California Regional Water Quality Control Board
San Diego Region

David Gibson, Executive Officer

Executive Officer's Report
June 14, 2023

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The June report for the Tentative Schedule of Significant NPDES Permits, WDRs, and Actions, Agenda Items Requested by Board Members, and the attachments noted above are included at the end of this report.

Part A – San Diego Region Staff Activities

1. Personnel Report

Staff Contact: Dulce Romero

An updated San Diego Water Board staff list is available online at: https://www.waterboards.ca.gov/sandiego/board_info/agendas/2023/jun/stafflist_june2023.pdf.

Recruitment

We are recruiting for four positions: one Student Assistant Engineer & Architectural Sciences in the Site Restoration and Groundwater Protection Branch, one Water Resource Control Engineer, one Senior Water Resources Control Engineer, and one Scientific Aid.

Information regarding our vacancies is located on the CalCareers and San Diego Water Board websites: https://calcareers.ca.gov/CalHRPublic/Search/AdvancedJobSearch.aspx ; https://www.waterboards.ca.gov/sandiego/about_us/employment/

2. COVID-19 Aftermath and Lessons Learned

Staff Contact: Chris Blank

Board Member Warren requested an update on the lessons learned regarding the use of the Zoom remote meeting platform for Board Meetings to inform how the Regional Boards move forward now that we have returned to the office and hold Board Meetings in person.

The COVID-19 pandemic changed the concept of remote work and remote meetings forever. Although the 20-month "stay-at-home" period presented some initial obstacles, we all learned valuable lessons. We were required to switch quickly to remote work, and as a team we were able to meet those challenges and continue to achieve our goals of serving the public efficiently and protecting water quality in our Region. We also discovered that remote meetings allowed us to complete our work, in some cases more efficiently than meeting in person.

Most San Diego Water Board staff have returned to working in the physical office space part time. Much of the office has been converted to a "hoteling" model, with the exception of those staff that report to the office 3 or more days a week or whose duties require a fixed workspace due to maintaining confidential materials. Most meetings continue to be remote via either Teams or Zoom, and the monthly Board Meetings continue to have a significant remote participation presence.

We are currently scheduled to have the audio-visual equipment in the Board Room upgraded in July 2023. After the equipment is upgraded, we will no longer have to rely on a third-party contractor to host the online portion of the meeting, unless we are meeting at an offsite location. If the upgrades proceed as scheduled, the San Diego Water Board can host its own online meetings beginning with the August 9, 2023 Board meeting.

3. Border Water Quality Update

Staff Contact: David Gibson

On May 5, 2023, I represented the Water Board at the U.S. EPA and U.S. International Boundary and Water Commission (IBWC) Eligible Public Entities Coordination Group (EPECG) regarding the status of the United States-Mexico-Canada Agreement (USMCA) funded border water quality protection measures. A significant concern is the unexpected costs for rehabilitation and repair of the IBWC International Wastewater Treatment Plant (ITP) primary treatment system equipment. These costs are variously estimated in excess of $80 million and may at least in part be drawn from the $300 million authorized and allocated to U.S. EPA in the USMCA. Regional Administrator Martha Guzman indicated that the Record of Decision would be signed in June or July and a full fiscal analysis of the Programmatic Environmental Impact Preferred Alternative projects to be developed in phases would be released in August. I have conferred with partner agencies and we're working with CalEPA on another joint letter to express our shared concerns and expectations for the long-awaited Record of Decision and the pending financial analyses. I also attend the subsequent U.S. EPA-IBWC public meeting on May 9, 2023 and met with Commissioner Maria Elena Giner and IBWC staff on May 12, 2023 for a briefing on the status of the ITP.

Flows in the Tijuana River have declined to 6.7 mgd (June 2, 2023) and PBCILA has been reactivated, further reducing the river flows into the U.S. The ITP is presently receiving 25mgd but does not have full primary wastewater treatment due to equipment failures. U.S. IBWC and CILA are re-erecting the berm in the Tijuana River to retain dry weather flows that bypass PBCILA.

I also gave a presentation together with Mayor Paloma Aguirre (Imperial Beach) and IBWC Area Operations Manager Morgan Rogers at the Industrial Environmental Association 39th Annual Conference as well media interviews on the pending border water quality protection measures and the compliance issues associated with deferred maintenance at the IBWC ITP.

Part B – Significant Regional Water Quality Issues

1. 2023 Secretary of the Navy and Secretary of Defense Environmental Awards *(Attachment B-1)*

Staff Contacts: Sean McClain and Kristin Schwall

The Department of the Navy (Navy) announced the winners of the 2023 Secretary of the Navy Environmental Awards[1] competition, in April 2023. The Navy identified the following winners within the San Diego Region:

- Natural Resources Conservation – Large Installation: Naval Base Coronado and Marine Corps Base Camp Pendleton
- Sustainability – Non-Industrial Installation: Naval Base San Diego
- Sustainability – Individual or Team: Bruce Delling and Jeff McGovern, Naval Weapons Station Detachment Fallbrook
- Environmental Restoration – Installation: Naval Base Point Loma

Winners of the Secretary of Navy Environmental Awards are nominated to compete in the Secretary of Defense Environmental Awards.[2] A diverse panel of 54 judges from federal and state agencies, academia, and the private sector evaluate the nominees and select winners for each competition category. The Department of Defense announced in April 2023, that Naval Base Point Loma won the award for the Environmental Restoration, Installation category. The Navy included in its nomination package for Naval Base Point Loma a narrative highlighting the following accomplishments (see Attachment):

- Corrective Action Completion at Underground Storage Tank Site 105
- Time Critical Removal Action Completions at Installation Restoration Site 7 and Munitions Response Program 1
- Site Closures at Old Town Campus Installation Restoration Site 10 and Taylor Street Installation Restoration Site 100
- Field Work Completions at Installation Restoration Sites 11, 12, and 13
- Application of Innovative Techniques at Installation Restoration Sites 6 and 7.

The San Diego Water Board and Department of Toxic Substances Control provided the Navy with supportive statements highlighting the productive and collaborative relationship with Navy representatives assigned to Naval Base Point Loma. This relationship resulted in significant progress over the past 2 years with inspections and implementation of corrective actions at

[1] Winners of the 2023 Secretary of the Navy Environmental Awards https://www.mynavyhr.navy.mil/Portals/55/Messages/ALNAV/ALN2023/ALN23030.txt?ver=1yWJcrjHPdI6mfCwMyjIzw%3D%3D

[2] Winners of the 2023 Secretary of Defense Environmental Awards https://www.defense.gov/News/Releases/Release/Article/3364408/the-department-of-defense-announces-winners-of-the-2023-secretary-of-defense-en/

Naval Base Point Loma Installation Restoration Sites. San Diego Water Board and Navy project managers frequently discuss technical approach, findings, and lessons learned to identify obstacles and brainstorm solutions that benefit cleanup project phases at Installation Restoration Sites. These discussions support the common goal of protecting human health and the environment at Naval Base Point Loma.

2. Encina Ocean Outfall State of the Ocean Written Report *(Attachment B-2)*

Staff Contact: Joann Lim

As required in Order No. R9-2018-0059[3], the Encina Wastewater Authority (Encina) submitted its Written State of the Ocean Report on May 4, 2023. The written report is available at the following website: https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/PublicReportEsmrAtGlanceServlet?reportID=2&isDrilldown=true&documentID=2718964.

The receiving water monitoring program includes the following:

- Weekly monitoring at shore stations and quarterly monitoring at the nearshore and offshore stations for visual observations, temperature, total coliform, fecal coliform, and enterococcus.
- Quarterly monitoring at the nearshore and offshore stations throughout the water column for temperature, dissolved oxygen, light transmittance, pH and salinity.
- Once per permit term monitoring at offshore stations for sediment grain size, sediment chemistry, sediment toxicity, and benthic community structure.
- Once per permit term collecting and cataloging of fish and macroinvertebrates at four trawl stations and three rig-fishing stations to evaluate fish tissue for the bioaccumulation of toxins.
- Participating in the Southern California Bight (Bight) regional monitoring efforts conducted by the Southern California Coastal Water Research Project (SCCWRP) and comparing the regional monitoring results with Encina's monitoring results.

Based on the monitoring results summarized below, Encina concludes that its effluent discharge from the Encina Ocean Outfall is not adversely affecting the Pacific Ocean.

- No visual observations related to the Encina discharge were identified in the receiving water.
- The dissolved oxygen depth profiles near the Encina discharge were not discernibly different than profiles at reference stations and were consistent with dissolved oxygen concentrations throughout the Bight as reported within the Bight 2018 studies.

[3] Order No. R9-2018-0059, NPDES Permit No. CA0107395, *Waste Discharge Requirements for the Encina Wastewater Authority Encina Water Pollution Control Facility and Satellite Wastewater Treatment Plants Discharge to the Pacific Ocean through the Encina Ocean Outfall*.

- Receiving water depth profiles of pH collected demonstrate no discernible difference in pH depth profiles between the monitoring stations near the Encina discharge and reference stations throughout the Bight.
- Clarity depth profiles near the Encina discharge were similar to the reference stations, while water clarity levels vary in accordance with natural phenomena (upwelling, wind, storm conditions).
- Depth vs. temperature profiles throughout the Bight show strong seasonal density stratification throughout much of the year where deeper colder waters are physically separated from warmer near-surface waters by a thermocline or pycnocline, restricting the upward movement of the Encina discharge. The thermocline trapping depths can range from less than 40 feet during spring months to 100 feet or more during the fall. The trends can sometimes be interrupted by upwelling events where cold waters from deep offshore canyons move upward and toward the coastal shelf.
- The shoreline, nearshore, and offshore monitoring results for fecal coliform and enterococcus met the Ocean Plan bacterial standards.
- Sediment concentrations of toxic inorganic and organic compounds near the Encina discharge were less than or equivalent to concentrations at other regional Bight 2018 stations, and below the State Water Resource Control Board's "reference" values characteristic of undisturbed habitat.
- Benthic community monitoring data demonstrated that biological communities in the vicinity of the Encina discharge are in excellent condition with a high degree of species diversity, richness, abundance, and evenness.
- Trawl monitoring demonstrated that fish and benthic invertebrate populations are diverse, balanced, and abundant.
- Fish populations in the vicinity of the Encina discharge are abundant, diverse, and healthy; and are comprised of species common to the Bight.
- Populations of benthic invertebrates are abundant in the vicinity of the Encina discharge.
- Anomalies in fish (tumors, lesions, etc.) are rare and occur on a percentage basis that is consistent with anomalies found throughout the Bight.
- No anomalies in benthic invertebrate organisms were observed near the Encina discharge.
- Fish tissue samples showed no detectable concentrations of cadmium, chromium, lead, nickel, or silver and showed detectable concentrations of arsenic, copper, mercury, selenium, and zinc that were consistent with concentrations that occur in fish caught in other areas of the Bight but were below Advisory Tissue Levels (ATLs) established by the California Environmental Protection Agency (EPA).
- Fish tissue samples also showed no detectable concentrations of chlorinated pesticides or polynuclear aromatic hydrocarbons and showed detectable concentrations of 4,4'-dichlorodiphenyldichloroethylene (DDE) (a dichlorodiphenyltrichloroethane (DDT)

isomer) and polychlorinated biphenyls that were far below ATLs established by the California EPA.

In addition to the receiving water monitoring described above, Encina coordinated with other regional dischargers to design a plume tracking study to assess the transport and fate of the Encina discharge using an approach pioneered by the Scripps Institution of Oceanography. Under three sets of conditions, net plume movement during ebb tide conditions was parallel to the coastline and in a southerly direction (maximum distance of 2200 feet south of outfall), while net plume movement during flood tide conditions was parallel to the coastline in a northerly direction (maximum distance of 1725 feet north of outfall). Under all observed conditions, it was found that the Encina discharge breaks up into multiple pieces that are rapidly diluted and dispersed due to ocean currents.

Based on the receiving water monitoring results and the plume tracking study, Encina concluded that the existing Encina Ocean Outfall monitoring program is adequate for assessing receiving water quality, sediment quality, and receiving water habitats. Encina further noted some existing effluent and receiving water monitoring may be superfluous or unnecessary.

3. 2021 Triennial Review Project No. 1: Designation of Tribal Tradition and Culture (CUL), Tribal Subsistence Fishing (T-SUB), and Subsistence Fishing (SUB) Beneficial Uses to Surface Waters in the San Diego Region

Staff Contact: Jody Ebsen

A. PROJECT INFORMATION
Project Lead: Jody Ebsen
Supervisor: Cynthia Gorham

Report Date: June 2023
Report Period: January-April 2023
Overall Status: On track

Website:
https://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/tribal_beneficial_uses.html

Project Description:
This project will designate surface water bodies, where appropriate, with the CUL, TSUB, and SUB beneficial uses. It builds on the work that was completed with the adoption of Resolution No. R9-2020-0254, which incorporated these beneficial uses into the San Diego Region Basin Plan. During the initial phase of this project, the San Diego Water Board is working with tribes to identify water bodies appropriate to designate with tribal beneficial uses. Completion of the project will extend beyond the 2021 triennial review cycle.

Project Objective:
Develop working relationships with local tribes and establish new tribal beneficial use designations where appropriate to waters in the San Diego region with a Basin Plan amendment.

Triennial Review Commitment:
Work in consultation with Tribes to designate waterbodies, as appropriate, in the San Diego Region with the CUL, T-SUB and SUB beneficial uses.

Key Milestone	Target Date	Status
Project Charter	March 2022	Completed
Tribal Summit	June 29, 2022	Completed
Regular meetings with Tribal Work Group	Winter 2022/Spring 2023	On-Going

B. PROGRESS REPORT: Tribal Beneficial Uses

Reporting Period Events

Accomplishments during period	Established monthly meetings with a tribal work group comprised of representatives from 10 tribes in the Southern California area to develop the project scope.
Collaboration during period	Participated in monthly meetings with a tribal work group to begin developing project scope. Coordinated with other Regional Boards and State Water Board Office of Public Participation, Tribal Affairs through the Tribal Beneficial Uses Workgroup.
Activities planned but not completed	None
Key issues during period	None

Looking Forward

Activities planned for next period	Continue outreach with tribal representatives on discussions identifying water bodies and tribal uses; complete project scope and identify data needs.
Key issues on the horizon	None

4. 2021 Triennial Review Project No. 2: Tijuana River Valley Water Quality Restoration

Staff Contact: Melissa Corona

A. PROJECT INFORMATION
Project Lead: *Melissa Corona*
Supervisor: Cynthia Gorham

Report Date: June 2023
Report Period: January–April 2023
Overall Status: On track

Website:
https://www.waterboards.ca.gov/sandiego/water_issues/programs/tmdls/tijuanarivervalley.html

Project Description:
The purpose of this project is to establish Total Maximum Daily Loads (TMDLs) for indicator bacteria and trash in the lower Tijuana River because the San Diego Water Board has identified human health and ecosystem impacts in the Tijuana River Valley as regional priorities for many years. The San Diego Water Board will continue work on development and approval of TMDLs. Staff will complete the peer and public review processes, continue to coordinate with stakeholders, and prepare an amendment to the *Water Quality Control Plan for the San Diego Basin* (Basin Plan amendment) for adoption by the Board and for approval from the State Water Resources Control Board, Office of Administrative Law, and the U.S. Environmental Protection Agency (USEPA).

Although the Tijuana River is on the 2020-2022 Clean Water Act section 303(d) List of Water Quality Limited Segments for impairments due to over 30 pollutants, control of the anthropogenic sources of indicator bacteria and trash is likely to result in a significant reduction of the remaining pollutants.

Project Objective:
The objective is to reduce pollutant loads entering the Tijuana River in order to restore and maintain the chemical, physical, and biological integrity of the Tijuana River as well as the downstream Tijuana River Estuary and coastal waters.

Triennial Review Commitment:
Development of TMDLs for indicator bacteria and trash with an implementation plan to restore impaired waters in the Tijuana River Valley.

Key Milestone	Target Date	Status
California Environmental Quality Act (CEQA) scoping meeting	May 15, 2019	Completed
Peer review of draft TMDL technical report	Summer 2023	Delayed (originally planned for Summer 2020)
Public review of draft TMDL technical report and comment period	Within six months following completion of peer review	Delayed (originally planned for Winter 2020-21)

Key Milestone	Target Date	Status
Basin Plan amendment package to San Diego Water Board for adoption	Within eight months following completion of peer review	Delayed (originally planned for August 2021)

B. PROGRESS REPORT: Tijuana River Valley Water Quality Restoration

Reporting Period Events

Accomplishments during period	• Staff revised the draft staff report based on feedback from internal review. • Staff conducted outreach to Tribal communities that could be potentially affected by implementation of the TMDLs to gather any concerns they may have.
Collaboration during period	Briefing to Tijuana River Valley Recovery Team Steering Committee (March 2023).
Activities planned but not completed	External scientific peer review of draft TMDL staff report is now planned for this summer.
Key issues during period	N/A

Looking Forward

Activities planned for next period	Staff will submit the draft TMDL staff report for external scientific peer review.
Key issues on the horizon	This project could be influenced by a number of efforts involving the Tijuana River Valley, including funding decisions and potential environmental impacts related to the United States-Mexico-Canada Agreement (USMCA) Project, efforts associated with IBWC Minute 320, and efforts led by the Tijuana River Valley Recovery Team.

5. 2021 Triennial Review Project No. 4: Contact Water Recreation (REC-1) Water Quality Objectives

Staff Contact: Michelle Santillan

A. PROJECT INFORMATION

Project Lead: Michelle Santillan
Supervisor: Cynthia Gorham

Report Date: June 2023
Report Period: January – April 2023
Overall Status: On track

Website:
Not available at this time

Project Description:
This project was first introduced during the 2014 Triennial Review. At the time, the focus of the project was to determine whether and to what extent data supported amending the objectives, implementation provisions for applicable bacteria Total Maximum Daily Loads (TMDLs), or the TMDLs themselves. Bacteria TMDLs were adopted in June 2008 and February 2010. In July 2018, San Diego Water Board staff prepared a summary report of the 2014 REC-1 Triennial Review Project that made recommendations for next steps. Recommendations were based on discussions and feedback from external and internal workgroups as well as the various technical studies that had been completed to date. During the 2018 Triennial Review, the focus for the project shifted towards implementation of actions that were identified in the 2018 recommendations report. The short-term actions included updates to the existing storm water (MS4) permit, audits of Illicit Discharge Detection and Elimination programs, updates to waste discharge requirements for sanitary sewer systems, and updates to Chapter 3 in the Basin Plan. Staff continues to implement and track the requirements of the 2018 Triennial Review. Furthermore, as part of the 2021 Triennial Review, staff will investigate the feasibility of the development of a narrative risk-based objective and potential revisions to the 20 Beaches and Creeks Bacteria TMDL.

Project Objective:

- Investigate and develop a narrative (risk-based) water quality objective that is protective of the REC-1 beneficial use.
- Establish, if appropriate, a numeric translator for the human-specific *Bacteriodes* HF183 to implement the narrative objective.
- Initiate review and develop recommendations for amending the Bacteria TMDLs.

Triennial Review Commitment:
Investigate the development of a narrative objective that would allow the use of human specific markers while being protective of the REC-1 beneficial use.

Key Milestone	Target Date	Status
Final Report for Investigative Order No. R9-2019-0014	June 2024	On track

Key Milestone	Target Date	Status
Final Report for SWAMP Sampling at Reference Beaches	2023	On track
California Environmental Quality Act (CEQA) scoping meeting for new objective	TBD	TBD
Public Workshop for MS4 Permit Renewal	Spring 2023	On track
Draft Revisions to Regional WDRs for Sanitary Sewer Systems	TBD	TBD

B. PROGRESS REPORT: REC-1 Water Quality Objectives

Reporting Period Events

Accomplishments during period	• Staff hosted the first in a series of focused meetings on March 9, 2023 for the reissuance of the MS4 Permit. The focus of the meeting was to discuss proposed changes to the Jurisdictional Runoff Management Program and proposed inclusion of climate change considerations. • On February 8, 2023, the San Diego Water Board held a public workshop on Tentative Time Schedule Order (TSO) No. R9-2023-0006, An Order Requiring Designated Responsible Permittees to comply with Bacteria, Project I-Twenty Beaches and Creeks TMDL Load Requirements Prescribed in the Regional MS4 Permit for the San Diego Region.
Collaboration during period	• The internal REC-1 workgroup met in February and April 2023. The internal REC-1 workgroup meets on a bimonthly basis to share information and coordinate actions. • Staff participated in a steering committee meeting led by the Southern California Coastal Water Research Project to discuss progress on the San Diego River Investigative Order. Ongoing studies include storm sampling up and downstream of homeless encampments, exfiltration of sanitary sewer collection system, sanitary sewer overflows, private lateral sampling via camera, dry and wet weather survey of human fecal sources, and assessing

	the defecation practices of unhoused individuals and their contributions to water quality.
Activities planned but not completed	Review of regional WDRs for Sewage Collection Agencies has been delayed
Key issues during period	None

Looking Forward

Activities planned for next period	• The SWAMP Beach study will be wrapping up early this summer 2023. • Staff will continue to host focused meetings for the reissuance of the MS4 Permit.
Key issues on the horizon	None

6. Sanitary Sewer Overflows in the San Diego Region – March 2023 *(Attachment B-6)*

Staff Contact: Fisayo Osibodu

Sanitary sewer systems experience periodic failures resulting in sanitary sewer overflow (SSO) discharges that may affect waters of the United States and/or the State of California (State). There are many factors (including factors related to geology, design, construction methods and materials, age of the system, population growth, and system operation and maintenance), that can influence the likelihood of an SSO and the volume of the discharge. Major causes of SSOs include: grease blockages, root blockages, sewer line flood damage, manhole structure failures, vandalism, pump station failures, power outages, excessive stormwater inflow or groundwater infiltration, debris blockages, failures due to aging sanitary sewer systems, lack of proper operation and maintenance, insufficient capacity, and contractor-caused damages. Many SSOs are preventable with adequate and appropriate facilities, source control measures, and proper operation and maintenance of the sanitary sewer system.

SSO discharges from public sewage collection systems and private laterals into the San Diego Region can contain high levels of suspended solids, pathogens, toxic pollutants, nutrients, and oil and grease. SSO discharges can pollute surface and ground waters, thereby threatening public health, adversely affecting aquatic life, and impairing the recreational use and aesthetic enjoyment of surface waters. Typical impacts of SSO discharges include closure of beaches and other recreational areas, inundation of property, and pollution of rivers, estuaries, and beaches.

State agencies, municipalities, counties, districts, and other entities (collectively referred to as public entities) that own or operate sewage collection systems report SSO spills through an on-line database system, the *California Integrated Water Quality System* (CIWQS). These SSOs are required to be reported under the Statewide General SSO Order,[4] the San Diego Regional

[4] State Water Board Order WQ 2022-0103-DWQ , *Statewide General Waste Discharge Requirements General Order for Sanitary Sewer Systems*. State Water Board Order WQ 2022-0103-DWQ was adopted on December 9, 2022, and became effective on June 5, 2023. State

General SSO Order,[5] and/or individual National Pollutant Discharge Elimination System (NPDES) permit requirements. Some federal entities[6] report this information voluntarily. Most SSO reports are available to the public on a real-time basis at the State Water Board Public SSO Report Database.

Details on the reported SSOs and private lateral sewage discharges (PLSDs) for March 2023 are provided in the following attached tables:

- Table 1: March 2023 - Summary of Public and Federal Sanitary Sewer Overflow Events
- Table 2: March 2023 - Summary of Private Lateral Sewage Discharge Events
- Table 3: March 2023 - Summary of Sewage Discharges by Source

A summary view of information on sewage spill trends are provided in the following attached figures:

- Figure 1: Number of Spills per Month
- Figure 2: Volume of Public SSOs per Month
- Figure 3: Volume of Federal SSOs per Month
- Figure 4: Volume of PLSDs per Month

The figures show the number and total volume of sewage spills per month from March 2022 through March 2023. During this period, 37 of the 64 collection systems in the San Diego Region reported one or more sewage spills. Twenty-seven collection systems did not report any sewage spills. A total of 236 sewage spills were reported with about 10,291,469 gallons of sewage reaching surface waters.

Additional information about the San Diego Water Board sewage overflow regulatory program is available on the San Diego Water Board's SSO Website.

Water Board Order WQ 2022-0103-DWQ supersedes Order 2006-0003-DWQ, the previous statewide waste discharge requirements for sanitary sewer systems.

[5] San Diego Water Board Order No. R9-2007-0005, *Waste Discharge Requirements for Sewage Collection Agencies in the San Diego Region*.

[6] Marine Corp Base Camp Pendleton reports sewage spills to CIWQS as required by its individual NPDES permit, Order No R9-2019-0167, NPDES Permit No. CA0109347, *Waste Discharge Requirements for the Marine Corps Base, Camp Pendleton, Southern Regional Tertiary Treatment Plant and Advanced Water Treatment Plant at Haybarn Canyon, Discharge to the Pacific Ocean through the Oceanside Ocean Outfall*. The United States Marine Corps Recruit Depot and the United States Navy voluntarily report sewage spills through CIWQS.

7. Transboundary Flows from Mexico into the San Diego Region – March 2023 *(Attachment B-7)*

Staff Contact: Vicente Rodriguez

Water and wastewater in the Tijuana River and from canyons located along the international border ultimately drain from the City of Tijuana, Baja California, Mexico (Tijuana) into the United States. The water and wastewater flows are collectively referred to as transboundary flows. The United States Section of the International Boundary and Water Commission (USIBWC) has built canyon collectors that capture dry weather transboundary flows for treatment at the South Bay International Wastewater Treatment Plant (SBIWTP) located at the United States/Mexico border. Dry weather transboundary flows that are not captured by the canyon collectors for treatment at the SBIWTP, such as flows within the main channel of the Tijuana River,[7] are reported by the USIBWC pursuant to Order No. R9-2021-0001, the National Pollutant Discharge Elimination System (NPDES) permit for the SBIWTP discharge. These uncaptured flows can enter waters of the United States and/or the State of California (State), potentially polluting the Tijuana River Valley and Estuary, and south San Diego beach coastal waters.

According to the 1944 *Water Treaty for the Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande* and stipulations established in IBWC Minute No. 283, the USIBWC and the Comisión Internacional de Limites y Aguas (CILA)[8] share responsibility for addressing border sanitation problems, including transboundary flows. Efforts on both sides of the border have led to the construction and ongoing operation of several pump stations and treatment plants to reduce the frequency, volume, and pollutant levels of transboundary flows. This infrastructure includes but is not limited to the following:

- The SBIWTP, located just north of the United States/Mexico border, which provides secondary treatment for a portion of the sewage from Tijuana and transboundary flows conveyed from canyon collectors located in Smuggler's Gulch, Goat Canyon, Canyon del Sol, Stewart's Drain, and Silva Drain. The secondary-treated wastewater is discharged to the Pacific Ocean through the South Bay Ocean Outfall, in accordance with USIBWC's NPDES permit, Order No. R9-2021-0001.
- Several pump stations and wastewater treatment plants (WWTPs) in Tijuana, including the San Antonio de los Buenos WWTP, the La Morita WWTP and the Arturo Herrera WWTP.
- The River Diversion Structure and Pump Station CILA in Tijuana which diverts dry weather transboundary flows from the Tijuana River. The flows are diverted to a discharge point at the Pacific Ocean shoreline, approximately 5.6 miles south of the United States/Mexico border; or the flows can be diverted to SBIWTP or another wastewater treatment plant in Tijuana, depending on how Tijuana's public utility department (CESPT) directs the flow into the collection system. The River Diversion Structure is not designed to collect wet weather

[7] Tijuana River transboundary flows typically consist of a mixture of groundwater, urban run-off, storm water, treated sewage wastewater, and untreated sewage wastewater from infrastructure deficiencies and other sources in Mexico.

[8] The Mexican section of the IBWC.

river flows and any river flows over 1,000 liters per second (35.3 cubic feet per second, 22.8 million gallons per day).

In March 2023, there was a total of 2 reported transboundary flow resulting in more than 4 million gallons of contaminated water flowing from Mexico into the United States. This includes one spill from the South Bay International Wastewater Treatment Plant. These flows were the direct and indirect results of rain events.

Details on the transboundary flows reported in March are provided in the attached tables:

- Table 1: March 2023 - Summary of Transboundary Flows from Mexico by Event
- Table 2: March 2023 - Summary of Transboundary Flows from Mexico

A summary view of information on transboundary flow trends are provided in the following attached figures:

- Figure 1: Number of Transboundary Flows per Month
- Figure 2: Tijuana River Transboundary Flow Volume per Month
- Figure 3: Canyon Collector Transboundary Flow Volume per Month

These figures show the number and volume of transboundary flows per month from March 2022 through March 2023. During this period, there were a total of 16 reported transboundary flows resulting in more than 36 billion gallons of contaminated water flowing from Mexico into the United States.

On July 30, 2022, CESPT of Tijuana in Mexico lost pumping capacity at the main pumping station PB1 due to damaged wastewater pipelines PB1A and PB1B. Pipeline PB1B has since been repaired, but pipeline PB1A remains offline. In the meantime, PB1 pumping capacity remains reduced and excess flow is being diverted to the SBIWTP. This excess flow includes sand, trash, and debris. The added sediment flowing into the SBIWTP has significantly reduced the solids removal in the primary sedimentation tanks (PSTs) and is biologically overloading the secondary treatment system, resulting in solids washout within the effluent. Excess flows are expected to continue until pipeline PB1A is completed in 2024.

Part C – Statewide Issues of Importance to the San Diego Region

No Reports

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

Significant NPDES Permits, WDRs, and Actions of the San Diego Water Board

June 14, 2023
APPENDED TO EXECUTIVE OFFICER'S REPORT

TENTATIVE SCHEDULE
SIGNIFICANT NPDES PERMITS, WDRs, AND ACTIONS
OF THE SAN DIEGO WATER BOARD

July 2023
No Meeting Scheduled

August 9, 2023
San Diego Water Board Meeting Room

Action Agenda Item	Action Type	Written Comments Due
Rescission of Order No. 95-34, Waste Discharge Requirements for Outdoor Resorts Rancho California, Inc., Outdoor Resorts Rancho California RV Park (Tentative Order No. R9-2023-0028). *(Brandon Bushnell)*	Waste Discharge Requirement Rescission	TBD
State Water Board Racial Equity Action Plan. *(David Gibson)*	Informational Item	NA

September 13, 2023
San Diego Water Board Meeting Room

Action Agenda Item	Action Type	Written Comments Due
Rescission of Order No. 94-119, Waste Discharge Requirements for Ivan and Adele Potts, Ivy Del Trailer Park, Near Escondido, San Diego County (Tentative Order No. R9-2023-0044). *(Mahsa Izadmehr)*	Waste Discharge Requirement Rescission	TBD
Operational Plan 23-24 *(David Gibson)*	Resolution	NA

Action Agenda Item	Action Type	Written Comments Due
A Sediment Investigation and Cleanup Strategy Update for San Diego Bay *(Sarah Mearon)*	Informational Item	NA
Administrative Civil Liability Order in the Matter of Quality Investors 1 2016 LLC and David G. Epstein for Alleged Violations of Water Quality Requirements as set forth in Administrative Civil Liability (ACL) Complaint No. R9-2023-0013. *(Christina Arias)*	ACL Hearing	18-Dec-2022
Time Schedule Order Issuance: An Order Requiring Designated Responsible Permittees to Comply with Bacteria TMDL Requirements Prescribed in the Regional Municipal Separate Storm Sewer Systems Permit for the San Diego Region (Tentative Time Schedule Order No. R9-2023-0006). *(Mireille Garcia Serrato and Laurie Walsh)*	Time Schedule Order Issuance	17-Feb-2023

Agenda Items Requested by Board Members

October 14, 2020

Requested Agenda Item	Board Member	Status
Notify Board Members when staff plan to attend community or public environmental meetings for outreach purposes so they can participate should they desire	Warren	Ongoing

November 18, 2020

Requested Agenda Item	Board Member	Status
Notification of dates when the San Diego City Council will consider taking an action o the De Anza Cover Amendment to the Mission Bay Park Master Plan and any related CEQA actions	Abaranel	June 2023
Updates on the City of San Diego's planning process for the De Anza/ReWild project when available	Warren	June 2023
Progress report for Lake San Marcos project	Olson	Ongoing

February 10, 2021

Requested Agenda Item	Board Member	Status
Update about the range of chemicals that might cause problems with the symporter of the fetus.	Olson	Winter 2022-23

March 10, 2021

Requested Agenda Item	Board Member	Status
Annual update on the progress and accomplishments of the Project Clean Water program, including information related to the impacts of the program on water quality.	Abarbanel, Warren	Ongoing
Region-wide workshop regarding the water quality issues in the Tijuana River Valley, including a discussion of water quality objectives and steps needed to achieve them.	Abarbanel	Summer 2023

April 14, 2021

Requested Agenda Item	Board Member	Status
Update from State Board on the lessons learned regarding the use of Zoom remote meeting platform for Board Meetings to inform how the Regional Boards move forward when we return to the office and hold Board meetings in person	Warren	June 2023

December 8, 2021

Requested Agenda Item	Board Member	Status
Update on the Contact Water Recreation (REC-1) Water Quality Objectives project, with information regarding the use of HF-183 in particular.	Olson	Upcoming

May 11, 2022

Requested Agenda Item	Board Member	Status
Lockheed Martin Tow Basin Cleanup Updates	Abarbanel, Olson	Ongoing
Environmental Justice outreach event	Warren	Winter 2023-24
Agricultural effects resulting from Colorado River water allocation reductions.	Olson	Ongoing

November 9, 2022

Requested Agenda Item	Board Member	Status
Update on monitoring and debris removal associated with the NPDES permit for discharges from fireworks	Various	Spring 2023
Annual progress reports on implementation of the Strategic Water Quality Assessment Approach for San Diego Bay	Olson, Warren	August 2023

February 8, 2023

Requested Agenda Item	Board Member	Status
Update regarding Colorado River water availability and plans to allocate the water	Cantú	April 2023
Update on how the State Water Resources Control Board provides drought messaging to the public	Warren	2023
Update regarding the use of drones and other surveillance methods and the associated restrictions for inspections	Olson	April 2023
Update regarding requirements of Assembly Bill 2108, which adds sections 189.7 and 13149.2 to the California Water Code	Cantú	May 2023

March 8, 2023

Requested Agenda Item	Board Member	Status
Update regarding the Southern California ROMS-BEC coastal water-quality model	Abarbanel	Fall 2023

INTRODUCTION

Naval Base Point Loma (NBPL) is located in San Diego, California, and consists of three main noncontiguous regions (NBPL Peninsula, NBPL Harbor Drive, and NBPL Old Town), as well as numerous separate smaller areas located throughout San Diego County. The total footprint of NBPL is approximately 1,901 acres. The NBPL Peninsula region has been used for military operations since the U.S. Army established Fort Rosecrans at Ballast Point in 1898 and built a coastal artillery battery, which remained active through World Wars I and II. In 1959, Fort Rosecrans was turned over to the Department of the Navy (Navy). Currently, NBPL is home to 65 tenant commands that provide a complement of 18,000 military and civilian personnel. The major tenants include Naval Information Warfare Systems Command Headquarters, Naval Information Warfare Center Pacific, Submarine Squadron 11, Commander U.S. 3rd Fleet, four homeported Submersible Ship Nuclear fast attack submarines, Explosive Ordnance Disposal Mobile Unit One and Training and Evaluation Unit One, Portsmouth Naval Shipyard Detachment San Diego, Military Sealift Command, Tactical Training Group Pacific, Naval Health Research Center, Surface Combat Systems Training Command, and others.

NBPL's mission is to support the U.S. Pacific Fleet and other operating forces by delivering great shore support, leading with innovation, satisfying customers, spending smart, driving mission accomplishment, and making a difference. NBPL meets this mission along three lines of effort: (1) Serve the Fleet, our tenant commands and organizations, and their families, (2) Build a base for tomorrow's war fighter with strong ties to our civic community, and (3) Protect our people, our resources, and the environment from all threats.


California gnatcatcher

One of the unique features of NBPL is the management of the Point Loma Ecological Conservation Area (PLECA). Since 1994, approximately 633 acres of land on the Point Loma peninsula has been designated a reserve sanctuary (the PLECA) to be managed by the Navy, the National Park Service, the U.S. Coast Guard, the Department of Veterans Affairs (Fort Rosecrans National Cemetery), and the City of San Diego. More than 177 native and 53 exotic plant species are present in the PLECA, with flora and fauna characteristic of those once found throughout the coastal region of southern California. Species found include the endangered California gnatcatcher, which is a bird that prefers to nest in the resident coastal sage habitat and can be affected by noise at high decibels during nesting season. NBPL Installation Restoration (IR) Program fieldwork that requires the use of heavy equipment on or adjacent to the PLECA is only conducted between September and February to avoid the nesting season.

BACKGROUND

Installation Environmental Organization

The NBPL Commanding Officer's (CO's) leadership is vital to the success of the installation's environmental programs. The CO provides guidance and oversight to ensure environmental integration with the military mission, and management direction to the Public Works Officer (PWO) and the Installation Environmental Program Director (IEPD). The IEPD reports to the PWO and the CO and manages the NBPL Public Works Office's Environmental Division (EV). NBPL EV's mission is to provide the NBPL CO and tenant commands with the environmental subject matter expertise necessary to ensure compliance with local, state, and federal environmental requirements while also meeting the NBPL mission. NBPL EV is committed to supporting operating forces and believes that national defense and environmental protection and restoration are not mutually exclusive goals.

2023 SECRETARY OF THE NAVY ENVIRONMENTAL AWARD

Naval Base Point Loma, San Diego, California | *Environmental Restoration – Installation*

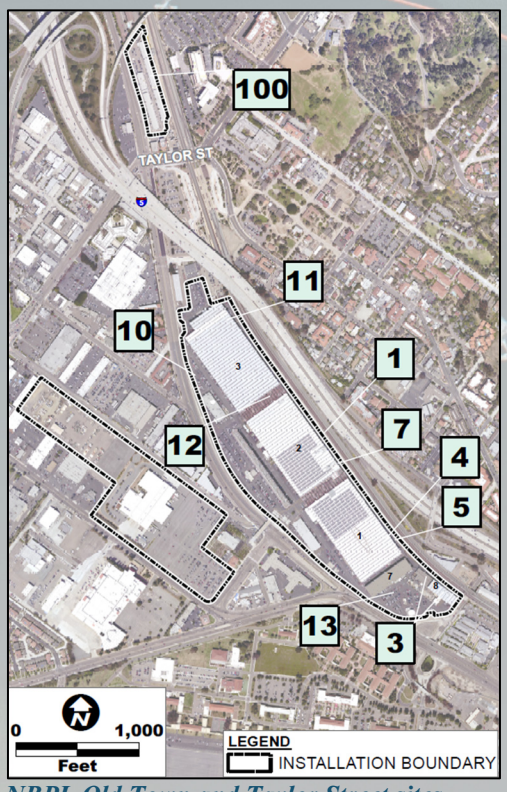
Environmental Restoration Program

Naval Facilities Engineering Systems Command (NAVFAC) manages the Navy's Environmental Restoration Program (ERN), which is funded annually through appropriations bills. IR, Munitions Response Program (MRP), and Underground Storage Tank (UST) sites are established and funded when past releases of hazardous substances, petroleum, or munitions and munitions constituents are identified that potentially pose a potential threat to human health and the environment, and a response is required. The NBPL IR Program currently consists of 22 active IR, MRP, and UST sites.

The Navy is the lead federal agency at NBPL. The Navy engages with two California regulatory agencies (the Department of Toxic Substances Control [DTSC] and the Regional Water Quality Control Board [Water Board]) through the Defense and State Memorandum of Agreement (DSMOA) for oversight of the NBPL IR Program. DSMOA is a cooperative agreement that was established for expediting cleanup programs at installations and as reimbursement for the state's efforts.

The Navy conducts restoration in accordance with the Defense Environmental Restoration Program and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLA is a linear process from investigation to remediation with two outcomes: Response Complete, where cleanup goals have been achieved with long-term management to ensure protectiveness, or Site Closure, where no further action is required and the site is fit for unlimited use/unrestricted exposure.

NBPL Peninsula sites and PLECA



NBPL Old Town and Taylor Street sites

The NBPL IR Program manages projects to achieve response complete or site closure by the milestone dates established in NAVFAC's Normalization of Environmental Data System (NORM). NORM is a web-based computer system that integrates and centrally maintains the information necessary to manage the program and generate reporting functions for the Navy and Department of Defense budgeting, reporting, and auditing requirements. Currently, NAVFAC's goal is to achieve response complete on 95% of all ERN sites by 2029.

The NBPL IR Program Team consists of two NAVFAC Southwest Remedial Project Managers (RPMs), Nicholas Shih and Carly Parana, who receive support from the NBPL IEPD, Robert Chichester.

The management approach for the NBPL IR Program prioritizes frequent communication, transparency, and collaboration. The RPMs and IEPD provide monthly briefs to the PWO and

quarterly briefs to the CO to discuss project status, solicit input for decision-making, and manage coordination with Base departments (such as Facilities, Planning, Environmental Compliance, Security, Public Affairs Office, and tenant commands). These command briefings allow for successful project execution while ensuring compliance with the NBPL mission and minimizing the impact to other mission critical entities. In addition, the NBPL IR Program conducts outreach by issuing fact sheets to tenant commands. Fact sheets are distributed as needed to communicate site status and upcoming fieldwork schedule, as well as provide education materials for technical restoration topics and risk communication. In fiscal year (FY) 2021 (FY21) and FY22, ERN issued three fact sheets to one of the NBPL tenants at an IR site to communicate site investigation and vapor intrusion mitigation efforts.

Over the past 2 years, the NBPL Environmental Restoration Program has built a collaborative working relationship with the Water Board that has resulted in significant progress on site investigation and cleanup. The Water Board and Navy project managers frequently discuss technical approach, findings, and lessons learned to identify obstacles and brainstorm solutions that benefit project phases and the entire life cycle of cleanup sites. The working relationship benefits from transparency and has facilitated efficient document review, work implementation on schedule, and accelerated work when needed to make effective progress toward accomplishing the common goal of protection of human health and water resources within Region 9.

Sean McClain, P.G.
Senior Engineering Geologist
San Diego Water Board

The RPMs conduct monthly conference calls with the regulatory agency project managers and use a document tracking spreadsheet as a management tool to track progress of site documents from draft to final. These meetings are used to ensure efficiency by discussing document priority and status and identifying obstacles, delays, and solutions. To further expedite document reviews, the RPMs conduct in-person site walks and briefings, as necessary, to discuss project details and convey the Navy's technical approach before issuing draft work plans or reports for agency review. In FY21 and FY22, a total of 44 NBPL IR Program documents were finalized with regulatory agency concurrence, demonstrating the effectiveness of the NBPL IR Program.

The NBPL lead RPM is the Navy co-chair for the NBPL Restoration Advisory Board (RAB), which is composed of Point Loma community members and meets in person on a quarterly basis and hosts an annual bus tour. The function of the meetings is for public outreach to the neighboring community to openly discuss the Navy's activities on restoration sites and to solicit input. The first half of each RAB meeting is dedicated to presenting the status of IR Program sites. The second half focuses on a technical topic selected by the RAB. The annual bus tour gives RAB members the opportunity to see sites and fieldwork in person on the installation. Throughout FY21 and most of FY22, the Navy conducted RAB meetings virtually to comply with local COVID-19 guidelines. In FY21, the annual bus tour was canceled; the Navy pivoted and prepared a virtual tour instead and shared video, photos, and narration of site activity and fieldwork. The virtual tour was attended by 100% of the RAB members and was well received. The Navy resumed in-person meetings in FY22 while maintaining the remote attendance option to expand outreach, and resumed the annual in-person bus tour in FY23.

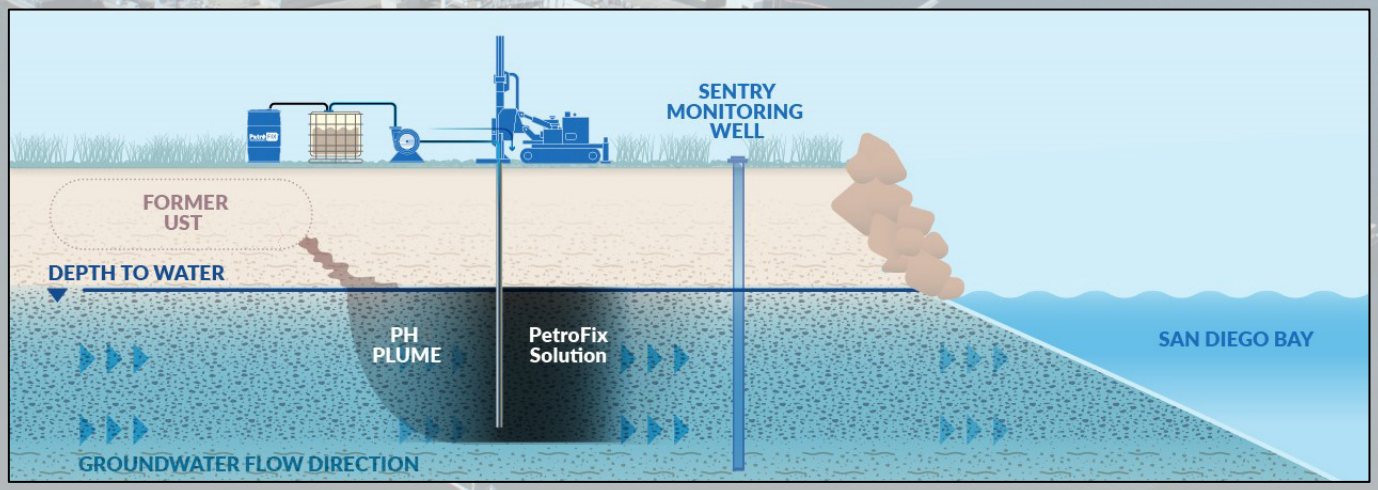
April 2022 Navy and Regulatory Agency site walk
Left to right: Kristin Schwall (Water Board), Nicholas Shih (NAVFAC SW), Derral Van Winkle (NAVFAC SW), Ed Morelan (DTSC), Eileen Mananian (DTSC). Not pictured: Carly Parana (NAVFAC SW)

ACCOMPLISHMENTS

UST 105 Corrective Action Completion

UST 105 corrective action implementation

The Navy completed corrective action at UST 105 in September 2022, and received regulatory agency concurrence on site closure, ending investigations that have been ongoing since 1995. UST 105 is a 1-acre site at the NBPL Magnetic Silencing Facility (MSF) where a release from a former 7,500-gallon marine diesel fuel UST occurred. The UST supported the MSF and was located approximately 100 feet from San Diego Bay and the Deperming Pier before being removed in 1995. The corrective action was designed to protect potential ecological receptors in San Diego Bay from the remaining petroleum hydrocarbons migrating in groundwater toward the bay. The corrective action consisted of injecting micron-scale activated carbon (Petrofix) into the saturated soil between the site and the bay to serve as a permeable reactive barrier zone. Petrofix is a water-based suspension solution that coats the soil and sediment grains to adsorb petroleum hydrocarbons as they migrate across the reactive zone. To enhance biodegradation of petroleum hydrocarbons once they are adsorbed, the Petrofix was combined with electron acceptors (nitrate and sulfate oxides) to help stimulate growth of microbes that degrade hydrocarbons. Because this was the first time applying this technology at NBPL, the Navy and Water Board researched the injection mixture and case studies to ensure it was inert and would not have a negative impact on San Diego Bay.



UST 105 corrective action cross section diagram

The NBPL IR Program injected approximately 13,000 gallons of treatment solution at 46 locations within the site in January 2021. Following injection, the Navy conducted five monitoring events from March 2021 to February 2022. In all five events, the Navy demonstrated achievement of the corrective action criteria and compliance with Water Board permit requirements in the sentry groundwater monitoring wells upgradient from San Diego Bay. The NBPL IR Program issued the Final Corrective Action Completion Report on September 19, 2022. The Water Board concurred with the NBPL IR Program's recommendation for completion of corrective action and site closure ahead of the IR Program's site closure milestone date of September 2024.

IR 7 TCRA Completion

The NBPL IR Program completed a successful Time Critical Removal Action (TCRA) at IR 7 between September 2021 and January 2022. IR 7 is a 5.5-acre vacant site where municipal and industrial wastes and

construction debris from the mid-1900s were buried at the bottom of a ravine. The NBPL IR Program implemented the TCRA protocol to accelerate removal on a 0.5-acre portion of IR 7 where contaminants of concern with elevated concentrations posed a potential threat to ecological receptors onsite and on the adjacent PLECA. Stormwater flow through the TCRA area eroded site soil and exposed buried waste, potentially resulting in the migration of contaminants. Contaminants of concern in soil included lead, polychlorinated biphenyls, and hexavalent chromium.

IR 7 TCRA excavation

The NBPL IR Program excavated approximately 5,700 cubic yard (330 truckloads) of debris and contaminated soil and disposed of the waste offsite. To completely excavate all of the debris and contaminated soil, the areal extent of the excavation increased 25% and up to 13 feet deeper than planned. Once post-excavation confirmation soil sampling results demonstrated the remedial goals were achieved, the excavation was backfilled, and the stormwater channel was sloped and stabilized with geotextile and riprap.

IR 7 post-TCRA site restoration

Site restoration was conducted by installing stormwater erosion controls, hydroseeding with native plant species, and installing a temporary irrigation system for revegetation. The NBPL IR Program issued the Removal Action Completion Report (RACR) to the regulatory agencies in May 2022, documenting the TCRA's achievement of the remedial action objectives and goals. The completion of the TCRA also resulted in the reduction of the IR 7 site area, where remedial action for the remainder of the site is still required.

MRP 1 TCRA Completion

The NBPL IR Program completed a successful TCRA at MRP 1 between October and November 2020 and received regulatory agency concurrence on site closure in December 2021, ending investigations ongoing since 2007. MRP 1 is a 3.5-acre site that was a former small arms range used from the 1940s to the early 1970s. The TCRA was designed to remove lead and soil contaminated with lead from target berm areas to achieve levels protective of both human and ecological receptors.

MRP 1 mechanical screening and small arms munitions debris (inset)

The NBPL IR Program excavated approximately 600 cubic yards of soil from MRP 1. A mechanical screener equipped with multiple sieve sizes was used to screen soils a minimum of three times to separate lead fragments. Screened soil was stockpiled and sampled in accordance with regulatory guidelines to determine whether soil could be reused as backfill. Approximately 150 cubic yards of waste was disposed of offsite, and approximately 450 cubic yards of screened soil was determined to be suitable for reuse as backfill. The screening and reuse approach allowed the NBPL IR Program to save approximately $50,000 by reducing waste disposal and backfill material costs. Once post-excavation confirmation soil sampling results demonstrated the TCRA remedial goals were achieved, the excavation was backfilled and graded to match existing contours. Site restoration was conducted by installing erosion controls, hydroseeding and planting native species, and installing a temporary irrigation system for revegetation. The NBPL IR

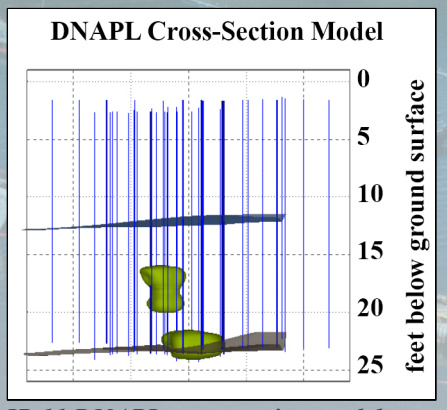
Program issued the Final RACR recommending site closure in November 2021, and received concurrence from the regulatory agencies ahead of the NBPL IR Program's site closure milestone date in May 2022.

IR Sites 10, 11, 12, and 13 Site Closure and Fieldwork Completion

The NBPL IR Program accomplished an extensive amount of work at multiple IR sites at the NBPL Old Town region. Chlorinated volatile organic compounds were released to soil and groundwater at these sites from large-scale industrial activity associated with World War II–era operations. A summary of the major accomplishments in 2021 and 2022 is provided as follows:

IR 10 – In April 2021, the NBPL IR Program issued the Data Collection Summary Report and Site Closure Request for IR Site 10, a small 0.25-acre site. The site closure request received regulatory agency concurrence in June 2021.

IR 11 – Between October 2021 and March 2022, the NBPL IR Program implemented dye-enhanced laser-induced fluorescence technology for the first time at NBPL, in 38 borings, to model and quantify the trichloroethylene (TCE) contaminant source, present as dense nonaqueous phase liquid (DNAPL), in groundwater. During this same period, the NBPL IR Program also injected approximately 20,000 gallons of enhanced anaerobic bioremediation fluid downgradient of the TCE source. The DNAPL model will help the NBPL IR Program identify and implement an appropriate remedy for the TCE source and, in the interim, bioremediation will prevent migration of contaminants dissolved in groundwater.



IR 11 DNAPL cross section model

IR 12 and IR 13 – Between February and April 2022, the NBPL IR Program managed investigation fieldwork at two sites. The fieldwork included a total of 30 direct-push drilling and cone penetrometer testing points, installation and sampling of 20 subslab vapor test probes and 30 soil vapor monitoring probes, groundwater sampling at 30 locations, and indoor air sampling at 85 locations. Approximately 40% of the fieldwork was subsurface drilling conducted after routine business hours because many of the locations were inside occupied buildings. The preliminary data from IR 12 showed that vapor intrusion of volatile organic contaminants from the subsurface into an occupied building was a potential concern at the site. Within 2 weeks, the NBPL IR Program expedited a response by conducting several indoor air sampling events followed by the installation and operation of a subslab ventilation system that successfully mitigated vapor intrusion and reduced TCE concentrations in indoor air to ensure protection of human health.

IR 100 Site Closure

The NBPL IR Program received regulatory agency concurrence with IR 100 site closure in January 2022, ending investigations ongoing since 1988. IR 100 was historically used for manufacturing and maintenance of aviation electronic parts at NBPL Taylor Street, just north of the Old Town region. In 2014, DTSC did not concur with the NBPL IR Program's closure of the site. Since then, the NBPL IR Program had used a teaming approach and conducted site walks and technical briefings with the regulatory agencies to increase lines of evidence and reduce uncertainty with respect to remaining contaminant levels in soil and groundwater. In January 2022, the NPBL IR Program issued the Final Data Gaps Investigation Report for IR 100 recommending site closure. Both the Water Board and DTSC concurred with the report, and the Navy decommissioned the groundwater wells at IR 100 in August 2022.

Innovative Techniques

The unique steep terrain on portions of NBPL makes land surveying efforts challenging using traditional means. In May 2022, the NBPL IR Program conducted its first unmanned aerial system (drone) flights at two IR sites. The drone was equipped with Light Detection and Ranging (LiDAR) technology to generate

digital terrain models to support environmental remediation design. Drone flights on NBPL in the metropolitan San Diego area required significant coordination and endorsements from the Commander, Navy Region Southwest; the NBPL CO; the Naval Air Systems Command Chief Engineer; Naval Air Station North Island Air Traffic Control; and the Federal Aviation Administration.

IR 7 ravine topography captured via LiDAR-equipped drone (inset)

Accomplishments Summary

The NBPL IR Program met or exceeded NAVFAC's site closure milestone dates for UST 105, MRP 1, IR 10, and IR 100. The results of site closure are: (1) protection of human health and the environment at the sites and adjacent areas, such as the PLECA or San Diego Bay, and (2) reduction of the Navy's future liability and long-term management costs associated with additional investigation and remediation. The NBPL IR Program currently allocates approximately $10,000 per year per site for annual inspections and reports and $50,000 every 5 years per site for Five-Year Reviews for long-term management sites with land use control remedies. Sites that do not obtain closure and are added to the long-term management program increase the cost of inspections and reviews. As a result of closing four sites in FY21 and FY22, approximately 8 acres of NBPL property on the Point Loma peninsula and in the Midway District of San Diego have now been restored by the NBPL IR Program for the Navy's reuse without restrictions and additional IR Program costs (up to $40,000/year and $200,000/every 5 years in perpetuity).

Successful completion of TCRAs and UST corrective actions demonstrate that the NBPL IR Program can work efficiently with regulatory agencies and multiple internal Navy components (Acquisition, Facilities, Environmental, Planning, Security, tenant commands, and the Naval Ordnance Safety and Security Activity) to obtain approvals, conduct cleanup actions on schedule (even when limited to a 6-month fieldwork window outside of the California gnatcatcher nesting season), and achieve remedial action objectives and goals. The NBPL IR Program intends to use the TCRAs at MRP 1 and IR 7 as models to efficiently achieve success and incorporate lessons learned on other accelerated removal action sites, including another former small arms range MRP site on NBPL. The success of in situ petroleum absorbent technology at UST 105 should also be used as a case study for assessing corrective action feasibility at other Navy petroleum release sites in proximity to surface waters.

The DTSC appreciates the working relationship that has been established between DTSC and the NBPL Environmental Restoration Program Project Managers. Project managers from the Navy and DTSC maintain open lines of communication and have made significant progress at NBPL sites that have historically been stalled (NBPL Taylor Street IR 100, NBPL Old Town IR 1 and 10, NBPL Peninsula IR 5, 10, 20 and 8, 9, 23) in addition to all the other program sites. Three new IR sites have also been identified through the collaborative efforts of NBPL and DTSC project managers. The working relationship has resulted in the completion of 40+ documents during the previous 2 years at NBPL. DTSC looks forward to further achievements in the future.

Daniel Cordero Jr
Senior Hazardous Substances Engineer
Department of Toxic Substances Control

Despite challenges created by the COVID-19 pandemic and funding delays on account of continuing resolutions (with 100% program funding not being received until third quarter in both FY21 and FY22), the NBPL IR Program had significant success. The NBPL IR Program completed an extensive amount of work over the 2-year timeframe (which includes approximately 10,000 hours of fieldwork labor with no reportable injuries). The magnitude of accomplishments at NBPL demonstrates the program's quality, significant contribution to environmental restoration at NBPL, and the commitment to accomplishing NBPL's mission.

Encina Ocean Outfall

STATE OF THE OCEAN REPORT

Submitted in Compliance with
Receiving Water Monitoring Requirement IV.E.3 of
Order No. R9-2018-0059

Summary of Receiving Water Findings and Conclusions from the 2023 Encina Ocean Outfall Receiving Water Report

Submitted by:
Encina Wastewater Authority

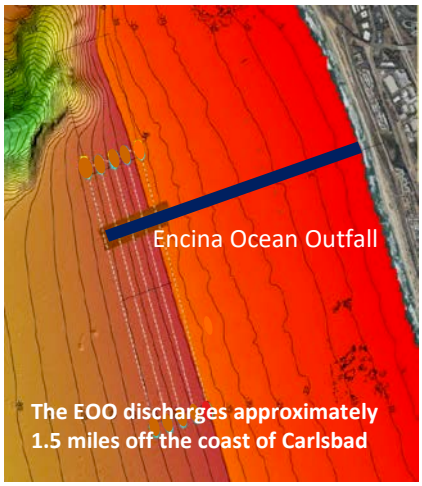
ENCINA WASTEWATER AUTHORITY

April 2023

Table of Contents

Section 1
Overview

Encina Ocean Outfall Discharge. Regional Water Quality Control Board (RWQCB) Order No. R9-2018-0059 (NPDES CA0107395) regulates the discharge of wastewater by the Encina Wastewater Authority (EWA) to the Pacific Ocean via the Encina Ocean Outfall (EOO). The 7800-foot-long EOO discharges at depths ranging from 135 to 168 feet. The final 800 feet of the outfall is comprised of a diffuser with 138 discharge ports.



The EOO discharge is almost exclusively comprised of secondary effluent from the Encina Water Pollution Control Facility (EWPCF). Order No. R9-2018-0059 also allows discharges from the Meadowlark Water Reclamation Facility and Carlsbad Water Reclamation Facility, but flows from these facilities are rarely discharged to the EOO.

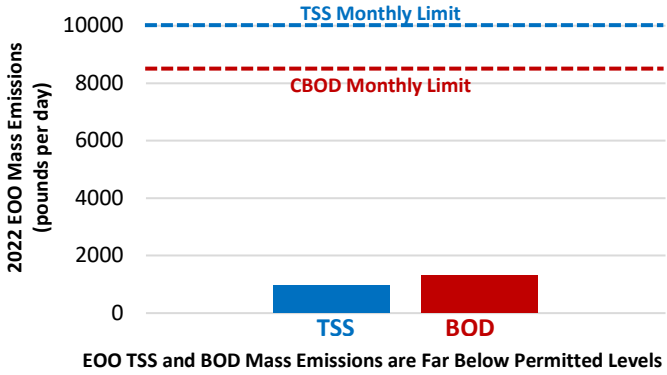
During days of peak recycled water demand, EOO ocean discharge flows can be reduced by up to 20 mgd as a result of recycled water use.

Order No. R9-2018-0059 allows for the discharge of up to 43.3 million gallons per day (mgd) during May through October and up to 52.6 mgd during November through April. Typical EOO discharge flows, however, are on the order of 20 mgd.

Purpose of Submittal. Monitoring and Reporting Requirements IV.E.1 and IV.E.2 of Order No. R9-2018-0059 require EWA to present an in-depth analysis of receiving water data collected since Order No. R9-2018-0059 became effective in November 2019. Monitoring and Reporting Requirement IV.E.3 of Order No. R9-2018-0059 requires EWA to submit a "State of the Ocean" report which summarizes the conclusions of the receiving water monitoring report.

In compliance with this requirement, this State of the Ocean report summarizes data from 2019-2022 that was presented and evaluated within 2023 *Encina Ocean Outfall Receiving Water Monitoring Report* (EWA, 2023). This State of the Ocean report also presents plume tracking results and receiving water findings presented in the *Encina Ocean Outfall Receiving Water Monitoring Report*. Compliance monitoring data collected during the effective period of Order No. R9-2018-0059 have been previously submitted to the RWQCB via the California Integrated Water Quality System.

Effluent Quality. Monthly average concentrations of total suspended solids (TSS) and carbonaceous biochemical oxygen demand (CBOD) in the highly-treated EOO discharge usually range from 5 to 7 milligrams per liter (mg/L). These effluent concentrations are similar to TSS and CBOD background concentrations that typically occur in ocean receiving waters within the Southern California Bight.



EOO TSS and BOD Mass Emissions are Far Below Permitted Levels

Turbidity levels in the EOO discharge average 2.4 Nephelometric Turbidity Units, which indicates that the water clarity of the EOO discharge may be classified as "ultraclear." Mass emissions of ammonia are typically a factor of ten less than performance goals established in Order No. R9-2018-0059. When combined with the high dilution achieved by the EOO, these low mass emissions result in receiving water concentrations of nitrogen in the vicinity of the EOO that are not discernibly different than ambient receiving water.

During the effective period of Order No. R9-2018-0059, the EOO discharge achieved 100 percent compliance with all water quality-based effluent standards and performance goals for the protection of aquatic habitat and human health. During this period, it was rare to detect concentrations of toxic organic and inorganic compounds in the EOO discharge above reportable levels.

No toxic organic compounds were detected above reporting limits within the EOO discharge during 2022.

Whole effluent toxicity tests represent a "catch-all" means of evaluating the effect of both known and regulated compounds and unknown and unregulated compounds. Additionally, the toxicity tests assess whether any adverse aggregate, combined, synergistic or antagonistic effects occur from combinations of multiple pollutants.

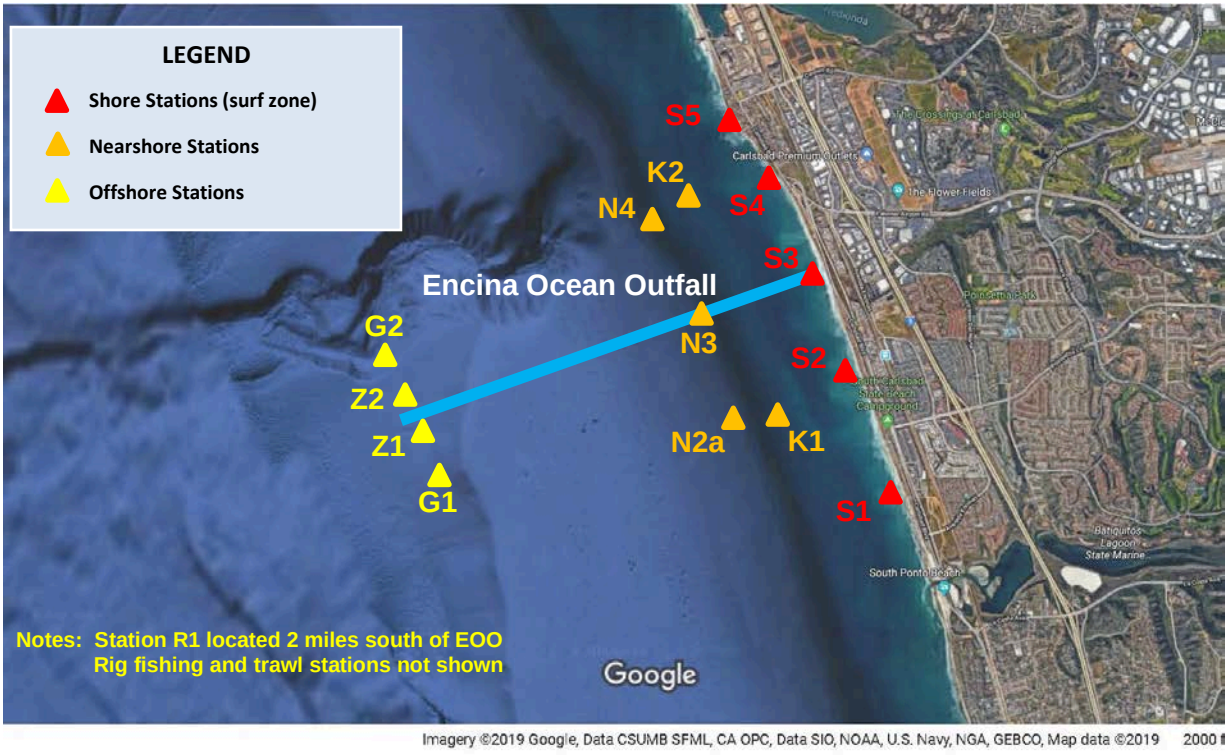
Whole effluent toxicity tests are multi-day tests used to identify adverse effects of the effluent on the health, growth, and reproduction of multiple species. Test protocols require an effluent to be declared "toxic" unless proven otherwise. During the period of Order No. R9-2018-0059, 100 percent of the EOO chronic toxicity tests (representing over 120 tests) passed the testing protocols and thus were deemed nontoxic.

Receiving Water Monitoring Program. To further assess the possible effects of the EOO discharge on receiving waters, Order No. R9-2018-0059 requires EWA to implement a comprehensive receiving water monitoring program. A key objective of the EOO receiving water monitoring program is to measure and document compliance with NPDES and California Ocean Plan standards and to assess possible impacts of the discharge on coastal water quality, seafloor sediments and marine life.

The EOO receiving water monitoring program is designed to address a series of questions posed within the NPDES permit related to whether beneficial uses are adversely affected. The 2023 *Encina Ocean Outfall Receiving Water Monitoring Report* evaluated each of the questions posed in the NPDES permit and concluded that the EOO discharge is not discernibly affecting water quality, sediments, marine life or beneficial uses.

This receiving water monitoring program includes weekly monitoring at shore (S) stations for visual observations, temperature, total coliform, fecal coliform, and enterococcus. Quarterly monitoring for these parameters at the surface and at mid-depth are required at the nearshore (K and N) stations and offshore (G, Z and R) stations. Additionally, temperature, dissolved oxygen, light transmittance, pH and salinity data are collected throughout the depth profiles at each of the nearshore and offshore stations.

Once per NPDES permit term, offshore (G, Z and R) stations are monitored for sediment grain size, sediment chemistry, sediment toxicity and benthic community structure. Further, fish and macroinvertebrates are collected and catalogued at four trawl stations and three rig-fishing stations and fish tissue is evaluated for the bioaccumulation of toxins.

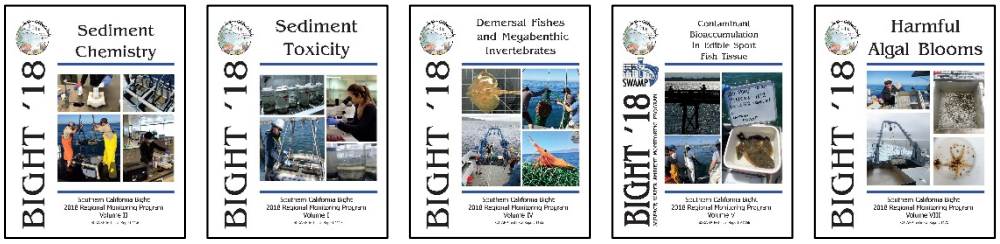


EOO Receiving Water Monitoring Stations

Monitoring Coordination within the Southern California Bight. Order No. R9-2018-0059 requires EWA to participate in regional monitoring efforts conducted by the Southern California Water Research Project (SCCWRP). Due to the timing of the adoption of Order No. R9-2018-0059, it was not possible for EWA to participate in the data collection portion of the most recent SCCWRP bight-wide regional survey (Bight '18). EWA, however, contributed financially in the Bight '18 effort even though EWA did not request a corresponding reduction in EOO monitoring. EWA has participated in planning meetings for the upcoming bight-wide regional survey (Bight '23), and data collected as part of the EOO receiving water program have been made available to SCCWRP for use in Bight '23.

Additionally, as part of completing the *2023 Encina Ocean Outfall Receiving Water Report*, EWA assessed SCCWRP data from the Bight '18 regional survey and compared the SCCWRP data with results from the EOO receiving water monitoring effort conducted during 2019-2020 pursuant to Order No. R9-2018-0059.

Every five years, SCCWRP coordinates with regional partners to implement a comprehensive regional monitoring data collection and assessment program within the Southern California Bight. SCCWRP's Bight '18 program is the most recent bight-wide monitoring effort that has been completed. The Bight '23 regional effort is currently underway.



SCCWRP Publishes the Results of the Bight '18 Regional Monitoring Effort in a Series of Comprehensive Reports

Section 2
Ocean Conditions

Data collected during the effective period of Order No. R9-2018-0059 demonstrates that the EOO discharge achieves 100 percent compliance with California Ocean Plan receiving water standards for dissolved oxygen, pH, water clarity, temperature and salinity. This compliance is demonstrated through the quarterly collection of depth profiles of temperature, dissolved oxygen, light transmittance, pH and salinity at EOO monitoring stations and reference stations. The quarterly depth profile data are collected using boat-based conductivity/temperature/density (CTD) sensors.

Visual Observations. Visual observations and ocean conditions are logged and reported each time water quality samples are collected. Observations are directed toward noting any phenomena that may be associated with wastewater discharges, including floating material, discoloration, grease and oil, turbidity or odor. No visual observations related to the EOO discharge were identified in any of the observations at EOO monitoring stations that were conducted during the current term of Order No. R9-2018-0059.

Boat-Based CTD Sensor

Dissolved Oxygen. Dissolved oxygen concentrations in the EOO discharge average approximately 5 mg/L, while CBOD concentrations in the discharge average approximately 7 mg/L. The EOO discharge has no discernible effect on receiving water dissolved oxygen as a result of the combination of high dilution, high effluent dissolved oxygen, and low effluent oxygen demand renders. Dissolved oxygen depth profiles at EOO stations were not discernibly different than profiles at reference stations and were consistent with dissolved oxygen concentrations throughout the Southern California Bight as reported within the Bight '18 studies.

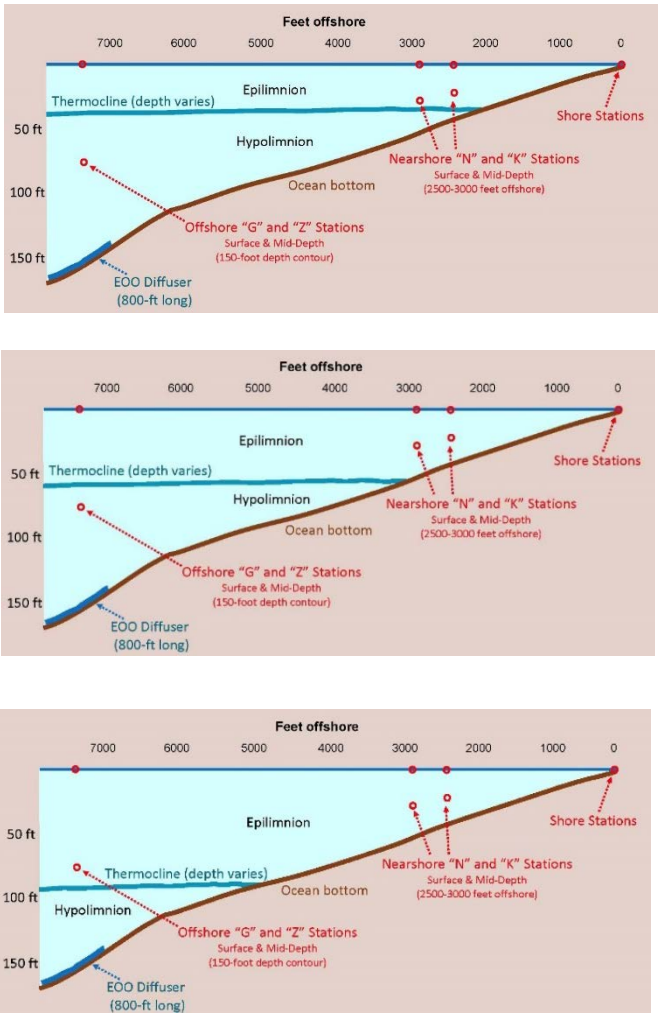
pH. The pH of the EOO discharge (typically on the order of 7.5) is not significantly different than the pH of receiving waters (typically near 8.0). Receiving water depth profiles of pH collected during the effective period of Order No. R9-2018-0059 demonstrate no discernible difference in pH depth profiles between EOO monitoring stations and reference stations throughout the Southern California Bight.

Water Clarity. The EOO discharge flow is visually clear, and the low concentrations of TSS and turbidity in the EOO discharge are similar to (and often lower than) concentrations in ambient ocean water. Data collected during the effective period of Order No. R9-2018-0059 confirm that no difference is seen between water clarity depth profiles at EOO stations and reference stations. While water clarity levels vary in accordance with natural phenomena (upwelling, wind, storm conditions), the EOO discharge has no discernible effect on water clarity.

As a result of the low turbidity concentrations in the EOO discharge, the EOO discharge can be characterized as an "ultraclear" discharge into an "ultraclear" receiving water.

Temperature and Salinity. Temperature and salinity monitoring conducted during the effective period of Order No. R9-2018-0059 demonstrate that the EOO discharge has no discernible effect on ocean temperature and salinity.

The data, however, show that ocean water temperature and salinity can vary significantly as a result of variations in seasonal climatic conditions and regional oceanographic conditions (e.g., El Niño and La Niña). Depth vs. temperature profiles throughout the California Bight show strong seasonal density stratification throughout much of the year where deeper colder waters are physically separated from warmer near-surface waters by a thermocline or pycnocline. This thermal stratification significantly restricts the upward movement of the EOO buoyant discharge and results in the discharge being trapped below the thermocline. EOO temperature and salinity data indicate that thermocline trapping depths can range from less than 40 feet during spring months to 100 feet or more during the fall.



Temperature is the dominant factor governing water density and stratification

A thermocline forms in early spring that separates warmer near-surface waters from deeper cooler waters

Thermal stratification strengthens and the thermocline deepens during summer months

Temperatures in the hypolimnion remain essentially constant throughout the year

Thermal stratification is strongest during late summer/fall months as epilimnion temperatures reach their maximum

Typical Seasonal Progression of the EOO Thermocline

The trend of seasonal warming of coastal ocean waters during spring and summer months can sometimes be temporarily interrupted by upwelling events where cold waters from deep offshore canyons move upward and toward the coastal shelf. Such an upwelling event was captured by the EOO monitoring data in 2022, where temperature vs. depth data showed considerably colder ocean waters throughout the depth profile in April 2022 compared to March 2022.

Section 3
Receiving Water Quality

Order No. R9-2018-0059 applies statewide ocean receiving water standards for body-contact recreation (REC-1) to all depths of ocean waters within the state-regulated three-nautical-mile limit. The EOO discharge has consistently complied with these recreational body-contact standards.

Shore Stations. Weekly monitoring at five shore stations are conducted as part of the EOO receiving water monitoring program. Samples are collected for total coliform, fecal coliform and enterococcus. Consistent compliance with the body-contact recreational standards has been maintained throughout the effective period of Order No. R9-2018-0059.

Sample Collection at EOO Shore Stations

During 2022, for example, median concentrations of fecal coliform and enterococcus at each of the five stations were ≤1 per 100 milliliters, and were predominantly a factor of 100 below the standards. Consistent with the EWA-collected bacteriological data at EOO shore stations, the *Heal the Bay 2021-2022 Beach Report Card* identified all five Carlsbad beaches inshore from the EOO as achieving consistent "A+" ratings and "honor roll" status.

Offshore Stations. The EOO discharge has achieved 100 percent compliance with Ocean Plan recreational body-contact bacteriological receiving water standards at all nearshore and offshore ocean waters at all monitored depths. During the effective period of Order No. R9-2018-0059, median fecal coliform concentrations were ≤1 per 100 milliliters at all nearshore and offshore stations at all depths. During this period, the highest observed concentration of fecal coliform at the EOO nearshore and offshore stations was more than a factor of six lower than the Ocean Plan single sample maximum objective.

Similarly, median enterococcus concentrations were <1 per 100 milliliters at all EOO nearshore and offshore stations at all depths. The highest observed enterococcus concentration at the EOO nearshore and offshore stations was more than a factor of six lower than the Ocean Plan 90th percentile objective. Further, enterococcus concentrations in each collected sample were lower than the Ocean Plan 6-week median standard.

EWA Water Quality Laboratory

Overall, the EOO receiving water monitoring program demonstrates that receiving water is of high quality at all depths in the vicinity of the EOO. The EOO discharge consistently complies with all receiving water requirements established in the Ocean Plan and all receiving water requirements established in Order No. R9-2018-0059.

Section 4
Sediment Chemistry and Toxicity

Order No. R9-2018-0059 requires sediment monitoring at five EOO offshore stations to assess compliance with Ocean Plan narrative objectives and to characterize the quality and health of bottom conditions. Sediment samples are analyzed for grain size and physical parameters, toxic inorganic and organic compounds and sediment toxicity.

Lack of Outfall-Related Sedimentation. Sediment monitoring at the EOO offshore stations demonstrate that sediments in the vicinity of the EOO are predominantly comprised of fine to very fine sands. The predominance of sand-sized particulates in the EOO sediments (combined with the lack of settleable material in the EOO discharge) offers strong evidence that the EOO discharge is not depositing any settleable material to the ocean environment. This conclusion is consistent with effluent quality monitoring which demonstrate virtually no settleable solids in the EOO discharge, high water clarity (low turbidity) and low concentrations of TSS.

Sediment Chemistry. Consistent with these findings, sediment chemistry monitoring also demonstrates that sediment concentrations of nitrogen and total organic carbon in the vicinity of the EOO are low, with nitrogen comprising less than 0.04 percent and total organic carbon comparing less than 0.5 percent of sediment by weight. Concentrations of nitrogen and total organic carbon in sediments near the EOO are consistent with concentrations found at EEO and Bight '18 reference stations. Additionally, concentrations of nitrogen and total organic carbon in EOO sediments are less than mean values seen in sediments at similar depths within the Southern California Bight. Based on these multiple lines of evidence, the EOO sediments show no discernible evidence of nutrient enrichment, either from the EOO discharge or from natural or man-induced sources (including atmospheric or shore-based sources).

Sediment chemistry monitoring at the EOO stations also demonstrates that concentrations of toxic inorganic and organic constituents in sediments near the EOO are comparable to concentrations at reference stations, and are significantly lower than sediment concentrations seen throughout the Southern California Bight. Additionally, sediment concentrations of almost all toxic constituents near the EOO are substantially lower than concentrations cited within the Bight '18 studies as representing undisturbed conditions. An exception to this is that concentrations of polynuclear aromatic hydrocarbon (PAH) compounds at the EOO stations were slightly higher than SCCWRP Bight '18 reference stations. The reason for this is unknown, as the EOO discharge typically does not contain detectable concentrations of PAH compounds. Observed concentrations of PAHs near the EOO, however, were substantially lower than reference threshold values used in Bight '18 to indicate undisturbed benthic conditions.

Sediment Toxicity. While sediment chemistry analyses showed low concentrations of toxic compounds in the EOO sediments, sediment toxicity monitoring was conducted to evaluate the overall toxicity of sediment samples. Sediment toxicity was evaluated using the marine amphipod *Eohaustorius estuarius* and a 10-day solid-phase test for survival and reburial. Percent survival data from the 10-day tests demonstrated that sediments were non-toxic in all EOO sediment samples. In combination with the lack of toxic compounds in the EOO effluent and low levels of toxic compounds in sediments near the EOO, the sediment toxicity monitoring represents an additional line of evidence that the EOO discharge is not adversely affecting sediment quality.

Section 5
Benthic Communities and Demersal Fish

Order No. R9-2018-0059 establishes monitoring requirements to assess the health of aquatic habitat. This monitoring includes identifying species and enumerating abundance of (1) benthic organisms in sediment samples collected from five offshore stations and (2) fish and benthic invertebrates in trawl samples collected from four trawl stations.

Benthic Community Analyses from Sediment Samples. In accordance with requirements of Order No. R9-2018-0059, sediment samples at EOO stations were collected and samples were sieved using a 1-millimeter mesh screen. Organisms were preserved and evaluated by marine biologists who identified collected organisms to the lowest possible taxon. Results were reported in terms of number of species, abundance (population) of each species, and benthic community indices.

Organisms found in the EOO sediment samples were common to sandy bottom and pollution-free ocean environments. Over 150 species were identified within the EOO sediment samples, including 87 species of polychaetes, 25 species of molluscs, 19 species of crustaceans, 7 species of sea urchin and 15 species of worms. In terms of abundance, polychaetes comprised 68 percent of the total number of organisms. Crustaceans and molluscs respectively comprised 13 percent and 9 percent of the total number of organisms. Polychaetes and molluscs comprised a significant majority of the biomass of collected organisms.

All benthic community indices at the EOO offshore stations were indicative of a healthy and diverse benthic community. Shannon-Weiner Index (H') values at each of the stations were in excess of 3.5, indicating a high diversity of organisms and healthy community. Pielou Evenness Index (J') values at each station were in excess of 0.9, indicating that populations were spread out among numerous species. Swartz Dominance Index values (number of qualifying species that comprise 75 percent of the total organism population) were in excess of 40 at each of the EOO offshore stations, indicating a high degree of species diversity. Benthic Response Index (BRI) values were also indicative of a diverse, healthy benthic habitat.

Benthic Response Index (BRI) values were below 15 at each of EOO offshore stations. BRI values below 25 are considered indicative of reference (unimpacted) conditions, while BRI values above 34 represent increasing levels of disturbance or environmental degradation.

The results of benthic community monitoring at the EOO stations were consistent with nearby benthic monitoring conducted as part of the SCCWRP Bight '18 studies. Overall, the EOO and Bight '18 benthic monitoring demonstrates that the EOO discharge has no discernible impacts on the benthic community. Benthic habitats at the EOO stations and nearby Bight '18 stations show a high degree of species diversity and abundant populations. Benthic community metrics and indices show no evidence of habitat degradation, and benthic data collected at EOO stations are at least as good (often better) than data collected at regional Bight '18 mid-shelf monitoring stations. The benthic community data, along with sediment chemistry results and sediment toxicity results, combine to present multiple lines of evidence to demonstrate that benthic communities are not adversely impacted by the EOO discharge.

Fish. Fish and invertebrate trawls were conducted at four EOO offshore trawl stations. A total of 23 species of fish were collected at the trawl stations, with at least 16 species being present at each station. Fish species caught at the EOO trawl stations are common throughout the Southern California Bight. Longfin sanddab, yellowchin sculpin, Pacific sanddab, Dover sole and pink seaperch comprised more than 85 percent of trawl-caught fish. Most collected fish were 6 to 10 centimeters (2.4 to 3.9 inches) in length.

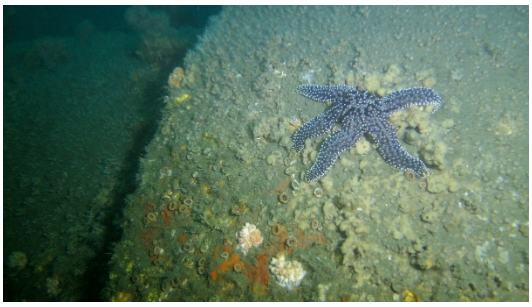
English sole comprised approximately 34 percent of the fish biomass caught at the trawl stations. Pink seaperch, California tonguefish, Pacific sanddab, California scorpionfish and vermillion rockfish comprised an additional 38 percent of the fish biomass. The fish abundance and biomass data from the EOO trawl stations indicate a healthy and diverse populations of fish.

Of the 1446 fish captured during the EOO trawl events, 6 exhibited some form of abnormity. One fish had lesions, two fish had parasites, and three fish had tumors. Each of the fish exhibiting tumors were Dover sole. The incidence of abnormalities in fish caught at the EOO trawl stations was consistent with the incidence of abnormalities found in the Southern California Bight as part of the regional Bight '18 monitoring effort.

Benthic Invertebrates. A total of 15 benthic invertebrate species were collected at the trawl stations, which is indicative of a balanced and healthy benthic invertebrate community. Free-floating colonial tunicates and target shrimp comprised nearly 90 percent of the benthic invertebrate organisms caught at the EOO trawl stations. Nearly 95 percent of the benthic invertebrate biomass at the EOO trawl stations was from pelagic tunicates, target shrimp and armed box crab.

Benthic Invertebrates at the EOO

No anomalies were observed in benthic invertebrates captured by the trawl monitoring at the EOO offshore stations.



Sea Star on the Outfall Pipe

Overall, EOO trawl data demonstrate that demersal fish and benthic invertebrate communities continue to be diverse and healthy. Fish and invertebrate species in the vicinity of the EOO are consistent with fish and invertebrate species seen throughout the Southern California Bight.

Section 6
Bioaccumulation

While the EOO discharge does not contain detectable concentrations of toxic inorganic or organic compounds, tissue monitoring of rig-caught fish was conducted under Order No. R9-2018-0059 to assess whether concentrations of pollutants in fish and benthic organisms bioaccumulate to harmful levels.

As part of this monitoring, three replicate composite samples of fish tissue were prepared from fish collected at three rig fishing zones, with each sample being comprised of a minimum of three fish. Fish species were targeted based on popularity for consumption, distribution, and potential exposure pathways, and included longfin sanddab and English sole. Samples were analyzed for toxic metals and a range of toxic organic compounds, including DDT isomers, chlorinated pesticides, polynuclear aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs).

Toxic Metals. No detectable concentrations of cadmium, chromium, lead, nickel, or silver were found in any of the EOO fish tissue samples. Detectable concentrations of arsenic, copper, mercury, selenium and zinc were found in each of the samples, but these concentrations were consistent with concentrations that occur in fish caught in other areas of the Southern California Bight.

Fish at the Outfall Pipe

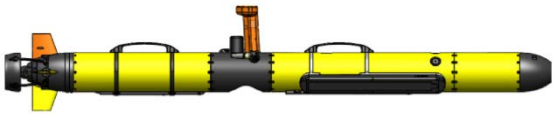
Sample results were compared with Advisory Tissue Levels (ATLs) established by the California Environmental Protection Agency which are designed to encourage the consumption of fish in quantities likely to provide significant health benefits, while discouraging consumption of fish in quantities that risk health consequences associated with contaminant concentrations. Maximum observed fish tissue concentrations in all samples at each EOO station were below ATL concentrations for the weekly consumption (over a lifetime) of 8-ounce servings of sportfish.

Toxic Inorganic Compounds. No detectable concentrations of chlorinated pesticides or PAHs were observed in the EOO fish tissue samples. While detectable concentrations of 4,4'-DDE (a DDT isomer) and PCBs were found in each of the fish tissue samples, maximum observed concentrations were far below ATLs for the daily consumption (over a lifetime) of 8-ounce servings of sportfish.

Overall, bioaccumulation findings from the EOO monitoring were consistent with data collected by SCCWRP as part of the regional Bight '18 effort. Fish in the vicinity of the EOO are safe to eat, and there is no evidence of contaminant accumulation in fish that are associated with wastewater discharges.

Section 7
Dilution and Dispersion

Plume Tracking Study. Order No. R9-2018-0059 established plume tracking monitoring requirements to assess the dispersion and fate of wastewater discharged from the EOO. To comply with the plume tracking requirements, EWA coordinated with other regional dischargers and RWQCB staff to design a study to assess the transport and fate of the EOO discharge using an approach pioneered by the Scripps Institution of Oceanography. As part of this approach, sensors mounted in autonomous underwater vehicles (AUVs) were used to assess movement of discharged wastewater using the parameter CDOM (colored dissolved organic matter) or fDOM (fluorescent dissolved organic matter). AUV deployment routes and depths were programmed based on data collected from boat-based CTD casts and boat-based ocean current monitoring devices. As part of the tracking study, AUV deployments were targeted to assess plume fate and transport during periods of maximum stratification, minimum stratification, and atypical post-storm conditions.



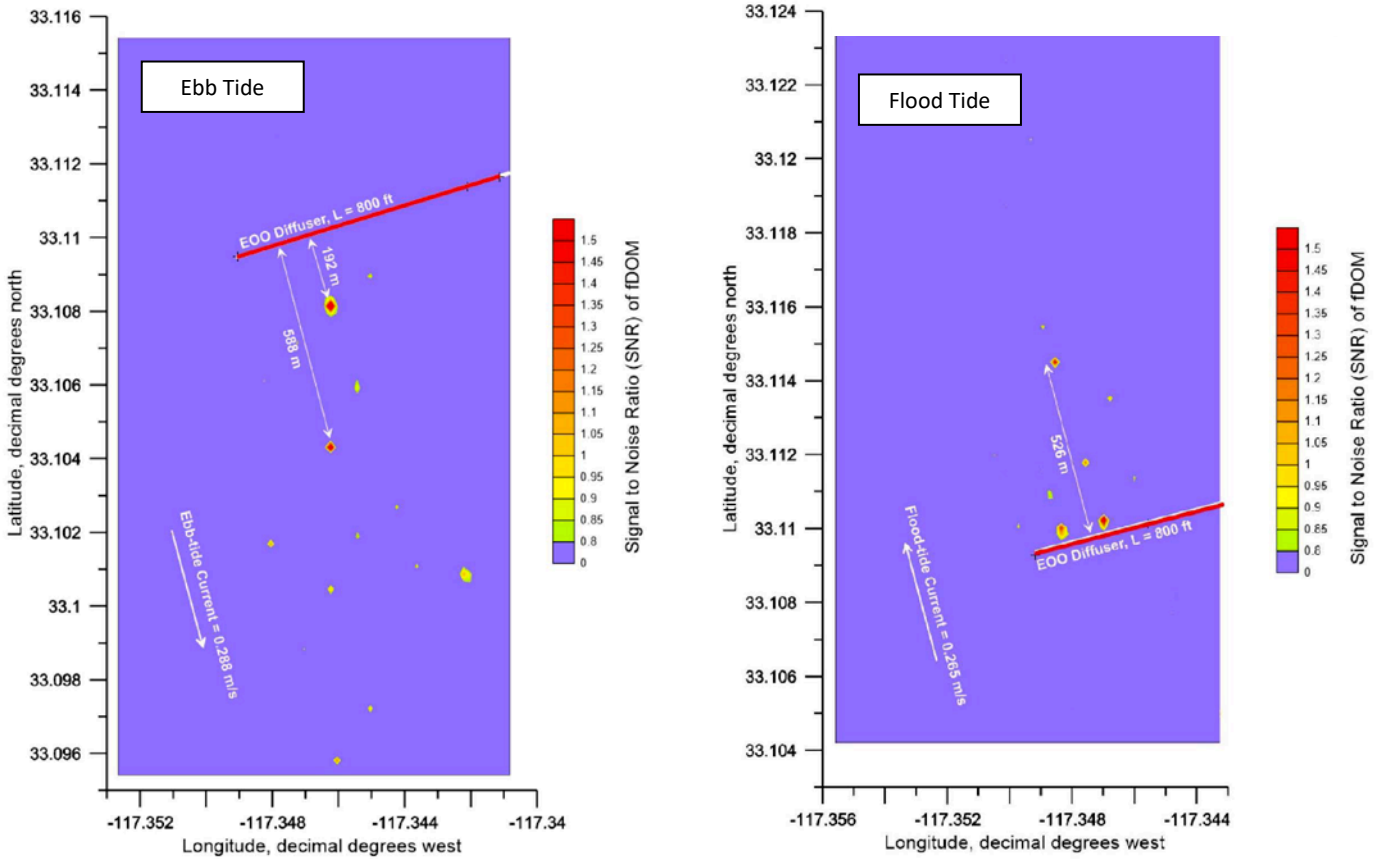
Autonomous Underwater Vehicle

The use of CDOM or fDOM to track discharges of highly treated wastewater is complicated by the fact that CDOM/fDOM exists naturally in seawater and concentrations can vary significantly from location to location. To address this issue, a "signal to noise" approach was utilized to differentiate between "noise" (natural variation) in the ambient receiving water data and concentrations that may be indicative of the presence of the EOO discharge.

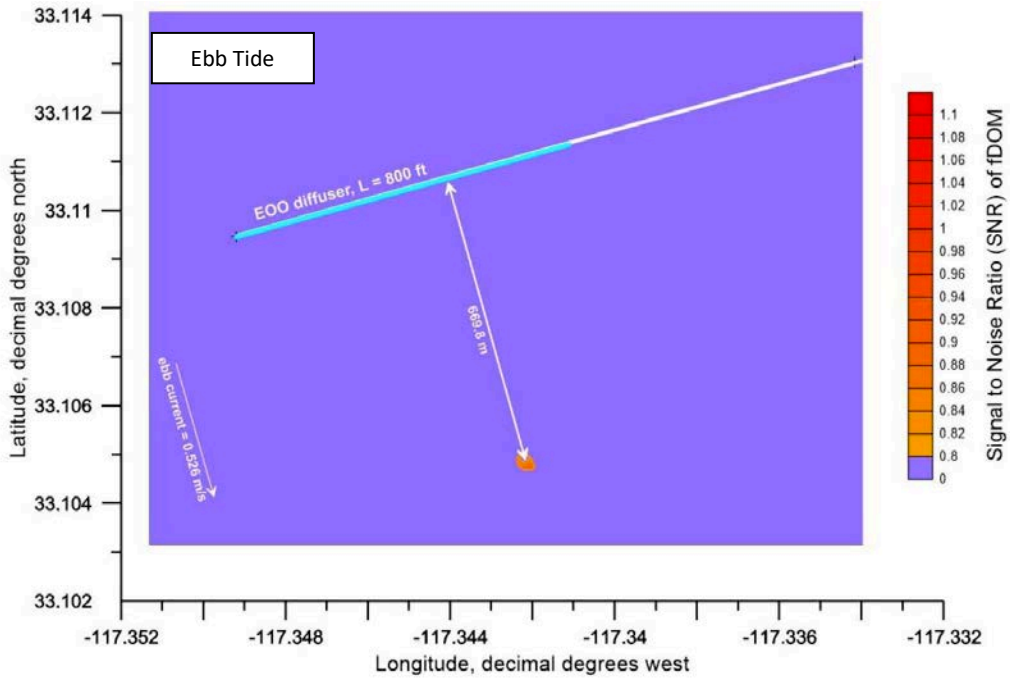
As part of the approach, fDOM concentrations in the EOO discharge and in ambient seawater were measured, and it was presumed that any receiving water concentration observed above ambient "noise" (allowing for natural variation) was due to the EOO discharge.

AUV Deployments. AUV deployments were conducted in September 2021 (maximum stratification), December 2021 (post-storm conditions) and March 2022 (minimum stratification). AUVs were programmed to assess a grid pattern downcurrent from the EOO both during ebb tide and flood tide conditions. Using the signal-to-noise approach, data from the AUV deployments were evaluated to assess where and when the EOO discharge may be detectable.

Under all three sets of conditions, net plume movement during ebb tide conditions was parallel to the coastline and in a southerly direction, while net plume movement during flood tide conditions was parallel to the coastline in a northerly direction. Under all observed conditions, it was found that the EOO discharge does not remain as a "plume" *per se* after discharge. Instead, short-term back-and-forth cross-shore oscillations in ocean currents, while producing no net drift of the EOO discharge, served to break off pieces of the discharge into remnants or pockets that are rapidly diluted and dispersed to the point of becoming indistinguishable from ambient receiving water. As a result of this phenomena, only a few tiny pocket or remnants of the EOO discharge were detected during the AUV deployments. Maximum distances at which these tiny plume remnants were detected during ebb tide conditions was 2200 feet south of the EOO. Maximum distances at which remnants were detected during flood tide conditions were 1725 feet north of the EOO. The minimum dilution in the center of any of the detected fragments during the three AUV deployments was 215:1, while dilutions near the edges of these remnants exceeded 10,000:1.



EOO Discharge Remnants Detected during the AUV Deployment of 21 September 2021



EOO Discharge Remnants Detected during Ebb Tide Conditions of 2 March 2022

Section 8
Conclusions

Plume Tracking and Initial Dilution Conclusions. Plume tracking studies conducted pursuant to requirements of Order No. R9-2018-0059 confirm that:

- Upon discharge, diluted EOO water moves parallel to the shore in an upcoast or downcoast direction, depending on tides and regional conditions.
- The EOO discharge is not transported to the shore. Monitoring data from the EOO shore "S" stations are of no value in assessing performance of the EOO.
- The EOO discharge is quickly diluted by an efficient diffuser.
- Initial dilution is consistently greater than the initial dilution value assigned by the RWQCB.
- Under typical fall and spring oceanographic conditions, the EOO discharge is difficult to detect because of lower-than-average discharge flows, high initial dilutions, and ambient water fDOM concentrations that are comparable to the diluted EOO discharge upon completion of initial dilution.
- After completion of initial dilution, diluted wastewater can be further diluted and dispersed by short-term oscillations in ocean currents (both longshore and cross-shore), creating small remnants of highly diluted water which rapidly become indistinguishable from ambient seawater.
- Under conditions in which remnants of the EOO discharge are detectable, the remnants are detectable only in limited areas, and the remnants become indistinguishable from ambient ocean waters soon after completion of initial dilution.
- Increased recycled water use and decreased EOO discharge flows result in improved dilution and dispersion.
- The existing offshore receiving water monitoring stations are ample for demonstrating compliance with receiving water narrative and numerical standards.
- Stations located more than 2500 feet from the EOO are of little value in assessing the EOO discharge and may be eliminated without consequence.
- The plume tracking work confirmed historical findings that the aquatic life and the ocean environment is not being adversely impacted by the EOO discharge.
- Plume tracking study results confirm prior understanding of the EOO discharge. As a result, no additional plume tracking studies are required.

State of the Ocean Conclusions. Based on recent and past monitoring data conducted at the EOO and at regional SCCWRP Southern California Bight monitoring stations, the following are concluded relative to the EOO discharge:

- Treatment facilities discharging to the EOO achieve high efficiencies in removing TSS, CBOD and other physical/chemical compounds.
- The EOO discharge is free from almost all toxic compounds. Most toxic constituents are below detection limits in the EOO discharge, and the few compounds that are detected are near detection limits and significantly below performance goal concentrations.
- The EOO discharge achieves 100 percent compliance with whole effluent toxicity tests, thus ensuring that unregulated, unknown or unmonitored compounds are not causing toxicity.
- A significant portion of the wastewater within the EWA service area can be diverted to reuse, resulting in reduced EOO discharge flows.
- EOO mass emissions of physical/chemical constituents are reduced from historical values as a result of improved treatment, reduced flows and increased recycled water use.
- The EOO discharge consistently achieves compliance with NDPES effluent limitations, performance goals and effluent toxicity standards.
- The EOO discharge consistently achieves compliance with State of California Ocean Plan receiving water standards for the protection of aquatic habitat and the protection of public health, and the EOO discharge zone is characterized by high-quality ocean water
- While the EOO effluent contains concentrations of nitrogen in excess of ambient receiving water, the EOO discharge is unlikely to directly contribute to algae blooms. As a result of high dilution and dispersion, nutrient concentrations in the discharge zone quickly become indistinguishable from ambient concentrations. Further, during months when algal blooms are most prevalent in the Southern California Bight, thermal stratification is strongest and plume trapping depths are greatest, preventing the EOO discharge from contributing nutrients to the epilimnion. Additionally, EOO nitrogen mass emissions are at their lowest during months when the potential for algae blooms are present due to recycled water production.
- The EOO discharge is trapped below the ocean surface throughout a significant majority of the year by thermal stratification.
- Plume tracking monitoring demonstrates that the EOO discharge is rapidly diluted and dispersed, and upon initial dilution becomes indistinguishable from ambient ocean water within several hundred feet of the ZID.
- During and after the initial dilution process, shear currents can transform the discharge into small fragments which are quickly dispersed and diluted, significantly increasing the overall degree of dilution.
- The EOO discharge contains negligible (typically non-detectable) amounts of settleable material and has no discernible effect on receiving water sediments.

- Sediment concentrations of toxic inorganic and organic compounds at EOO offshore stations are less than or equivalent to concentrations at other regional Bight ’18 stations, and below SWRCB “reference” values characteristic of undisturbed habitat.

- Benthic community monitoring data demonstrate that biological communities in the vicinity of the EOO are in excellent condition with a high degree of species diversity, species richness, abundance and evenness. The EOO discharge has no discernible adverse effects on benthic species populations or diversity.

- Trawl monitoring demonstrates that fish and benthic invertebrate populations are diverse, balanced, and abundant, and show no evidence of discernible adverse impact from the EOO discharge.

- Fish populations in the vicinity of the EOO are abundant, diverse and healthy, and are comprised of species common to the Southern California Bight including longfin sanddab, yellowchin sculpin, Pacific sanddab, Dover sole, pink seaperch and white seaperch.

- Populations of benthic invertebrates are abundant in the vicinity of the EOO discharge, and include common mid-shelf invertebrates such as tunicates, shrimp, sea urchins, crabs and sea stars.

- Anomalies in fish (tumors, lesions, etc.) are rare and occur on percentage basis that is consistent with anomalies found throughout the Southern California Bight.

- No anomalies in benthic invertebrate organisms were observed at the EOO monitoring stations.

- The existing EOO monitoring program is adequate for assessing receiving water quality, sediment quality and receiving water habitats, but some existing effluent and receiving water monitoring may be superfluous or unnecessary.

Table 1: March 2023 – Summary of Public and Federal Sanitary Sewer Overflow Events

Responsible Collection System Agency	Total Volume (Gallons)[1]	Total Recovered (Gallons)[2]	Total Reaching Surface Waters (Gallons)[3]	Total Reaching Separate Storm Drain and Recovered (Gallons)[4]	Total Discharged to Land (Gallons)[5]	Surface Water Body Affected[6]	Miles of Pressure Sewer	Miles of Gravity Sewer	Population in Service Area[7]
City of Encinitas	1,500	0	1,500	0	0	Not Reported	4.5	124.0	36,200
City of Imperial Beach	100	0	100	0	0	Not Reported	4.6	39.5	26,059
City of Oceanside	325	150	0	0	325	Not Applicable	37.7	456.1	175,464
City of San Clemente	750	700	0	700	50	Not Reported	3.7	177.6	51,339

[1] Total Volume = total amount that discharged from sanitary sewer system to a separate storm drain, drainage channel, surface water body, and/or land.

[2] Total Recovered = total amount recovered from a separate storm drain, drainage channel, surface water body, and/or land.

[3] Total Reaching Surface Waters = total amount reaching separate storm drain (not recovered), drainage channel, and/or surface water body, but does not include amount reaching separate storm drain that was recovered.

[4] Total Reaching Separate Storm Drain and Recovered = total amount reaching separate storm drain that was recovered.

[5] Total Discharged to Land = total amount reaching land.

[6] Agencies are only required to note the surface water body affected if the discharge reaches or has the potential to reach a surface water. If the discharge did not reach a surface water and does not have a potential to reach a surface water (i.e., a discharge to land or a discharge to a separate storm drain that is fully recovered) the surface water body affected is listed as "Not Applicable." If the discharge was to a surface water body or to a separate storm drain and was not fully recovered, and the surface water body was not reported, the surface water body affected is listed as "Not Reported."

[7] As reported in the Collection System Questionnaire required under Order No. 2006-0003-DWQ.

Responsible Collection System Agency	Total Volume (Gallons)[1]	Total Recovered (Gallons)[2]	Total Reaching Surface Waters (Gallons)[3]	Total Reaching Separate Storm Drain and Recovered (Gallons)[4]	Total Discharged to Land (Gallons)[5]	Surface Water Body Affected[6]	Miles of Pressure Sewer	Miles of Gravity Sewer	Population in Service Area[7]
City of San Diego	90	90	0	0	90	Not Applicable	112.2	2,944.9	2,380,000
City of San Diego	52,998	13,000	3,725	0	49,273	Lake Hodges	112.2	2,944.9	2,380,000
City of San Diego	280	0	280	0	0	Switzer Canyon Open Space	112.2	2,944.9	2,380,000
City of San Diego	810	0	810	0	0	Drainage Channel Tributary to Switzer Canyon	112.2	2,944.9	2,380,000
City of San Diego	76	76	0	0	76	Not Applicable	112.2	2,944.9	2,380,000
Naval Facilities Command Southwest	2,000	0	2,000	0	0	San Diego Bay	Not Reported	Not Reported	Not Reported
Olivenhain Municipal Water District	400	0	400	0	0	Drainage Channel Tributary to Lasardi Creek	20.0	65.0	14,000
Rainbow Municipal Water District	2,800	0	2,800	0	0	Drainage Channel Tributary to San Luis River	3.0	87.0	7,983

Responsible Collection System Agency	Total Volume (Gallons)[1]	Total Recovered (Gallons)[2]	Total Reaching Surface Waters (Gallons)[3]	Total Reaching Separate Storm Drain and Recovered (Gallons)[4]	Total Discharged to Land (Gallons)[5]	Surface Water Body Affected[6]	Miles of Pressure Sewer	Miles of Gravity Sewer	Population in Service Area[7]
Rainbow Municipal Water District	500	0	500	0	0	Drainage Channel Tributary to San Luis River	3.0	87.0	7,983
Rainbow Municipal Water District	1,050	0	1,050	0	0	Drainage Channel Tributary to San Luis River	3.0	87.0	7,983
Rainbow Municipal Water District	2,300	0	2,300	0	0	Drainage Channel Tributary to San Luis River	3.0	87.0	7,983
Santa Margarita Water District	4,000	0	4,000	0	0	San Juan Creek, Doheny State Beach	14.0	639.9	170,000
United States Marine Corps Base Camp Pendleton	975	0	975	0	0	Storm Drain Tributary to San Mateo Creek	39.2	125.0	83,340
United States Marine Corps Base Camp Pendleton	400	400	0	0	400	Not Applicable	39.2	125.0	83,340

Responsible Collection System Agency	Total Volume (Gallons)[1]	Total Recovered (Gallons)[2]	Total Reaching Surface Waters (Gallons)[3]	Total Reaching Separate Storm Drain and Recovered (Gallons)[4]	Total Discharged to Land (Gallons)[5]	Surface Water Body Affected[6]	Miles of Pressure Sewer	Miles of Gravity Sewer	Population in Service Area[7]
United States Marine Corps Base Camp Pendleton	180	0	0	0	180	Not Applicable	39.2	125.0	83,340
Vallecitos Water District	74,700	0	74,700	0	0	Batiquitos Lagoon	7.6	260.0	180,892

Table 2: March 2023 – Summary of Private Lateral Sewage Discharge Events

Responsible Collection System Agency	Total Volume (Gallons)[1]	Total Recovered (Gallons)[2]	Total Reaching Surface Waters (Gallons)[3]	Total Reaching Separate Storm Drain & Recovered and/or Discharged to Land (Gallons)[4]	Surface Water Body Affected[5]	Population in Service Area[6]	Number of Lateral Connections
City of Chula Vista	750	150	0	750	Not Applicable	280,284	49,532
City of Escondido	1	0	0	1	Not Applicable	148,000	27,497
City of Laguna Beach	7	7	0	7	Not Applicable	18,000	6,650
City of Poway	194	0	194	0	Not Reported	43,216	12,290
City of Poway	2	2	0	2	Not Applicable	43,216	12,290
City of San Diego	13,820	11,210	2,610	11,210	Not Reported	2,380,000	267,188
City of San Diego	30	0	0	30	Not Applicable	2,380,000	267,188
Fallbrook Public Utility District	50	20	30	20	Not Reported	23,000	4,699
Fallbrook Public Utility District	100	5	0	100	Not Applicable	23,000	4,699

[1] Total Volume = total amount that discharged from private lateral to a separate storm drain, drainage channel, surface water body, and/or land.

[2] Total Recovered = total amount recovered from a separate storm drain, drainage channel, surface water body, and/or land.

[3] Total Reaching Surface Waters = total amount reaching separate storm drain (not recovered), drainage channel, and/or surface water body, but does not include amount reaching separate storm drain that was recovered.

[4] Total Reaching Separate Storm Drain & Recovered and/or Discharged to Land = total amount reaching separate storm drain that was recovered and/or total amount reaching land.

[5] Agencies are only required to note the surface water body affected if the discharge reaches or has the potential to reach a surface water. If the discharge did not reach a surface water and does not have a potential to reach surface water (i.e., a discharge to land or a discharge to a separate storm drain that is fully recovered) the surface water body affected is listed as "Not Applicable." If the discharge was to a surface water body or to a separate storm drain and was not fully recovered, and the surface water body was not reported, the surface water body affected is listed as "Not Reported."

[6] As reported in the Collection System Questionnaire required under Order No. 2006-0003-DWQ.

Responsible Collection System Agency	Total Volume (Gallons)[1]	Total Recovered (Gallons)[2]	Total Reaching Surface Waters (Gallons)[3]	Total Reaching Separate Storm Drain & Recovered and/or Discharged to Land (Gallons)[4]	Surface Water Body Affected[5]	Population in Service Area[6]	Number of Lateral Connections
Fallbrook Public Utility District	10	10	0	10	Not Applicable	23,000	4,699
Leucadia Wastewater District	20	20	0	20	Not Applicable	62,607	20,716
Padre Dam Municipal Water District	4,320	0	0	4,320	Not Applicable	69,641	15,568

Table 3: March 2023 – Summary of Sewage Discharges by Source

Spill Type	Month/Year	Number of Spills	Total Volume (Gallons)[1]	Total Recovered (Gallons)[2]	Total Reaching Surface Waters (Gallons)[3]	Total Reaching Separate Storm Drain & Recovered and/or Discharged to Land (Gallons)[4]
Public Spills	March 2023	16	142,679	14,016	92,165	49,439
Federal Spills	March 2023	4	3,555	400	2,975	580
Private Spills	March 2023	12	19,304	11,424	2,834	16,470
All Spills	**March 2023**	**32**	**165,538**	**25,840**	**97,974**	**66,489**

[1] Total Volume = total amount that discharged from sanitary sewer system to a separate storm drain, drainage channel, surface water body, and/or land.

[2] Total Recovered = total amount recovered from a separate storm drain, drainage channel, surface water body, and/or land.

[3] Total Reaching Surface Waters = total amount reaching separate storm drain (not recovered), drainage channel, and/or surface water body, but does not include amount reaching separate storm drain that was recovered.

[4] Total Reaching Separate Storm Drain & Recovered and/or Discharged to Land = total amount reaching separate storm drain that was recovered and/or total amount reaching land.

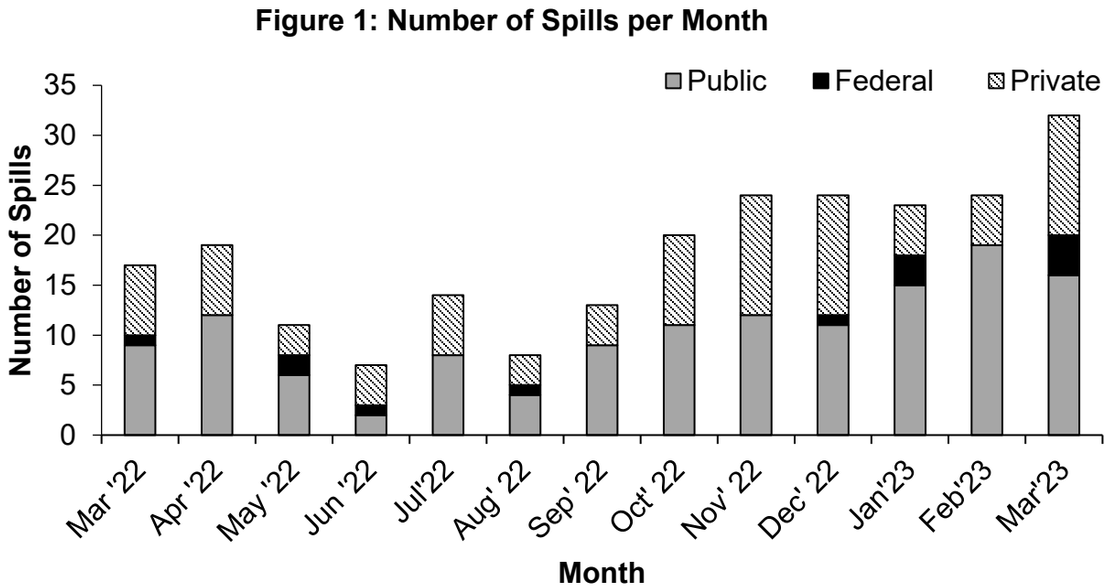


Figure 1: The number of public, federal, and private sewage spills per month from March 2022 through March 2023.

Figure 2: Volume of Public SSOs per Month

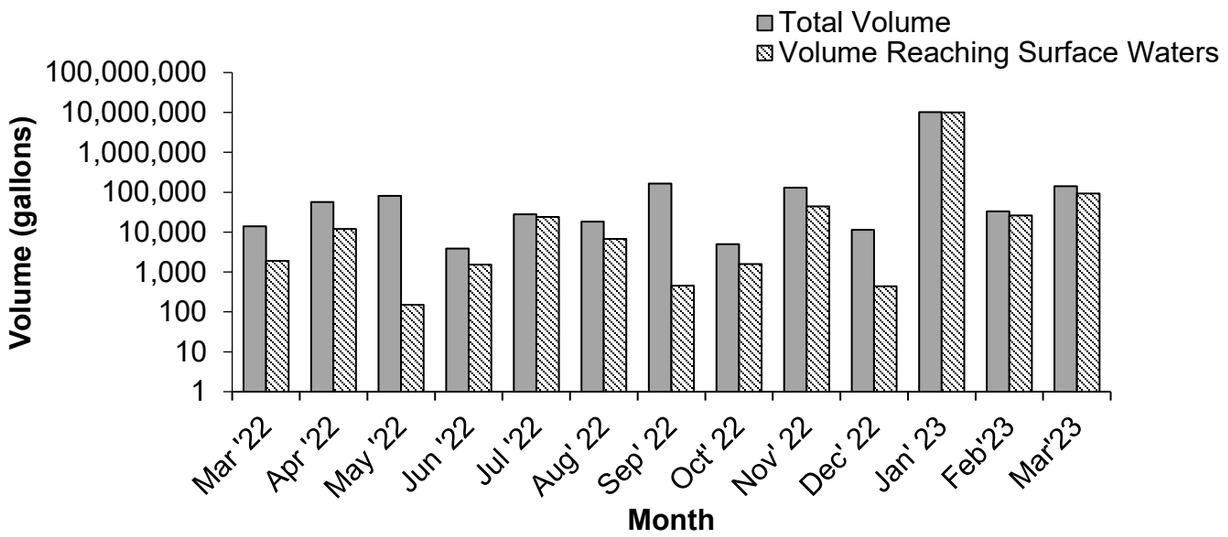


Figure 2: The volume of sanitary sewer overflows (SSOs) from public agencies per month from March 2022 through March 2023. Note the logarithmic scale on the vertical axis showing the wide variation in spill volumes.

Figure 3: Volume of Federal SSOs per Month

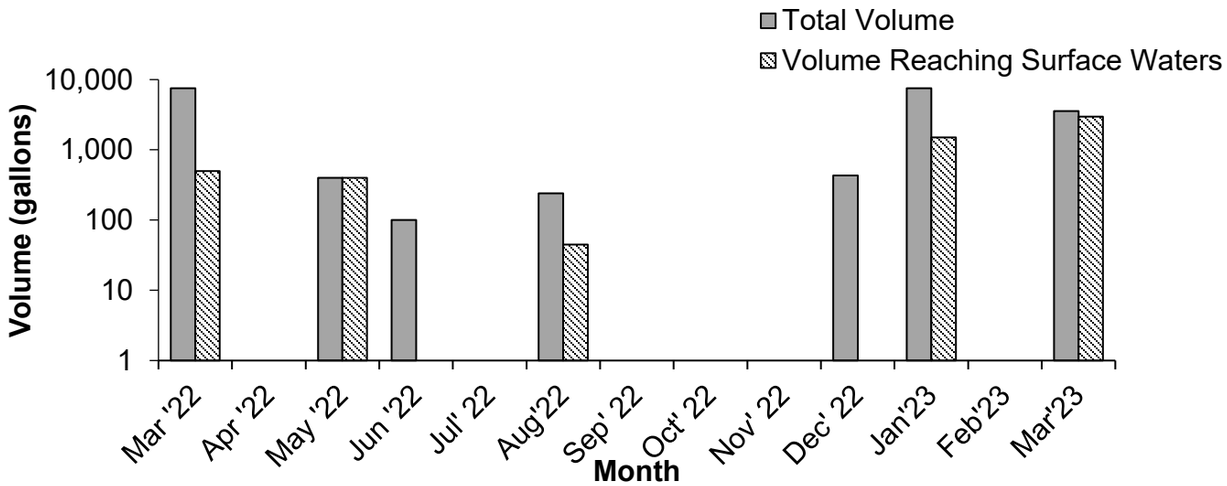


Figure 3: The volume of SSOs from federal agencies per month from March 2022 through March 2023. Note the logarithmic scale on the vertical axis showing the wide variation in spill volumes.

Figure 4: Volume of PLSDs per Month

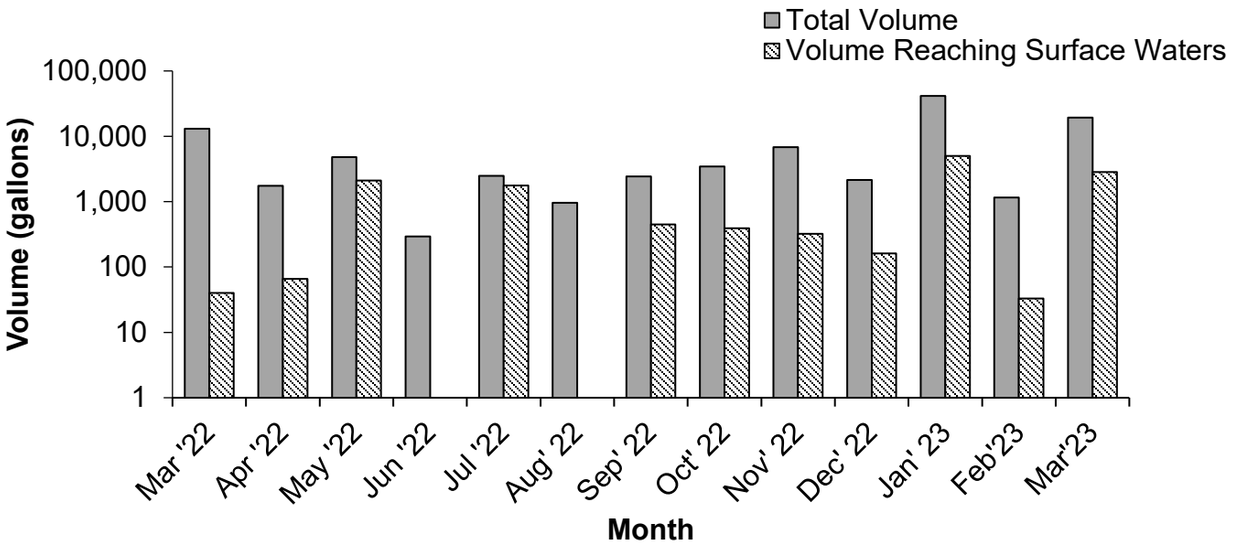


Figure 4: The volume of private lateral sewage discharges (PLSDs) per month from March 2022 through March 2023. Note the logarithmic scale on the vertical axis showing the wide variation in spill volumes.

Table 1: March 2023– Summary of Transboundary Flows from Mexico by Event[1]

Location	Transboundary Flow Start Date	Transboundary Flow End Date	Weather Condition[2]	Total Volume (Billion Gallons)[3]	Total Volume Recovered (Million Gallons)[3]	Total Volume Reaching Surface Waters (Billion Gallons)[3]	Additional Details Reported By USIBWC
Tijuana River Main Channel	12/28/2022	3/31/2023 (Ongoing)	Wet	30	0	30	Rain Event
Goat Canyon	3/4/2023	3/9/2023	Dry	4.2 (million gallons)	0	4.2 (million gallons)	Canyon collector taken out of service due to sediment clogged collector box and piping. Significant rain in 2023 included sediment from Mexico which overwhelmed the canyon collector.
South Bay International Wastewater Treatment Plant	3/21/2023	3/21/2023	Dry	1,000 (gallons)	0	1,000 (gallons)	Spill at the South Bay Ocean Outfall Anti-Intrusion Structure from overflow at the air assembly on top of the SBOO drop shaft was the result of excess flow into the SBOO pipeline exceeding the SBOO discharge capacity. This excess flow backed up within the SBOO piping to the anti-intrusion structure and the point of overflow and spill.

[1] Transboundary flow volumes are obtained from self-monitoring reports submitted by USIBWC pursuant to Order No. R9-2021-0001.

[2] Order No. R9-2021-0001 defines wet weather as the period of time when a storm event produces 0.1 inches or greater within a 24-hour period plus 72 hours after, based on the Goat Canyon Pump Station rain gauge. USIBWC reported that there was precipitation of 5.79 inches as recorded at Marron Valley in February 2023. The rain gauges at Goats Canyon and Smugglers Gulch were not operable and are scheduled for maintenance and repair.

[3] Total transboundary flow volume, total volume recovered, and total volume reaching surface waters is an estimate provided by USIBWC.

Table 2: March 2023- Summary of Transboundary Flows from Mexico[1]

Location	Month/Year	Number of Transboundary Flows	Total Volume (Million Gallons)	Total Volume Recovered (Gallons)	Total Volume Reaching Surface Waters (Million Gallons)
Tijuana River Main Channel	March 2023	0	0	0	0
Canyon Collectors	March 2023	1	4.2	0	4.2
South Bay International Wastewater Treatment Plant	March 2023	1	0.001	0	0.001
All Locations	**March 2023**	**2**	**4.2**	**0**	**4.2**

[1] For transboundary flows that start and end in different months, Table 2 includes the transboundary flow in the month the transboundary flow started. For March, there are only two flows because the 12/28/2022 event started in December 2022.

Figure 1: Number of Transboundary Flows

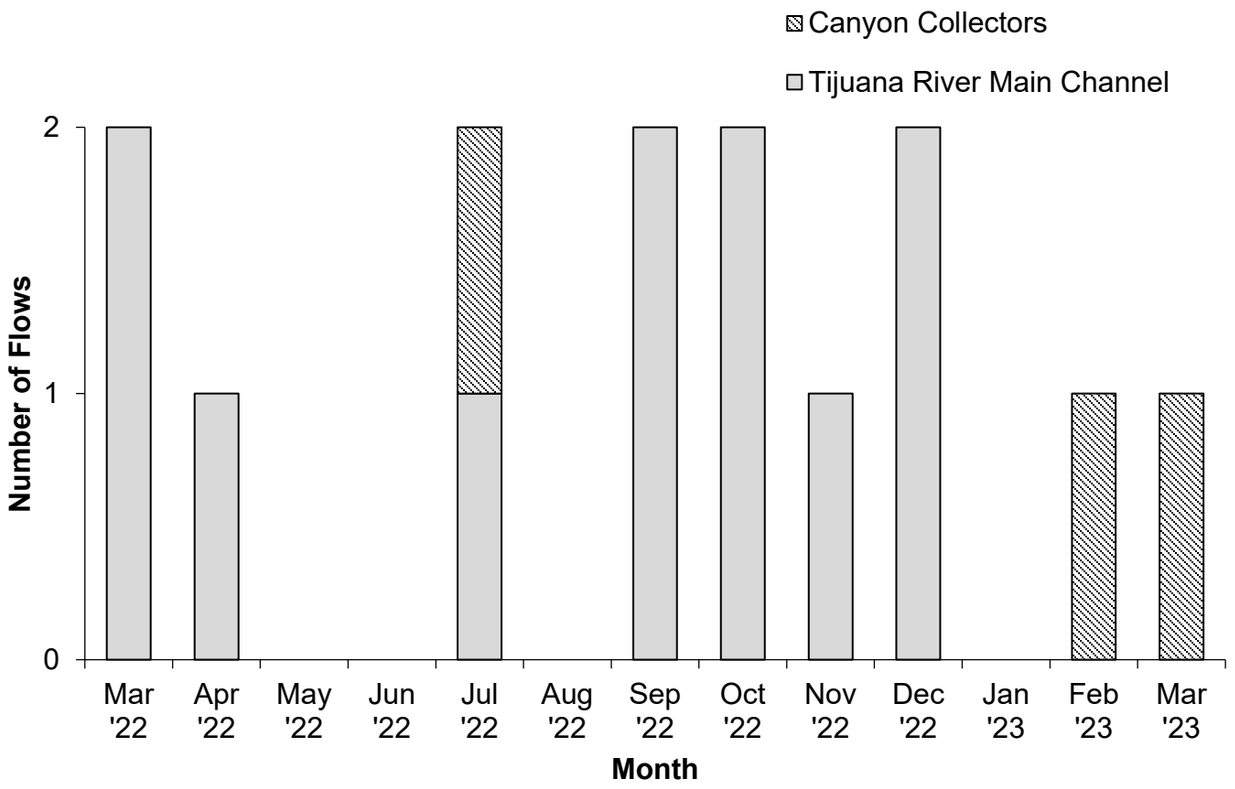


Figure 1: Number of reported transboundary flows per month from March 2022 through March 2023 at the canyon collector systems and the Tijuana River main channel. For transboundary flows that start and end in different months, the figure includes the transboundary flow in month the transboundary flow started. For example, flows in January through March 2023 that started in December 2022 are only shown in December 2022.

Figure 2: Tijuana River Transboundary Flow Volume

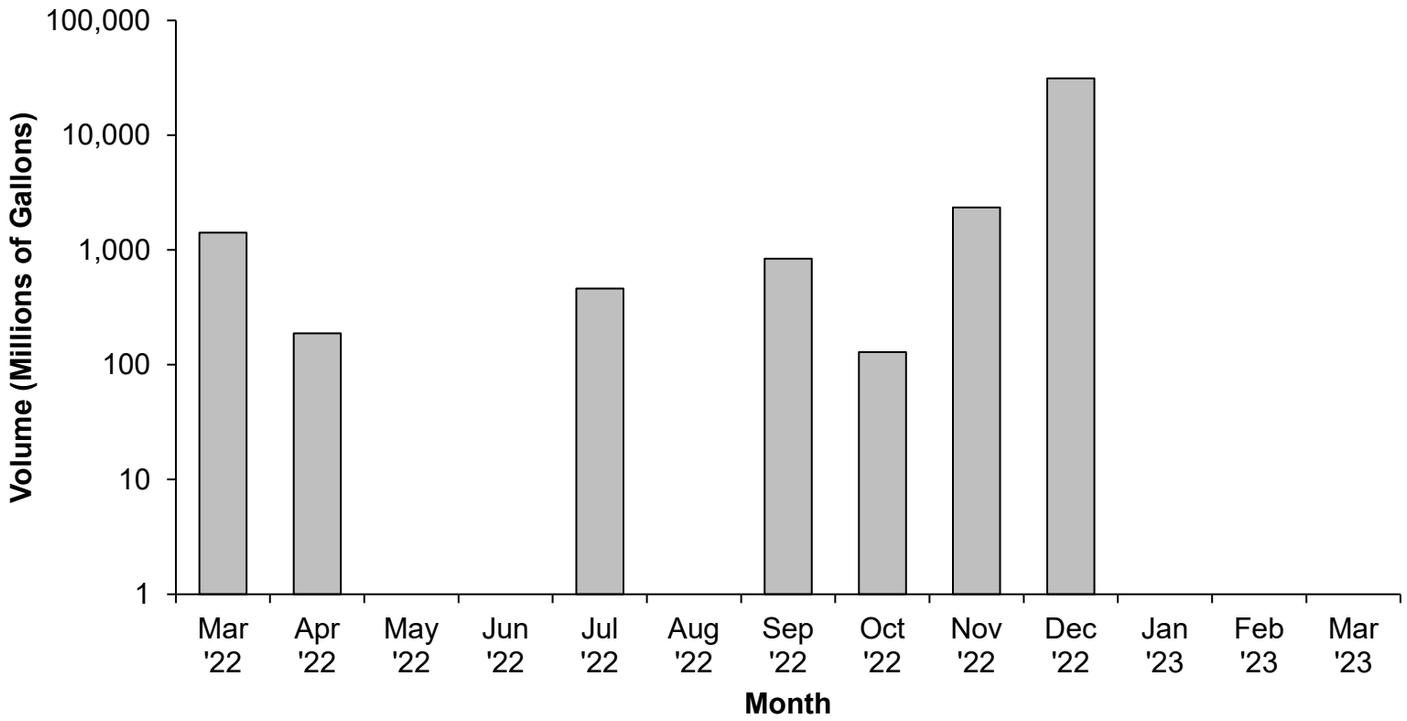


Figure 2: Volume of reported transboundary flows per month from March 2022 through March 2023 at the Tijuana River main channel. For transboundary flows that start and end in different months, the figure includes the total volume of the transboundary flow in the month the transboundary flow started. For example, flows in January through March 2023 that started in December 2022 are only shown in December 2022. Note the logarithmic scale on the vertical axis to accommodate the variation in transboundary flow volumes.

Figure 3: Canyon Collector Transboundary Flow Volume

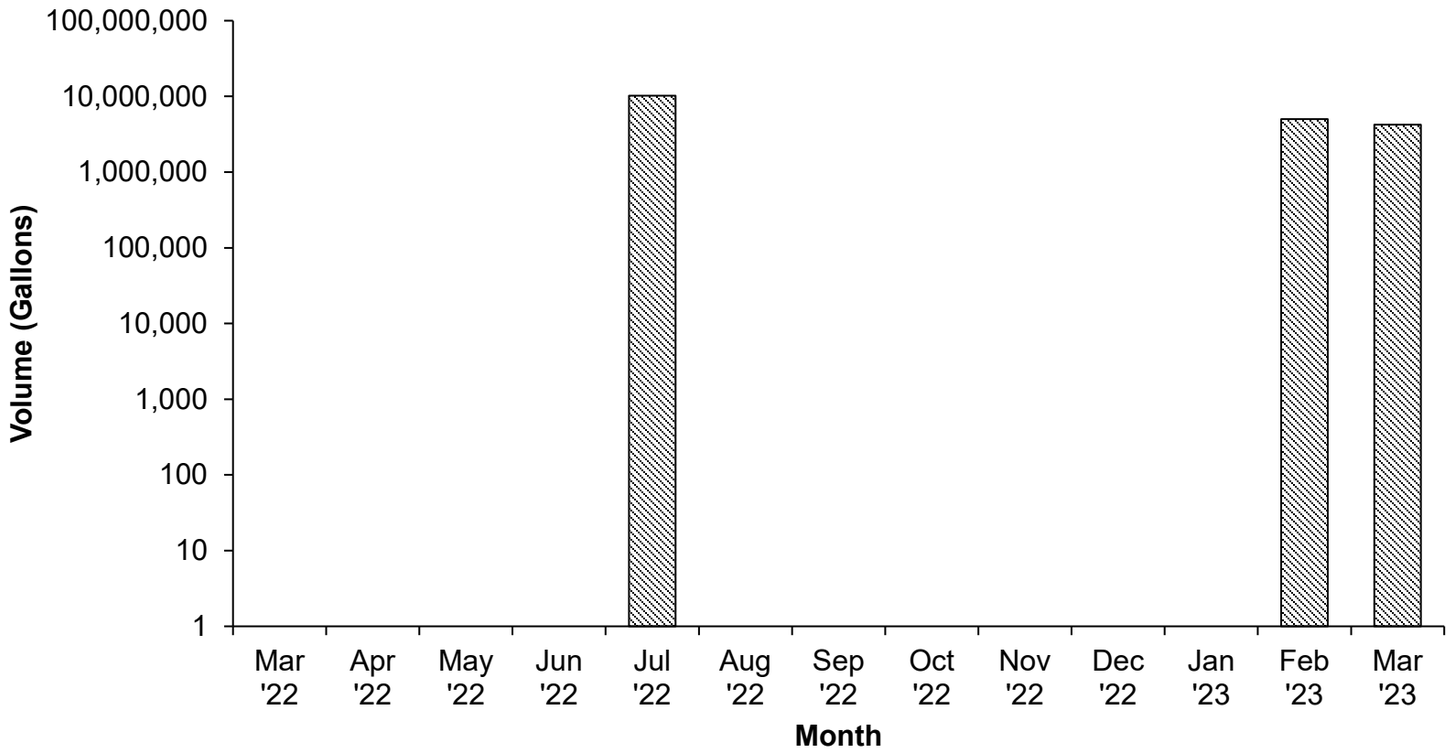


Figure 3: Volume of reported transboundary flows per month from March 2022 through March 2023 at the canyon collector systems. Note the logarithmic scale on the vertical axis to accommodate variation in transboundary flow volumes.