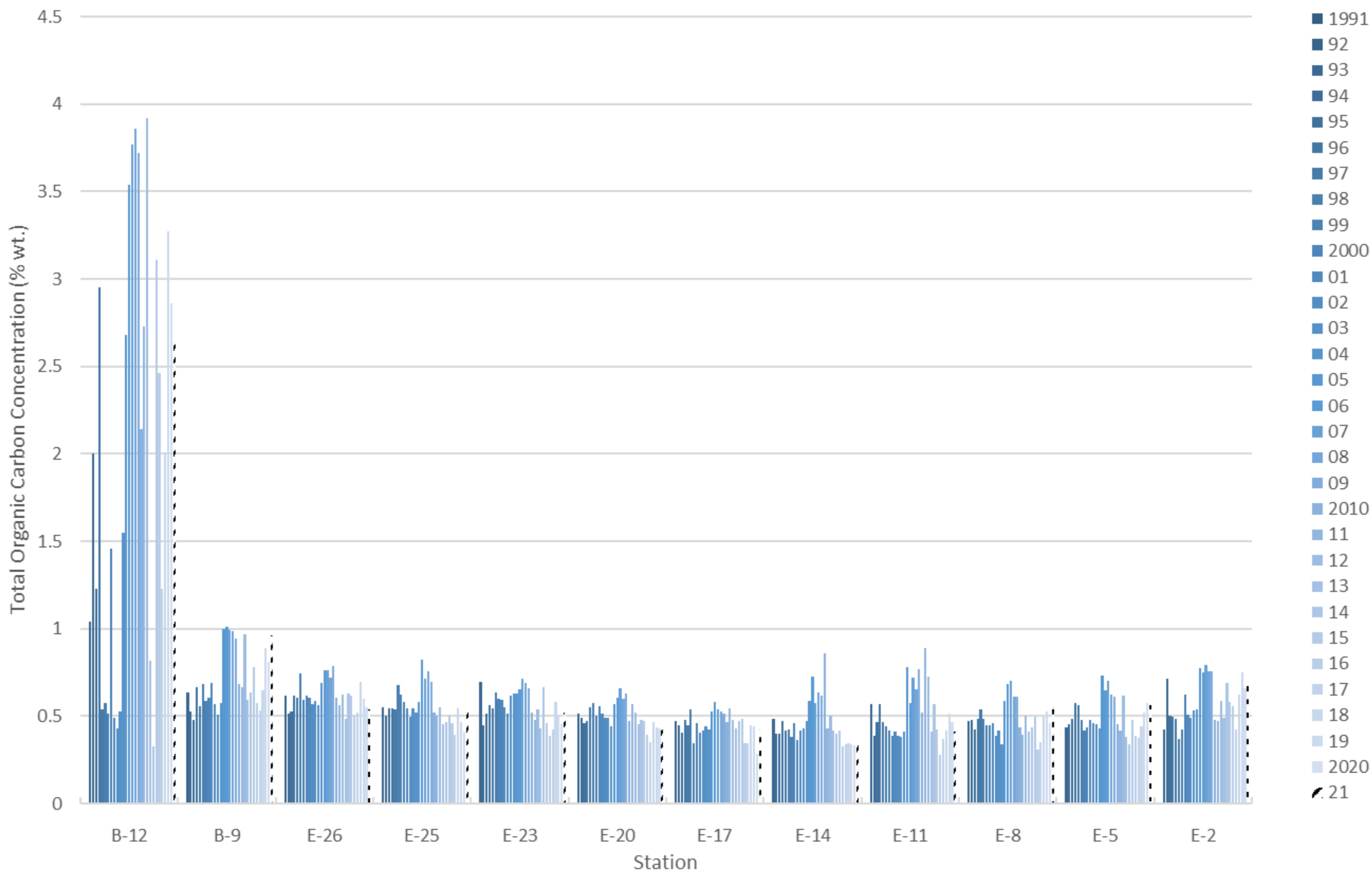


Figure A-9. Total organic carbon concentrations (% wt.) in sediment at all 98 m depth stations during July (1991-2021).
Stations E-17, E-14, E-11 are nearfield to Point Loma discharge outfall.



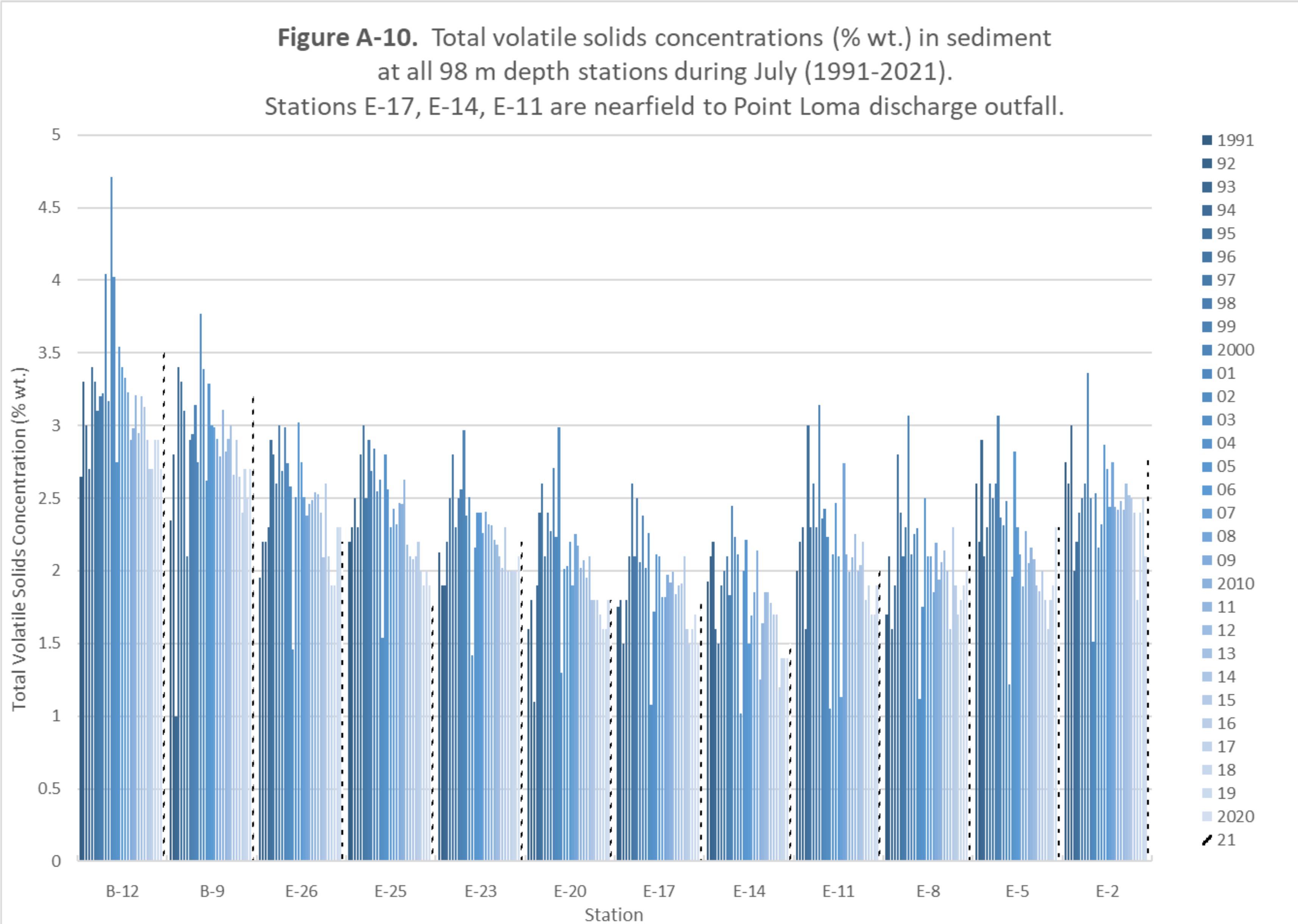


Figure A-10. Total volatile solids concentrations (% wt.) in sediment at all 98 m depth stations during July (1991-2021).
Stations E-17, E-14, E-11 are nearfield to Point Loma discharge outfall.
Total Volatile Solids Concentration (% wt.)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
B-12
B-9
E-26
E-25
E-23
E-20
E-17
E-14
E-11
E-8
E-5
E-2
Station
1991
92
93
94
95
96
97
98
99
2000
01
02
03
04
05
06
07
08
09
2010
11
12
13
14
15
16
17
18
19
2020
21

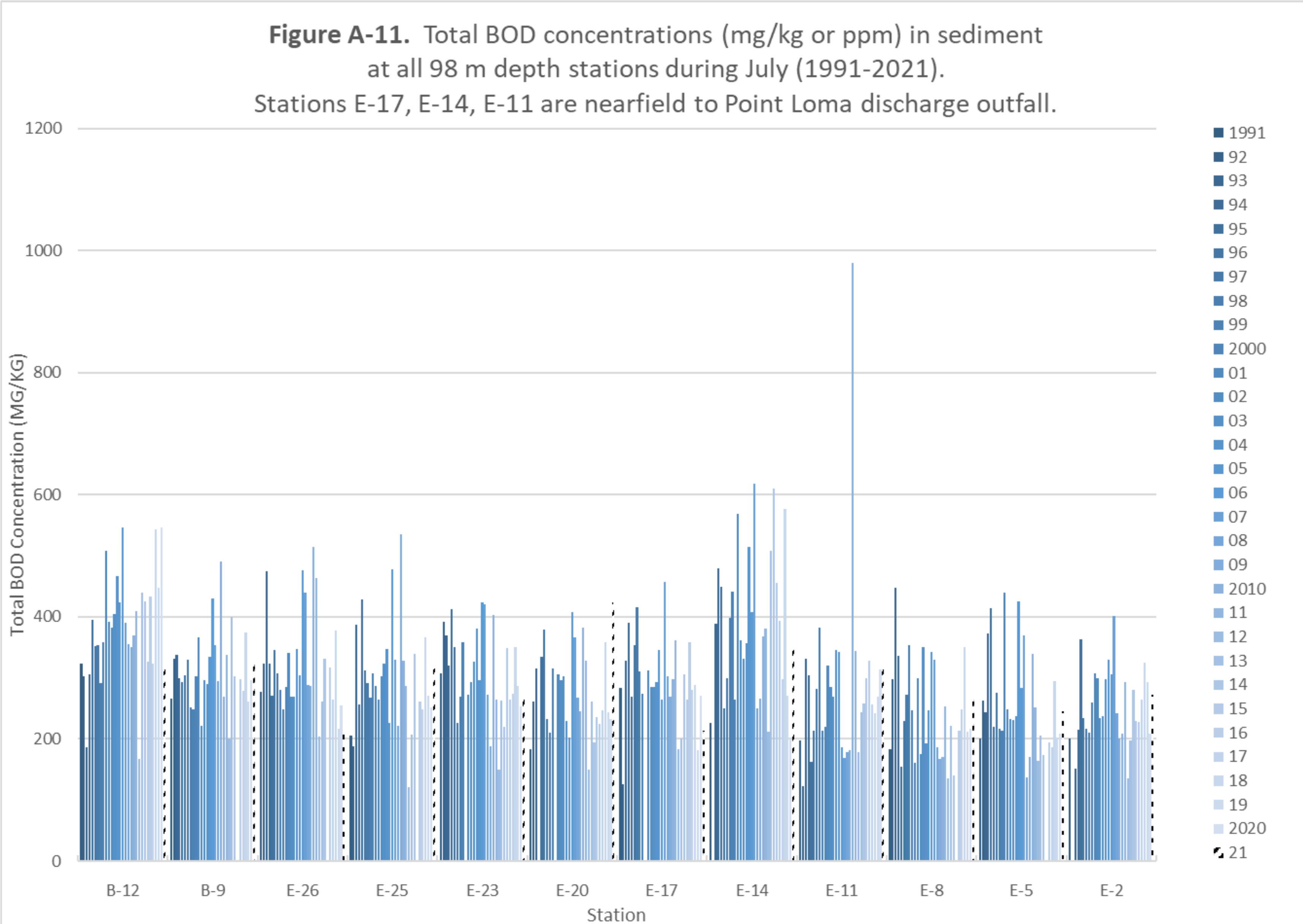


Figure A-11. Total BOD concentrations (mg/kg or ppm) in sediment
at all 98 m depth stations during July (1991-2021).
Stations E-17, E-14, E-11 are nearfield to Point Loma discharge outfall.
Total BOD Concentration (MG/KG)
0
200
400
600
800
1000
1200
B-12
B-9
E-26
E-25
E-23
E-20
E-17
E-14
E-11
E-8
E-5
E-2
Station
1991
92
93
94
95
96
97
98
99
2000
01
02
03
04
05
06
07
08
09
2010
11
12
13
14
15
16
17
18
19
2020
21

Figure A-12. Total sulfide concentrations (mg/kg or ppm) in sediment at all 98 m depth stations during July (1991-2021). Stations E-17, E-14, E-11 are nearfield to Point Loma discharge outfall.

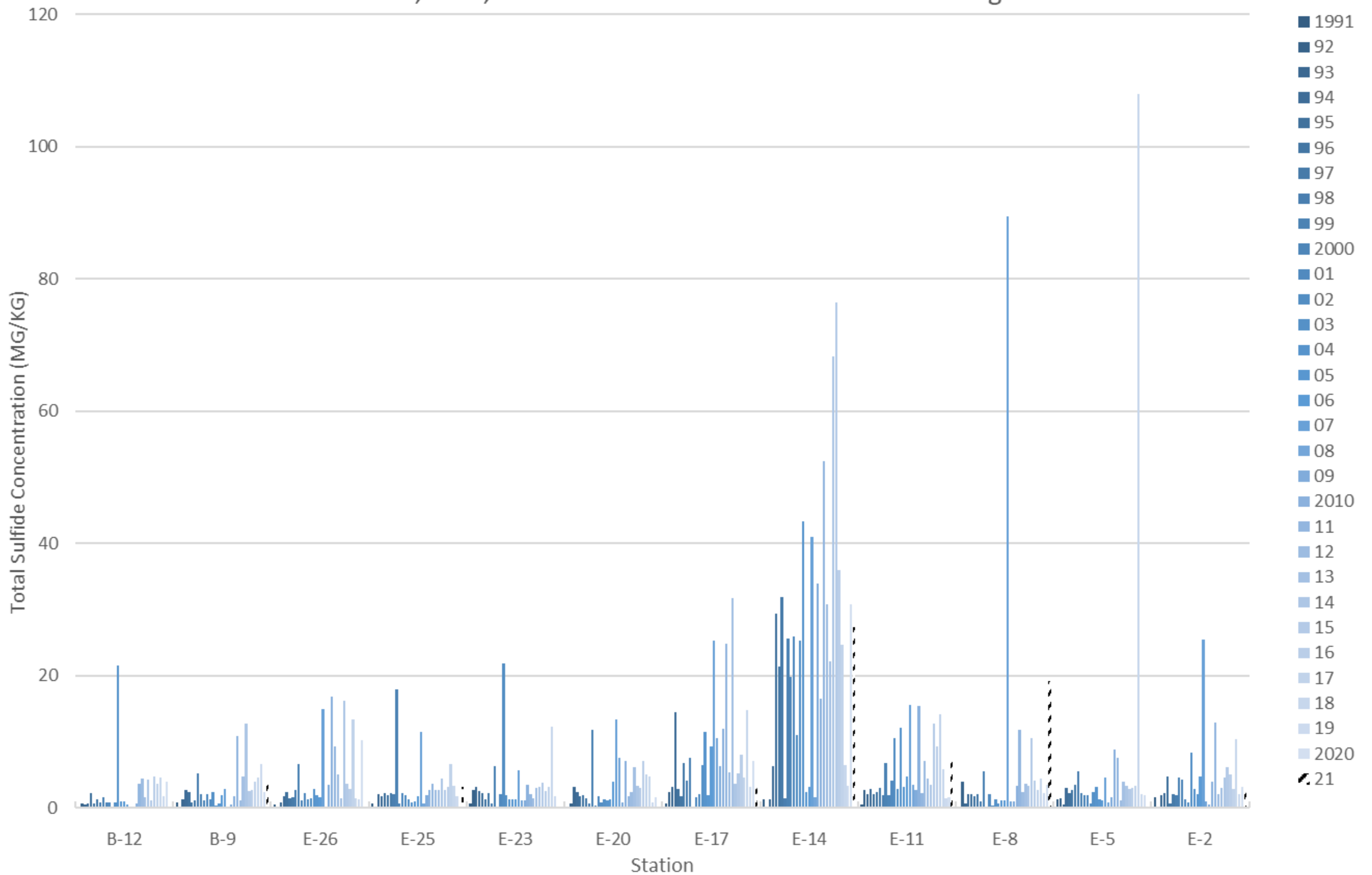


Figure A-13. Total nitrogen concentrations (% wt.) in sediment at all 98 m depth stations during July (1991-2021). Stations E-17, E-14, E-11 are nearfield to Point Loma discharge outfall.

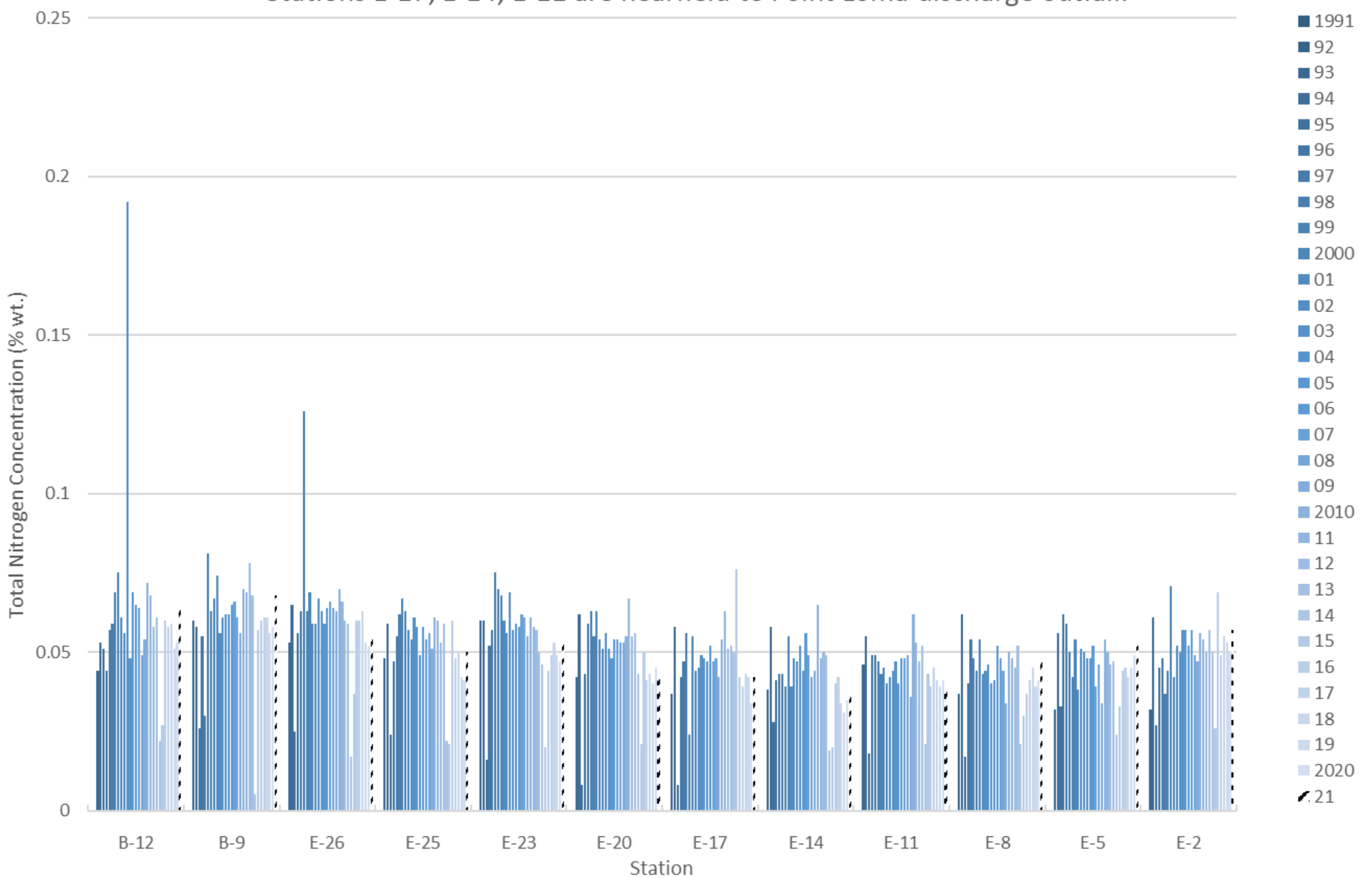
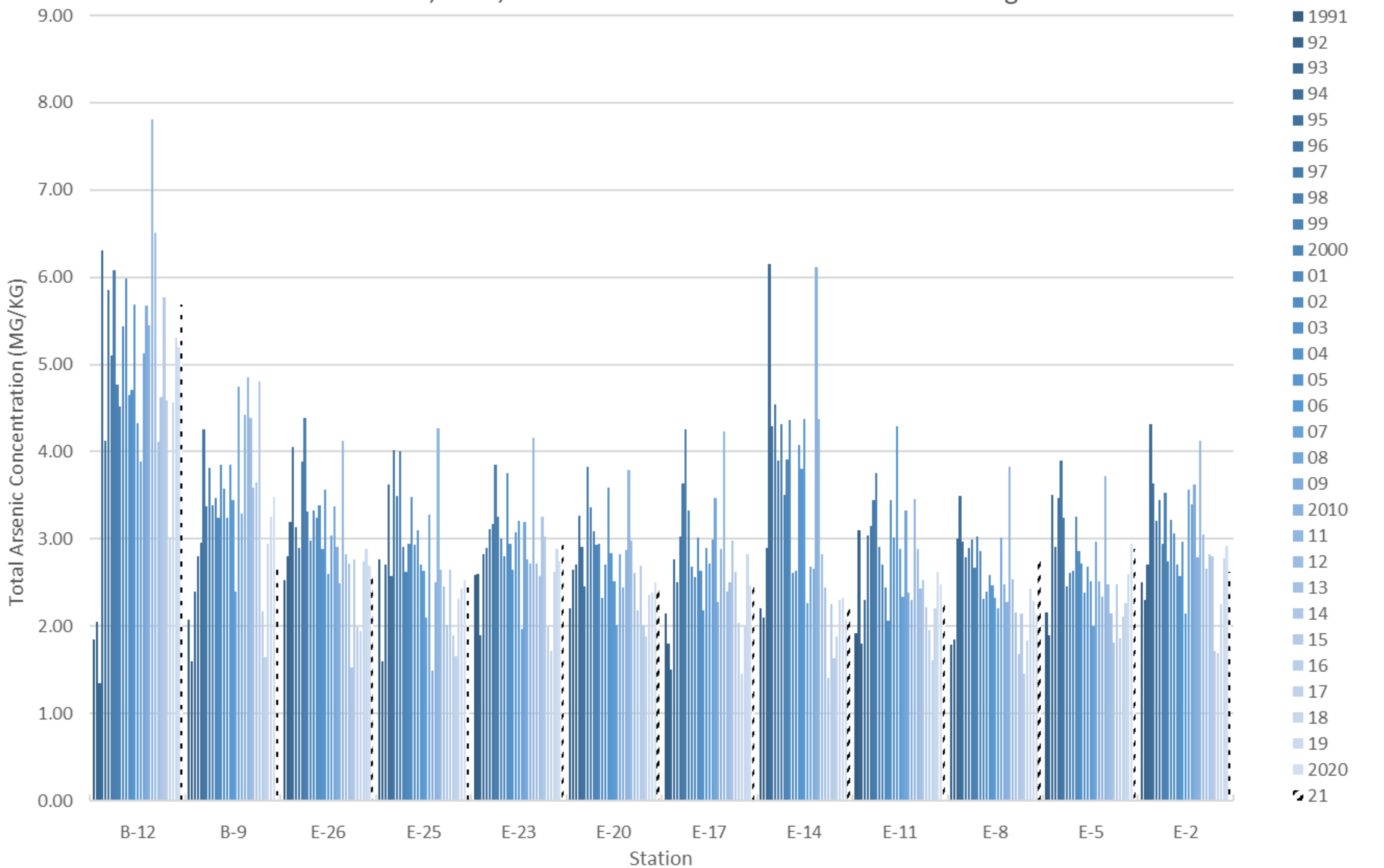


Figure A-14. Total arsenic concentrations (mg/kg or ppm) in sediment at all 98 m depth stations during July (1991-2021). Stations E-17, E-14, E-11 are nearfield to Point Loma discharge outfall.



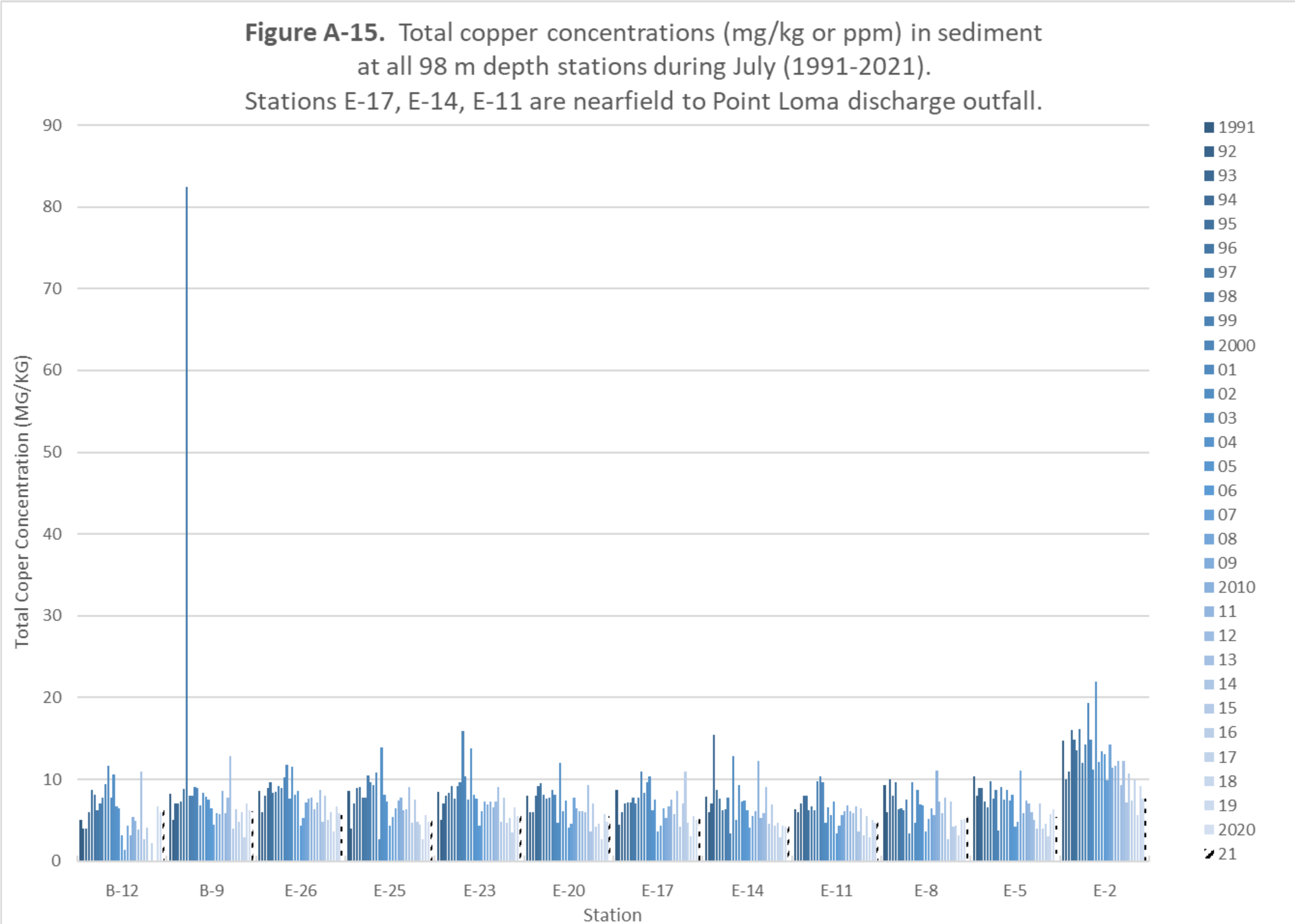


Figure A-15. Total copper concentrations (mg/kg or ppm) in sediment at all 98 m depth stations during July (1991-2021).
Stations E-17, E-14, E-11 are nearfield to Point Loma discharge outfall.
Total Coper Concentration (MG/KG)
0
10
20
30
40
50
60
70
80
90
B-12
B-9
E-26
E-25
E-23
E-20
E-17
E-14
E-11
E-8
E-5
E-2
Station
1991
92
93
94
95
96
97
98
99
2000
01
02
03
04
05
06
07
08
09
2010
11
12
13
14
15
16
17
18
19
2020
21

Figure A-16. Total mercury concentrations (mg/kg or ppm) in sediment at all 98 m depth stations during July (1991-2021). Stations E-17, E-14, E-11 are nearfield to Point Loma discharge outfall.

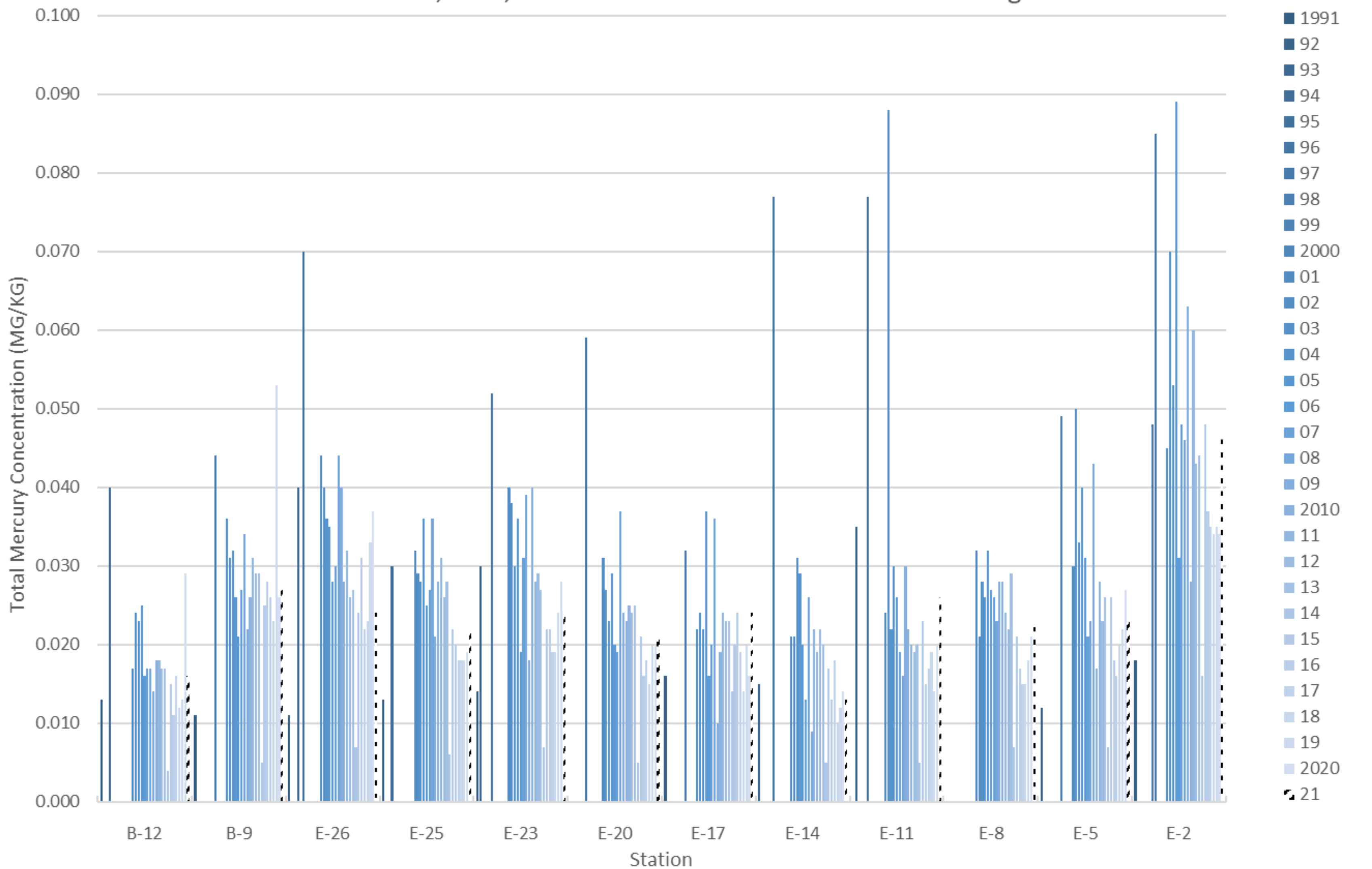
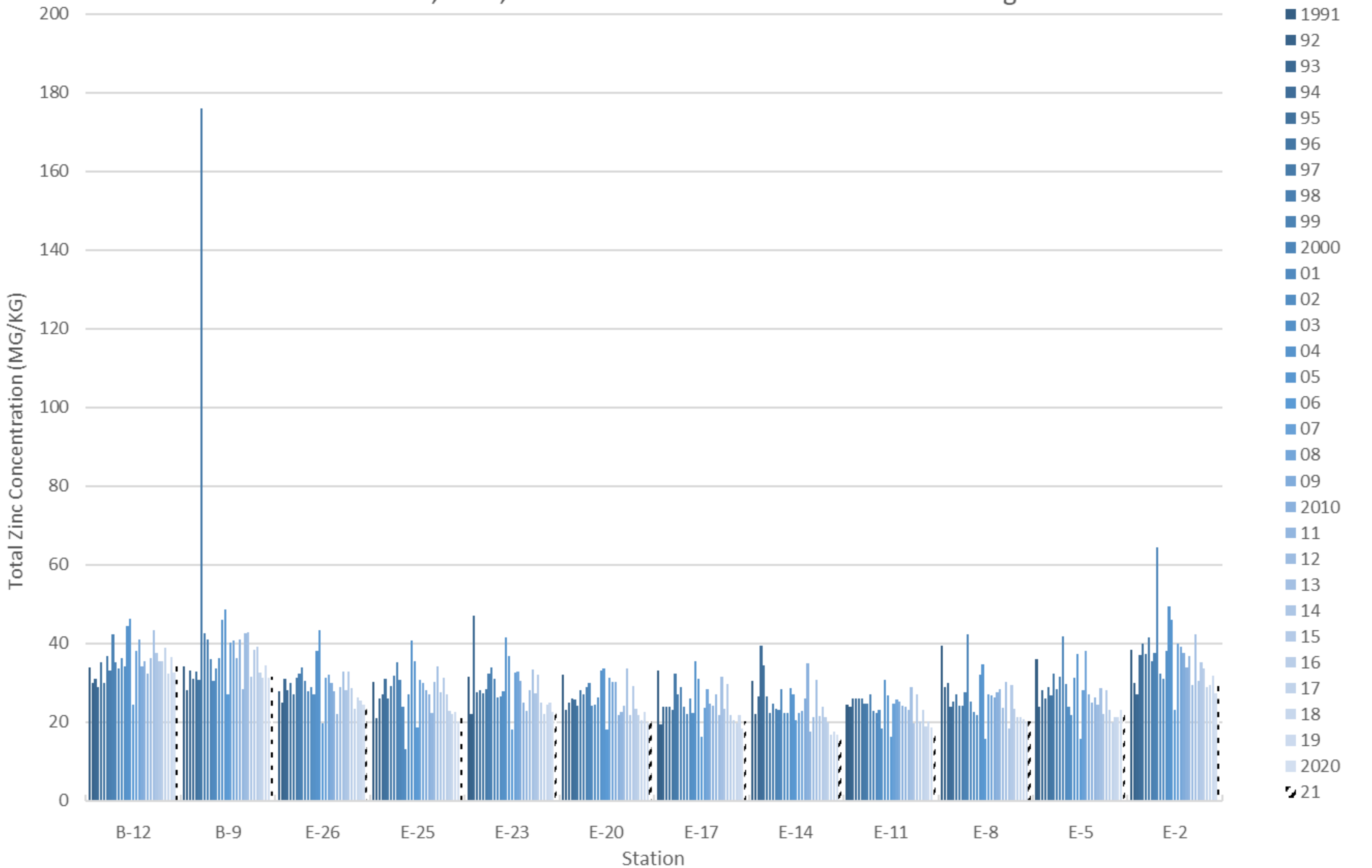


Figure A-17. Total zinc concentrations (mg/kg or ppm) in sediment at all 98 m depth stations during July (1991-2021). Stations E-17, E-14, E-11 are nearfield to Point Loma discharge outfall.



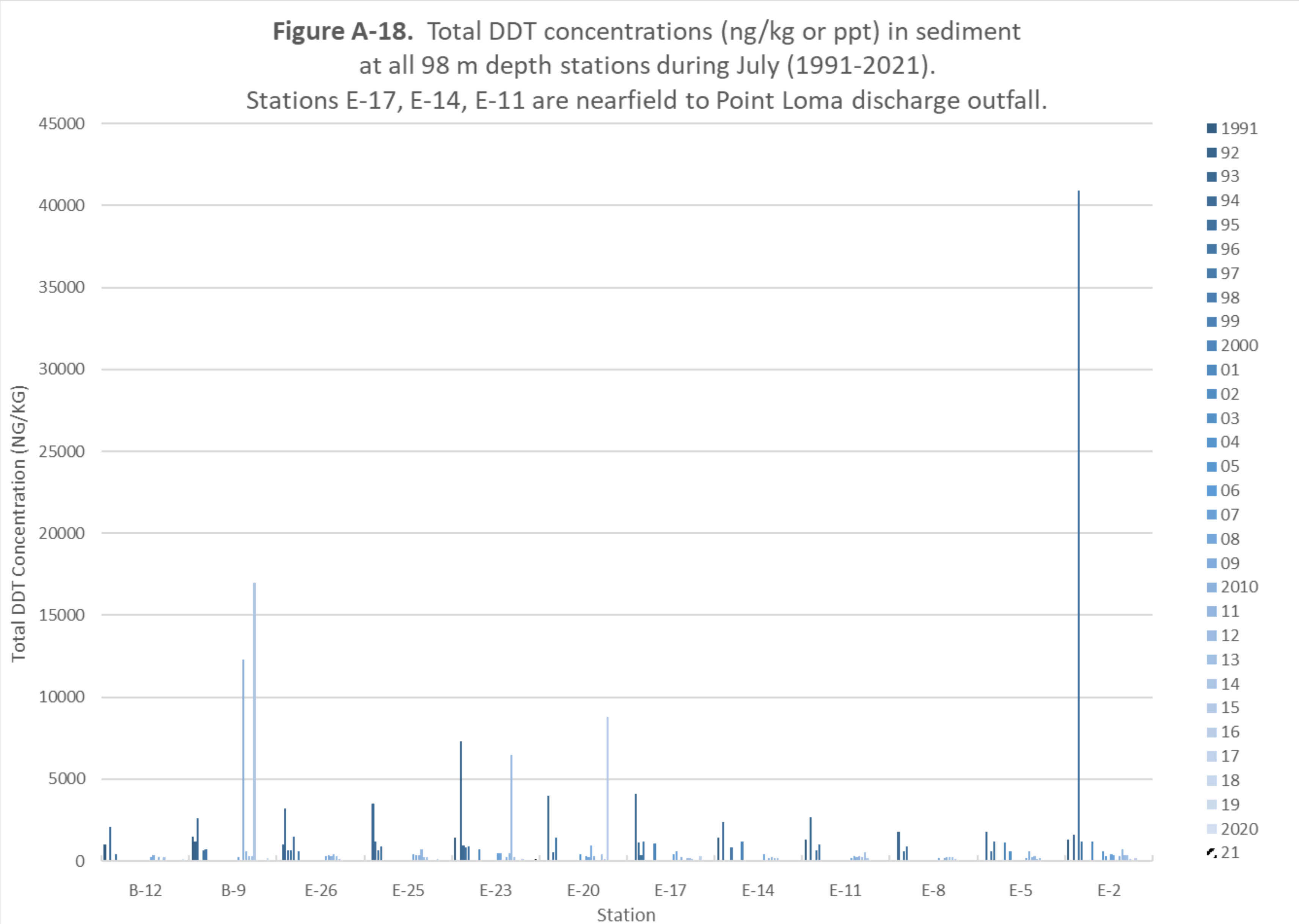


Figure A-18. Total DDT concentrations (ng/kg or ppt) in sediment at all 98 m depth stations during July (1991-2021).
Stations E-17, E-14, E-11 are nearfield to Point Loma discharge outfall.
Total DDT Concentration (NG/KG)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
B-12
B-9
E-26
E-25
E-23
E-20
E-17
E-14
E-11
E-8
E-5
E-2
Station
1991
92
93
94
95
96
97
98
99
2000
01
02
03
04
05
06
07
08
09
2010
11
12
13
14
15
16
17
18
19
2020
21

Figure A-19. Total PAHs concentrations (µg/kg or ppb) in sediment at all 98 m depth stations during July (1991-2021). Stations E-17, E-14, E-11 are nearfield to Point Loma discharge outfall.

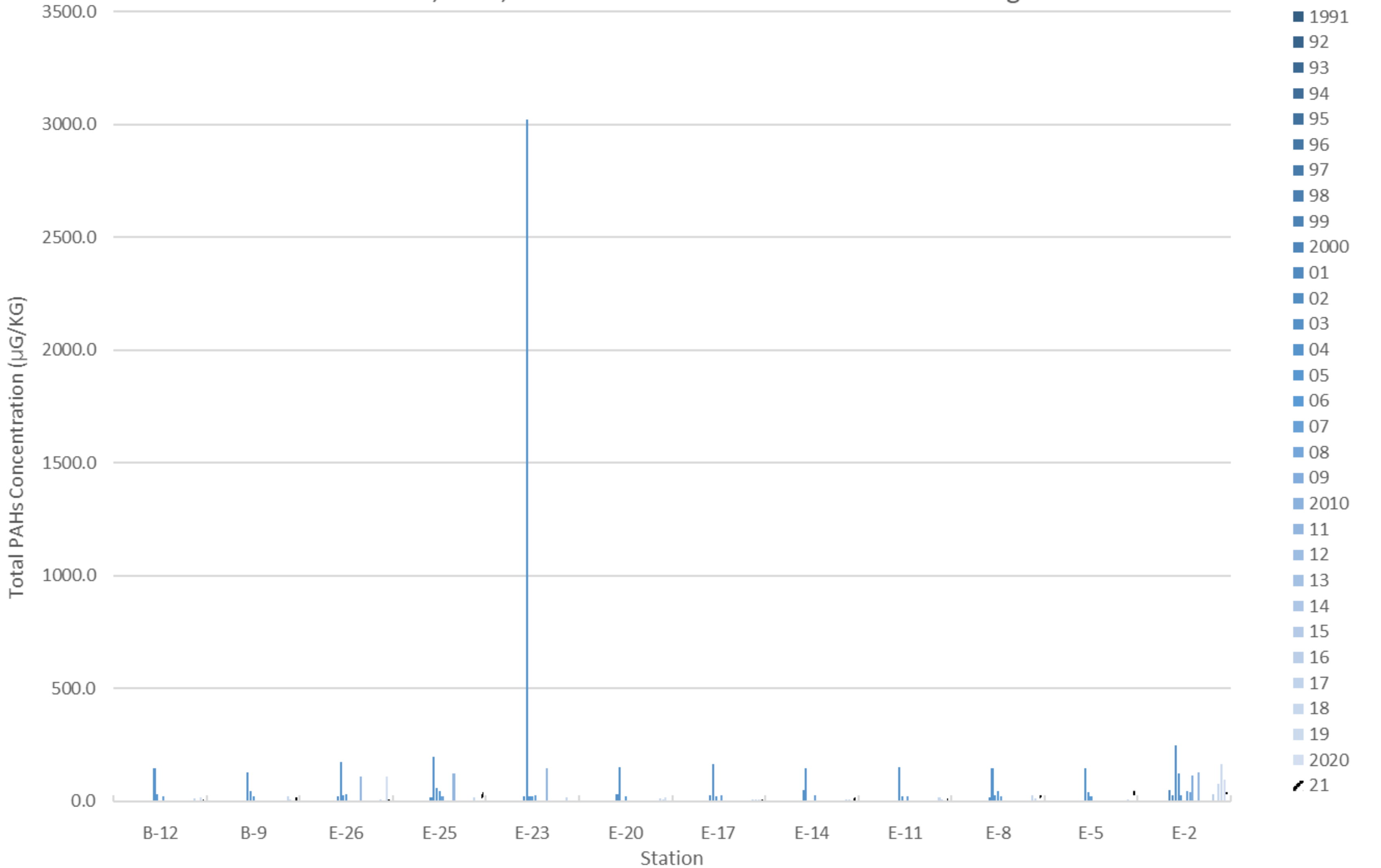


Figure A-20. (from Application figure C1-32) BRI values at near-ZID station E14, farfield station E26, and reference station B9 along PLOO discharge depth contour from 1991 to 2020.

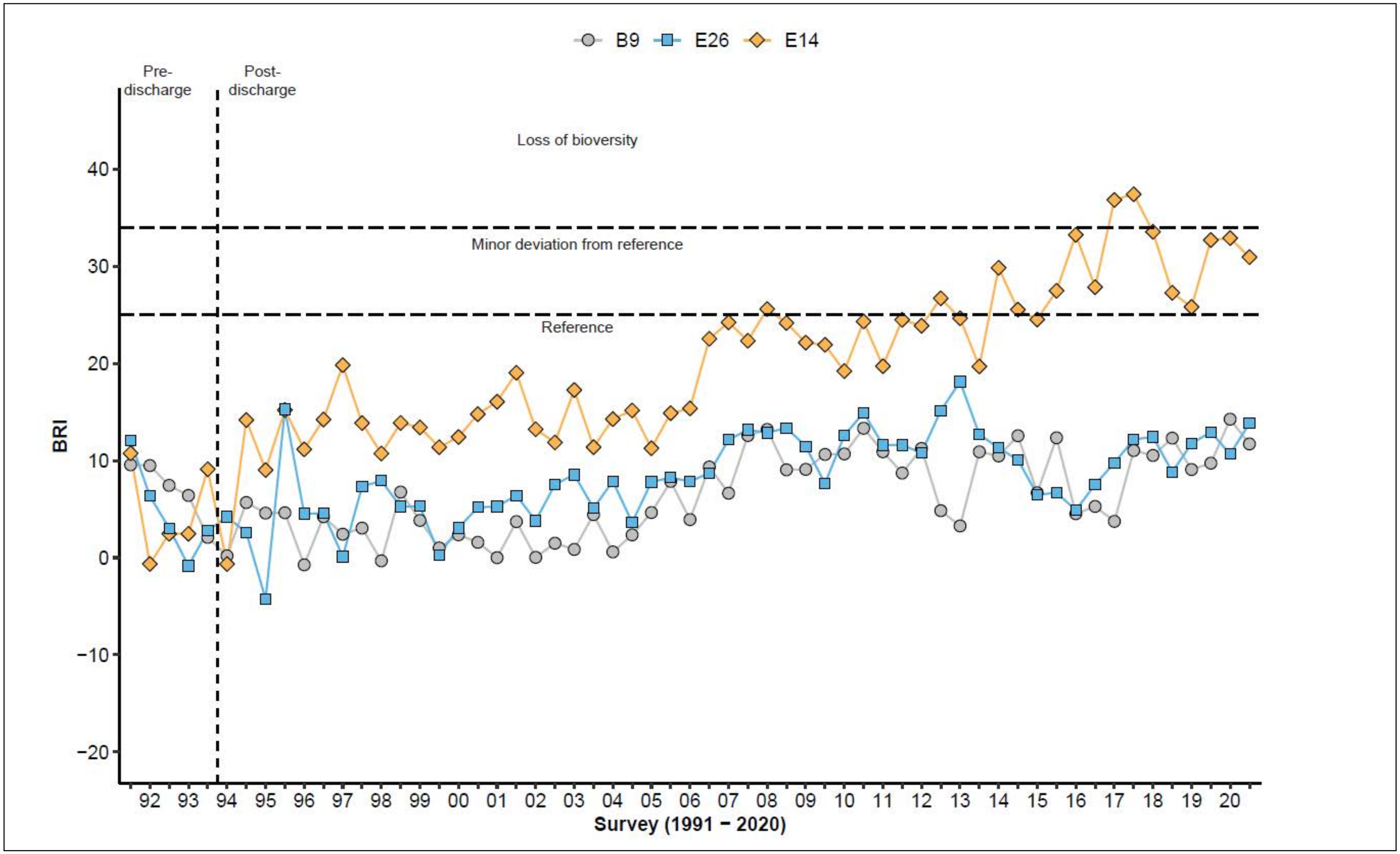


Figure A-21. Abundance of the ostracods *Euphilomedes* spp at outfall discharge depths near the PLOO from 1991 to 2020. Values for each station during July survey only. Data expressed as mean abundance per 0.1 m^2.

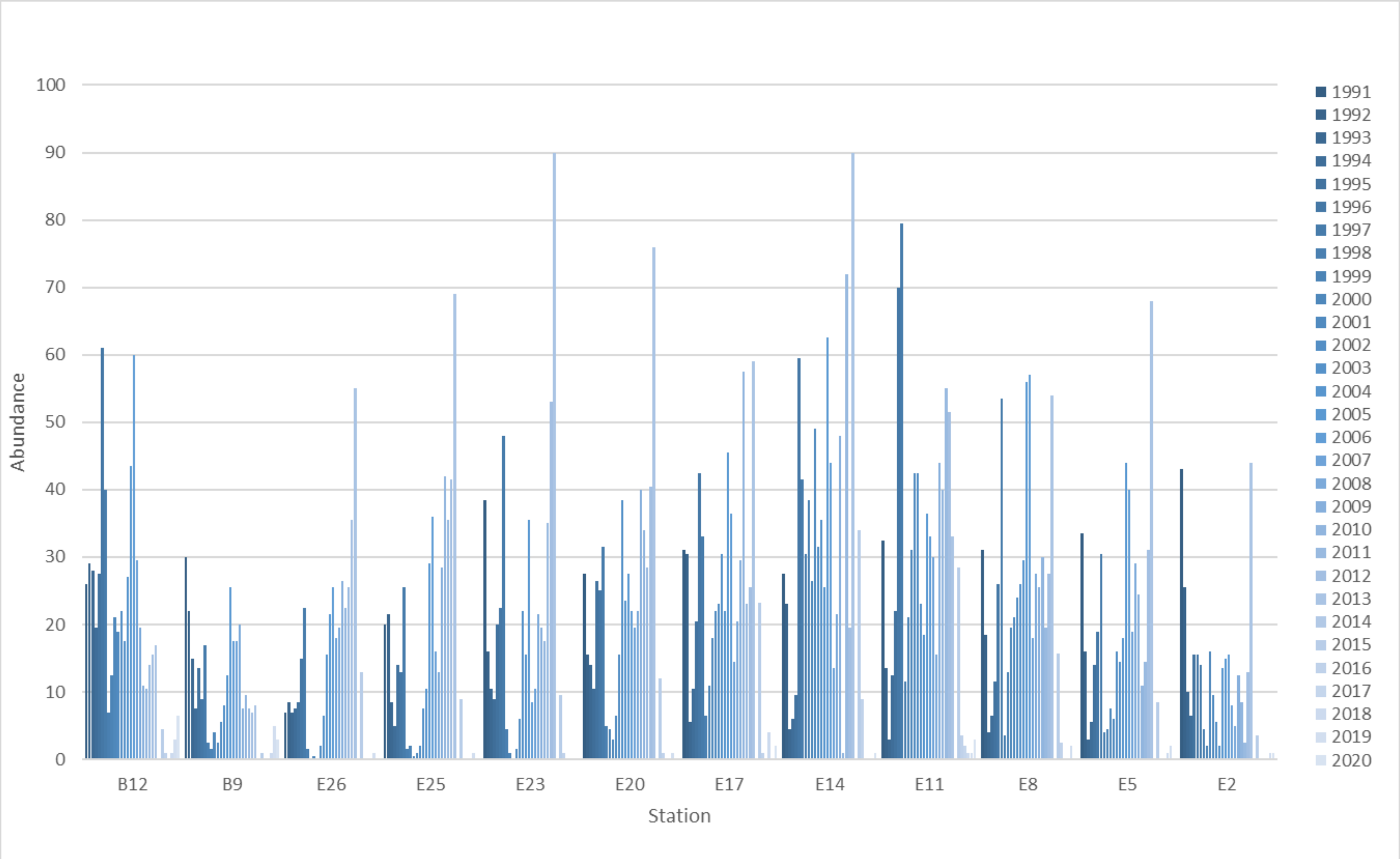


Figure A-22. Abundance of bivalve *Parvilucina tenuisculpta* at outfall depths stations near PLOO from 1991 to 2020. Values for each station during July survey only. Data expressed as mean abundance per 0.1 m^2.

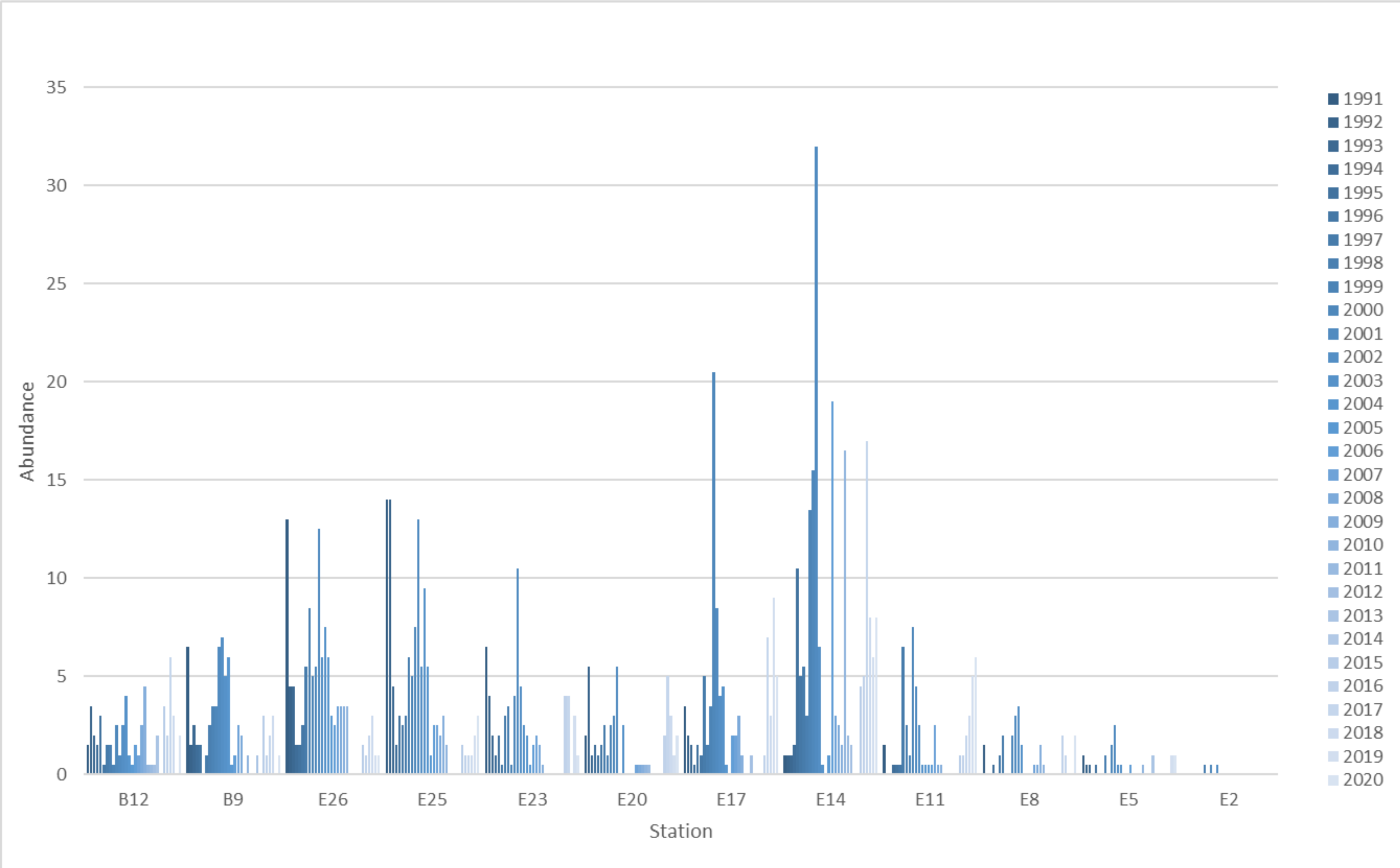


Figure A-23. Abundance of *Capitella teleta* at outfall depths stations near PLOO from 1991 to 2020. Values for each station during July survey only. Data expressed as mean abundance per 0.1 m^2.

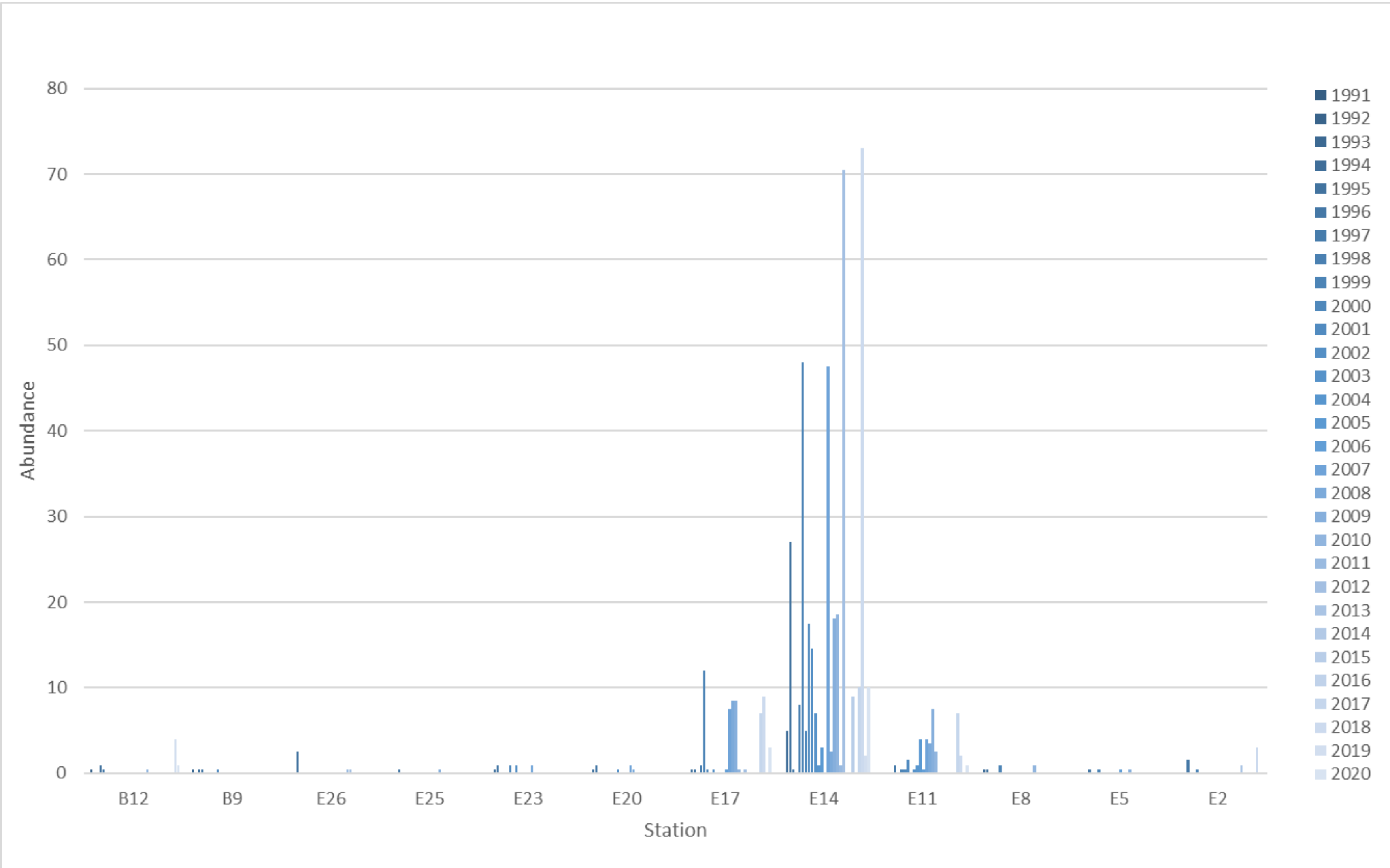


Figure A-24. Map of trawl fishing zones and rig fishing monitoring station locations in offshore area. (Note that LA4 and LA5 are USEPA designated dredged materials disposal sites.)

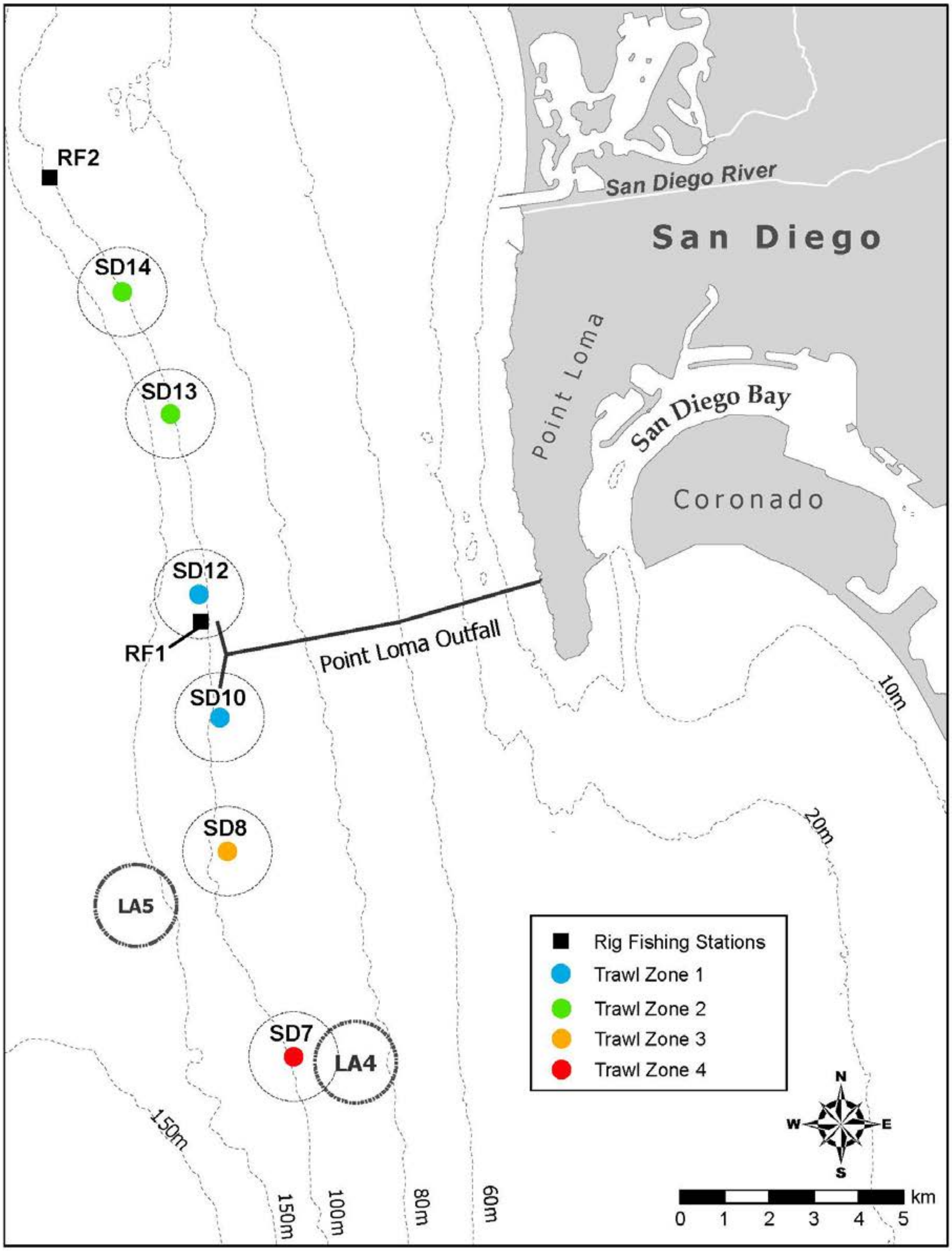


Figure A-25. Average arsenic concentrations (mg/kg ww) in flatfish liver at 98 meter trawl fishing zone (TFZ) stations during October (1995-2021).

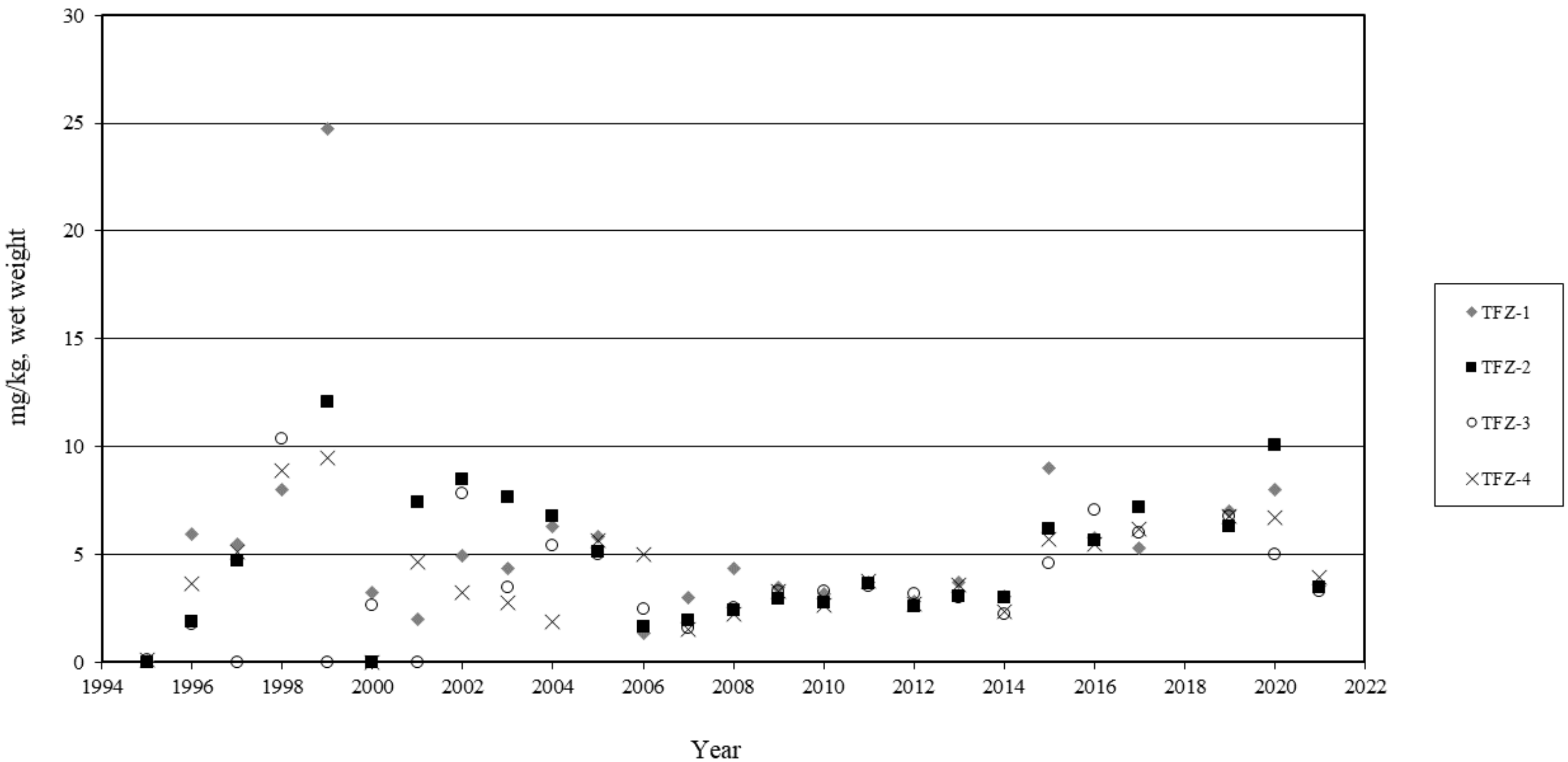


Figure A-26. Average mercury concentrations (mg/kg ww) in flatfish liver at 98 meter trawl fishing zone (TFZ) stations during October (1995-2021).

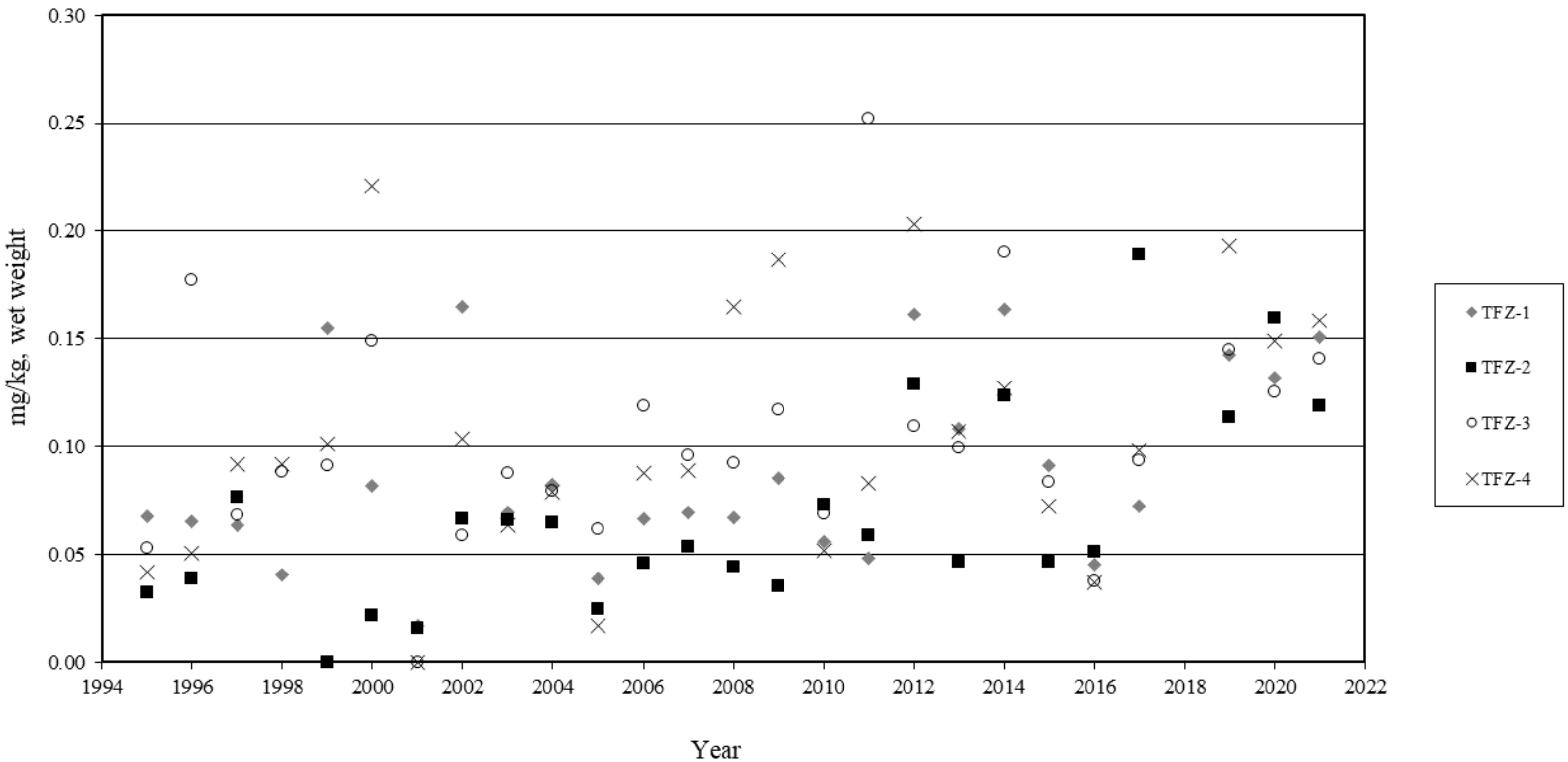


Figure A-27. Average selenium concentrations (mg/kg ww) in flatfish liver at 98 meter trawl fishing zone (TFZ) stations during October (1995-2021).

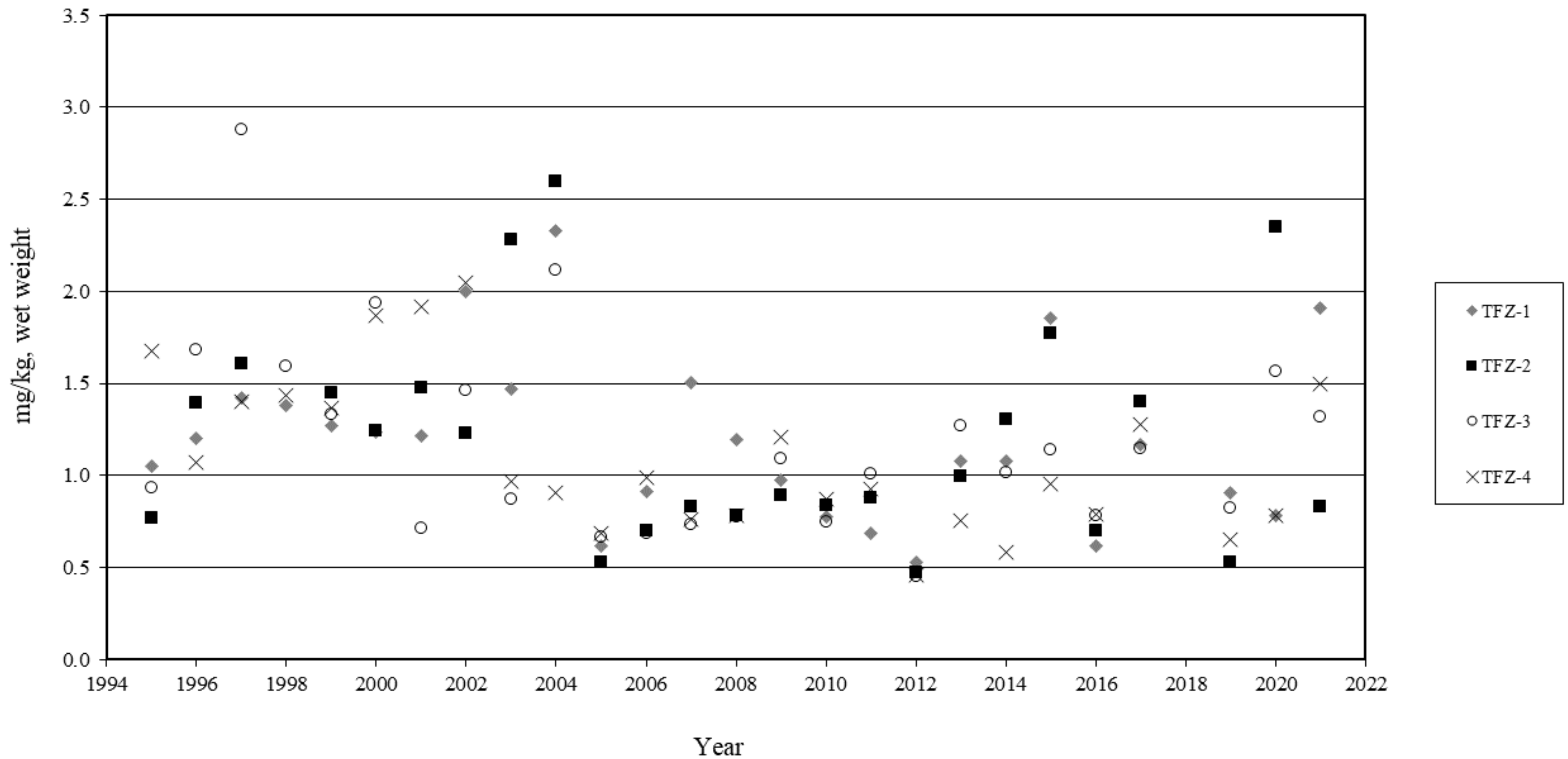


Figure A-28. Average total DDT concentrations (µg/kg ww) in flatfish liver at 98 meter trawl fishing zone (TFZ) stations during October (1995-2021).

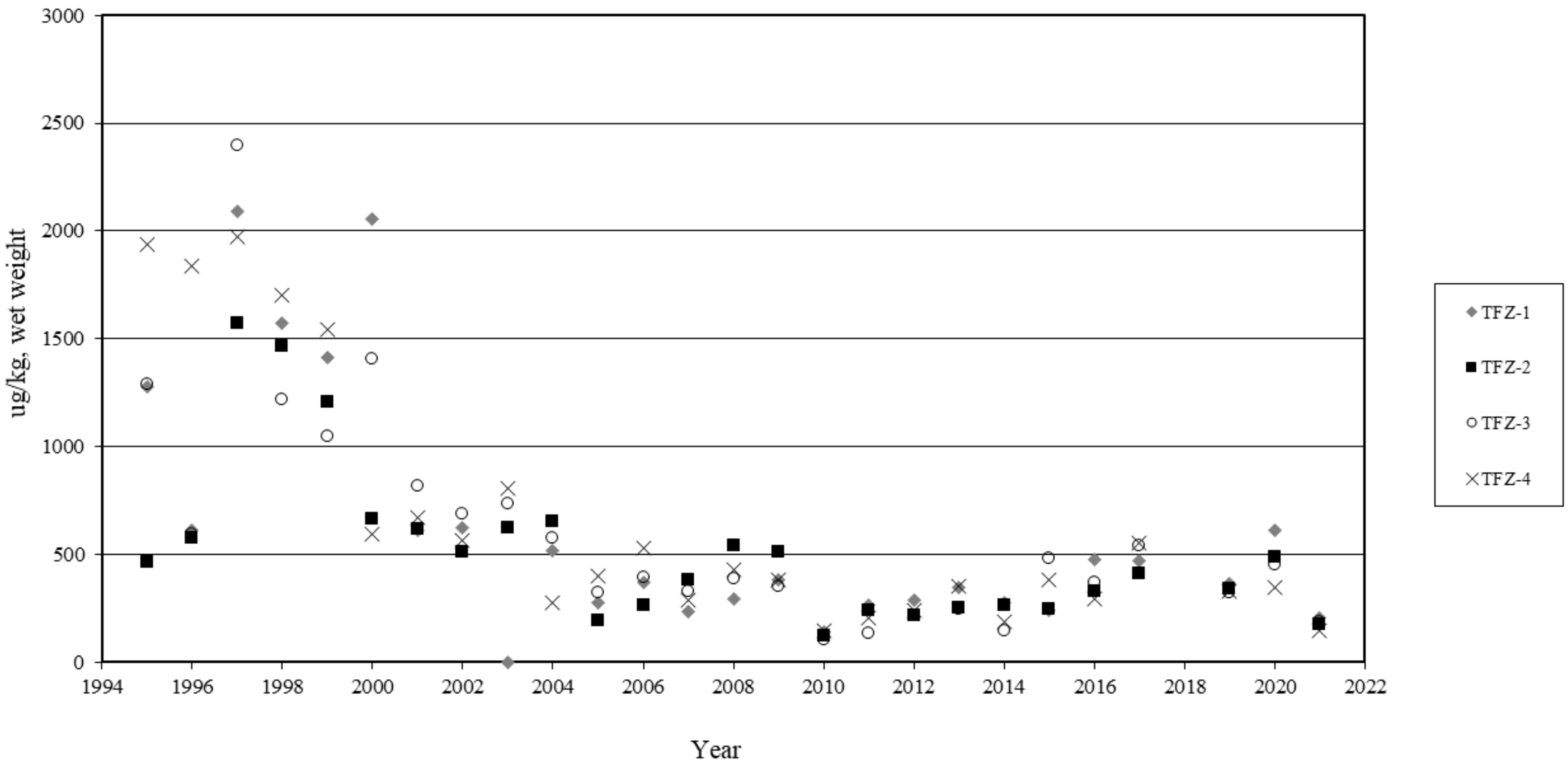


Figure A-29. Average total PCB concentrations (µg/kg ww) in flatfish liver at 98 meter trawl fishing zone (TFZ) stations during October (1995-2021).

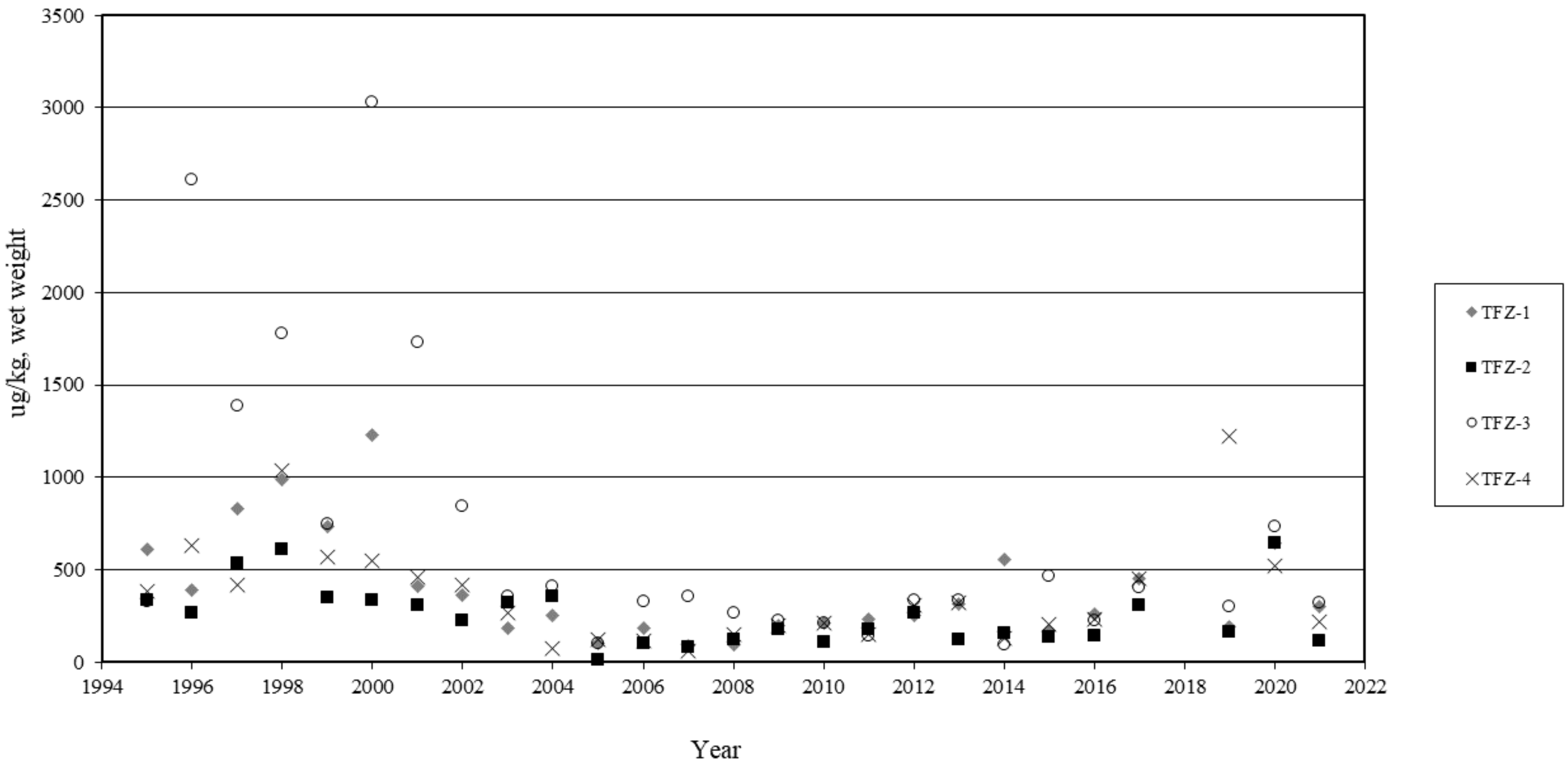


Figure A-30. Average arsenic concentrations (mg/kg ww) in rockfish muscle at 98 meter rig fishing (RF) stations during October (1995-2021).

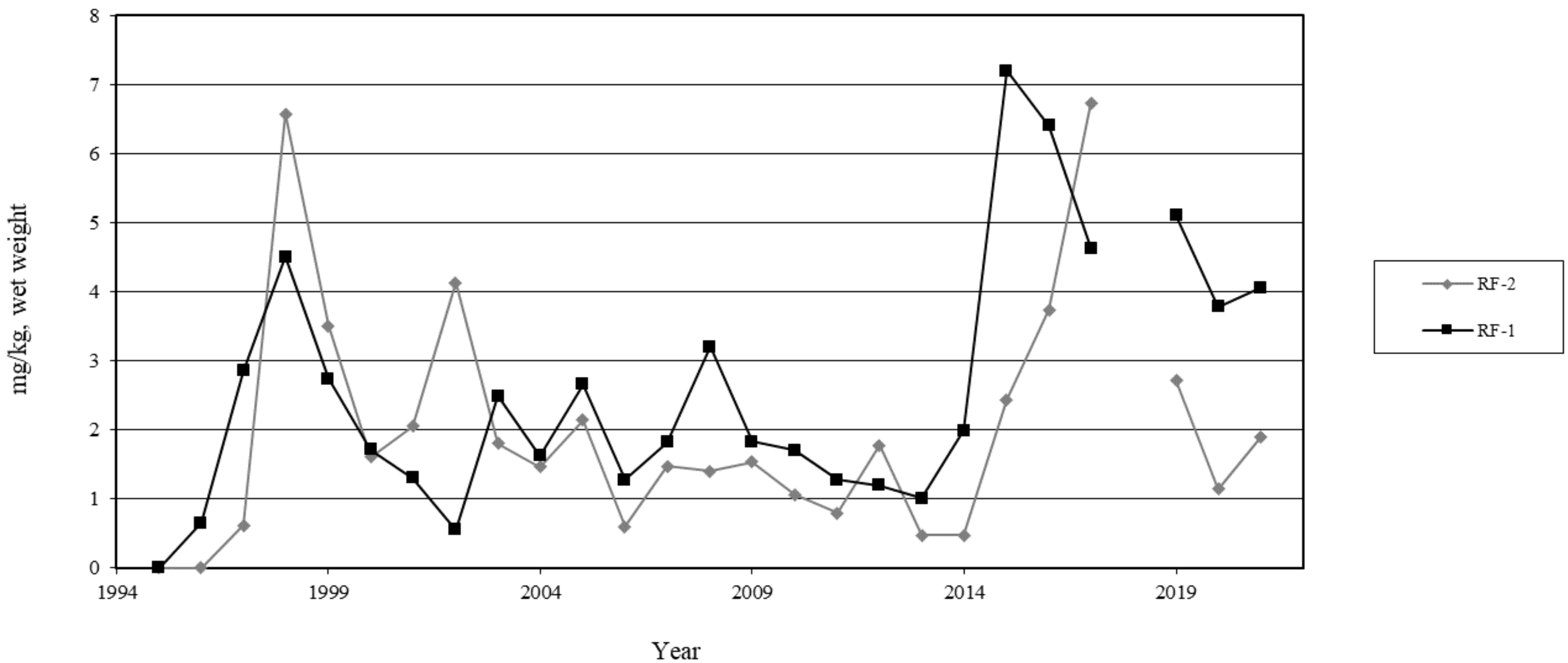


Figure A-31. Average mercury concentrations (mg/kg ww) in rockfish muscle at 98 meter rig fishing (RF) stations during October (1995-2021).

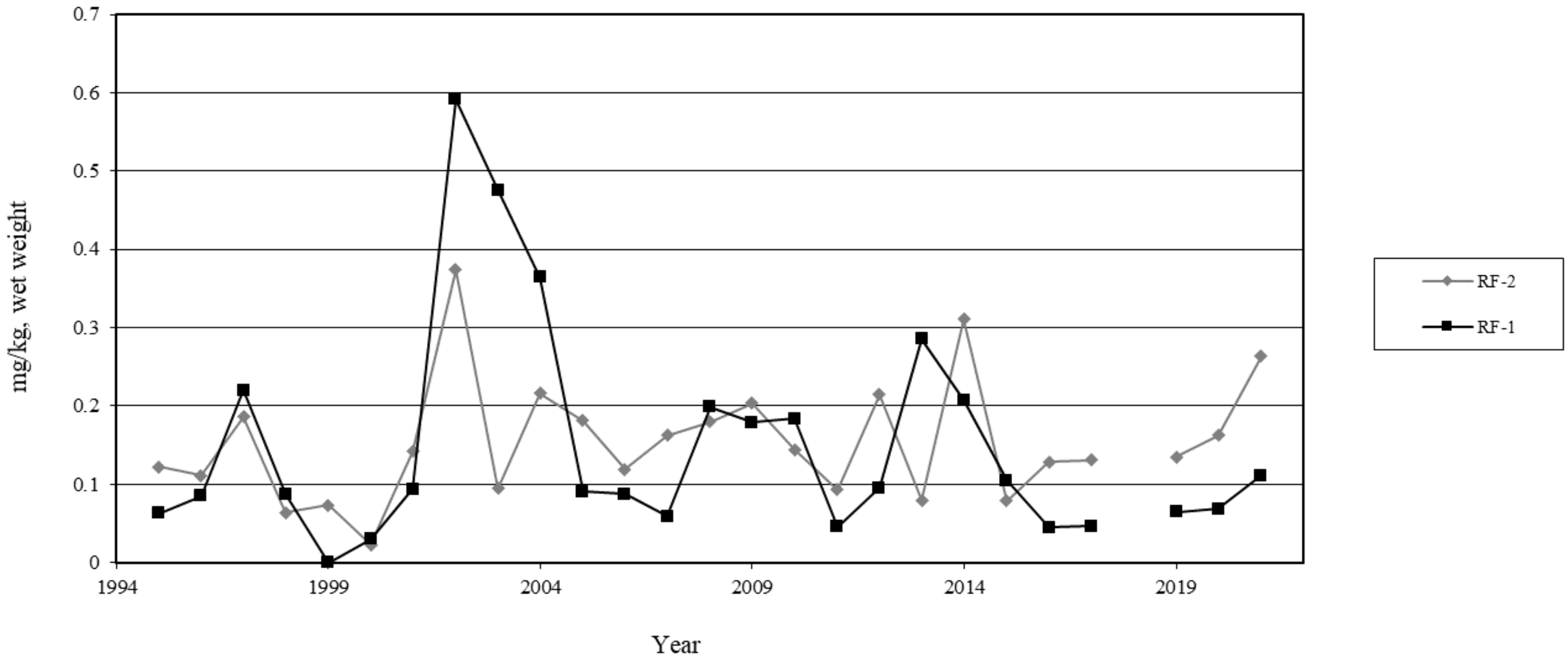


Figure A-32. Average selenium concentrations (mg/kg ww) in rockfish muscle at 98 meter rig fishing (RF) stations during October (1995-2021).

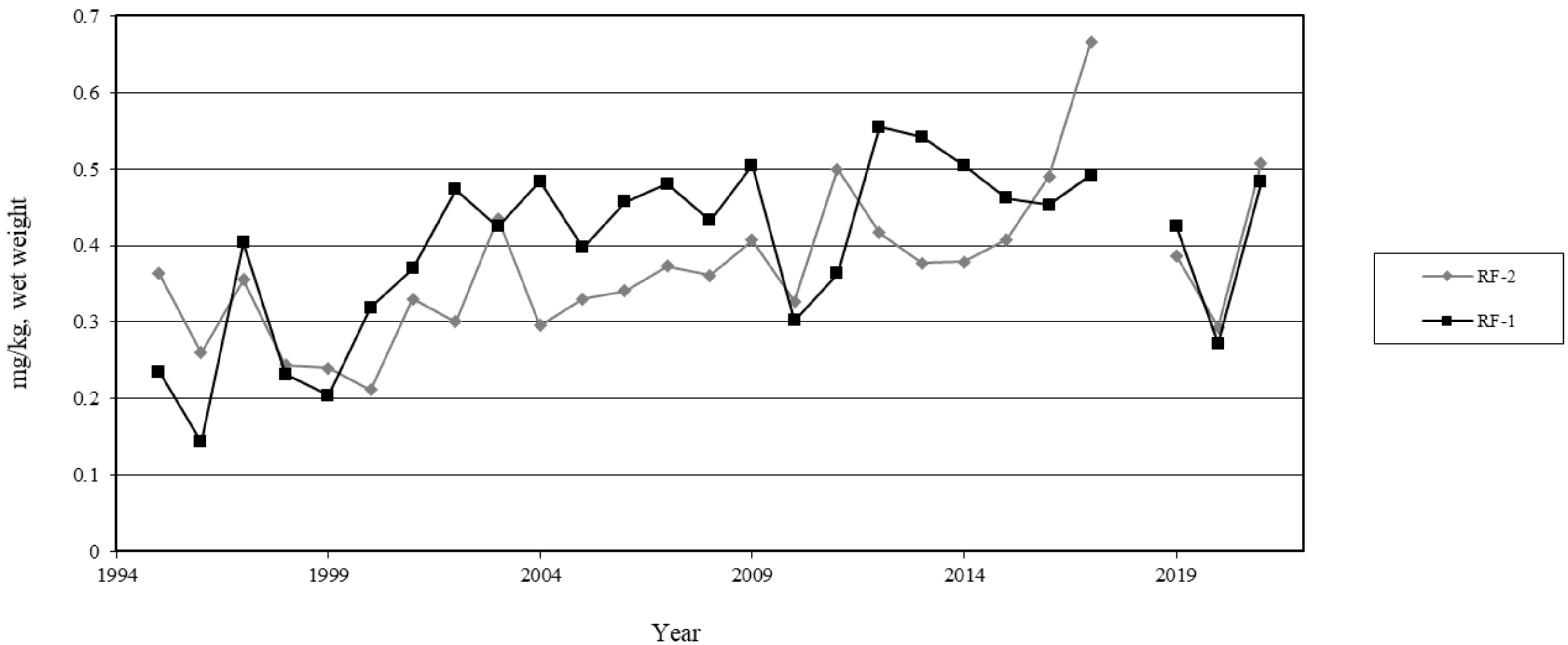


Figure A-33. Average total chlordane concentrations (µg/kg ww) in rockfish muscle at 98 meter rig fishing (RF) stations during October (1995-2021).

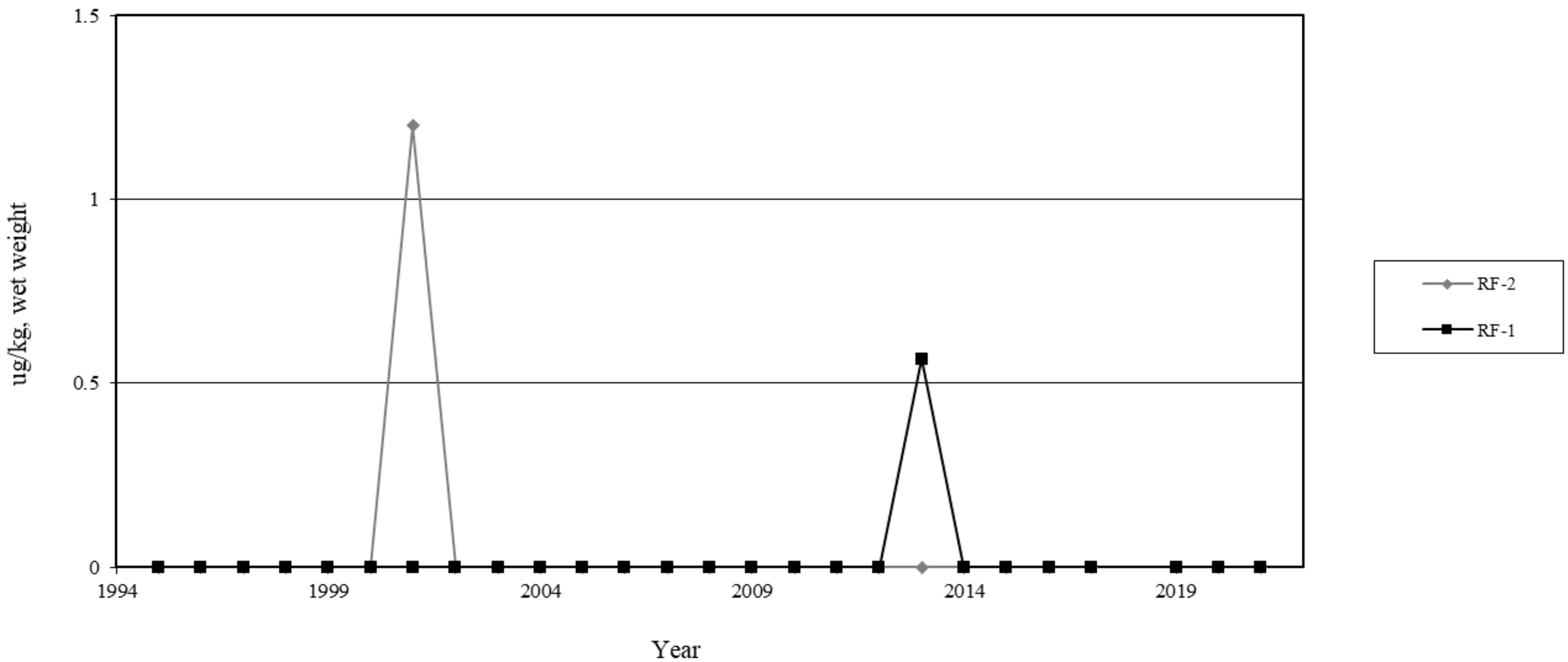


Figure A-34. Average total DDT concentrations (µg/kg ww) in rockfish muscle at 98 meter rig fishing (RF) stations during October (1995-2021).

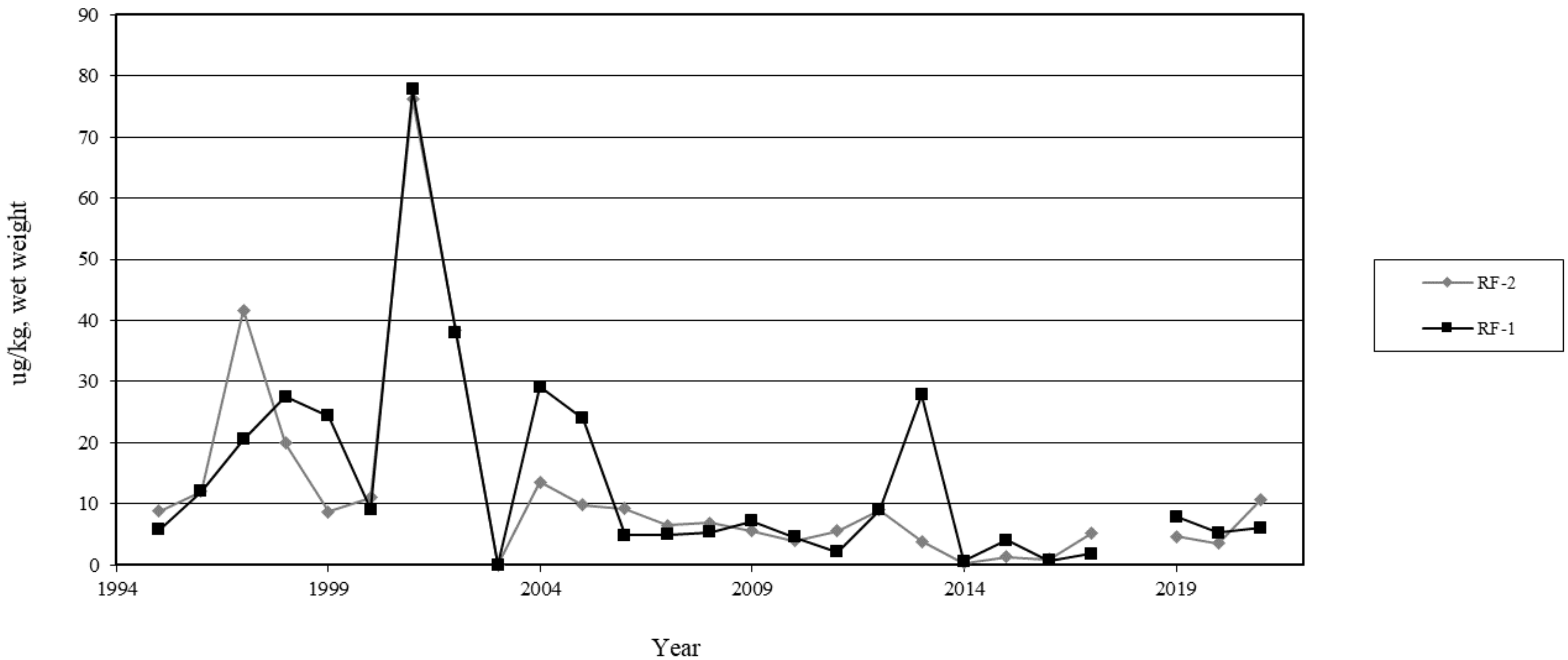
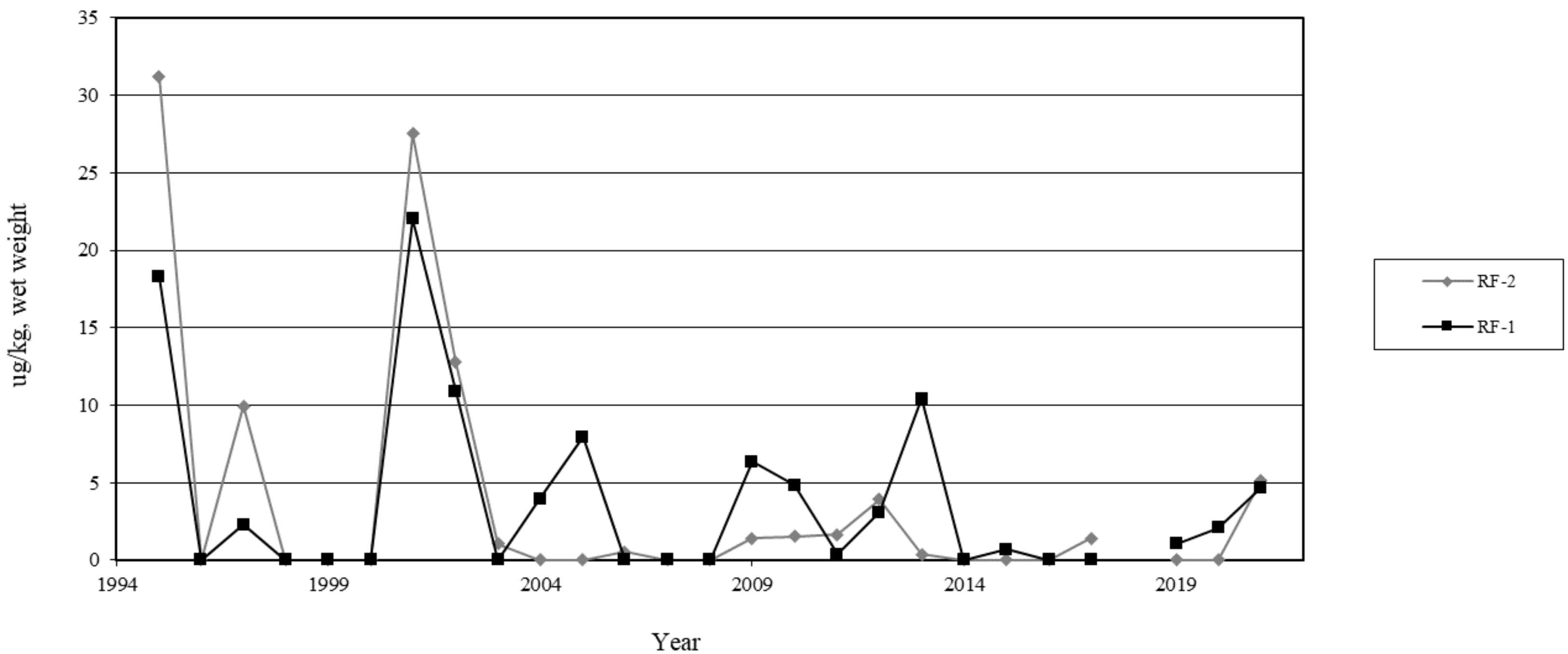


Figure A-35. Average total PCB concentrations (µg/kg ww) in rockfish muscle at 98 meter rig fishing (RF) stations during October (1995-2021).



(Page intentionally blank)

APPENDIX B – TABLES

LIST OF TABLES

Table B-1. Long-term average and ±1 standard deviation for percent transmissivity (XMS, %) at offshore station water depths, by contour, from 2015 through 2021.

Contour (m)	Stn	Water Depth (m) 1	15	25	40	60	70	80	95	100
20	F03	77 ± 13	82 ± 5	-	-	-	-	-	-	-
	F02	76 ± 13	83 ± 5							
	F01	77 ± 7	81 ± 6							
60	F14	81 ± 9	85 ± 4	87 ± 4	88 ± 3	82 ± 9	-	-	-	-
	F13	80 ± 11	85 ± 4	87 ± 3	88 ± 3	83 ± 6				
	F12	79 ± 13	85 ± 5	87 ± 3	88 ± 3	84 ± 5				
	F11	79 ± 12	84 ± 5	87 ± 4	88 ± 3	81 ± 8				
	F10	79 ± 12	84 ± 7	87 ± 4	88 ± 4	83 ± 6				
	F09	79 ± 12	85 ± 4	87 ± 4	88 ± 4	82 ± 8				
	F08	79 ± 12	85 ± 4	87 ± 3	88 ± 4	83 ± 7				
	F07	80 ± 10	85 ± 4	87 ± 4	88 ± 4	85 ± 5				
	F06	80 ± 10	85 ± 5	87 ± 4	88 ± 4	83 ± 8				
	F05	82 ± 7	86 ± 4	87 ± 3	89 ± 2	86 ± 4				
	F04	84 ± 5	86 ± 4	87 ± 3	89 ± 2	86 ± 4				
80	F25	82 ± 12	86 ± 5	87 ± 4	88 ± 4	89 ± 3	88 ± 4	84 ± 10	-	-
	F24	79 ± 15	86 ± 4	87 ± 3	88 ± 3	89 ± 3	88 ± 6	85 ± 8		
	F23	81 ± 13	86 ± 4	87 ± 5	88 ± 3	89 ± 3	88 ± 6	85 ± 7		
	F22	81 ± 14	86 ± 3	87 ± 4	88 ± 3	89 ± 3	88 ± 4	84 ± 8		
	F21	81 ± 13	86 ± 4	88 ± 3	89 ± 2	89 ± 4	89 ± 3	85 ± 7		
	F20	81 ± 13	86 ± 5	88 ± 3	89 ± 3	89 ± 3	88 ± 4	84 ± 7		
	F19	82 ± 13	86 ± 5	88 ± 2	89 ± 2	89 ± 2	87 ± 5	84 ± 10		
	F18	82 ± 11	86 ± 4	88 ± 2	89 ± 2	89 ± 2	89 ± 3	83 ± 8		
	F17	83 ± 9	87 ± 3	88 ± 2	89 ± 2	90 ± 2	89 ± 3	84 ± 8		
	F16	83 ± 8	87 ± 3	88 ± 2	89 ± 2	90 ± 2	89 ± 3	84 ± 11		
	F15	85 ± 4	86 ± 4	88 ± 2	89 ± 2	90 ± 2	89 ± 2	85 ± 8		
100	F36	83 ± 13	88 ± 2	88 ± 3	89 ± 3	90 ± 2	90 ± 2	90 ± 3	89 ± 4	89 ± 3
	F35	82 ± 14	87 ± 5	88 ± 3	89 ± 3	90 ± 2	90 ± 3	89 ± 4	88 ± 5	87 ± 5
	F34	81 ± 15	86 ± 5	88 ± 3	89 ± 3	89 ± 3	89 ± 3	89 ± 4	88 ± 4	86 ± 7
	F33	81 ± 16	83 ± 11	87 ± 4	89 ± 3	89 ± 3	89 ± 4	89 ± 3	88 ± 4	85 ± 9
	F32	81 ± 14	86 ± 4	88 ± 3	89 ± 3	90 ± 3	89 ± 4	89 ± 4	88 ± 6	87 ± 5
	F31	80 ± 12	85 ± 7	87 ± 3	88 ± 3	89 ± 3	89 ± 3	88 ± 4	87 ± 6	83 ± 9
NearZID	F30	83 ± 5	85 ± 5	87 ± 4	88 ± 3	88 ± 3	86 ± 5	86 ± 6	86 ± 6	83 ± 4
	F29	83 ± 5	85 ± 5	87 ± 4	88 ± 3	89 ± 3	89 ± 2	89 ± 3	86 ± 8	86 ± 7
	F28	85 ± 5	87 ± 4	88 ± 3	89 ± 3	90 ± 2	90 ± 2	89 ± 3	87 ± 6	84 ± 13
	F27	84 ± 5	86 ± 5	88 ± 3	89 ± 3	90 ± 2	90 ± 2	89 ± 2	87 ± 5	86 ± 4
	F26	84 ± 5	86 ± 5	88 ± 3	89 ± 3	90 ± 2	89 ± 2	89 ± 3	87 ± 6	88 ± 3

Table B-2. Long-term average and ±1 standard deviation for dissolved oxygen (mg/l) at offshore station water depths, by contour, from 2015 through 2021.

Contour (m)	Stn	Water Depth (m) 1	15	25	40	60	70	80	95	100
20	F03	8.2 ± 0.7	6.9 ± 1.5	-	-	-	-	-	-	-
	F02	8.0 ± 0.7	6.9 ± 1.3							
	F01	8.0 ± 0.8	6.7 ± 1.4							
60	F14	8.0 ± 0.7	7.2 ± 1.3	6.7 ± 1.5	5.8 ± 1.3	4.9 ± 1.0	-	-	-	-
	F13	8.2 ± 0.6	7.2 ± 1.2	6.5 ± 1.4	5.8 ± 1.2	4.9 ± 1.0				
	F12	8.1 ± 0.5	7.2 ± 1.3	6.7 ± 1.4	5.8 ± 1.3	5.0 ± 1.0				
	F11	8.2 ± 0.8	7.3 ± 1.1	6.7 ± 1.3	5.8 ± 1.2	5.0 ± 1.0				
	F10	8.2 ± 0.8	7.4 ± 1.1	6.7 ± 1.3	5.8 ± 1.2	5.1 ± 1.1				
	F09	8.2 ± 0.7	7.2 ± 1.0	6.7 ± 1.2	5.8 ± 1.2	5.1 ± 1.1				
	F08	8.2 ± 0.6	7.5 ± 1.1	6.6 ± 1.4	5.8 ± 1.2	5.1 ± 1.0				
	F07	8.2 ± 0.9	7.6 ± 1.2	6.8 ± 1.3	5.9 ± 1.2	5.1 ± 1.1				
	F06	8.3 ± 0.7	7.6 ± 1.1	6.8 ± 1.4	5.9 ± 1.3	5.2 ± 1.1				
	F05	8.2 ± 0.7	7.5 ± 1.3	6.6 ± 1.5	6.0 ± 1.3	5.2 ± 1.1				
	F04	8.0 ± 0.6	7.4 ± 1.3	6.7 ± 1.3	5.9 ± 1.3	5.1 ± 1.1				
80	F25	7.9 ± 0.8	7.7 ± 1.1	7.0 ± 1.4	6.2 ± 1.2	5.2 ± 0.9	4.8 ± 0.9	4.5 ± 0.8	-	-
	F24	8.1 ± 0.5	7.5 ± 1.3	6.9 ± 1.4	6.2 ± 1.2	5.2 ± 1.0	4.8 ± 0.9	4.5 ± 0.8		
	F23	8.0 ± 0.6	7.4 ± 1.2	7.0 ± 1.2	6.0 ± 1.1	5.1 ± 0.9	4.8 ± 0.8	4.5 ± 0.8		
	F22	8.1 ± 0.6	7.5 ± 1.1	7.0 ± 1.1	6.0 ± 1.2	5.2 ± 0.9	4.9 ± 0.8	4.5 ± 0.8		
	F21	8.1 ± 0.6	7.6 ± 1.1	7.0 ± 1.2	6.0 ± 1.1	5.3 ± 0.8	4.9 ± 0.8	4.5 ± 0.8		
	F20	8.1 ± 0.7	7.5 ± 1.1	6.9 ± 1.2	5.9 ± 1.1	5.3 ± 1.0	5.0 ± 0.9	4.5 ± 0.8		
	F19	8.0 ± 0.6	7.6 ± 1.1	6.9 ± 1.3	6.0 ± 1.2	5.2 ± 1.0	4.8 ± 0.9	4.5 ± 0.7		
	F18	8.1 ± 0.6	7.5 ± 1.0	6.9 ± 1.3	6.0 ± 1.2	5.2 ± 1.0	4.9 ± 0.9	4.5 ± 0.8		
	F17	8.0 ± 0.6	7.5 ± 1.0	7.0 ± 1.3	6.1 ± 1.2	5.3 ± 1.0	4.9 ± 0.9	4.4 ± 0.8		
	F16	8.1 ± 0.8	7.5 ± 1.1	7.0 ± 1.3	6.1 ± 1.3	5.3 ± 1.0	4.9 ± 0.9	4.5 ± 0.8		
	F15	8.1 ± 0.7	7.6 ± 1.0	7.0 ± 1.3	6.2 ± 1.3	5.4 ± 1.0	4.9 ± 0.9	4.5 ± 0.8		
100	F36	8.0 ± 0.6	7.9 ± 1.1	7.4 ± 1.2	6.5 ± 1.3	5.5 ± 1.0	5.1 ± 0.9	4.7 ± 0.9	4.3 ± 0.8	4.2 ± 0.8
	F35	7.9 ± 0.7	7.8 ± 1.2	7.3 ± 1.3	6.4 ± 1.2	5.4 ± 1.1	5.1 ± 0.9	4.7 ± 0.9	4.3 ± 0.8	4.1 ± 0.8
	F34	8.0 ± 0.6	7.6 ± 1.3	7.2 ± 1.4	6.3 ± 1.2	5.3 ± 1.1	4.9 ± 0.9	4.6 ± 0.8	4.2 ± 0.8	4.0 ± 0.7
	F33	8.1 ± 0.6	7.7 ± 1.0	7.1 ± 1.5	6.3 ± 1.2	5.3 ± 0.9	4.9 ± 0.9	4.7 ± 0.8	4.3 ± 0.8	4.1 ± 0.7
	F32	8.1 ± 0.6	7.4 ± 1.3	7.0 ± 1.4	6.2 ± 1.2	5.3 ± 0.9	5.0 ± 0.8	4.7 ± 0.8	4.3 ± 0.7	4.1 ± 0.7
	F31	8.1 ± 0.5	7.6 ± 1.2	7.1 ± 1.2	6.1 ± 1.1	5.2 ± 0.8	4.9 ± 0.8	4.6 ± 0.7	4.2 ± 0.7	4.5 ± 0.4
NearZID	F30	8.1 ± 0.5	7.6 ± 1.3	7.1 ± 1.2	6.1 ± 1.1	5.1 ± 1.0	4.7 ± 0.8	4.5 ± 0.7	4.2 ± 0.6	4.5 ± 0.4
	F29	8.1 ± 0.6	7.7 ± 1.2	7.2 ± 1.2	6.1 ± 1.1	5.3 ± 0.9	4.9 ± 0.8	4.6 ± 0.8	4.2 ± 0.7	4.1 ± 0.7
	F28	8.1 ± 0.6	7.5 ± 1.3	7.0 ± 1.2	6.2 ± 1.2	5.3 ± 1.0	5.0 ± 0.8	4.6 ± 0.7	4.2 ± 0.6	4.0 ± 0.6
	F27	8.1 ± 0.6	7.5 ± 0.9	6.9 ± 1.3	6.2 ± 1.3	5.3 ± 1.0	4.9 ± 0.8	4.6 ± 0.7	4.1 ± 0.6	4.0 ± 0.6
	F26	8.1 ± 0.6	7.6 ± 1.0	7.0 ± 1.3	6.2 ± 1.3	5.3 ± 1.0	4.9 ± 0.7	4.6 ± 0.7	4.2 ± 0.7	3.9 ± 0.5

Table B-3. Long-term average and ±1 standard deviation for pH (units) at offshore station water depths, by contour, from 2015 through 2021.

Contour (m)	Stn	Water Depth (m)								
		1	15	25	40	60	70	80	95	100
20	F03	8.18 ± 0.08	8.04 ± 0.13	-	-	-	-	-	-	-
	F02	8.14 ± 0.09	8.04 ± 0.12							
	F01	8.17 ± 0.09	8.06 ± 0.13							
60	F14	8.18 ± 0.08	8.08 ± 0.13	8.02 ± 0.13	7.94 ± 0.11	7.86 ± 0.09	-	-	-	-
	F13	8.19 ± 0.08	8.08 ± 0.11	8.02 ± 0.13	7.94 ± 0.11	7.87 ± 0.09				
	F12	8.18 ± 0.08	8.08 ± 0.12	8.02 ± 0.12	7.94 ± 0.11	7.87 ± 0.10				
	F11	8.20 ± 0.09	8.09 ± 0.10	8.03 ± 0.11	7.95 ± 0.11	7.88 ± 0.10				
	F10	8.19 ± 0.09	8.10 ± 0.11	8.04 ± 0.12	7.95 ± 0.11	7.88 ± 0.10				
	F09	8.19 ± 0.09	8.09 ± 0.11	8.04 ± 0.12	7.95 ± 0.11	7.88 ± 0.10				
	F08	8.20 ± 0.08	8.11 ± 0.11	8.02 ± 0.13	7.95 ± 0.11	7.89 ± 0.11				
	F07	8.22 ± 0.08	8.12 ± 0.12	8.05 ± 0.12	7.96 ± 0.12	7.89 ± 0.11				
	F06	8.21 ± 0.09	8.13 ± 0.10	8.05 ± 0.12	7.97 ± 0.12	7.90 ± 0.11				
	F05	8.21 ± 0.08	8.12 ± 0.11	8.04 ± 0.13	7.98 ± 0.12	7.90 ± 0.11				
	F04	8.21 ± 0.08	8.11 ± 0.11	8.04 ± 0.12	7.97 ± 0.12	7.90 ± 0.10				
80	F25	8.16 ± 0.09	8.10 ± 0.11	8.03 ± 0.13	7.96 ± 0.12	7.87 ± 0.10	7.83 ± 0.09	7.81 ± 0.08	-	-
	F24	8.18 ± 0.08	8.09 ± 0.11	8.02 ± 0.13	7.96 ± 0.12	7.87 ± 0.10	7.84 ± 0.09	7.81 ± 0.09		
	F23	8.18 ± 0.08	8.09 ± 0.12	8.04 ± 0.12	7.95 ± 0.11	7.87 ± 0.10	7.84 ± 0.09	7.81 ± 0.09		
	F22	8.18 ± 0.08	8.10 ± 0.10	8.04 ± 0.11	7.96 ± 0.11	7.88 ± 0.10	7.85 ± 0.09	7.81 ± 0.09		
	F21	8.19 ± 0.07	8.11 ± 0.10	8.04 ± 0.12	7.96 ± 0.11	7.89 ± 0.09	7.85 ± 0.10	7.82 ± 0.09		
	F20	8.19 ± 0.08	8.10 ± 0.10	8.04 ± 0.12	7.95 ± 0.11	7.89 ± 0.10	7.85 ± 0.10	7.82 ± 0.09		
	F19	8.19 ± 0.08	8.11 ± 0.10	8.04 ± 0.12	7.95 ± 0.12	7.88 ± 0.10	7.85 ± 0.10	7.81 ± 0.09		
	F18	8.19 ± 0.08	8.11 ± 0.09	8.04 ± 0.12	7.96 ± 0.11	7.88 ± 0.10	7.86 ± 0.10	7.82 ± 0.09		
	F17	8.19 ± 0.08	8.11 ± 0.10	8.05 ± 0.12	7.96 ± 0.12	7.89 ± 0.11	7.86 ± 0.10	7.82 ± 0.09		
	F16	8.20 ± 0.09	8.11 ± 0.10	8.06 ± 0.12	7.97 ± 0.12	7.89 ± 0.11	7.86 ± 0.10	7.82 ± 0.09		
	F15	8.20 ± 0.09	8.12 ± 0.09	8.06 ± 0.12	7.98 ± 0.11	7.90 ± 0.11	7.86 ± 0.10	7.83 ± 0.09		
100	F36	8.18 ± 0.08	8.12 ± 0.09	8.07 ± 0.11	7.99 ± 0.12	7.90 ± 0.11	7.87 ± 0.10	7.83 ± 0.10	7.79 ± 0.09	7.78 ± 0.09
	F35	8.18 ± 0.08	8.12 ± 0.11	8.07 ± 0.12	7.99 ± 0.12	7.90 ± 0.11	7.87 ± 0.10	7.84 ± 0.10	7.80 ± 0.10	7.77 ± 0.09
	F34	8.19 ± 0.07	8.11 ± 0.12	8.06 ± 0.13	7.98 ± 0.12	7.90 ± 0.11	7.86 ± 0.11	7.83 ± 0.10	7.79 ± 0.10	7.77 ± 0.09
	F33	8.19 ± 0.07	8.12 ± 0.09	8.06 ± 0.13	7.99 ± 0.12	7.90 ± 0.10	7.86 ± 0.10	7.84 ± 0.10	7.80 ± 0.10	7.78 ± 0.09
	F32	8.19 ± 0.07	8.11 ± 0.11	8.06 ± 0.13	7.98 ± 0.12	7.90 ± 0.10	7.86 ± 0.10	7.84 ± 0.10	7.80 ± 0.09	7.78 ± 0.09
	F31	8.19 ± 0.06	8.10 ± 0.10	8.05 ± 0.12	7.96 ± 0.11	7.88 ± 0.10	7.84 ± 0.10	7.82 ± 0.09	7.78 ± 0.09	7.79 ± 0.06
NearZID	F30	8.20 ± 0.07	8.10 ± 0.11	8.05 ± 0.12	7.96 ± 0.11	7.86 ± 0.11	7.82 ± 0.10	7.80 ± 0.09	7.78 ± 0.08	7.82 ± 0.06
	F29	8.20 ± 0.07	8.12 ± 0.10	8.06 ± 0.11	7.97 ± 0.11	7.88 ± 0.10	7.85 ± 0.10	7.83 ± 0.09	7.79 ± 0.08	7.79 ± 0.08
	F28	8.21 ± 0.08	8.12 ± 0.11	8.06 ± 0.12	7.99 ± 0.12	7.90 ± 0.10	7.87 ± 0.10	7.84 ± 0.09	7.80 ± 0.09	7.78 ± 0.08
	F27	8.21 ± 0.08	8.13 ± 0.09	8.07 ± 0.12	7.99 ± 0.12	7.91 ± 0.10	7.87 ± 0.10	7.84 ± 0.09	7.80 ± 0.09	7.78 ± 0.09
	F26	8.21 ± 0.08	8.14 ± 0.10	8.07 ± 0.12	7.99 ± 0.13	7.91 ± 0.11	7.87 ± 0.10	7.85 ± 0.09	7.81 ± 0.09	7.79 ± 0.07

Table B-4. Long-term average and ±1 standard deviation for chlorophyll a (mg/L) at offshore station water depths, by contour, from 2015 through 2021.

Contour (m)	Stn	Water Depth (m) 1	15	25	40	60	70	80	95	100
20	F03	2.2 ± 2.2	2.6 ± 1.8	-	-	-	-	-	-	-
	F02	2.4 ± 2.6	2.7 ± 2.8							
	F01	1.3 ± 0.7	2.2 ± 1.1							
60	F14	1.4 ± 1.4	1.7 ± 1.0	1.3 ± 0.7	0.9 ± 0.6	0.5 ± 0.4	-	-	-	-
	F13	1.5 ± 1.5	2.4 ± 3.6	1.4 ± 0.9	0.9 ± 0.6	0.5 ± 0.3				
	F12	1.6 ± 2.1	3.1 ± 6.6	1.6 ± 1.0	0.9 ± 0.5	0.5 ± 0.3				
	F11	1.3 ± 1.2	2.8 ± 4.7	1.8 ± 1.1	0.9 ± 0.6	0.5 ± 0.3				
	F10	1.7 ± 2.1	3.9 ± 10.2	1.8 ± 1.6	1.0 ± 0.6	0.6 ± 0.4				
	F09	1.2 ± 1.2	2.2 ± 2.3	1.6 ± 1.1	0.9 ± 0.6	0.6 ± 0.3				
	F08	1.2 ± 1.4	2.1 ± 1.5	1.8 ± 1.5	1.0 ± 0.6	0.6 ± 0.3				
	F07	1.2 ± 1.3	1.9 ± 1.2	1.6 ± 1.0	1.0 ± 0.6	0.6 ± 0.3				
	F06	1.0 ± 0.9	1.9 ± 1.4	2.0 ± 1.9	1.1 ± 0.7	0.6 ± 0.3				
	F05	0.8 ± 0.6	1.5 ± 1.1	1.6 ± 1.0	1.1 ± 0.6	0.7 ± 0.4				
	F04	0.7 ± 0.4	1.4 ± 0.9	1.7 ± 1.2	1.0 ± 0.7	0.7 ± 0.5				
80	F25	1.5 ± 3.2	1.3 ± 1.0	1.7 ± 2.0	1.2 ± 0.9	0.4 ± 0.2	0.3 ± 0.1	0.3 ± 0.3	-	-
	F24	1.9 ± 4.5	1.4 ± 0.9	1.8 ± 1.5	1.1 ± 0.6	0.4 ± 0.3	0.3 ± 0.2	0.3 ± 0.3		
	F23	1.7 ± 3.6	1.5 ± 1.1	2.5 ± 5.6	1.1 ± 0.7	0.4 ± 0.2	0.3 ± 0.2	0.3 ± 0.1		
	F22	1.5 ± 2.8	1.5 ± 1.0	2.7 ± 6.6	1.1 ± 0.7	0.5 ± 0.2	0.4 ± 0.2	0.4 ± 0.4		
	F21	1.3 ± 2.2	1.8 ± 1.4	1.6 ± 0.9	1.0 ± 0.6	0.5 ± 0.2	0.5 ± 0.5	0.3 ± 0.2		
	F20	1.3 ± 2.1	2.0 ± 2.7	1.5 ± 0.8	1.0 ± 0.6	0.5 ± 0.3	0.4 ± 0.2	0.3 ± 0.1		
	F19	1.2 ± 2.0	2.3 ± 3.9	1.5 ± 0.7	1.1 ± 0.7	0.5 ± 0.3	0.4 ± 0.2	0.3 ± 0.1		
	F18	0.9 ± 1.2	2.2 ± 3.4	1.4 ± 0.6	1.0 ± 0.7	0.5 ± 0.2	0.4 ± 0.2	0.3 ± 0.2		
	F17	0.8 ± 0.8	1.6 ± 1.7	1.4 ± 0.9	1.2 ± 0.7	0.5 ± 0.3	0.4 ± 0.2	0.3 ± 0.2		
	F16	0.7 ± 0.5	1.4 ± 1.1	1.3 ± 0.7	1.2 ± 0.7	0.5 ± 0.3	0.4 ± 0.2	0.3 ± 0.2		
	F15	0.6 ± 0.4	1.4 ± 1.5	1.5 ± 0.9	1.2 ± 0.7	0.5 ± 0.3	0.4 ± 0.2	0.4 ± 0.2		
100	F36	1.4 ± 3.2	1.0 ± 0.7	1.5 ± 1.4	1.1 ± 0.7	0.5 ± 0.3	0.4 ± 0.2	0.3 ± 0.1	0.2 ± 0.1	0.2 ± 0.1
	F35	1.8 ± 4.7	1.3 ± 1.4	1.3 ± 1.0	1.2 ± 0.8	0.5 ± 0.2	0.3 ± 0.2	0.3 ± 0.1	0.2 ± 0.1	0.2 ± 0.1
	F34	1.6 ± 3.5	1.8 ± 2.3	1.3 ± 0.9	1.2 ± 0.8	0.5 ± 0.2	0.3 ± 0.2	0.3 ± 0.1	0.2 ± 0.1	0.2 ± 0.1
	F33	1.6 ± 3.5	2.9 ± 4.8	1.4 ± 1.1	1.2 ± 0.7	0.5 ± 0.2	0.3 ± 0.1	0.3 ± 0.1	0.2 ± 0.1	0.2 ± 0.1
	F32	1.3 ± 2.7	1.7 ± 1.8	1.2 ± 1.0	1.1 ± 0.7	0.5 ± 0.3	0.4 ± 0.2	0.3 ± 0.1	0.2 ± 0.1	0.2 ± 0.1
	F31	1.3 ± 2.3	2.1 ± 2.9	1.5 ± 1.0	1.1 ± 0.7	0.5 ± 0.3	0.4 ± 0.2	0.3 ± 0.1	0.3 ± 0.1	0.3 ± 0.1
NearZID	F30	0.8 ± 0.5	2.3 ± 3.9	1.7 ± 1.4	1.1 ± 0.7	0.5 ± 0.3	0.3 ± 0.1	0.3 ± 0.1	0.2 ± 0.1	0.3 ± 0.1
	F29	0.7 ± 0.4	2.1 ± 2.1	1.8 ± 1.4	1.2 ± 0.7	0.5 ± 0.3	0.4 ± 0.2	0.3 ± 0.2	0.3 ± 0.1	0.3 ± 0.1
	F28	0.5 ± 0.3	1.6 ± 3.1	1.3 ± 1.0	1.1 ± 0.6	0.5 ± 0.3	0.4 ± 0.2	0.3 ± 0.1	0.2 ± 0.1	0.2 ± 0.1
	F27	0.6 ± 0.3	2.3 ± 5.0	1.3 ± 1.0	1.0 ± 0.6	0.5 ± 0.2	0.4 ± 0.2	0.3 ± 0.2	0.2 ± 0.1	0.3 ± 0.1
	F26	0.6 ± 0.4	2.0 ± 3.4	1.3 ± 1.0	1.1 ± 0.6	0.5 ± 0.3	0.4 ± 0.2	0.3 ± 0.2	0.2 ± 0.1	0.3 ± 0.1

Table B-5. Monitored chemical parameters in Point Loma WTP effluent in 2015 through 2021.

Chemical Parameter	
1,1,1-Trichloroethane	Dibutyltin
1,1,2,2-Tetrachloroethane	Dichlorobenzenes, Sum
1,1,2-Trichloroethane	Dichlorobromomethane
1,1-Dichloroethane	Dichlorodifluoromethane
1,1-Dichloroethylene	Dichlorvos
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	Dieldrin
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	Diethyl Phthalate
1,2,3,4,6,7,8-Heptachlorodibenzofuran	Dimethoate
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	Dimethyl Phthalate
1,2,3,4,7,8,9-Heptachlorodibenzofuran	Di-n-butyl Phthalate
1,2,3,4,7,8-Hexachlorodibenzofuran	Di-n-octyl Phthalate
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	Dioxane
1,2,3,6,7,8-Hexachlorodibenzofuran	Disulfoton
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	Electrical Conductivity @ 25 Deg. C
1,2,3,7,8,9-Hexachlorodibenzofuran	Endosulfan I
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	Endosulfan II
1,2,3,7,8-Pentachlorodibenzofuran	Endosulfan Sulfate
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	Endosulfans, Sum
1,2,4-Trichlorobenzene	Endrin
1,2-Dibromoethane	Endrin Aldehyde
1,2-Dichlorobenzene	Ethylbenzene
1,2-Dichloroethane	Floating Particulates, Dry Weight
1,2-Dichloropropane	Fluoranthene
1,2-Diphenylhydrazine	Fluorene
1,3-Dichlorobenzene	Fluoride, Total
1,4-Dichlorobenzene	gamma-BHC
1-Methylnaphthalene	gamma-Chlordane
2,3,4,6,7,8-Hexachlorodibenzofuran	Halomethanes, Sum
2,3,4,7,8-Pentachlorodibenzofuran	Hardness, Ca (as CaCO3)
2,3,5-Trimethylnaphthalene	Hardness, Mg (as CaCO3)
2,3,7,8-TCDD (Dioxin)	Hardness, Total (as CaCO3)
2,3,7,8-Tetrachlorodibenzofuran	Heptachlor
2,4,5-Trichlorophenol	Heptachlor Epoxide
2,4,6-Trichlorophenol	Hexachlorobenzene
2,4-DDD	Hexachlorobutadiene
2,4-DDE	Hexachlorocyclopentadiene
2,4-DDT	Hexachloroethane
2,4-Dichlorophenol	Indeno (1,2,3-cd) Pyrene
2,4-Dimethylphenol	Iron, Total
2,4-Dinitrophenol	Isophorone
2,4-Dinitrotoluene	Isopropylbenzene
2,6-Dimethylnaphthalene	Lead, Total Recoverable
2,6-Dinitrotoluene	Lithium, Total
2-Chloroethylvinyl Ether	m,p-Xylenes
2-Chloronaphthalene	Magnesium, Total
2-Chlorophenol	Malathion
2-Methylnaphthalene	Manganese, Total

Chemical Parameter	
2-Methylphenol	Mercury, Total Recoverable
2-Nitrophenol	Methoxychlor
2-Nitropropane	Methyl Ethyl Ketone
3,3-Dichlorobenzidine	Methyl Iodide
4,4-DDD	Methyl Methacrylate
4,4-DDE	Methyl Tert-butyl Ether (MTBE)
4,4-DDT	Methylene Blue Active Substances (MBAS)
4,6-Dinitro-2-methylphenol	Methylene Chloride
4-Bromophenyl Phenyl Ether	Mirex
4-Chloro-3-methylphenol	Molybdenum, Total
4-Chlorophenyl Phenyl Ether	Monobutyltin
4-Methyl-2-pentanone	Naphthalene
4-Methylphenol	Nickel, Total Recoverable
4-Nitrophenol	Nitrate, Total (as N)
Acenaphthene	Nitrate, Total (as NO3)
Acenaphthylene	Nitrite, Total (as N)
Acetone	Nitrite, Total (as NO2)
Acrolein	Nitrobenzene
Acrylonitrile	N-Nitrosodimethylamine
Aldrin	N-Nitrosodi-n-Propylamine
Alkalinity, Total (as CaCO3)	N-Nitrosodiphenylamine
Allyl Chloride	Oil and Grease
alpha-BHC	Orthophosphate, Dissolved (as P)
alpha-Chlordane	Orthophosphate, Total (as P)
Aluminum, Total	Oxychlordane
Ammonia, Total (as N)	o-Xylene
Anthracene	Parathion
Antimony, Total	PCB-1016
Arsenic, Total Recoverable	PCB-1221
Azinphos-methyl	PCB-1232
Barium, Total	PCB-1242
Benzene	PCB-1248
Benzidine	PCB-1254
Benzo(a)anthracene	PCB-1260
Benzo(a)pyrene	PCB-1262
Benzo(b)fluoranthene	Pentachlorophenol
Benzo(e)pyrene	Perylene
Benzo(ghi)perylene	pH
Benzo(k)fluoranthene	Phenanthrene
Beryllium, Total	Phenol, Single Compound
beta-BHC	Phenols, Chlorinated
Biochemical Oxygen Demand (BOD) (5-day @ 20 Deg. C)	Phenols, Non-chlorinated
Biphenyl	Phosphate, Total (as PO4)
Bis (2-Chloroethoxy) Methane	Phosphorus, Total (as P)
Bis (2-Chloroethyl) Ether	Potassium, Dissolved
Bis (2-Chloroisopropyl) Ether	Pyrene
Bis (2-Ethylhexyl) Phthalate	Pyridine
BOD5 @ 20 Deg. C, Percent Removal	Radiation, Gross Alpha
Boron, Total	Radiation, Gross Beta

Chemical Parameter	
Bromide	Selenium, Total Recoverable
Bromoform	Settleable Solids
Bromomethane	Silver, Total Recoverable
Butylbenzyl Phthalate	Sodium, Total
Cadmium, Total Recoverable	Soluble Biochemical Oxygen Demand (5-day @ 20 Deg. C)
Calcium, Total	Soluble Chemical Oxygen Demand
Carbon disulfide	Stirophos
Carbon Tetrachloride	Styrene
Chemical Oxygen Demand (COD)	Sulfate, Total (as SO4)
Chlordane	Sulfide, Total (as S)
Chloride	TCDD Equivalents
Chlorine, Total Residual	Temperature
Chlorobenzene	Tetrachloroethene
Chloroethane	Thallium, Total Recoverable
Chloroform	Tin, Total
Chloromethane	Titanium, Total
Chloroprene	Toluene
Chlorpyrifos	Total Dissolved Solids (TDS)
Chromium (III) Total Recoverable	Total Kjeldahl Nitrogen (TKN) (as N)
Chromium (VI)	Total Solids (TS)
Chromium, Total Recoverable	Total Suspended Solids (TSS)
Chrysene	Total Suspended Solids (TSS), Percent Removal
cis-1,3-Dichloropropene	Total Volatile Solids
cis-Nonachlor	Toxaphene
Cobalt, Total	trans-1,2-Dichloroethene
Cobalt, Total Recoverable	trans-1,3-Dichloropropene
Copper, Total Recoverable	trans-Nonachlor
Coumaphos	Tributyltin (TBT)
Cyanide, Total (as CN)	Trichloroethene
delta-BHC	Trichlorofluoromethane
Demeton-O	Turbidity
Demeton-S	Vanadium, Total
Diazinon	Vinyl Chloride
Dibenzo(a,h)anthracene	Volatile Suspended Solids (VSS)
Dibromochloromethane	Zinc, Total Recoverable

Table B-6. Monitored chemical parameters detected at least once in Point Loma WTP effluent from 2015 through 2021.

Chemical Parameter	
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	Floating Particulates, Dry Weight
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	Fluoride, Total
1,2,3,4,6,7,8-Heptachlorodibenzofuran	gamma-BHC
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	Halomethanes, Sum
1,2,3,4,7,8,9-Heptachlorodibenzofuran	Hardness, Ca (as CaCO3)
1,2,3,4,7,8-Hexachlorodibenzofuran	Hardness, Mg (as CaCO3)
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	Hardness, Total (as CaCO3)
1,2,3,6,7,8-Hexachlorodibenzofuran	Iron, Total
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	Lead, Total Recoverable
1,2,3,7,8,9-Hexachlorodibenzofuran	Lithium, Total
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	m,p-Xylenes
1,2,3,7,8-Pentachlorodibenzofuran	Magnesium, Total
1,4-Dichlorobenzene	Malathion
2,3,4,6,7,8-Hexachlorodibenzofuran	Manganese, Total
2,3,4,7,8-Pentachlorodibenzofuran	Mercury, Total Recoverable
2,3,7,8-Tetrachlorodibenzofuran	Methoxychlor
2,4,6-Trichlorophenol	Methyl Ethyl Ketone
2,4-DDE	Methyl Tert-butyl Ether (MTBE)
2,4-Dinitrophenol	Methylene Blue Active Substances (MBAS)
2-Chlorophenol	Methylene Chloride
2-Methylnaphthalene	Mirex
4-Methyl-2-pentanone	Molybdenum, Total
4-Methylphenol	Nickel, Total Recoverable
Acetone	Nitrate, Total (as NO3)
Alkalinity, Total (as CaCO3)	Oil and Grease
Aluminum, Total	Orthophosphate, Dissolved (as P)
Ammonia, Total (as N)	Orthophosphate, Total (as P)
Antimony, Total	o-Xylene
Arsenic, Total Recoverable	PCB-1248
Barium, Total	Pentachlorophenol
Benzene	pH
Beryllium, Total	Phenol, Single Compound
Biochemical Oxygen Demand (BOD) (5-day @ 20 Deg. C)	Phenols, Chlorinated
Bis (2-Ethylhexyl) Phthalate	Phenols, Non-chlorinated
BOD_5 @ 20 Deg. C, Percent Removal	Phosphate, Total (as PO4)
Boron, Total	Phosphorus, Total (as P)
Bromide	Potassium, Dissolved
Bromomethane	Pyridine
Cadmium, Total Recoverable	Radiation, Gross Alpha

Chemical Parameter	
Calcium, Total	Radiation, Gross Beta
Carbon disulfide	Selenium, Total Recoverable
Chemical Oxygen Demand (COD)	Settleable Solids
Chloride	Silver, Total Recoverable
Chlorine, Total Residual	Sodium, Total
Chloroethane	Soluble Biochemical Oxygen Demand (5-day @ 20 Deg. C)
Chloroform	Soluble Chemical Oxygen Demand
Chloromethane	Styrene
Chlorpyrifos	Sulfate, Total (as SO4)
Chromium (III) Total Recoverable	Sulfide, Total (as S)
Chromium (VI)	TCDD Equivalents
Chromium, Total Recoverable	Temperature
Cobalt, Total	Tetrachloroethene
Cobalt, Total Recoverable	Thallium, Total Recoverable
Copper, Total Recoverable	Tin, Total
Cyanide, Total (as CN)	Titanium, Total
Diazinon	Toluene
Dibromochloromethane	Total Dissolved Solids (TDS)
Dibutyltin	Total Kjeldahl Nitrogen (TKN) (as N)
Dichlorobenzenes, Sum	Total Solids (TS)
Dichlorobromomethane	Total Suspended Solids (TSS)
Dichlorvos	Total Suspended Solids (TSS), Percent Removal
Diethyl Phthalate	Total Volatile Solids
Dimethyl Phthalate	Trichlorofluoromethane
Di-n-butyl Phthalate	Turbidity
Electrical Conductivity @ 25 Deg. C	Vanadium, Total
Endosulfans, Sum	Volatile Suspended Solids (VSS)
Ethylbenzene	Zinc, Total Recoverable

Table B-7. Flatfish species sampled for liver tissue (*) at 98 meter trawl fishing zones in October (1995-2021).

Common Name	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21
Bigmouth Sole									*																		
Dover Sole	*							*																			
English Sole	*	*				*	*	*	*	*		*	*	*							*						
Hornyhead Turbot			*			*			*																		
Longfin Sanddab	*	*	*	*	*	*	*	*	*	*																*	
Pacific Sanddab	*	*				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		*	*	*

Table B-8. Rockfish species sampled for muscle tissue (*) at 98 meter rig fishing stations in October (1995-2021).

Common Name	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21
California Scorpionfish			*	*	*											*											
Canary	*																										
Chilipepper																	*										
Copper	*	*		*			*	*	*	*		*	*	*	*			*		*	*						
Flag Rockfish								*									*										
Greenspotted Rockfish										*			*	*				*									
Greenstriped Rockfish																									*		
Mixed Rockfish	*	*	*	*		*	*	*	*	*	*		*	*	*	*		*	*		*	*	*		*	*	*
Rosethorn Rockfish											*																
Speckled Rockfish		*	*		*						*								*	*	*	*					
Squarespot Rockfish			*								*																
Starry Rockfish			*	*			*					*						*	*						*	*	*
Vermilion Rockfish	*	*		*	*	*	*	*	*				*	*	*	*	*	*		*	*	*	*		*	*	*
Yellowtail Rockfish												*															

Table B-9. Exceedance summary for statistical threshold value (STV) enterococcus objective at shoreline stations from January 2015 through December 2021.

Enterococcus Objective: Statistical Threshold Value of 110 cfu/100 ml

Station	# of times exceeded	# of observations	% > 110	% < 110
D12	3	398	0.8%	99.2%
D11	11	410	2.7%	97.3%
D10	7	395	1.8%	98.2%
D9	5	376	1.3%	98.7%
D8	12	389	3.1%	96.9%
D7	5	355	1.4%	98.6%
D5	2	390	0.5%	99.5%
D4	1	388	0.3%	99.7%
Total	46	3101	1.5%	98.5%

Note: Number of individual shore station samples during January 2015 through December 2021 that exceeded the state STV enterococcus objective of 110 cfu/100 ml. Exceedances at shore stations are the result of shore-based runoff or discharges. See tables summarizing data at offshore stations for information related to outfall performance.

Table B-10. Exceedance summary for 6-week geometric mean enterococcus objective at shoreline stations from January 2015 through December 2021.

Enterococcus Objective: 6-Week Geometric Mean of 30 cfu/100 ml

Station	# of times exceeded	# of observations	% > 30	% < 30
D12	3	398	0.8%	99.2%
D11	21	410	5.1%	94.9%
D10	11	395	2.8%	97.2%
D9	4	376	1.1%	98.9%
D8	17	389	4.4%	95.6%
D7	4	355	1.1%	98.9%
D5	0	390	0.0%	100.0%
D4	0	388	0.0%	100.0%
Total	60	3101	1.9%	98.1%

Note: Number of individual shore station samples during January 2015 through December 2021 that exceeded the state 6-week geometric mean enterococcus objective of 30 cfu/100 ml. Exceedances at shore stations are the result of shore-based runoff or discharges. See tables summarizing data at offshore stations for information related to outfall performance.

Table B-11. Exceedance summary for statistical threshold value (STV) enterococcus objective at kelp bed stations from January 2015 through December 2021.

Enterococcus Objective: Statistical Threshold Value of 110 cfu/100 ml

Station	Depth (m)	# of times exceeded	# of observations	% > 110	% < 110
C6	Surface (1)	0	383	0%	100%
	Mid (3)	0	383	0%	100%
	Bottom (9)	0	383	0%	100%
C5	Surface (1)	0	383	0%	100%
	Mid (3)	0	383	0%	100%
	Bottom (9)	0	383	0%	100%
C4	Surface (1)	0	383	0%	100%
	Mid (3)	0	383	0%	100%
	Bottom (9)	0	383	0%	100%
C8	Surface (1)	0	384	0%	100%
	Mid (12)	0	384	0%	100%
	Bottom (18)	0	385	0%	100%
C7	Surface (1)	1	384	0.26%	99.74%
	Mid (12)	0	384	0%	100%
	Bottom (18)	1	384	0.26%	99.74%
A6	Surface (1)	1	384	0.26%	99.74%
	Mid (12)	0	384	0%	100%
	Bottom (18)	1	387	0.26%	99.74%
A7	Surface (1)	0	384	0%	100%
	Mid (12)	1	386	0.26%	99.74%
	Bottom (18)	1	386	0.26%	99.74%
A1	Surface (1)	1	385	0.26%	99.74%
	Mid (12)	1	385	0.26%	99.74%
	Bottom (18)	3	386	0.78%	99.22%
Total		11	9,219	0.12%	99.88%

Note: Number of individual kelp bed station samples during January 2015 through December 2021 that exceeded the state STV enterococcus objective of 110 cfu/100 ml.

Table B-12. Exceedance summary for 6-week geometric mean enterococcus objective at kelp bed stations from January 2015 through December 2021.

Enterococcus Objective: 6-Week Geometric Mean of 30 cfu/100 ml

Station	Depth (m)	# of times exceeded	# of observations	% > 30	% < 30
C6	Surface (1)	0	383	0%	100%
	Mid (3)	0	383	0%	100%
	Bottom (9)	0	383	0%	100%
C5	Surface (1)	0	383	0%	100%
	Mid (3)	0	383	0%	100%
	Bottom (9)	0	383	0%	100%
C4	Surface (1)	0	383	0%	100%
	Mid (3)	0	383	0%	100%
	Bottom (9)	0	383	0%	100%
C8	Surface (1)	0	384	0%	100%
	Mid (12)	0	384	0%	100%
	Bottom (18)	0	385	0%	100%
C7	Surface (1)	0	384	0%	100%
	Mid (12)	0	384	0%	100%
	Bottom (18)	0	384	0%	100%
A6	Surface (1)	0	384	0%	100%
	Mid (12)	0	384	0%	100%
	Bottom (18)	0	387	0%	100%
A7	Surface (1)	0	384	0%	100%
	Mid (12)	0	386	0%	100%
	Bottom (18)	1	386	0.26%	99.74%
A1	Surface (1)	0	385	0%	100%
	Mid (12)	0	385	0%	100%
	Bottom (18)	0	386	0%	100%
Total		1	9,219	0.01%	99.99%

Note: Number of calendar months within January 2015 through December 2021 where the computed 6-week geometric mean at the listed station and depth exceeded the state 6-week geometric mean enterococcus objective of 30 cfu/100 ml. Listed number of observations is the number of samples at the given station and depth within this 84 month period.

Table B-13. Exceedance summary for statistical threshold value (STV) enterococcus objective at offshore stations in State waters from January 2015 through December 2021.

Enterococcus Objective in State Waters: Statistical Threshold Value of 110 cfu/100 ml

Contour	Station	Depth (m)	# of times exceeded	# of observations	% > 110	% < 110
18	F3	1	0	28	0%	100%
		12	0	28	0%	100%
		18	0	28	0%	100%
	F2	1	0	28	0%	100%
		12	0	28	0%	100%
		18	0	28	0%	100%
	F1	1	0	28	0%	100%
		12	0	28	0%	100%
		18	0	28	0%	100%
60	F14	1	0	28	0%	100%
		25	0	28	0%	100%
		60	0	27	0%	100%
	F13	1	0	28	0%	100%
		25	0	28	0%	100%
		60	0	28	0%	100%
	F12	1	0	28	0%	100%
		25	0	28	0%	100%
		60	1	28	3.57%	96.43%
	F11	1	0	28	0%	100%
		25	0	28	0%	100%
		60	3	30	10.00%	90.00%
	F10	1	0	28	0%	100%
		25	0	28	0%	100%
		60	1	28	3.57%	96.43%
	F9	1	0	28	0%	100%
		25	0	28	0%	100%
		60	0	28	0%	100%
	F8	1	0	28	0%	100%
		25	0	28	0%	100%
		60	0	28	0%	100%
	F7	1	0	28	0%	100%
		25	0	28	0%	100%
		60	0	28	0%	100%
	F6	1	0	28	0%	100%
		25	0	28	0%	100%
		60	1	28	3.57%	96.43%
80	F20	1	0	28	0%	100%
		25	0	28	0%	100%
		60	5	28	17.86%	82.14%
		80	6	28	21.43%	78.57%
	F19	1	0	28	0%	100%
		25	0	28	0%	100%
		60	3	29	10.34%	89.66%
		80	9	30	30.00%	70.00%
	F18	1	0	28	0%	100%
		25	0	28	0%	100%
		60	3	29	10.34%	89.66%
		80	4	29	13.79%	86.21%
Total			36	1350	2.67%	97.33%

Table B-14. Exceedance summary for 6-week geometric mean enterococcus objective at offshore stations in State waters from January 2015 through December 2021.

Enterococcus Objective in State Waters: 6-Week Geometric Mean of 30 cfu/100 ml

Contour	Station	Depth (m)	# of times exceeded	# of observations	% > 30	% < 30
18	F3	1	0	28	0%	100%
		12	0	28	0%	100%
		18	0	28	0%	100%
	F2	1	0	28	0%	100%
		12	0	28	0%	100%
		18	0	28	0%	100%
	F1	1	0	28	0%	100%
		12	0	28	0%	100%
		18	0	28	0%	100%
60	F14	1	0	28	0%	100%
		25	0	28	0%	100%
		60	1	27	3.70%	96.30%
	F13	1	0	28	0%	100%
		25	0	28	0%	100%
		60	2	28	7.14%	92.86%
	F12	1	0	28	0%	100%
		25	0	28	0%	100%
		60	3	28	10.71%	89.29%
	F11	1	0	28	0%	100%
		25	0	28	0%	100%
		60	4	30	13.33%	86.67%
	F10	1	0	28	0%	100%
		25	0	28	0%	100%
		60	5	28	17.86%	82.14%
	F9	1	0	28	0%	100%
		25	0	28	0%	100%
		60	3	28	10.71%	89.29%
	F8	1	0	28	0%	100%
		25	0	28	0%	100%
		60	4	28	14.29%	85.71%
	F7	1	0	28	0%	100%
		25	0	28	0%	100%
		60	4	28	14.29%	85.71%
	F6	1	0	28	0%	100%
		25	0	28	0%	100%
		60	3	28	10.71%	89.29%
80	F20	1	0	28	0%	100%
		25	0	28	0%	100%
		60	7	28	25.00%	75.00%
		80	12	28	42.86%	57.14%
	F19	1	0	28	0%	100%
		25	0	28	0%	100%
		60	7	29	24.14%	75.86%
		80	13	30	43.33%	56.67%
	F18	1	0	28	0%	100%
		25	0	28	0%	100%
		60	5	29	17.24%	82.76%
		80	11	29	37.93%	62.07%
Total			84	1350	6.22%	93.78%

Note: Since only one enterococcus sample is collected per quarter at the above stations, the above table compares individual sample results with the 6-week geometric mean state objective for enterococcus.

Table B-15. Maximum enterococcus density in offshore waters from January 2015 through December 2021. Station results in State waters are shown in bold font.

Contour	Station	Maximum Enterococcus Concentration (CFU/100 ml)						
		1m depth	12m depth	18m depth	25m depth	60m depth	80m depth	98m depth
18	**F3**	**10**	**2**	**6**				
	F2	**6**	**6**	**2**				
	F1	**2**	**2**	**2**				
60	**F14**	**2**			**2**	**50**		
	F13	**4**			**4**	**36**		
	F12	**2**			**6**	**240**		
	F11	**4**			**14**	**140**		
	F10	**20**			**8**	**180**		
	F9	**2**			**20**	**54**		
	F8	**2**			**8**	**56**		
	F7	**4**			**2**	**58**		
	F6	**2**			**2**	**960**		
	F5	36			6	120		
	F4	2			4	54		
80	F25	4			14	220	220	
	F24	60			40	380	240	
	F23	2			2	500	86	
	F22	2			2	220	180	
	F21	2			2	320	540	
	F20	**2**			**4**	**440**	**320**	
	F19	**2**			**2**	**460**	**620**	
	F18	**2**			**4**	**800**	**420**	
	F17	2			2	120	500	
	F16	2			2	220	520	
	F15	2			2	160	520	
98	F36	2			140	32	220	140
	F35	2			10	280	120	110
	F34	2			4	560	220	86
	F33	2			2	500	2200	800
	F32	2			2	560	1200	240
	F31	2			2	320	400	160
	F30	4			2	1100	1000	580
	F29	6			20	880	440	420
	F28	2			2	540	440	120
	F27	2			2	280	260	260
	F26	2			4	400	160	110

Note: Quarterly enterococcus sampling is required for the above stations. The above data represent a total of 28 quarterly enterococcus samples collected between January 2015 and December 2021.

Table B-16. Long-term average enterococcus density in offshore waters from January 2015 through December 2021. Station results in State waters are shown in bold font.

Contour	Station	Enterococcus Arithmetic Average Concentration (CFU/100 ml)						
		1m depth	12m depth	18m depth	25m depth	60m depth	80m depth	98m depth
18	**F3**	**2**	**2**	**2**				
	F2	**2**	**2**	**2**				
	F1	**2**	**2**	**2**				
60	**F14**	**2**			**2**	**8**		
	F13	**2**			**2**	**10**		
	F12	**2**			**2**	**22**		
	F11	**2**			**3**	**25**		
	F10	**3**			**2**	**24**		
	F9	**2**			**3**	**14**		
	F8	**2**			**2**	**17**		
	F7	**2**			**2**	**14**		
	F6	**2**			**2**	**43**		
	F5	3			2	11		
	F4	2			2	10		
80	F25	2			3	23	25	
	F24	4			3	34	28	
	F23	2			2	33	26	
	F22	2			2	20	38	
	F21	2			2	26	75	
	F20	**2**			**2**	**64**	**66**	
	F19	**2**			**2**	**55**	**105**	
	F18	**2**			**2**	**56**	**59**	
	F17	2			2	12	65	
	F16	2			2	16	32	
	F15	2			2	10	29	
98	F36	2			7	4	28	14
	F35	2			2	15	19	12
	F34	2			2	30	45	14
	F33	2			2	39	147	66
	F32	2			2	46	106	28
	F31	2			2	21	79	25
	F30	2			2	140	294	89
	F29	2			3	39	57	37
	F28	2			2	25	65	12
	F27	2			2	26	35	19
	F26	2			2	24	16	10

Note: Quarterly enterococcus sampling is required for the above stations. The above data represent a total of 28 quarterly enterococcus samples collected between January 2015 and December 2021.

Table B-17 Summary of various benthic macrofauna indices for PLOO stations. Data from January and July surveys only, from 1991 to 2020. (adapted from Table C1-5, Volume V. Appendix C1, of the 2022 Application).

	Pre-Discharge Surveys (1991−1993)				2014-2020 Post-Discharge			All Post-Discharge Surveys			
	All Sites		Outfall Stn. E14	Ref. Stn. B9	All Sites	Outfall Stn. E14	Ref. Stn. B9	All Sites		Outfall Stn. E14	Ref. Stn. B9
	Mean	Range	Mean	Mean	Mean	Mean	Mean	Mean	Range	Mean	Mean
Abundance											
All Invertebrates	269	124 – 498	279	254	341	351	311	346	94 – 788	422	310
Annelids[a]	151	50 – 375	170	143	209	209	221	205	40 – 670	279	194
Arthropods[b]	44	10 – 102	44	52	37	36	26	57	2 – 178	64	47
Molluscs	19	4 – 102	14	13	57	91	27	36	2 – 283	58	24
Echinoderms	51	9 – 84	47	43	31	3	29	42	0 – 175	12	41
Misc. Other Taxa	3	0 – 11	4	4	8	13	8	6	0 – 51	10	5
Species Richness	66	44 – 100	63	68	77	69	85	86	41 – 140	92	85
Swartz Dominance	18	9 – 30	18	20	24	18	30	28	4 – 50	26	29
Diversity (H')	3.3	2.7 – 3.9	3.3	3.4	3.6	3.4	3.8	3.7	2.0 – 4.4	3.7	3.8
BRI	4.6	-4 – 12	4.8	7.0	13.2	30.4	9.6	10.2	-4 – 37	20.5	6.4

[a] Annelids = mostly polychaetes [b] Arthropods = mostly crustaceans