APPENDIX F

NMFS BIOLOGICAL ASSESSMENT

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

July 22, 2022

Dan Lawson
Long Beach Office Branch Chief (Acting)
Protected Resources Division
National Marine Fisheries Service, West Coast Region
National Oceanic and Atmospheric Administration

Re: Request to Initiate Formal Consultation under Endangered Species Act Section 7 for the United States-Mexico-Canada Agreement (USMCA) Mitigation of Contaminated Transboundary Flows Project (Alternative 1)

Dear Dan Lawson:

The United States Environmental Protection Agency, Region 9 (EPA) would like to request the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS) review of the enclosed Biological Assessment (BA). EPA is submitting this request to initiate formal consultation pursuant to 50 CFR § 402.14, and requests NMFS's review of and finding of sufficiency for the enclosed BA under Section 7 of the Endangered Species Act (ESA). The proposed Federal Action is the implementation of Alternative 1 of the United States-Mexico-Canada Agreement (USMCA) Mitigation of Contaminated Transboundary Flows Project, as described below and in the BA. EPA has determined that implementation of the proposed Federal Action is "likely to result in adverse effects" to listed species identified as having medium to high potential to occur within the proposed Federal Action's Action Area and "may affect, but is not likely to adversely affect" all other listed species that are unlikely to occur or have a low likelihood to occur in the Action Area. EPA will submit a separate Essential Fish Habitat (EFH) Assessment for consultation under the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

In January 2020, Congress passed the USMCA Implementation Act, which appropriated funds to EPA for implementation of wastewater infrastructure projects at the U.S.-Mexico border and authorized EPA to plan, design, and construct wastewater treatment projects in the Tijuana River area. These projects aim to reduce transboundary flows that cause adverse public health and environmental impacts in the Tijuana River watershed and adjacent coastal areas. In accordance with the requirements of the National Environmental Policy Act, EPA has developed a Draft Programmatic Environmental Impact Statement (PEIS) to support an informed decision-making process that considers and reviews the environmental impacts of reasonable alternatives to meet the purpose and need of the USMCA goals.

EPA has identified two alternatives that it has evaluated in its Draft PEIS: a limited funding approach for implementation (Alternative 1) and a more comprehensive solution (Alternative 2) that would warrant additional funding. EPA has not yet identified a preferred alternative; however, EPA has completed a BA evaluating potential effects to federally listed threatened and endangered species for the activities associated with Alternative 1, which includes four Core Projects. If implemented, and as described in the Draft PEIS, most activities under the Core Projects would be located within the U.S. in the Tijuana River Valley in San Diego, California. Though Alternative 1 also includes actions in Mexico, the BA does not include analysis for international activities occurring in Mexico except when transboundary flows could be affected. Further details regarding the USMCA Mitigation of Contaminated Transboundary Flows Project are provided in the Draft PEIS, which was made available for public review on June 17, 2022.[1]

On May 5, 2022, EPA submitted to NMFS a preliminary draft combined BA and EFH Assessment report and solicited feedback regarding whether EPA should move forward with requesting official review pursuant to ESA Section 7 and the MSA. On May 25, 2022, EPA submitted to NMFS a draft BA and EFH report for review with a request to initiate informal consultation (see Appendix E of the Draft PEIS). On May 27, 2022, NMFS provided comments on the May 5, 2022 preliminary draft BA and EFH report and requested that EPA make appropriate revisions before resubmitting the BA and EFH Assessment to initiate consultation pursuant to ESA Section 7 and the MSA. Since receiving the comments from NMFS on the preliminary draft, EPA decided to separate the BA and EFH Assessments into their own distinct reports, rather than a combined report. The enclosed BA incorporates revisions intended to address NMFS's ESA Section 7 consultation-specific comments on the May 5, 2022 preliminary draft BA.

EPA's evaluation of the ESA-listed and candidate species with potential to occur in the Action Area and potential effects associated with the construction and operations of Alternative 1 are detailed in the enclosed BA. The analysis in the BA supports the determinations that the proposed Federal Action "may affect, and is likely to adversely affect" listed species identified as having medium to high potential to occur in the Action Area, and "may affect, but is not likely to adversely affect" all other listed species that are unlikely to occur or have a low likelihood to occur in the Action Area. Table 1 below summarizes effects determinations for ESA-listed species that may occur in the Action Area.

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[1] The Draft PEIS and appendices are available on EPA's website at https://www.epa.gov/sustainable-water-infrastructure/usmca-draft-programmatic-environmental-impact-statement.

Table 1. Summary of EPA's Effects Determination by ESA-listed Species for Construction and Operation.

Species and Management Unit (DPS)	Scientific Name	Status	Effects from Construction	Effects from Operation
Marine Mammals				
Blue whale	*Balaenoptera musculus*	FE	NLAA	LAA
Humpback whale (Central America DPS)	*Megaptera novaeangliae*	FE	NLAA	LAA
Humpback whale (Mexico DPS)		FT	NLAA	LAA
Fin whale	*Balaenoptera physalus*	FE	NLAA	LAA
Gray whale (Western North Pacific DPS)	*Eschrichtius robustus*	FE	NLAA	LAA
Guadalupe fur seal	*Arctocephalus townsendi*	FT	NLAA	LAA
Sperm whale	*Physeter macrocephalus*	FE	NLAA	NLAA
Sei whale	*Balaenoptera borealis*	FE	NLAA	NLAA
North Pacific right whale	*Eubalaena japonica*	FE	NLAA	NLAA
Sea Turtles				
Green sea turtle (East Pacific DPS)	*Chelonia mydas*	FT	NLAA	LAA
Leatherback sea turtle	*Dermochelys coriacea*	FE	NLAA	LAA
Loggerhead turtle (North Pacific DPS)	*Caretta caretta*	FE	NLAA	LAA
Pacific olive ridley turtle (Mexico Pacific breeding population DPS)	*Lepidochelys olivacea*	FE	NLAA	NLAA
Pacific olive ridley turtle (Remaining range)		FT	NLAA	NLAA
Marine Invertebrates				
White abalone	*Haliotus sorenseni*	FE	NLAA	LAA
Sunflower sea star	*Pycnopodia helianthoides*	FPL	NLAA	LAA
Black abalone	*Haliotus crachoredii*	FE	NLAA	NLAA
Fishes				
Shortfin mako or bonito shark	*Isurus oxyrinchus*	FPL	NLAA	LAA
Gulf grouper	*Mycteroperca jordani*	FE	NLAA	NLAA
Giant manta ray	*Manta birostris*	FT	NLAA	NLAA
Scalloped hammerhead shark	*Sphyrna lewini*	FE	NLAA	NLAA
Oceanic whitetip shark	*Carcharhinus longimanus*	FT	NLAA	NLAA
Steelhead (Southern California DPS)	*Oncorhynchus mykiss irideus*	FE	NLAA	NLAA
Green sturgeon (Southern DPS)	*Acipenser medirostris*	FT	NLAA	NLAA

Abbreviations: FE = federally endangered; FT = federally threatened; FPL = petitioned for federal listing; LAA = likely to adversely affect; NLAA = not likely to adversely affect.

We are hereby requesting to initiate formal consultation with NMFS pursuant to 50 CFR § 402.14 and request NMFS's review of and finding of sufficiency for the enclosed BA followed by NMFS development and issuance of a Biological Opinion for the proposed Federal Action. If you have questions or need additional information, please contact me (415-947-4187, lee.lily@epa.gov) or Mimi Soo-Hoo of my staff (415-972-3500, soo-hoo.mimi@epa.gov).

Sincerely,

LILY LEE
Digitally signed by LILY LEE
Date: 2022.07.22 16:52:45
-07'00'

Lily Lee
Manager, Infrastructure Section

Enclosures (1):

1. *Biological Assessment, USMCA Mitigation of Contaminated Transboundary Flows Project,* prepared by Tenera Environmental, Inc. under subcontract to Eastern Research Group, Inc. (July 22, 2022)

cc: (with enclosures)

Chi Mori
Joe Dillon
Bryant Chesney
Susan Wang

Biological Assessment

USMCA Mitigation of Contaminated Transboundary Flows Project

Prepared for:

United States Environmental Protection Agency
Office of Wastewater Management
1200 Pennsylvania Avenue, NW
Washington DC 20460

Prepared by:

Eastern Research Group, Inc.

Tenera Environmental, Inc.

22 July 2022

Work Performed Under EPA Contract No. 68HERH19D0033
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ABBREVIATIONS, ACRONYMS, AND SYMBOLS

ACS/LA	American Cetacean Society Los Angeles Chapter
ADCP	acoustic doppler current meter
APTP	advanced primary treatment plant
BA	Biological Assessment
BIAs	Biologically Important Areas
BOD	biochemical oxygen demand
BWIP	Border Water Infrastructure Program
CA-OR-WA	California-Oregon-Washington
CALCOFI	California Cooperative Oceanic Fisheries Investigations
CBD	Center for Biological Diversity
CDOM	colored dissolved organic matter
CEC	Contaminant of Emerging Concern
CFR	Code of Federal Regulations
CILA	Comisión International de Limites y Aguas
cm	centimeter(s)
COAWST	Coupled Ocean-Atmosphere-Wave-Sediment-Transport
CoSD	City of San Diego
CTD	conductivity-temperature-depth
DDT	dichloro-diphenyl-trichloroethane
DO	dissolved oxygen
DPS	Distinct Population Segment
EDC	endocrine-disrupting chemical
EFH	Essential Fish Habitat
EID	Environmental Information Document
ENP	Eastern North Pacific
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
FIB	fecal indicator bacteria
FR	Federal Register
ft	feet
HAB	harmful algal blooms
HdC	Hotel del Coronado
IEDC	industrial endocrine-disrupting compound
ITP	South Bay International Wastewater Treatment Plant
IUCN	International Union for Conservation of Nature
km	kilometer(s)
m	meter(s)
MGD	million gallons per day
MMPA	Marine Mammal Protection Act
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NEPA	National Environmental Policy Act
nm	nautical mile(s)
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPFW	North Pacific Fin Whale
OB	Optical Brightener
OOR	out-of-range

(Continued)

PAH	polycyclic aromatic hydrocarbon
PB1-A	Pump Station 1A
PB-CILA	Planta de Bombeo CILA
PBDE	polybrominated diphenyl ether
PCB	polychlorinated biphenyls
PEIS	Programmatic Environmental Impact Statement
PLOO	Point Loma Ocean Outfall
POP	persistent organic pollutant
PPCP	pharmaceutical and personal care product
PSP	paralytic shellfish poisoning
PTMP	Plume Tracking Monitoring Plan
REMUS	Remote Environmental Monitoring UnitS
ROTV	remotely operated towed vehicle
ROV	remotely operated vehicle
RTOM	real-time oceanographic mooring system
SAB	San Antonio de los Buenos
SABTP	San Antonio de los Buenos Wastewater Treatment Plant
SBLO	South Bay Land Outfall
SBOO	South Bay Ocean Outfall
SBWRP	South Bay Water Reclamation Plant
SCB	Southern California Bight
SD RSMP	San Diego Regional Sediment Management Plan
TBT	tributyltin
TCDD	tetrachlorodibenzodioxin
TCEP	tris(chloroethyl) phosphate
TCPP	tris(chloropropyl) phosphate
TDCPP	tris(1,3-dichloro-2-propyl) phosphate
TJRE	Tijuana River Estuary
TSS	total suspended solids
UME	Unusual Mortality Event
U.S.	United States
USFWS	United States Fish and Wildlife Service
USIBWC	United States International Boundary and Water Commission
USMCA	United States–Mexico–Canada Agreement
WNP	Western North Pacific
WWTP	wastewater treatment plant
ZID	zone of initial dilution

1. BACKGROUND

1.1 Project Background and Overview

Transboundary flows of untreated wastewater (sewage), trash, and sediment routinely enter the United States (U.S.) from Mexico via the Tijuana River, its tributaries, and across the maritime boundary along the San Diego County coast. Transboundary flows crossing into the U.S. from Mexico have raised water quality and human health concerns since at least the 1930s. These transboundary flows impact public health and the environment and have been linked to beach closures along the San Diego County coast.

In January 2020, Congress passed the U.S.–Mexico–Canada Agreement (USMCA) Implementation Act, which appropriated $300 million to the U.S. Environmental Protection Agency (EPA) under Title IX of the Act for architectural, engineering, planning, design, construction, and related activities in connection with the construction of high-priority wastewater facilities in the U.S.-Mexico border area. Subtitle B, Section 821 of the Act authorized EPA to plan, design, and construct wastewater (including stormwater) treatment projects in the Tijuana River area.

EPA established the Eligible Public Entities Coordinating Group, consisting of federal, state, and local stakeholders, and solicited their input on the set of project options to be considered for evaluation in a Programmatic Environmental Impact Statement (PEIS) consistent with requirements of the National Environmental Policy Act (NEPA). EPA and the U.S. Section of the International Boundary and Water Commission (USIBWC) are joint lead agencies, in accordance with 40 Code of Federal Regulations (CFR) 1501.7, for preparation of the PEIS. EPA and USIBWC have identified three alternatives for evaluation in the PEIS: no disbursement of funding and continuation of current wastewater management practices (No-Action Alternative), a limited funding approach for implementing the Proposed Action (Alternative 1), and a more comprehensive solution for implementing the Proposed Action (Alternative 2). Full implementation of Alternative 1 identified in the PEIS is the proposed Federal Action and the subject of this Biological Assessment (BA) report.

Further details are provided in Section 1.6 (Proposed Federal Action) below and in the Draft PEIS, which was made available for public review on June 17, 2022.[1]

1.2 Consultation History

On February 26, 2021, members of the EPA-led NEPA planning team provided a joint presentation to the National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS) that included information on the planning effort underway as part of the USMCA Mitigation of Contaminated Transboundary Flows Project. At this point in the project cycle, the EPA-led team had developed 10 project alternatives that were under consideration in an Environmental Information Document (EID).

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[1] The Draft PEIS and appendices are available on EPA's website at https://www.epa.gov/sustainable-water-infrastructure/usmca-draft-programmatic-environmental-impact-statement.

On July 7, 2021, once the draft EID was near completion, the NEPA planning team gave a second presentation to NMFS that provided an update on three tentative project alternatives that would be brought forward to the PEIS.

On August 4, 2021, the NEPA planning team provided a technical memorandum to NMFS. The technical memorandum intended to further facilitate early discussions between the EPA and NMFS in relation to marine wildlife listed under the Endangered Species Act (ESA) and Essential Fish Habitat (EFH) that may be affected by the project. The technical memorandum described the Action Area that could be affected based on the proposed suite of project options under consideration for evaluation in the NEPA process. The memorandum also contained a list of species that the EPA had determined could occur within this Action Area, although the memorandum did not determine if those species were likely to be adversely affected by any of the projects under consideration at that time. In addition to the species list, a table of key references, primarily related to management milestones for ESA-listed species, was also provided. These references were compiled in order to inform the basis of a comprehensive summary of life history information and current management status under the ESA in the BA. Lastly, the technical memorandum included a discussion of potential EFH in the Action Area identified during the development of the EID. EPA requested feedback from NMFS on the species list, EFH resources considered, and references table in the technical memorandum.

On August 25, 2021, NMFS provided an email response with comments relating to the technical memorandum. In addition to a correction on the name of the Western North Pacific (WNP) Distinct Population Segment (DPS) for gray whale, NMFS provided information on two candidate species not included in the technical memorandum—specifically, the shortfin mako shark and the sunflower sea star, noting that both of these species may occur in the Action Area and so should be included in the species list. NMFS also advised that impacts to species protected under the Marine Mammal Protection Act (MMPA) should also be considered. These include all marine mammals, which are managed according to MMPA stocks. While several species listed under the ESA are also protected under the MMPA, the respective management units may differ. Subsequently, marine mammals protected under the MMPA, including ESA-listed and candidate marine mammals, are considered in the PEIS. Lastly, NMFS pointed to an updated status review for Guadalupe fur seal and a new NOAA website hosting information on Biologically Important Areas (BIAs) for cetaceans. Some of these BIAs occur close to, or may overlap, the Action Area described in the memo and should be considered in any future assessment.

Since these discussions, EPA completed the Alternative Analysis which identified the Alternatives 1 and 2 considered in the Draft PEIS. The consultation with NMFS includes only Alternative 1 (i.e., the Core Projects). ESA compliance for Supplemental Projects would be conducted at the time of the subsequent tiered NEPA analyses for those projects.

On May 5, 2022, EPA submitted to NMFS a preliminary draft combined BA and EFH Assessment report and solicited feedback regarding whether EPA should move forward with requesting official review pursuant to ESA Section 7 and the Magnuson-Stevens Fishery Conservation and Management Act (MSA). On May 25, 2022, EPA submitted to NMFS a draft BA and EFH Assessment report for review with a request to initiate informal consultation (see Appendix E of the Draft PEIS). On May 27, 2022, NMFS provided comments on the May 5, 2022 preliminary draft BA and EFH Assessment report and requested that EPA make appropriate revisions before submitting the BA and EFH Assessment to initiate consultation pursuant to ESA Section 7 and the MSA. Since receiving the comments from NMFS on the preliminary draft, EPA decided to separate the BA and EFH Assessments into their own distinct reports, rather than a combined report. This BA incorporates revisions intended to address NMFS's ESA Section 7 consultation-specific comments on the May 5, 2022 preliminary draft BA and now reflects changes in the effects determinations for several ESA-listed species as summarized in Section 4.4 (Summary Conclusions).

The following BA describes the potential for adverse effects to species listed under the ESA due to full implementation of Alternative 1 of the Proposed Action in the NEPA PEIS (the proposed Federal Action).

1.3 Transboundary Flows

Transboundary flows consist of untreated wastewater, trash, and sediment that enters the U.S. via the Tijuana River, via tributaries that flow north through canyons to the Tijuana River Valley and Estuary, and via coastal waters of the Pacific Ocean. These polluting transboundary flows are due to deficiencies in the treatment, piping, and pump station network in Tijuana.

1.3.1 Tijuana River Transboundary Flows

The Tijuana River originates in Mexico and flows northwest, crossing into the U.S. before ultimately discharging to the Pacific Ocean via the Tijuana River Estuary (TJRE).

In the U.S., flows in the Tijuana River mainly occur during the rainy season, which begins as early as October and ends as late as April. During this period, intermittent but very large flows occur following storm events that typically result in a surge of peak flow that flushes through the estuary and out to the ocean, followed by days with sustained and subsiding flow. Based on USIBWC flow gage data collected just downstream of the U.S.-Mexico border since 2000, an average wet season features approximately 96 days with river flows (i.e., approximately 53 percent of wet-season days have flows) and approximately 9,000 million gallons (MG) of total flow over the course of the season. However, flows fluctuate greatly from season to season, with wet-season flows since 2000 ranging from less than 1,000 MG to greater than 25,000 MG. The two-, five-, and 10-year flood events are estimated to have peak flows of approximately 1,300; 5,400; and 11,000 cubic feet per second, respectively (PG Environmental, 2022).

However, for most of the year, conditions in the Tijuana River in the U.S. are characterized by prolonged dry periods of very low to zero surface water flows—particularly during the dry season commonly defined as spanning from Memorial Day to Labor Day. A typical dry season features fewer than 10 days with river flows (i.e., less than 10 percent of dry-season days have flows) and less than 100 MG of total flow over the course of the season. However, failures of the river diversion system in Tijuana (described below) can result in extended periods of flow, such as in 2020 when transboundary river flows occurred on nearly every day of the dry season.

The Planta de Bombeo (PB)-Comisión International de Limites y Aguas (CILA) diversion system was designed and built in the 1990s to divert river water from the Tijuana River during low-flow conditions—typically "dry-weather flows"[2]—before the river crossed the border into the U.S. PB-CILA is designed to divert river water into the Tijuana sewer system. However, malfunctions of the PB-CILA diversion system currently result in dry-weather transboundary river flows. When PB-

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[2] The term "dry-weather flow" does not have a standard definition but generally refers to flows that persist following a period of several days with minimal to no precipitation. These flows can occur at any time of year, not just during the dry season.

CILA is unable to divert dry-weather flows from the river to the distribution and treatment network as intended, between 20 to 30 million gallons per day (MGD) crosses into the U.S. via the Tijuana River. These river transboundary flows are estimated to consist of approximately 10 MGD of treated effluent from La Morita wastewater treatment plant (WWTP) and Arturo Herrera WWTP and 4 to 5 MGD of flows from the Alamar River. The remainder consists of untreated wastewater and "urban drool" (i.e., unnatural, unpermitted, non-exempted dry-weather flows) that escapes the Tijuana metropolitan area wastewater collection system and flows into the Tijuana River, primarily because of sewer system deterioration and pump station mechanical failures (PG Environmental, 2021). This includes sanitary wastewater generated by unsewered communities whose wastewater flows directly into the river.

1.3.2 Canyon Transboundary Flows

Two major canyons and several minor canyon and drainage features drain from Mexico to the U.S. The westerly major canyon is referred to as Goat Canyon in the U.S. and Los Laureles Canyon in Mexico. The second major canyon lies to the east of Goat Canyon/Los Laureles Canyon. This is referred to as Smuggler's Gulch in the U.S. and Matadero Canyon in Mexico. In addition to these two canyons, several other drainages that cross the border from Mexico deliver transboundary flows to the U.S. These include Stewart's Drain, Silva Drain, and Cañón del Sol.

Smuggler's Gulch/Matadero Canyon has a subwatershed area of 3,762 acres, including the portions in Mexico (HDR, 2020a). The ephemeral wash system that flows through Smuggler's Gulch collects stormwater and wastewater flows from parts of the City of Tijuana and receives drainage from the surrounding mesas. The canyon flow diversion structure intercepts dry-weather transboundary flows and conveys them to the South Bay International Wastewater Treatment Plant (ITP). During wet-weather flow conditions, the pump diversion is turned off and transboundary flows continue north through a natural channel and a culvert under Monument Road instead, ultimately discharging into the Tijuana River pilot channel.

Goat Canyon is located to the west of Smuggler's Gulch and is referred to as Los Laureles Canyon south of the U.S.-Mexico border. It has a subwatershed area of 2,941 acres, including the portions in Mexico, and is formed from Goat Canyon Creek, which is fed predominantly by runoff and other water sources in Mexico. The canyon flow diversion structure intercepts dry-weather transboundary flows and conveys them to the ITP. Wet-weather flows bypass the diversion structure and continue northwest into two sediment basins, which capture sediment and trash and are also intended to reduce flooding in downstream areas, including Monument Road (HDR, 2020). Outflow from the sediment basins enters the TJRE. In Goat Canyon, transboundary wastewater flows during dry weather have increased in the last two years, possibly due to increased leaks from the wastewater collection system in Los Laureles Canyon in Tijuana.

Transboundary flows through Goat and Smuggler's Gulch canyons include runoff and sediment from overdeveloped, unpaved areas in the canyons south of the border. Trash from residential areas is also washed through the canyons across the border along with stormwater runoff. Flows can also include untreated wastewater due to breaks or leaks in the Tijuana sewer system and wastewater from "disconnected" facilities that drain directly into the canyons.

1.3.3 Coastal Ocean Transboundary Flows

In addition to the wastewater crossing the border via the Tijuana River and adjacent canyons, approximately 35.5 MGD of mixed Tijuana River water and untreated wastewater is collected from Tijuana and transferred via a network of collector pipes and pump stations to San Antonio de los

Buenos (SAB) Creek, either directly or after passing through the San Antonio de los Buenos Wastewater Treatment Plant (SABTP). Current operations at the SABTP do not effectively improve water quality prior to discharge. SAB Creek, including this wastewater, discharges directly to the Pacific Ocean at Punta Bandera. Approximately 28.2 MGD of this effluent is untreated wastewater. The remainder (7.3 MGD) is diverted Tijuana River water that includes the Arturo Herrera WWTP effluent, the La Morita WWTP effluent, and river water from the Alamar River. Seasonal marine currents cause these coastal discharges of largely untreated wastewater (sewage) to migrate north along the Pacific Ocean coast into U.S. coastal waters.

1.4 Existing Facilities and Operation

Wastewater from the Tijuana region is collected and treated at three WWTPs in Mexico. Two of these facilities, the La Morita and Arturo Herrera WWTPs, discharge treated effluent, with reportedly high water quality (BOD_5[3] concentration under 10 mg/L) (IBWC, 2020), into the Tijuana River. The design capacities for these plants are 5.8 MGD and 10.5 MGD, respectively. The third facility, the SABTP, has a design capacity of 25 MGD and discharges effluent into the Pacific Ocean via SAB Creek. SAB Creek is located 9.9 kilometers (km) downcoast of the international border. Current operations at the SABTP do not effectively improve water quality prior to discharge.

The ITP is a U.S.-based facility that treats wastewater from Tijuana. The ITP is designed to treat an average daily flow of 25 MGD of wastewater from Mexico. However, when certain infrastructure failures occur in Mexico, the ITP may receive (and treat) flows that exceed the plant's design average daily flow capacity of 25 MGD. The existing plant is a primary and secondary treatment system, and effluent from the plant is discharged to the Pacific Ocean via the South Bay Ocean Outfall (SBOO). The ITP is owned by USIBWC, operated by a contract operator (Veolia), and regulated under the National Pollutant Discharge Elimination System (NPDES) Permit #CA 0108928.

Wastewater from Mexico arrives at the ITP from two sources. It is collected in Mexico and transferred across the international border to the ITP by the International Collector and from a canyon collector system located in the U.S. close to the international border.

The International Collector consists of about 1.5 miles of 72-inch reinforced concrete pipe with a design flow capacity of about 103 MGD. A diversion box directs about 25 MGD of wastewater from the International Collector to the ITP and the remainder of the wastewater is sent to the SABTP. The International Collector receives wastewater from two sources; untreated wastewater from downtown Tijuana and the portion of diverted Tijuana River water from PB-CILA that is not sent to Pump Station 1A (PB1-A).

The PB-CILA pump station is located along the Tijuana River channel just south of the U.S.-Mexico border and is owned and operated by CILA. When the PB-CILA river diversion system is functioning properly, all dry-weather flow (up to 23 MGD) in the Tijuana River is diverted before transboundary flows occur. The diverted flow is routed to PB1-A or into the International Collector. The PB-CILA river diversion system was upgraded in 2021 with a new river intake, new bar

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[3] BOD_5, the biochemical oxygen demand (BOD) of microorganisms over a five-day period, is an indicator of the amount of organic pollution in wastewater.

screens, a new vortex desander, and new pumps to improve reliability and provide the capability to divert up to 35 MGD of river flows.

The canyon collector system in the U.S. collects wastewater during dry-weather periods from five canyon flow diversion structures[4]. The total average design flow rate from all five structures is 9.67 MGD (Arcadis, 2019). However, actual flows from the canyon collector system to the ITP average approximately 0.6 MGD (PG Environmental, 2021). This wastewater is conveyed through pipelines to the ITP. If flows exceed the capacity of the canyon collectors, they are not diverted for treatment anywhere and instead flow untreated to the north towards the Tijuana River Valley to be discharged into the Tijuana River and ultimately the Pacific Ocean.

During wet-weather, flows through Goat Canyon and Smugglers Gulch flow past the canyon diversion structures, eventually entering the Tijuana River and/or Estuary. Wet-weather flows from Cañón del Sol are conveyed to the Tijuana River via underground piping with an outfall located immediately northwest of the ITP. Wet-weather flows from Silva Drain flow overland into Stewart's Drain, which discharges to the Tijuana River immediately east of the ITP.

In Mexico, canyon pump stations include the Matadero Pump Station in Matadero Canyon (i.e., the portion of Smuggler's Gulch in Mexico) and the Los Laureles 1 and Los Laureles 2 Pump Stations in Los Laureles Canyon (i.e., the portion of Goat Canyon in Mexico). When the pump stations are operating properly, dry-weather wastewater flows in the canyons (other than "disconnected" flows that drain directly into the canyons) are conveyed via the Tijuana sanitary sewer system to the SABTP. The current wastewater flow from these canyon pump stations in Mexico is 6.3 MGD.

A second facility, the South Bay Water Reclamation Plant (SBWRP), also discharges effluent via the SBOO. The SBWRP currently treats wastewater collected from U.S. communities only. It was constructed in 2002 by the City of San Diego (CoSD) on a 22-acre site adjacent to the ITP. The existing SBWRP is designed to treat an average daily flow of 15 MGD and a peak daily flow of 35 MGD. The treatment process consists of preliminary, primary, and secondary treatment for discharged effluent, plus tertiary treatment and disinfection of effluent for beneficial reuse. This facility combines its effluent with the ITP prior to discharge to the Pacific Ocean but is not affected by the Federal Action assessed for this report.

These existing facilities are described in more detail in Section 1.2 of the Draft PEIS.

1.5 South Bay Ocean Outfall

The SBOO is the pipe structure used to discharge treated effluent from the ITP and the SBWRP to the Pacific Ocean. Construction of the South Bay Land Outfall (SBLO) began in 1991 and was finished in 1994. Building the offshore portion of the SBOO commenced during the fourth quarter of 1995 and the onset of ITP effluent discharge from the SBOO was January 13, 1999. The SBWRP went online and began discharging effluent via the SBOO on May 6, 2002.

The main barrel of the pipeline runs offshore (west) and terminates in federal waters approximately 5.5 km offshore. The alignment of the main barrel of the outfall is approximately

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[4] The canyon flow diversion structures along the U.S.-Mexico border consist of culverts, concrete approach pads, and grated intakes that drain to the ITP headworks via subsurface gravity piping. These are also referred to as "canyon collectors" in HDR (2020).

210° - 215° (south-southwest facing), starts at a depth of 71 ft below sea level near the shore and ends approximately 90 ft below mean sea level. The nearshore portion of the main barrel runs approximately 4.1 km offshore as a pipe buried underneath the seafloor, then transitions to a surface-laid portion that runs for an additional 1.4 km to the diffuser wye. The main barrel terminates as a wye diffuser. An engineering drawing depicting the configuration of the SBOO wye diffuser and terminal end of the main barrel is shown in Figure 1-1. The wye diffuser consists of two 'legs' that each contain 82 vertical diffuser risers, with each riser containing four ports, and one additional diffuser riser at the end of the main barrel near the junction with the wye diffuser (165 risers; 660 ports). Each leg is 1,981 ft between the centerline of the wye diffuser where it joins the main barrel and the termination structure of each diffuser leg. The legs are run to the south and northwest, respectively. Each leg of the wye diffuser features a sealed offshore terminus structure designed to provide access to the pipe.

The surface-laid portion of the main barrel and the wye diffuser legs are completely covered in ballast rock. Effluent is discharged through diffuser riser assemblies that are bolted to the top of the diffuser leg conduits (CoSD, 2019). The effluent rises vertically through the high-density polyethylene diffuser risers, then discharges horizontally through a 19.5-inch diffuser head with four ports. Each diffuser riser assembly is equipped with a surrounding canister to protect it from the adjacent rock, and vessel anchors (CoSD, 2019). These cylindrical diffuser risers are interspersed along the pipeline at regular intervals. Excepting outfall risers and maintenance hatches, the pipeline itself is obscured by ballast rock.

Currently, each riser is either open, capped, or blind flanged. There are currently 18 open risers. These include the single open riser located on the main barrel and 17 open risers located along the south leg of the wye diffuser, most of which are clustered at the south end of the south leg. A further 16 risers along the southern leg of the wye diffuser are capped. Capped risers consist of a riser pipe head with four temporarily closed ports. The remaining 49 risers on the southern leg of the wye diffuser, and all 82 risers on the northern leg of the wye diffuser, are sealed closed with a blind flange. In the case of a blind flanged riser, there is no head on the riser and a blind flange is bolted to the upper flange of the riser assembly. The SBOO wye diffuser is inspected annually for structural integrity by CoSD using a commercial remotely operated vehicle (ROV). Noteworthy observations of this infrastructure from the CoSD (2019) inspection report include:

- Localized areas of low rock distribution and subsequent sand intrusion on the north diffuser leg—likely resulting from construction and not oceanographic forces.
- Large invertebrate populations were observed accumulating on the active diffuser heads, though diffuser ports were generally unobstructed and functioning. The report states CoSD intends for divers to clean encrusting organisms from the ports in coordination with CoSD engineers.
- The capped and blind flanged riser assemblies were reported to be "in good condition."
- Cosmetic damage to some concrete cover structures noted in previous surveys remained unchanged, and the structures were reported to be "fundamentally sound."

The SBOO is designed to handle an average flow of 174 MGD and a maximum daily flow of 233 MGD. Table 1-1 shows the actual discharge flows from the SBOO for each facility from 2016 through 2019 based on data collected as part of the NPDES monitoring programs at each facility. The average discharge of effluent through the SBOO in 2020 was approximately 31 MGD, including 4 MGD of secondary and tertiary treated effluent from the SBWRP, and 27 MGD of secondary treated effluent from the ITP (CoSD, 2021).

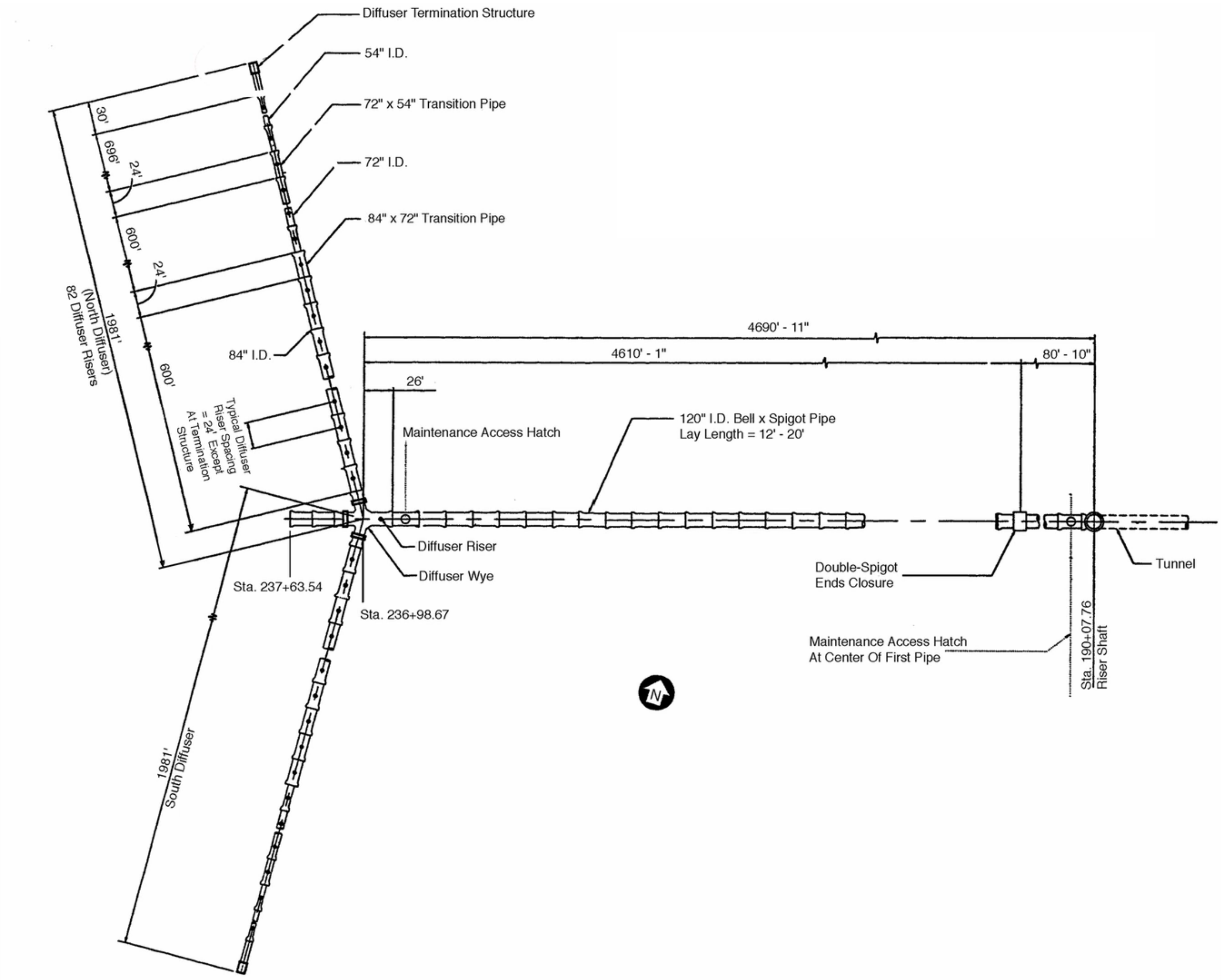

Figure 1-1. Engineering drawings of the terminal end of the SBOO and wye diffuser array.

Table 1-1. Plant design capacity and actual discharge flows (MGD) from 2016 through 2019 for effluent discharged from the SBOO based on data collected as part of NPDES monitoring programs.

Component	Design Capacity (MGD)		Actual Discharge (MGD) (2016–2019)	
	Peak Daily	Average Daily	Peak Daily	Average Daily
SBWRP (to SBOO)	35	15	7.3	3.8
ITP (to SBOO)	30	25	37	25
Total to SBOO	**65**	**40**	**44**	**29**

Currently, the USIBWC is responsible for maintenance and operation of the SBLO east of a drop shaft approximately 1 mile inland from the ocean. This section of pipeline includes an anti-intrusion structure and two valves, which are located on top of the drop shaft hatch cover. The City is responsible for maintenance and operation of the drop shaft and everything west of this structure (i.e., the SBOO), including all of the offshore components.

1.6 Proposed Federal Action

The proposed Federal Action evaluated in this BA is the issuance of U.S. appropriations (including but not limited to USMCA Implementation Act appropriations) for, and implementation (i.e., design and construction) of, water infrastructure projects to address impacts from transboundary flows in the Tijuana River watershed and adjacent coastal areas.

Because of the programmatic nature of the decisions to be made, only certain projects (those identified as Core Projects in the PEIS) will be able to be implemented by USIBWC at the completion of the initial NEPA process. The Core Projects are sufficiently evolved to be ready for decision making but are expected to fully expend the $300 million of USMCA Implementation Act appropriations. Other projects (those identified as Supplemental Projects in the PEIS) are expected to require substantial additional U.S. appropriations beyond the USMCA Implementation Act appropriations and funds from existing programs such as EPA's Border Water Infrastructure Program (BWIP), and would require additional tiered NEPA review before USIBWC would be able to implement them. Therefore, for purposes of this BA, the Federal Action is the funding and implementation of the four projects identified as Core Projects in the PEIS. This corresponds with the scope of PEIS Alternative 1.

The following are the four Core Projects that comprise the proposed Federal Action:

A. Expand the ITP from its current capacity of 25 MGD to 60 MGD.[5]

B. Install a wastewater conveyance system from Matadero Canyon and Los Laureles Canyon in Mexico that conveys dry-weather flows to the expanded ITP for treatment.

C. Rehabilitate or replace targeted sewer collectors in Tijuana that currently leak into the Tijuana River.

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[5] average daily flow

D. Construct and operate a 35-MGD Advanced Primary Treatment Plant (APTP) for advanced primary treatment of diverted water from the existing PB-CILA diversion in Mexico.

These projects are summarized in the following subsections. See Section 2.4 of the Draft PEIS, which was made available for public review on June 17, 2022, for additional details.[6]

1.6.1 Project A: Expanded ITP

Project A includes expansion of the ITP from 25 MGD to 60 MGD[7] to allow for untreated wastewater currently sent to the SABTP in Mexico to instead be sent to a facility maintained and regulated in the U.S. Currently, the SABTP directly discharges large volumes (approximately 28.2 MGD) of untreated wastewater (primarily raw sewage) to the Pacific Ocean at Punta Bandera via SAB Creek. From this coastal creek mouth, this heavily polluted plume is coastally trapped and transported upcoast where it crosses the U.S.-Mexico border resulting in extensive pollution of U.S. coastal waters and beaches (Feddersen et al., 2021).

The primary purpose of expanding the ITP is to receive and treat additional wastewater from the International Collector in Mexico that otherwise would be discharged to the Pacific Ocean via SAB Creek. The expanded ITP may also reduce untreated wastewater overflows from the sanitary sewer to the Tijuana River caused by mechanical failures at Pump Station 1B. The expanded ITP will also provide treatment for wastewater collected in the canyons (Project B) and will provide capacity to accommodate additional wastewater flows produced by the future population of Tijuana (based on 2050 projections).

Expansion of the ITP will allow for primary and secondary treatment of this untreated wastewater prior to discharge via the SBOO, resulting in a reduction in the nearshore pollution currently impacting water quality and marine ecology in the southern San Diego marine region.

Influent to the ITP will undergo the following sequential primary and secondary treatment processes; screening, grit removal, the addition of ferric chloride and advanced primary settling (for primary sludge removal), biological reactors, and finally secondary settling. The treated effluent will then be discharged to the Pacific Ocean via the SBOO. Sludge will undergo dissolved air flotation unit thickening, anaerobic digestion, dewatering, and solids loading before being trucked for disposal in Mexico. Figure 1-2 provides a schematic of the proposed treatment train at the expanded ITP.

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[6] The Draft PEIS and appendices are available on EPA's website at https://www.epa.gov/sustainable-water-infrastructure/usmca-draft-programmatic-environmental-impact-statement.

[7] Project A, as evaluated in the PEIS, includes three capacity options that will expand the 25-MGD ITP to an average daily capacity of 40 MGD (Option A1), 50 MGD (Option A2), or 60 MGD (Option A3). For purposes of this BA consultation, the proposed Federal Action includes expanding the ITP to 60 MGD (Option A3). This approach ensures that the consultation is based on a scope that reflects the maximum potential changes in environmental impacts that could occur under the proposed Federal Action.

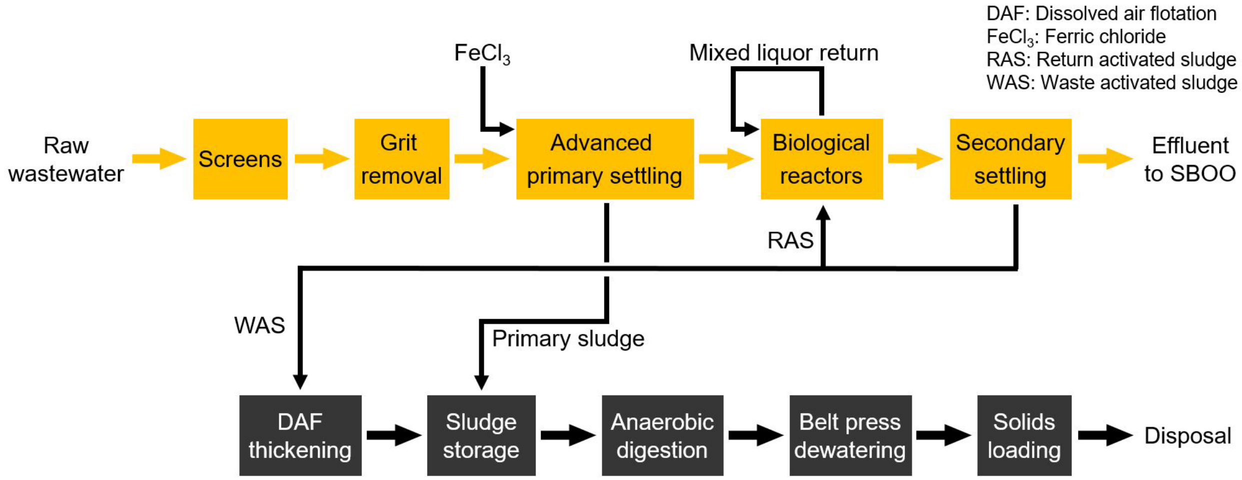


Figure 1-2. Schematic of expanded ITP treatment train under Project A.

1.6.2 Project B: Tijuana Canyon Flows to ITP

Project B includes the installation of a wastewater conveyance system from Matadero Canyon (i.e., Smuggler's Gulch) and Los Laureles Canyon (i.e., Goat Canyon) in Mexico to the expanded ITP for treatment (see Project A for details on the ITP expansion). Once complete, this pipeline system will allow for the decommissioning of the existing Matadero pump station in Matadero Canyon, and the Los Laureles 1 and 2 pump stations in the Los Laureles Canyon. These pump stations currently convey wastewater from the canyons to the SABTP, where the untreated wastewater is typically discharged to the Pacific Ocean.

Up to 12.7 MGD (peak daily) of wastewater from the canyons will be collected by the new conveyances and transported to the ITP for treatment. The current wastewater flow from the canyons to the SABTP is 6.3 MGD, so the new conveyances will have available capacity to accommodate flow increases over time. Following treatment at the ITP, these flows will be discharged to the Pacific Ocean through the SBOO as described for Project A.

The primary purpose of the proposed canyon conveyance system is to reduce the amount of dry-weather wastewater flows that are currently discharged with little to no treatment to the Pacific Ocean via SAB Creek. As a secondary benefit, Project B will potentially reduce the volume and frequency of dry-weather transboundary flows in Goat Canyon and Smuggler's Gulch by eliminating the reliance on pump stations whose mechanical issues may cause occasional wastewater overflows into the canyons in Mexico.

1.6.3 Project C: Tijuana Sewer Repairs

Project C includes the rehabilitation or replacement of targeted sewer collectors in the Tijuana metropolitan area. Sewage that leaks from the damaged sewer system enters the Tijuana River, crossing the border into the U.S. By reducing wastewater leaks to the river in Tijuana, Project C will improve downstream water quality in the Tijuana River Valley and Estuary by both 1) reducing overall river flow volumes, and thus reducing the frequency of dry-weather transboundary flows caused by river flow rates that exceed the PB-CILA diversion capacity, and 2) ensuring that more wastewater in the Tijuana sewer system is successfully conveyed to the expanded ITP for treatment (see Project A) rather than entering the U.S. as a transboundary flow. Project C sewer repairs are aimed to reduce the amount of untreated wastewater in the Tijuana River down to 5 MGD.

1.6.4 Project D: Advanced Primary Treatment Plant (APTP) Phase 1

Project D includes the construction and operation of a 35-MGD APTP for advanced primary treatment of diverted water from the existing PB-CILA diversion, rehabilitation and extension of the existing force main from PB-CILA to the new APTP, installation of other new supporting facilities, and associated site modifications. This will provide additional capacity in the U.S. for treating diverted river water from Mexico that would otherwise be pumped to SABTP and discharged to the Pacific Ocean. The project will be designed for potential future expansion to 60 MGD. For example, concrete pads for ballasted flocculation, sludge storage, and other process units will be large enough to accommodate the potential installation of additional process units under a later phase, and piping and stub-outs to convey flows between the units will be sized to accommodate the flow rates of a 60-MGD plant. However, this potential future expansion is not part of the proposed Federal Action.

In order to convey river water to the new APTP, the existing PB-CILA diversion (which will operate when the instantaneous river flow rate is 35 MGD or less) will convey diverted river flows through an existing force main across the border to the APTP headworks. Project D will include the rehabilitation and extension of this existing force main from PB-CILA in Mexico to the new APTP in the U.S. This will reduce the frequency of transboundary river flows by eliminating the use of a pump station (PB1-A) whose mechanical issues indirectly cause occasional shutdowns of the PB-CILA diversion. Because PB-CILA will not be capable of operating when the instantaneous river flow rate exceeds 35 MGD, no treatment at the APTP will occur during these river flow conditions.

The APTP will operate independently of the existing ITP and will consist of the following treatment processes: screening, aerated grit removal, grit dewatering, a ballasted flocculation process, and sludge handling. Preliminary treatment will remove large solid waste and 25 percent suspended solids (“grit”). The ballasted flocculation process is estimated to achieve total suspended solids (TSS) and BOD_5 removals of 85 percent and 50 percent, respectively. Effluent from the APTP will be discharged to the Pacific Ocean via the SBOO. Sludge will be gravity thickened, belt press dewatered, undergo solid loading, and then be trucked for disposal in Mexico.

Figure 1-3 provides a schematic of the treatment train at the proposed APTP. Figure 1-4 provides a flow schematic of the ballasted flocculation component of the treatment train.

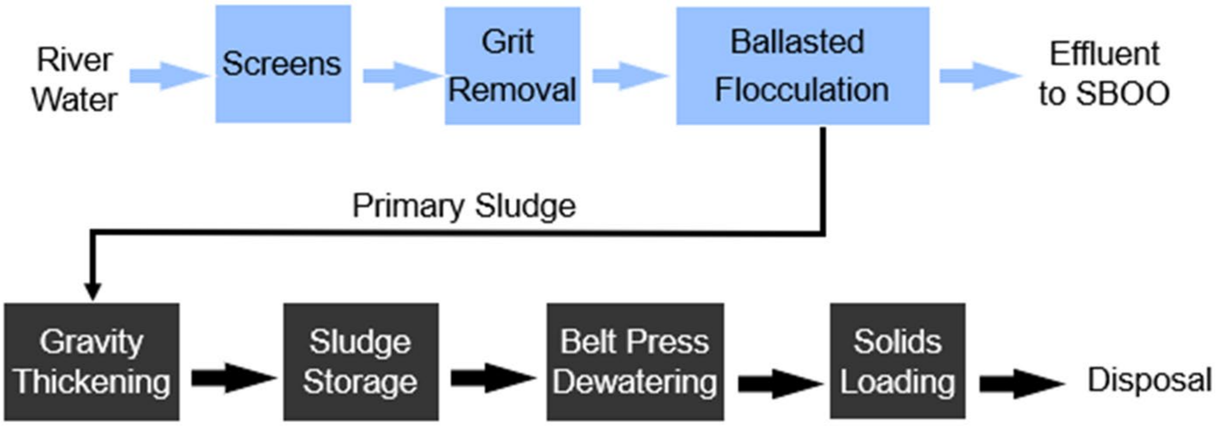
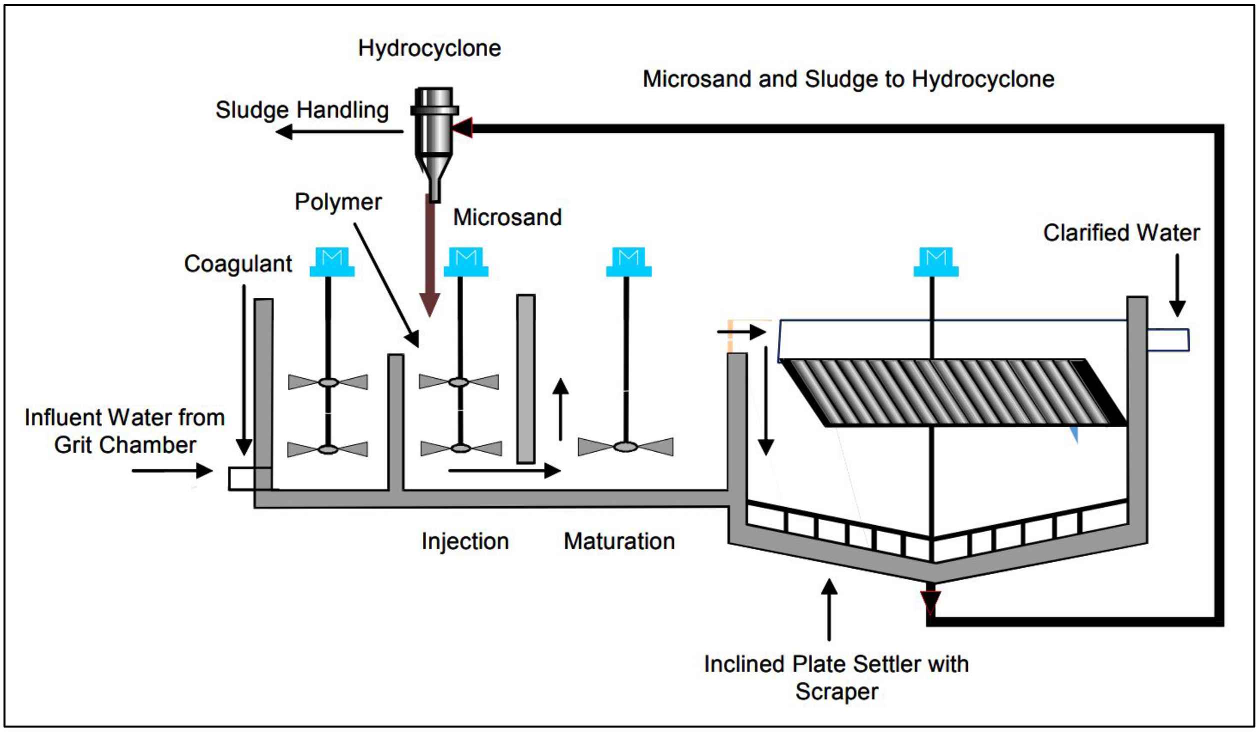


Figure 1-3. Schematic of APTP treatment train under Project D.



Source: EPA, 2003.

Figure 1-4. Flow schematic of APTP ballasted flocculation process under Project D.

EPA and USIBWC estimate that the APTP will achieve a total nitrogen removal efficiency of 13 percent, as compared to an estimated 85 percent removal efficiency from secondary treatment at the ITP. Ballasted flocculation at the APTP, while effective for removal of particulate organic nitrogen, would not effectively remove dissolved nitrogen (which would constitute a substantial percentage of total nitrogen in the influent). Conversely, EPA and USIBWC estimate that the APTP will achieve a higher total phosphorus removal efficiency than the ITP (85 percent vs. 71 percent) because secondary treatment at the ITP is optimized for biological nitrogen removal rather than biological phosphorus removal.

EPA and USIBWC considered incorporating secondary treatment (in addition to advanced primary treatment) of diverted Tijuana River water but eliminated this option from detailed study due to prohibitive costs that would prevent USMCA and BWIP funds from being used for a larger range of reasonable alternatives that successfully reduce contaminated transboundary flows. However, the proposed Federal Action will not prevent the eventual expansion of the APTP to include secondary treatment, should sufficient funding be identified in the future.

1.7 Action Area

The proposed Federal Action will result in projects that will affect the marine environment in U.S. Territorial waters through changes in nearshore pollution from transboundary flows and due to a change in the quality and quantity of treated effluent discharged from the SBOO. Subsequently, the Action Area assessed in this BA encompasses coastal waters affected by the transboundary flows from Mexico and the area likely to encompass the effluent plume discharged from the SBOO. Because some marine species consistently affected within the boundaries of these areas may move in and out of this extent, the Action Area has been extended beyond the likely extent to encompass adjacent areas.

Models by Feddersen et al. (2021), aerial imagery compiled and analyzed by Ocean Imaging (2021), and monitoring by CoSD as part of their ongoing NPDES permit-related monitoring program related to operation of the SBOO indicate that both sources of wastewater effluent influence waters as far north as the Coronado Embayment. Fishes and other marine life potentially affected by the plume may move offshore as far as the continental shelf break. On this basis, the Action Area is determined as extending from Point Loma to the U.S.-Mexico border and between the coastline and the approximate location of the shelf break as shown in Figure 1-5. The seabed consists predominantly of soft (sandy) seabed but also includes areas of hard (rocky) substrate, kelp habitat, and the TJRE. These habitats are discussed in Section 2 (Environmental Baseline) of this report. Effluent effects are also likely in Mexico, but these are not considered in this assessment.

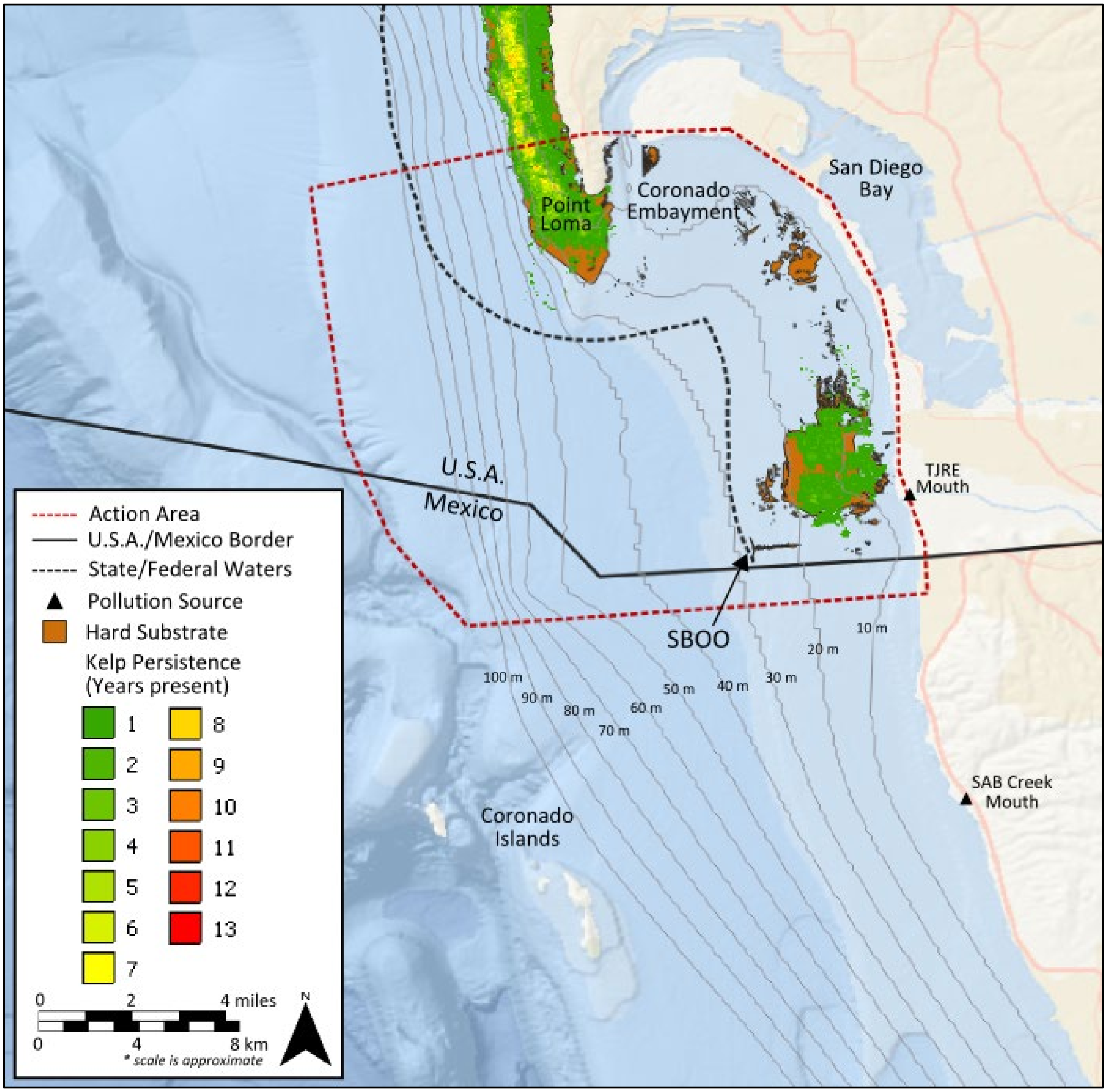


Figure 1-5. Action Area as defined for purposes of this Biological Assessment.

2. ENVIRONMENTAL BASELINE

2.1 Oceanography and Ocean Habitat

The SBOO is situated approximately 0.6 miles north of the U.S.-Mexico border and extends approximately 3.5 miles offshore to a depth of approximately 90 feet (ft) below the surface. The SBOO discharge plume monitoring program (CoSD, 2020) has detected the influence of the discharge at stations located approximately 6.6 miles upcoast and 4.9 miles downcoast of the SBOO. Point Loma is approximately 10 miles to the north of the SBOO discharge and the continental shelf extends from the shoreline to the shelf break approximately 10 miles offshore (west) of the coastline.

The Action Area is located near the southern limit of the geographic region known as the Southern California Bight (SCB). The SCB extends from Point Conception to the U.S.-Mexico border, encompassing an area characterized by a broad continental borderland consisting of a series of islands, shallow banks, basins, canyons, and troughs. The dramatic shift in coastline south of Point Conception affects ocean currents, resulting in a biogeographic transition zone in the SCB between cool-temperate water in the north and warm sub-tropical water in the south. In the ocean adjacent to and including the Action Area, warm sub-tropical waters are entrained northward from the equator by the oceanography of the region throughout most of the year. Subsequently, the region experiences warmer water conditions relative to the remainder of the SCB region. Horn et al. (2006) refer to the warm-temperate ecology in the SCB, which extends into coastal Baja Mexico, as the San Diegan Province.

Current water quality conditions within the Action Area are affected by ongoing and seasonally variable pollution events originating from untreated and partially treated discharges of wastewater from Mexico. Nitrogen is a limiting factor in the abundance of phytoplankton in the oceans. Treated or untreated effluent can contribute high volumes of nutrients relative to natural nutrient inputs at a local scale in coastal waters, particularly ammonia (NH_3) and ammonium (NH_4^+). While upwelling contributes most of the nitrogen to coastal waters in California, a study by Howard et al. (2014) indicated that effluent and riverine discharges may contribute more than 82 percent of the annual nitrogen input in the San Diego area.

In addition to ongoing monitoring by the CoSD, two comprehensive reviews of the oceanography by Largier et al. (2004) and Terrill et al. (2009) have described the circulation and oceanographic character of the area. The coastal waters off Imperial Beach become strongly stratified in summer. During this period cool, deep water is separated by a sharp temperature boundary (thermocline) from solar-heated warm surface waters. During the winter these shallow waters are typically well mixed with no or limited thermocline present. Circulation patterns within the Action Area are heavily influenced by coastal topography. A large eddy system consistently establishes upcoast of the SBOO in the lee of the Point Loma headland (feature **f** in Figure 2-1). South of this eddy system, ocean currents circulate in a clockwise manner (feature **g** in Figure 2-1). These flows represent the offshore circulation patterns visible in high-frequency radar data, which is capable of mapping surface flows away from the immediate shoreline. Feddersen et al. (2021), who incorporated nearshore transportation into their model of the region, accommodate wave-driven transport that influences the nearshore environment that is not necessarily represented in Figure 2-1 but plays an important role in the transport of shoreline discharges such as the TJRE mouth and SAB Creek mouth. Circulation patterns in the region cycle according to tides, winds, and larger-scale remote forcing.

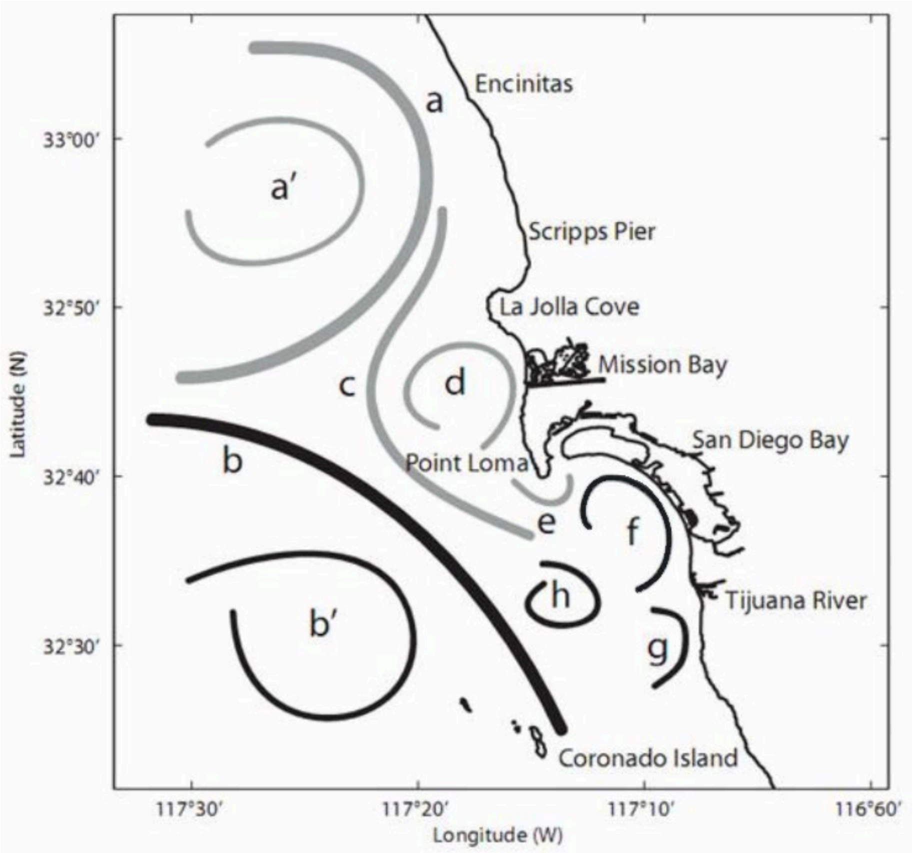


Figure 2-1. Patterns of offshore ocean circulation in the San Diego region from Terrill et al. (2009). Flow strength is represented by line thickness. Black flows have consistent direction, gray features have periodic direction reversals. b has a southeastward flow. b′, g, and h are clockwise flows. f is counterclockwise.[8]

2.2 Existing SBOO Plume and Transport Environment

2.2.1 SBOO Effluent Characteristics

Effluent monitoring at the USIBWC-owned ITP facility occurs monthly in accordance with the plant's NPDES permit. Constituents with numeric effluent limits include, but are not limited to, TSS, copper, mercury, benzidine, chlordane, dichlorodiphenyltrichloroethane (DDT), heptachlor epoxide, hexachlorobenzene, polychlorinated biphenyls (PCBs), tetrachlorodibenzodioxin (TCDD) equivalents, and toxaphene. Refer to Appendix A (Effluent Limitations in ITP NPDES Permit No. CA0108928) for a complete list of the effluent limitations per the ITP NPDES permit. Refer to Appendix B for the 2021 NPDES Annual Report for the ITP, which summarizes the results of ITP influent and effluent monitoring efforts conducted from January through December 2021.

Although different from the proposed Federal Action in nature and scope, EPA reviewed recent Biological Evaluations and Biological Opinions for NPDES permit re-issuances (EPA, 2016, 2021;

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[8] In the original publication, Terrill et al. (2009) drew feature 'f' as grey but described it in the text as counterclockwise. The gyre depicted as feature 'f' has been adjusted to black in Figure 2-1.

NMFS 2018a, 2022) to identify Contaminants of Emerging Concern (CECs) of interest to NMFS, and reviewed the 2021 NPDES Annual Report for the ITP to identify available monitoring data for these CECs. As discussed below, only limited ITP effluent monitoring data are available for these CECs. Refer to Appendix B for summaries of the 2021 monitoring efforts for these and other pollutants:

- **Persistent organic pollutants (POPs)** (e.g., PCBs, polybrominated diphenyl ethers [PBDEs], chlorinated pesticides, polycyclic aromatic hydrocarbons [PAHs], dioxins, furans). ITP effluent monitoring is performed for some POPs, including numerous chlorinated pesticides, PAHs, and TCDD equivalents. For 2021, the average monthly concentrations for all monitored pesticides, total PAHs, and TCDD equivalents in the ITP effluent were non-detect or well below the 30-day average limits.

- **Endocrine-disrupting chemicals (EDCs)** (e.g., hormones, alkylphenols, organochlorine pesticides). ITP effluent monitoring is performed for a limited selection of EDCs, including organochlorine pesticides (as mentioned above for POP monitoring) and selected phthalates. For 2021, the average monthly concentrations for monitored phthalates in ITP effluent were non-detect or well below the 30-day average limits.

- **Pharmaceutical and personal care products (PPCPs)** (e.g., prescription drugs, over-the-counter medications, sunscreen, caffeine); **veterinary medicines** (e.g., antimicrobials); **other industrial endocrine-disrupting compounds (IEDCs)** (e.g., nonylphenol monoethoxylate); **nanomaterials** (e.g., carbon nanotubes); **industrial/commercial compounds** (e.g., benzophenone, bisphenol A, nonylphenol); and **microplastics** (e.g., microbeads). ITP effluent monitoring is not required or performed for these categories of CECs.

Refer to Section 4.3.2 (Changes to the SBOO Discharge) for information on estimated pollutant concentrations and loadings discharged via the SBOO (accounting for effluent from both the ITP and the SBWRP) for selected pollutants under current conditions and after implementation of the proposed Federal Action.

2.2.2 Zone of Initial Dilution at the SBOO

When effluent is discharged from a port on a diffuser riser, it is positively buoyant in ambient seawater conditions, and initial and rapid mixing of the effluent with ambient seawater occurs. Initial dilution is formally defined in the California Ocean Plan as "*the process which results in the rapid and irreversible turbulent mixing of wastewater with ocean water around the point of discharge.*" The momentum of the discharge and its initial buoyancy act together to produce turbulent mixing, entraining ambient seawater into the plume of discharged effluent. This area of mixing effluent and ambient seawater becomes more diluted as distance increases from the riser port. The effluent continues to mix through this turbulence-driven mixing process until a point of neutral buoyancy is reached, either trapping below the surface or reaching a boundary, such as the surface or ocean bottom. As defined in the California Ocean Plan, initial dilution is completed when the diluting wastewater ceases to rise in the water column and first begins to spread horizontally.

The process of initial dilution is rapid and energetic, with timescales of seconds to minutes, so that organisms temporarily entrained in or passing through the initial plume are not present long enough to be exposed to chronic or lethal toxicity effects. EPA (and states) may use this initial dilution to establish a mixing zone, or zone of initial dilution (ZID). EPA defines the ZID as "*a regularly shaped area (e.g., circular or rectangular) surrounding the discharge structure (e.g.,* *submerged pipe or diffuser line) that encompasses the regions of high (exceeding standards) pollutant concentrations under design conditions*" (EPA, 2006).

Nearfield modeling of the existing operational conditions of the outfall (M. Reusswig [PG Environmental], personal communication, 2022) indicates that the current ZID extends 77 ft horizontally from each open port. This is equivalent to a circular ZID with diameter 154 ft around each of the 17 open risers along the southern leg of the diffuser and the one open riser on the main barrel. Because most of the open risers are clustered towards the southern end of the southern leg with 24 ft spacing between risers (with the exception of the terminal riser, which is 30 ft from the next closest riser), the ZIDs from most open risers overlap as shown in Figure 2-2.

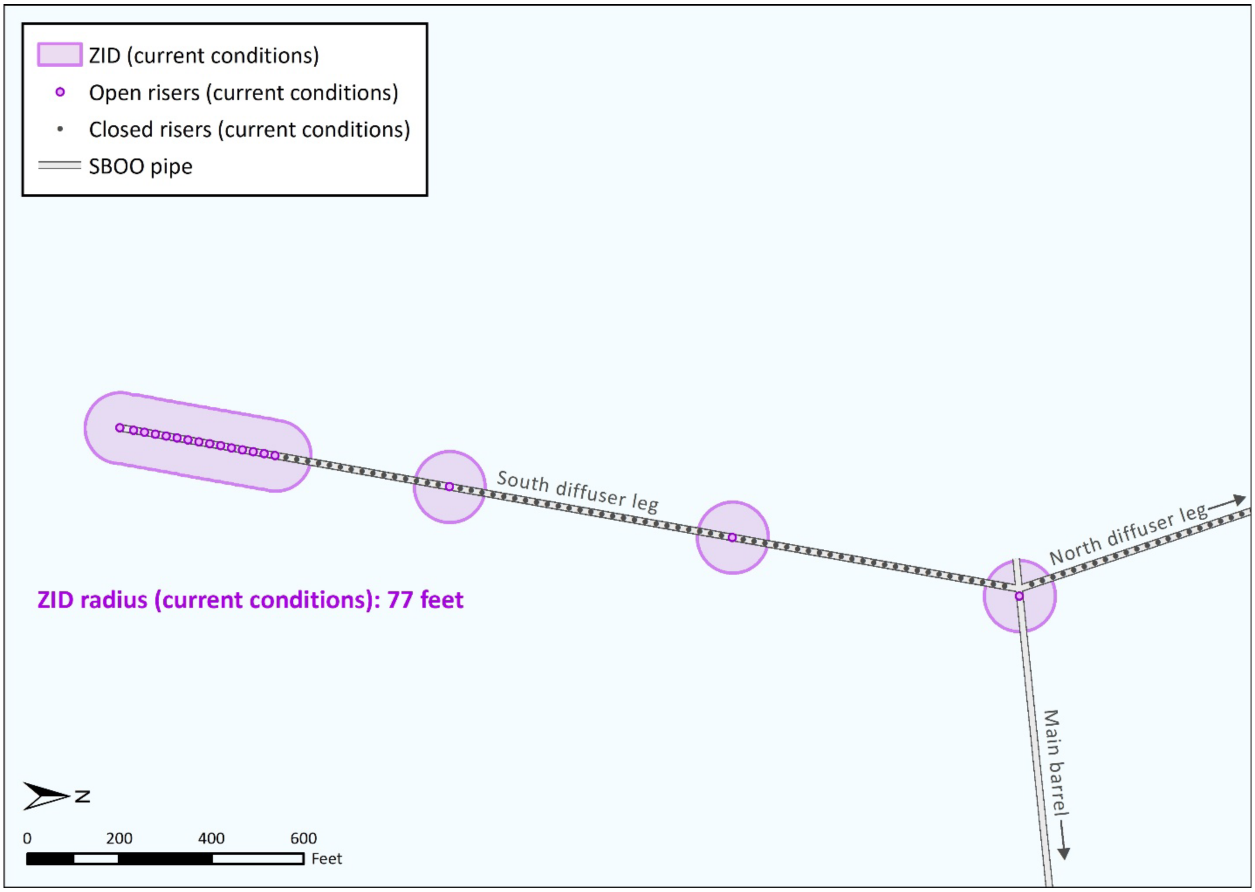

Figure 2-2. Existing ZID around open risers on the SBOO, based on dilution modeling representing current conditions.

Following the process of initial dilution that defines the extent of the ZID, passive diffusion becomes the dominant physical process that results in further dilution of the effluent with seawater. These two processes, initial dilution and passive diffusion, are physically different. Alongside nearfield modeling of the initial dilution process that defines the ZID, far-field modeling of the existing operational conditions of the outfall (M. Reusswig [PG Environmental], personal communication, 2022) has also been completed to estimate the potential extent of a 'detectable' plume signature outside the extent of a ZID. However, toxicity criteria defined under regulations subsequent to the Clean Water Act and California Ocean Plan are not expected to be exceeded within this 'detectable' portion of the plume extent.

The model results indicate the expected dilution value of the effluent at increasing distances from the SBOO wye diffuser array. Specifically, the model assessed the dilution rate of Aldrin, a relatively persistent component of the effluent. Some components of the effluent, such as fecal indicator bacteria, degrade more rapidly than others and therefore may have smaller predicted dilution 'footprints' than these model estimates predict. Table 2-1 provides model estimates of the distances at which plume dilution occurs. The plume is diluted to 75 percent at approximately 600 meters (m), 50 percent at approximately 1 km, and 15 percent at approximately 3 km from the diffuser array.

Table 2-1. Modeled estimates of distance for plume dilution at the SBOO (current operation).

Far-field Plume Dilution	Distance from SBOO [a]
75%	0.599 km
50%	0.996 km
25%	1.947 km
20%	2.355 km
15%	2.983 km
10%	4.100 km

a – Values presented here are average distance based on model-estimated concentration of Aldrin in four directions from the SBOO (north, south, east, and west).

2.2.3 Monitoring of SBOO Effluent Plume

Although the ITP and SBWRP are regulated under separate NPDES permits, both facilities discharge via the SBOO. Therefore, a combined monitoring program for the SBOO is used to evaluate potential environmental effects associated with the SBOO discharge. Stations monitored as part of this monitoring program are shown in Figure 2-3. The monitoring program is implemented by the CoSD, which reports the results of the monitoring annually. According to the most recent biennial monitoring report for 2018–2019 (CoSD, 2020), multiple sources of bacterial contamination exist in the Point Loma and South Bay monitoring regions. These include outflows from the San Diego River, San Diego Bay, the Tijuana River, and SAB Creek. Storm water discharges and terrestrial runoff from local watersheds during storms, or other wet weather events, can also flush sediments and contaminants into nearshore coastal waters. Separating any impact that may be associated with wastewater discharge from other point, or non-point, sources of contamination is often challenging.

Based on the 2020 monitoring year, core monitoring of receiving waters for the SBOO discharge includes 53 stations ranging from shore to depths of around 61 m (CoSD, 2021). Weekly sampling for fecal indicator bacteria (FIB) are collected at eight shore stations from Coronado to the U.S.-Mexican border. In 2020, compliance rates at shore stations declined from January to the monthly minimum in April and increased incrementally from May, obtaining 100 percent compliance as the year progressed through December. A similar pattern was observed at kelp stations, although this was considerably less pronounced, with lowest compliance values in January, incrementally increasing to 100 percent compliance by June. Offshore stations had 100 percent compliance throughout 2020 (CoSD, 2021). This pattern of shoreline pollution progressing to less severe pollution at the kelp and negligible FIB detection at the offshore stations is indicative of a coastal source of contamination rather than issues from the treated effluent discharged from the SBOO. Based on evidence presented in Feddersen et al. (2021), the pollution source is most likely transboundary flows originating from the TJRE or SAB Creek.

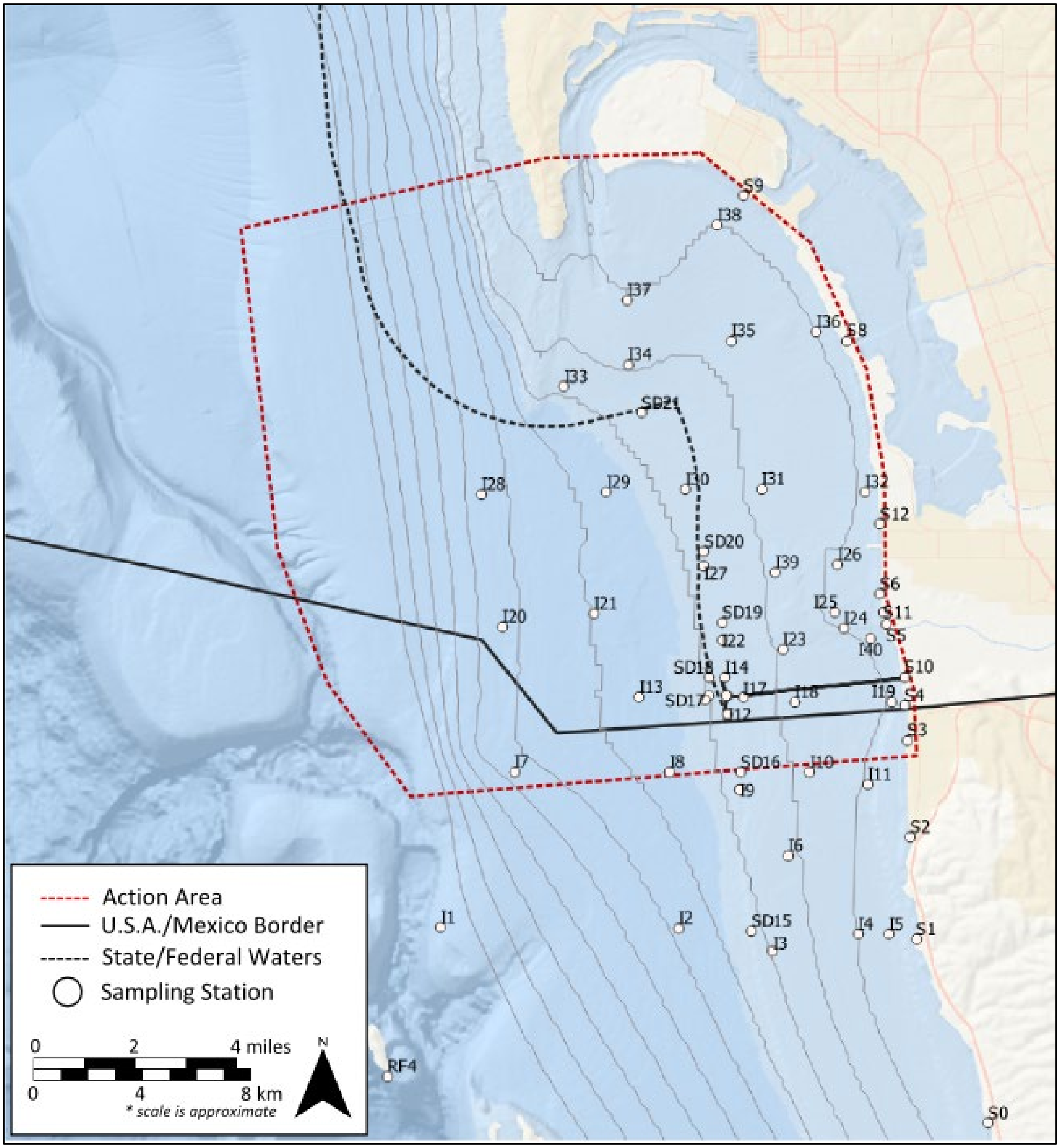

Figure 2-3. Stations monitored as part of the SBOO NPDES monitoring program.

Weekly sampling is also completed for a suite of water quality parameters at seven relatively nearshore stations within the Imperial Beach Kelp Forest and inshore areas between 18 m and 9 m deep. In addition to these SBOO stations, several stations occur in the Action Area that are formerly associated with the Point Loma Ocean Outfall monitoring program. CoSD includes results from these monitoring stations in their most recent annual reports. Data collected at the offshore and kelp stations includes FIB at three to five discrete depths and a suite of oceanographic parameters. These include conductivity-temperature-depth data, dissolved oxygen (DO), pH, transmissivity, chlorophyll *a* fluorescence, and colored dissolved organic matter (CDOM). Oceanographic data are sampled at 1 m depth intervals. A real-time oceanographic mooring system (RTOM) is deployed at the end of the SBOO at a depth of approximately 30 m just west (offshore) of the southern diffuser leg terminus. The RTOMS measures temperature, conductivity (salinity), total pH, DO, dissolved carbon dioxide (xCO_2), nitrogen (nitrate + nitrite), chlorophyll *a*, CDOM, BOD, and current direction and velocity. These water quality criteria were used to detect potential plume positions throughout the station array and then DO, pH, and transmissivity were assessed for stations potentially within the plume at the time of sampling relative to stations outside of the potential plume extent at the time of sampling. Using this approach, potential plume conditions are detected as far as 6.3 nautical miles (nm) from the wye diffuser.

CoSD also performs seasonal (spring, summer, fall, and winter) surveys of water column parameters throughout the action area and subsequent analysis of these parameters to 'detect' plume signatures. These quarterly sample stations are located offshore of the 18 m isobath. Samples at stations are designated as "Potential plume," "Plume not detected," or "Reference." This analysis method has been established as part of the NPDES monitoring program, and details of the analysis are included in the 2014-15 Biennial Monitoring plan (CoSD, 2016). Parameters collected and used in the plume detection analysis include temperature, conductivity, chlorophyll *a*, CDOM, DO, pH, and transmissivity. Identification of potential plume signal was determined for each quarterly survey at each monitoring station based on a combination of CDOM, chlorophyll *a*, and salinity levels, as well as a visual review of the overall water column profile. Plume signature designations are assigned as follows:

- Reference stations are identified as stations with all CDOM values below the 85th percentile of all stations sampled in a quarter.
- A "Potential plume" signal at a station is determined in the analysis as having: (1) CDOM exceeding the 95th percentile; (2) salinity below the 40th percentile; (3) chlorophyll *a* below the 90th percentile of the reference stations. The threshold for chlorophyll *a* was incorporated to exclude CDOM derived from marine phytoplankton. Once parameter profiles are identified with these methods, a visual interpretation of the overall water column profile is completed. The mean values of DO, pH, and transmissivity within the possible plume are compared to similar depths for reference stations.
- Remaining stations are considered "Plume not detected" if values exceeded the narrative water quality standards for these parameters defined in the Ocean Plan as out-of-range (OOR). The Ocean Plan defines OOR thresholds for DO as a 10 percent reduction from that which occurs naturally, while the OOR threshold for pH is defined as a 0.2 pH unit change, and the OOR for transmissivity is defined as dropping below the lower 95 percent confidence interval from the mean. Natural DO conditions are defined as values above the mean DO minus one standard deviation.

Results of the plume detection algorithm are presented in successive Annual and Biennial Monitoring reports (CoSD, 2013, 2016, 2018, 2020, and 2022). The most recent results (COSD, 2022) encompass quarterly sampling in 2020 and 2021 and are shown in Figure 2-4. The plume is most consistently detected with this method at stations immediately adjacent to the SBOO wye diffuser (I12, I14, I15, and I16). However, the method has also identified potential plume signatures at stations several kilometers from the SBOO, such as stations I34 and I35. It is unclear whether this approach reliably predicts the extent of the plume, particularly at stations located farthest from the wye diffuser where it is less likely detections representing actual SBOO plume signatures. These detections may instead represent variability in combinations of sampled parameters caused by other factors, such as instrument error or water from San Diego Bay and the TJRE.

In 2004, an independent review of the SBOO monitoring program conducted by Largier et al. (2004) suggested it may be impossible to detect the presence of the plume using the current sampling regime once it is a short distance from the outfall because water quality properties such as temperature and salinity will rapidly dilute. In addition, based on aerial imagery it appears that plumes may often remain intact as narrow streamers rather than being well dispersed horizontally and these plume shapes can be missed altogether by sampling stations. Largier et al. (2004) made several recommendations for improving the current monitoring program to resolve ongoing uncertainty on plume extent, including the use of mobile sampling technologies for plume tracking.

Terrill et al. (2009) continued work recommended in the Largier et al. (2004) review. Their study used a Remote Environmental Monitoring UnitS (REMUS) autonomous underwater vehicle to map the plume extent using CDOM and salinity measurements. Between July 2007 and October 2008, a total of 18 SBOO plume sampling missions were conducted using the REMUS and boat-based conductivity-temperature-depth (CTD) sensors and the plume was identified in 17 of these deployments. The plume extent detected in these analyses extended between 100 m and 3.3 km from the SBOO with an average extent of 1.65 km. On one occasion it extended beyond the limits of the monitoring area that was 3.7 km from the SBOO. The plume was observed extending in the direction of prevailing currents measured at a fixed monitoring mooring located at the centerline of the wye diffuser. It was observed extending to the south on seven occasions and extending to the north on nine occasions. During these surveys, the vertical extent of the plume was also highly variable. Figure 2-5 shows the normalized vertical distribution of the detected plume during each REMUS deployment reported in Terrill et al. (2009). Typically, the plume did not surface when a sharp gradient in temperature indicated the presence of a density gradient, sometimes referred to as a trapping layer. When a trapping layer was not present at the SBOO, the plume was typically observed near the surface or at the surface. The studies by Largier et al. (2004) and Terrill et al. (2009) indicate that the plume surfaces approximately 27 percent of the year. Surfacing was seasonal, with the plume surfacing 100 percent of the time in the wet season when the ocean was not stratified. Stratification typically maintained the plume at a depth of 8 m below the surface. When surfacing, the plume may reach the shoreline up to 25 percent of the time. However, there was no evidence that this results in water quality exceedances.

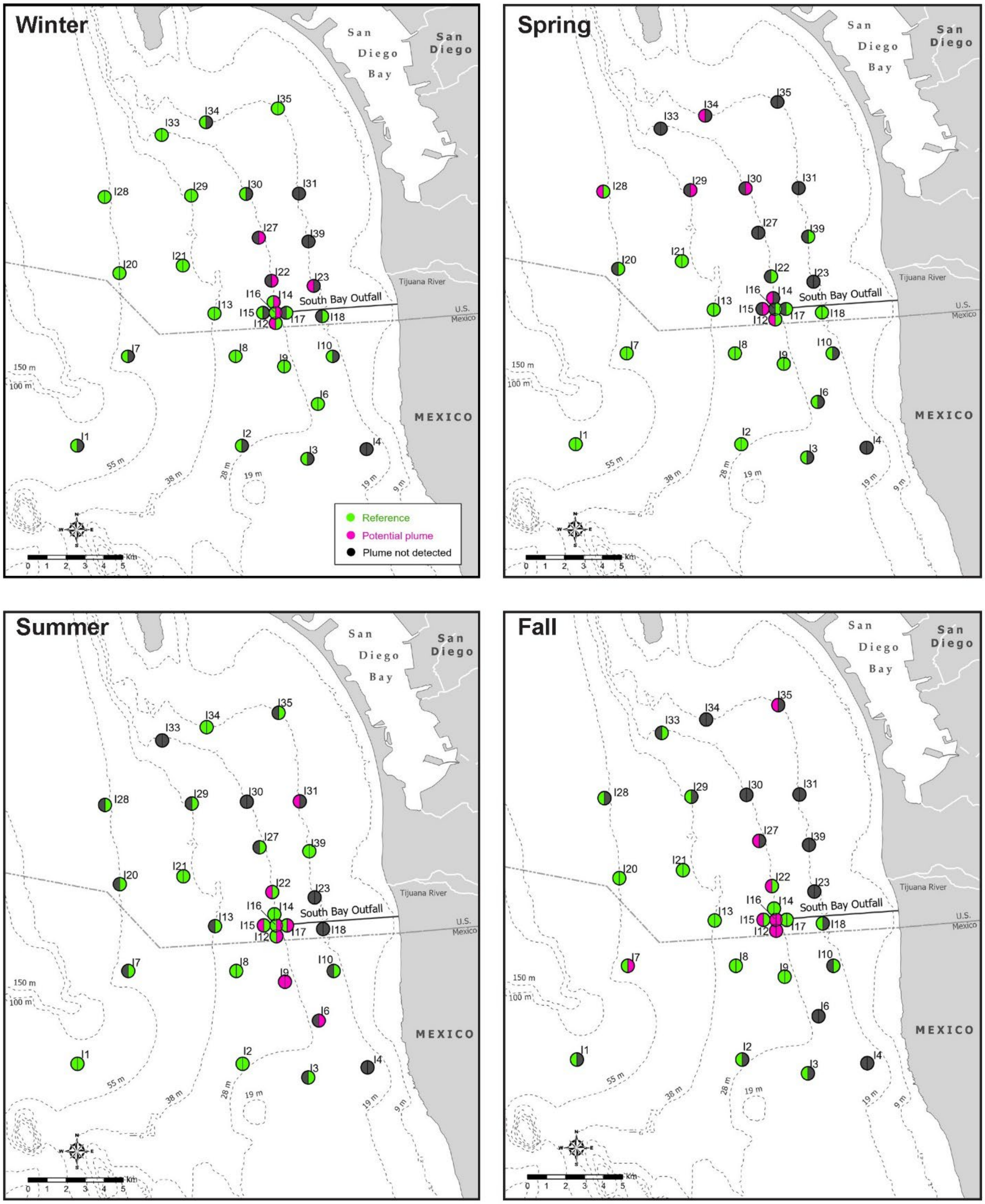

Figure 2-4. Results of a plume detection analysis at sampling stations during the CoSD NPDES monitoring surveys for the SBOO, from CoSD (2022). Results are shown for seasonal surveys in 2020 (left half of each pie) and 2021 (right half of each pie).

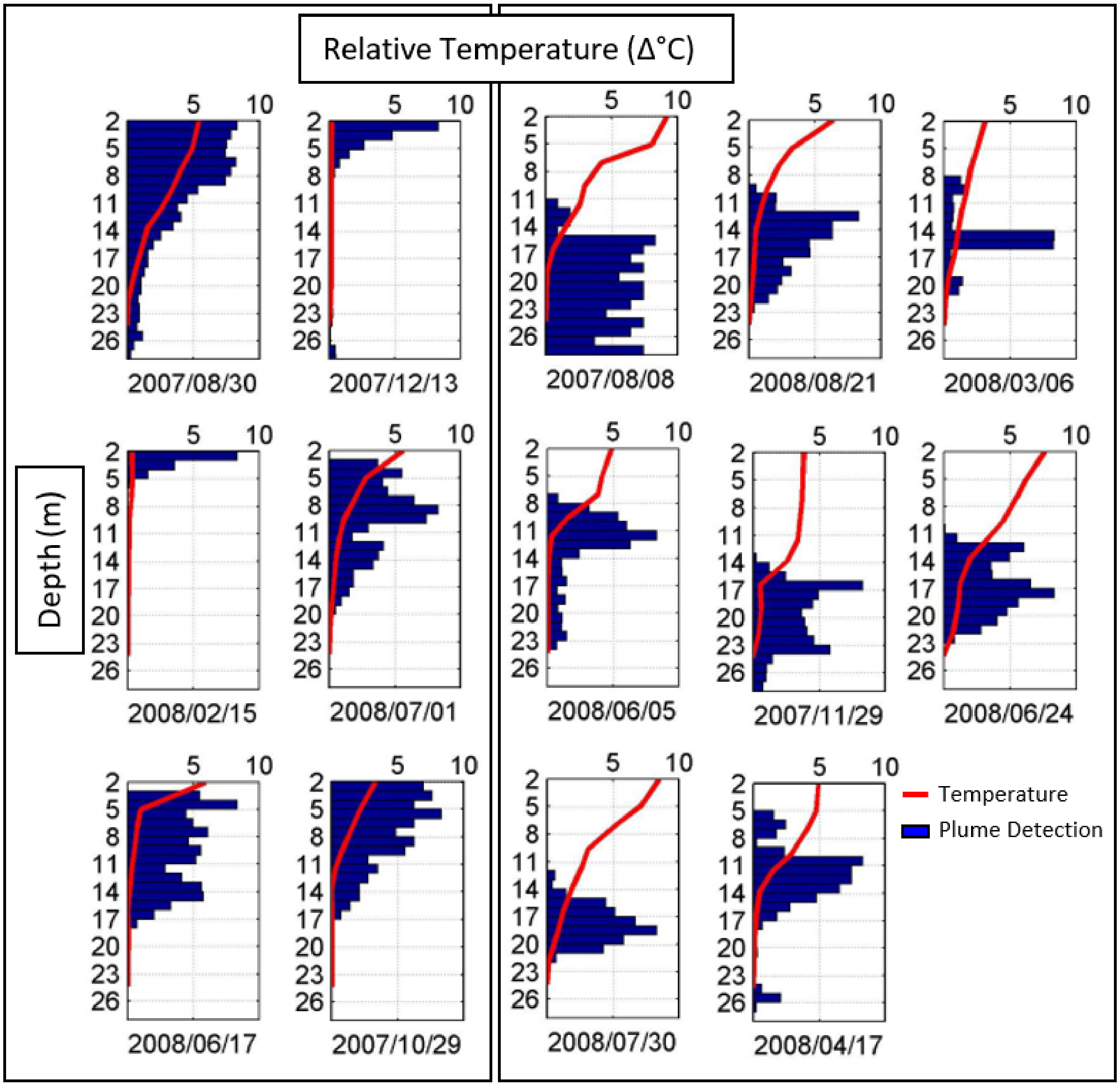

Figure 2-5. SBOO plume detection at depths determined from REMUS data collected by Terrill et al. (2009). Left six plots show vertical plume detection when no trapping layer contains the buoyant plume. Right eight plots show vertical plume detection when a trapping layer did appear to contain the buoyant plume. Temperature shown is difference (Δ) from ambient temperature and Plume Detection is aggregated normalized Δ in CDOM and salinity.

Subsequent to the Terrill et al. review in 2009, CoSD has recently begun collecting data using a remotely operated towed vehicle (ROTV) to detect the potential plume extent. Between 2017 and 2021, the City developed and carried out the Plume Tracking Monitoring Plan (PTMP) for the Point Loma and South Bay Ocean Outfall Regions (CoSD, 2022). As of July 1, 2021, the PTMP was included as a requirement in the NPDES permits for the ITP and the SBWRP.

The ROTV (ScanFish III) is a wing-shaped ROTV that is towed behind the sampling vessel using a "live-wire" tow cable with ethernet communication capabilities to surface computing platforms aboard the sampling vessel. The City's current monitoring program collects temperature, conductivity, depth, BOD, DO, CDOM, Tryptophan, and Optical Brightener (OB) measurements. Successful tows were completed at the SBOO in summer and fall 2020. However, plume signatures could not be detected following these deployments. Potential reasons provided in the CoSD (2022) include nearshore currents, a relatively shallow outfall depth, shore-based sources of CDOM and OB (i.e., the Tijuana River outflow, San Diego Bay, other non-point source runoff), nearshore turbidity, and phytoplankton blooms. When the entire water column is weakly stratified and well mixed, as is often the case in the SBOO region from late fall to early spring, tracking the transport of water sources is further complicated due to mixing of surface and deep waters. As an example of the difficulties in determining potential SBOO plume signatures, during the fall 2020 SBOO ROTV survey, high concentrations of CDOM and OB were observed throughout the survey area at various depths that were indicative of 'plume' events but were not clearly associated with a signature emitted from the wye diffuser. This was also reflected in satellite imagery taken around the same time (November 2020) highlighting multiple sediment turbidity plumes clearly unrelated to the SBOO throughout the region (Figure 2-6). None of these CDOM or OB plumes observations could be associated with the SBOO and were most likely from other sources in the area.

Satellite imagery of the SBOO is compiled annually as part of the ongoing monitoring program that provides visible light images of ocean plume conditions throughout the Action Area (e.g., Ocean Imaging, 2021). This analysis consists of a qualitative review of purchased imagery and does not include measurements of plume extent observed in these images, but plume signatures are regularly observed in the imagery and described by the authors. Plume extents are typically visible in the winter when waters are less well stratified and the plume is most likely to reach the surface. Visible plume extents in the imagery vary from several 10s of m to multiple kms. While these data indicate a larger plume extent than the nearfield modeling, it is not possible to determine if concentrations of pollutants within the visible plume extents are likely to be above exceedance values estimated by the ZID models. They are within the range of the far-field modeling estimates and plume detection results in the NPDES monitoring and Terrill et al. (2009) REMUS-based plume tracking efforts.

Aerial imagery does not detect plume activity from the Point Loma Ocean Outfall (PLOO), presumably because this discharge is located in much deeper water (approximately 100 m) than the SBOO (approximately 30 m) and therefore the PLOO discharge plume rarely surfaces where it can be seen in remote sensed imagery. The SBOO plume is regularly visible in aerial imagery and provides context for the extent of the discharge relative to other features throughout the Action Area. The plume was observed in 34 of the 133 images collated in 2020 (Ocean Imaging, 2021). Imagery of the plume shows linear bands discharging from the southern leg of the wye diffuser. When visible, these plumes are typically no more than 0.5 nm long and vary in orientation. On two occasions in 2020, the plume was observed extending as far as 4 km (approximately 2.2 nm). The plume is less likely to surface when the ocean water is stratified because the plume remains trapped below the pycnocline (the depth layer where the density gradient is greatest). Therefore, the plume is generally observed more frequently in aerial imagery in the winter period when the pycnocline is less common or absent.

Studies completed by Largier et al. (2004) and Terrill et al. (2009) (Scripps Studies) provided detailed data and analysis on the current SBOO plume distribution. The findings of these studies indicate that the plume surfaces approximately 27 percent of the year. Surfacing was seasonal, with the plume surfacing 100 percent of the time in the wet season when the ocean was not stratified. Stratification typically maintained the plume at a depth of 8 m below the surface. When surfacing, the plume may reach the shoreline up to 25 percent of the time. However, there was no evidence that this results in water quality exceedances in the Scripps Studies.

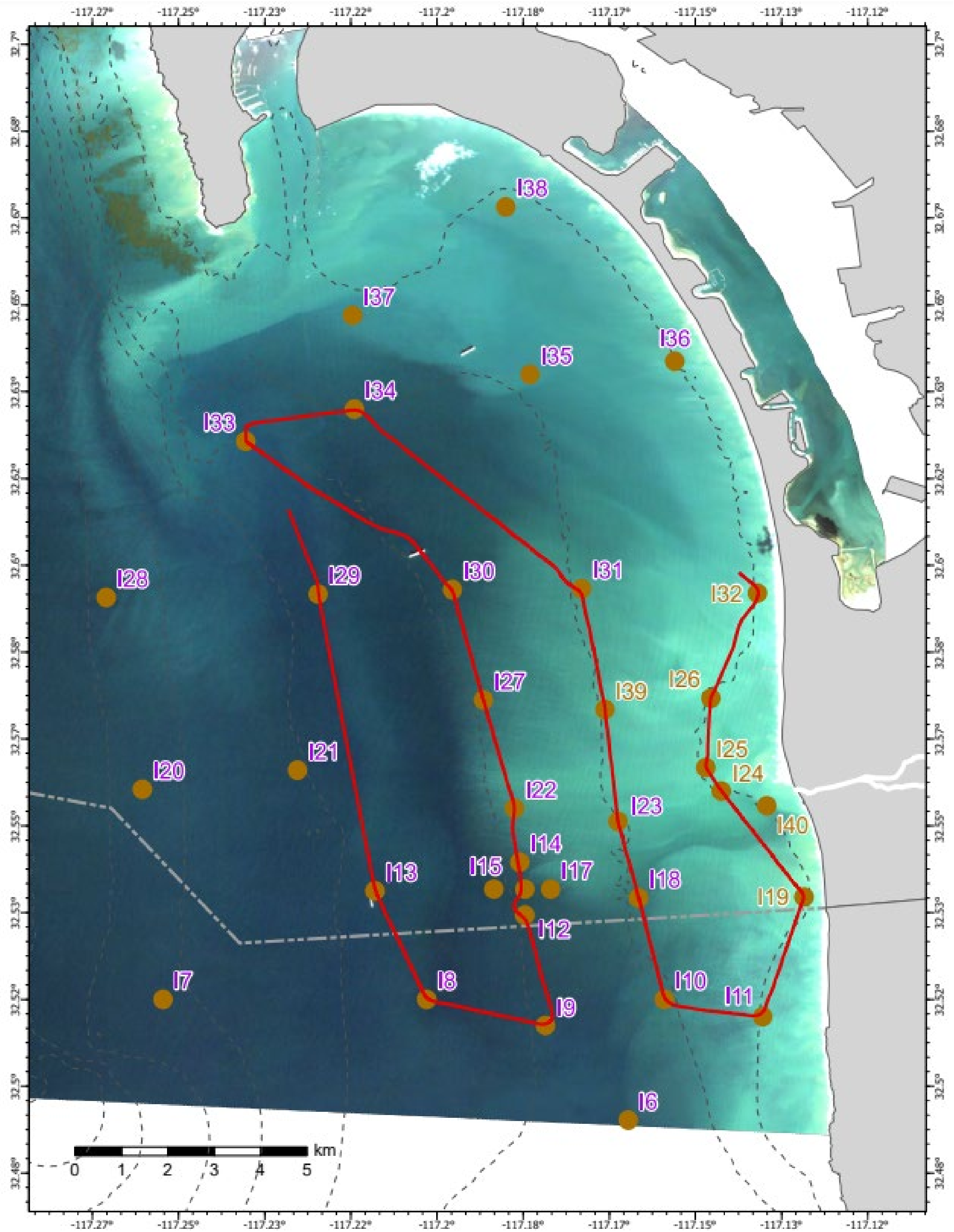

Figure 2-6. The ROTV tow path for the fall 2020 survey in the SBOO region. Sampling was conducted parallel to the regular offshore water quality stations.The tow path is overlaid on an image taken by the Spot 6 satellite on November 9, 2020 (CoSD, 2022). Turbid water is seen extending from the shoreline out across the tow path.

2.3 Nearshore Pollution from TJRE and SAB Creek

The visual plume features from the SBOO evident in remote sensed imagery are small in scale and infrequent compared with other phytoplankton and turbidity features visible in the reported imagery. Phytoplankton blooms regularly establish within eddies approximately the size of the Action Area. Plumes of phytoplankton and turbidity emanating from the TJRE mouth are also regularly observed in the imagery. These river plumes often reach well over 3 nm from the shoreline. Headlands like Point Loma form southward-facing coastal embayments throughout the west coast of the continental U.S. The coastal topography interacts with water currents to commonly form retention zones. These retention zones can have a positive influence on the abundance of plankton blooms (Largier, 2020; Trautman and Walter, 2021; Woodson et al., 2009; Ryan et al., 2008). In addition to satellite derived imagery, the aerial imagery reports (e.g., Ocean Imaging. 2021) examine circulation patterns in the region derived from high-frequency (HF) radar instruments that measure ocean surface current patterns. The patterns of movement of these river plumes and eddy features visible in the aerial imagery align closely with patterns of ocean surface currents measured by these HF radar instruments. Figure 2-7 provides an example of aerial imagery overlaid with HF radar data (direction and magnitude arrows). Turbid eddies and plumes are clearly visible in the imagery, which is typical for the Action Area according to Ocean Imaging (2021). The turbid conditions are often seen inshore of the Point Loma headland, which appears to interact with ocean circulation in the region causing these eddies and forming a retention zone in the Action Area. River plumes are undoubtedly also related to wet-weather flows caused by rainstorms, particularly in the winter. However, based on the modelled dispersion of the SAB Creek plume described in Feddersen et al. (2021), it is also likely that river plumes and subsequent turbid conditions originating from SAB Creek contribute to the increased turbid conditions.

Feddersen et al. (2021) presented modelled pollution dispersal from the Tijuana River and SAB Creek using a Coupled Ocean-Atmosphere-Wave-Sediment-Transport (COAWST) model system.[9] The model spans the Action Area and extends into Mexico to the SAB Creek outfall at the shoreline of Punta Bandera. While their model assessed the transport of norovirus pathogen, which has a decay constant that may differ from other pollutants of concern in transboundary flows, the advection processes illuminated by the model indicate pollution plumes for these other pollutants and illuminate the scale of the Tijuana River and SAB Creek pollution plumes in the nearshore environment. The model was run for a full year to provide an indication of seasonal changes in the plume behaviors. Modelled baseline scenarios show that, during wet season outflows from the TJRE mouth, the dominant source of pollution within the Action Area is due to the Tijuana River. However, during the dry season when river flows are limited or absent, the Action Area is still heavily impacted by coastally trapped pollution originating from SAB Creek. This is particularly pronounced during periods of south swell.

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[9] The COAWST model couples a Regional Ocean Modeling System with the Simulating WAves Nearshore model to capture offshore and nearshore wave-driven transport respectively.

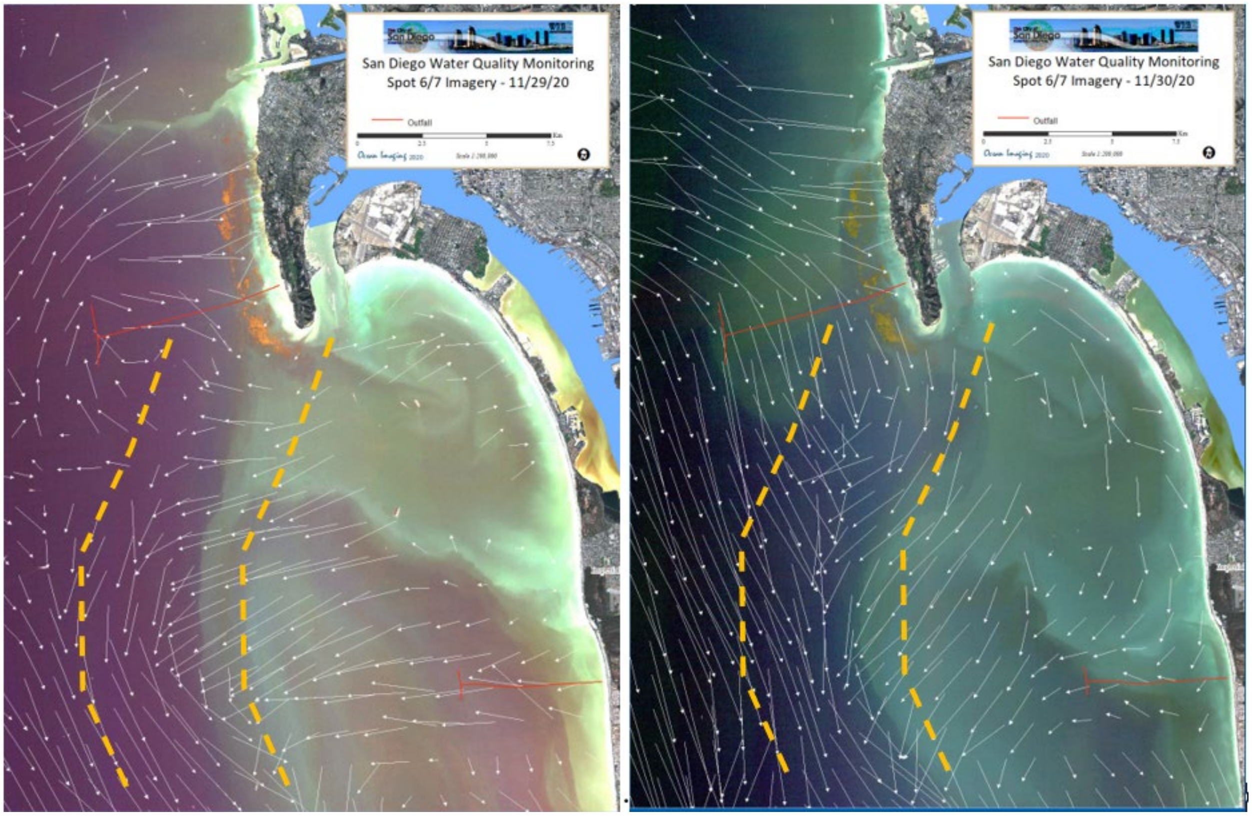

Figure 2-7. Aerial imagery and overlaid surface current vectors (white arrows) from Ocean Imaging (2021). Lighter and greener areas are light reflectance caused by turbid conditions in the surface of the water resulting from a mixture of phytoplankton blooms and turbidity. Phytoplankton levels are clearly elevated south and inshore of Point Loma headland. The transition from the zone of elevated phytoplankton and offshore waters corresponds with a pattern of surface currents indicative of a convergent front between retention zone circulation and offshore circulation (indicated by yellow dashed lines). Plumes from the Tijuana River, San Diego Bay, and Mission Bay are clearly visible.

2.4 Other Sources Affecting Water Quality in the Action Area

In addition to the SBOO discharge, TJRE, and SAB Creek discussed above, wastes from a variety of human-related sources reach the Action Area as terrestrial runoff. These include direct terrestrial runoff (over shoreline cliffs and beaches), stormwater discharges, and outflows from the San Diego River/Mission Bay, and San Diego Bay mouths. Metropolitan areas of San Diego and surrounding residential areas, including Imperial Beach and Mission Bay, are major population centers and are likely to contribute significant non-point source pollutants to the ocean water in the Action Area. In addition, the Point Loma WWTP discharges advanced primary treated effluent to the Pacific Ocean via the PLOO approximately 22 km to the northwest of the SBOO discharge. Based on the results of an extensive monitoring program, it is unlikely that contaminants from this outfall result in polluting effects within the SBOO Action Area. However, ongoing studies are seeking to allay concerns surrounding uncertainty in relation to the extent and behavior of the discharge plume, pollutant pathways from the discharge through regional food webs, and the relative contribution of the discharge to HAB events in the region.

2.5 Seabed Communities

Seabed habitat in the Action Area consists primarily of soft substrate, but hard substrates and kelp forests are also present. These features are shown in Figure 1-5 in relation to the SBOO. Seabed habitat throughout California is dominated by sandy and muddy substrate. This is also true in the Action Area, where historical surveys have indicated that at least 80 percent of the surveyed seabed consists of soft sediment habitat. The remainder of seabed habitat consists of rocky reef habitat, portions of which support kelp forest habitat. An approximately 4.2-square-mile area of kelp forest lies inshore to the north of the SBOO discharge pipeline at the mouth of the TJRE.

Surveys throughout the Action Area of the infaunal community, fishes, and macro invertebrates inhabiting the soft sediment habitat are completed annually as part of the ongoing monitoring of the SBOO outfall. These surveys are conducted using non-targeted sampling methods (e.g., grab sampling and net tows) and therefore the data describe species that dominate the community assemblage. Benthic macrofauna has typically consisted of worms, crabs, clams, brittle stars, and other small invertebrates. These organisms play important ecological roles in coastal marine ecosystems off southern California, including as primary and secondary consumers that support higher trophic organisms such as fishes, larger invertebrates, and even marine mammals and other vertebrates such as birds.

Many of these species respond to environmental stressors associated with pollution. These relationships are increasingly well understood in southern California where extensive monitoring of species for the purposes of determining polluted marine habitats has been conducted for many decades (Schiff et al., 2001; Smith et al., 2001). For example, minor organic enrichment due to wastewater discharge may result in increases in species richness and abundance while more severe pollutant loading may result in decreases in the overall number of species and increases in abundance of a few pollution-tolerant species. Annual monitoring since 1991 has not detected differences in benthic infauna or macrofauna assemblages associated with proximity to the SBOO.

Historical surveys have indicated that annelid polychaete worms have been the dominant infaunal taxonomic group, constituting more than 80 percent of the total organisms collected in the region. They have been followed in abundance by crustaceans, mollusks, and echinoderms. Dominant polychaete species have included *Spiophanes norrisi* and *S. duplex*, the capitellid *Mediomastus* sp, the amphinomid *Pareurythoe californica*, and the sigalionid *Pisione* sp. Cluster analysis has identified two primary groups (Group C and D) in the Action Area. Group C has been generally associated with high proportions of medium and coarse sand and contained the highest proportion of the dominant annelid *S. norrisi*. Group D has been found at the stations closest to the SBOO, within the Zone of Initial Dilution where effluent mixing with ambient waters occurs most rapidly. Stations clustered with Group D have been generally to the north of the SBOO and sediments at these stations have been more dominated by fine and very fine sand relative to other grain sizes and other groups.

Trawl samples have been undertaken as part of the PLOO and SBOO monitoring. Within the Action Area, trawl samples have been restricted to the 28 m bathymetry contour. At the PLOO stations to the north of the Action Area trawls have been taken at the 100 m depth contour. Fish and invertebrate assemblage between these regions are unlikely to be very different, as seabed habitat at 100 m adjacent to the PLOO are likely to be similar to habitat at this depth in the Action Area. Speckled and longfin sanddab have constituted 50 percent of all fishes collected in 28 m stations in the SBOO region. California lizardfish have also been abundant in trawl samples. Other common species have included California tonguefish and white croaker. These fishes have been abundant sandy-seabed associated fishes in southern California. Northern anchovy and Pacific sardine have also been captured in trawls. These have been midwater and pelagic schooling fishes not typical of seabed habitat. However, they can occur in large schools and have been one of the most abundant species in California waters. Other species captured in trawl nets have included flatfishes such as California halibut, hornyhead turbot, English sole, fantail sole and spotted turbot. Seabed-associated round fishes have included yellowchin sculpin, longspine combfish, roughback sculpin, plainfin midshipman, queenfish, and California scorpionfish. Elasmobranchs have included round stingray, California skate, and shovelnose guitarfish.

At the deeper, 100 m stations adjacent to the PLOO, Pacific sanddab have also been the most abundant fishes caught. Other flatfishes collected at the deeper stations also found in the 28 m stations have included English sole, hornyhead turbot, California tonguefish, and fantail sole. The flatfishes Dover sole, slender sole, bigmouth sole, and curlfin sole have also been observed at the deeper stations. Several rockfishes have been collected in the 100 m trawls. Halfbanded rockfish have been highly abundant, ranking second in most frequently collected of all fishes at these deeper stations. The other rockfish species collected have been stripetail, squarespot, vermillion, greenstriped, rosethorn, flag, greenspotted, cowcod, and rosy rockfishes. Other seabed associated round fishes have included species observed in the 28 m trawls, such as yellowchin sculpin, longspine combfish, roughback sculpin and plainfin midshipman. Other bottom associated roundfish species collected have include pink seaperch, blacktip poacher, Pacific Argentine, spotted cusk-eel. California skate has been the only elasmobranch collected at the deeper trawl stations.

The deepest third of the submerged portions of the SBOO is covered by rock armoring. Footage from an ROV survey of the SBOO wye diffuser and part of the main pipeline was completed in 2019 and provides additional information on the seabed community associated with this artificial reef feature. The SBOO is covered with small- to medium-sized rock boulders placed as protection of the pipeline. This rock armoring, the vertical risers that constitute the diffuser ports, and several access points along the pipeline provide hard-substrate on which rocky reef-associated marine wildlife are established. As described below, the extent of the rocky reef is unclear:

- The San Diego Regional Sediment Management Plan (SD RSMP) developed in 2009 (SD RSMP, 2022) indicates the estimated seabed habitat type, including hard seafloor, as derived from an acoustic survey of the seafloor. Based on visual interpretation of this dataset, rock armoring along the main barrel is approximately 1 mile long and varies in width from approximately 175 to 350 ft. Rock armoring along the northern and southern legs of the wye diffuser varies in width from approximately 60 to 120 ft and runs along the entire length of each leg (1,981 ft per leg). This equates to approximately 30 to 40 acres of rocky reef.

- Based on interpretation of engineering drawings provided in the CoSD (2019) inspection report, the armoring is designed to be approximately 65 ft wide along the main barrel and approximately 57 ft wide along the diffuser legs. Assuming a conservative 20 percent increase in width to account for potential spread of rock material over time due to wave action and potential inaccuracy in the placement of rock at the time of construction, this would be equivalent to 78 ft width along the main barrel and 68.5 ft width along each diffuser leg, which equates to approximately 15 acres of rocky reef.

Regionally abundant marine algae, fish, and invertebrate communities are apparent in the ROV footage associated with the rock-armoring reef. The rock-armoring reef indicates a healthy reef community of invertebrates, understory seaweeds, and associated fishes. Encrusting organisms such as anemone and gorgonian corals were more abundant on open diffuser risers and areas surrounding these risers than other areas. It was particularly notable that the northern leg of the wye diffuser, which has no open risers, contained less biological life than the southern leg. It is likely that the effluent contributes nutrients that enhances organisms on the southern diffuser leg. This included encrusting macroinvertebrates, algal species, and associated fishes. Figure 2-8 shows screen captures from the ROV footage of a capped riser on the northern leg that is largely barren of marine life and an open port on the southern leg heavily encrusted in anemones and other benthic invertebrates.

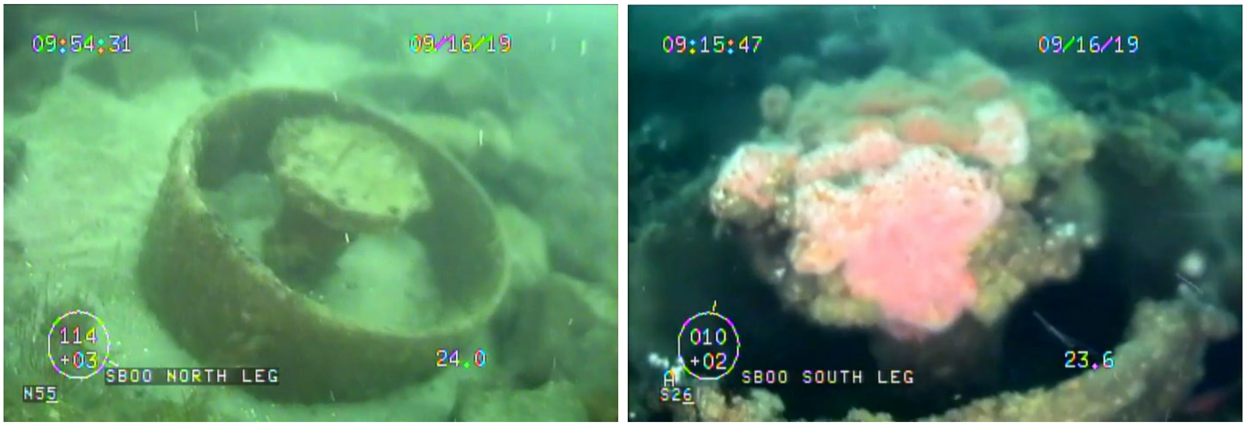

Figure 2-8. ROV footage of (left) a capped diffuser riser on the north leg and (right) an open diffuser riser on the southern leg. Note the abundance of sea life living on the open riser relative to the capped riser.

3. ENDANGERED SPECIES ACT - LISTED SPECIES AND CRITICAL HABITAT

Species that are listed or are candidates for listing under the ESA are included in this BA on the basis that the project may affect the species. The criterion used to determine whether the project may affect a species is whether the typical distribution of the species overlaps the Action Area. This criterion is not a determination of whether the project may adversely affect or jeopardize the species.

Twenty species listed under the ESA and managed by NMFS have been identified as having a typical distribution that overlaps the Action Area. These species, their listing status (threatened or endangered), and their relevant ESA management units (DPS) are included in Table 3-1. No designated critical habitat occurs in the Action Area.

Table 3-1. Species Listed Under the ESA and their Likelihood of Occurrence in the Action Area

Species and Management Unit (DPS) [a]	Scientific Name	ESA	Likelihood of Occurrence [b]
Marine Mammals [c]			
Blue whale	*Balaenoptera musculus*	FE	High
Humpback whale (Central America DPS)	*Megaptera novaeangliae*	FE	High
Humpback whale (Mexico DPS)		FT	High
Fin whale	*Balaenoptera physalus*	FE	High
Gray whale (Western North Pacific DPS)	*Eschrichtius robustus*	FE	Medium
Guadalupe fur seal	*Arctocephalus townsendi*	FT	Medium
Sperm whale	*Physeter macrocephalus*	FE	Low
Sei whale	*Balaenoptera borealis*	FE	Unlikely
North Pacific right whale	*Eubalaena japonica*	FE	Unlikely
Sea Turtles			
Green sea turtle (East Pacific DPS)	*Chelonia mydas*	FT	High
Leatherback sea turtle	*Dermochelys coriacea*	FE	Medium
Loggerhead turtle (North Pacific DPS)	*Caretta caretta*	FE	Medium
Pacific olive ridley turtle (Mexico Pacific breeding population DPS)	*Lepidochelys olivacea*	FE	Unlikely
Pacific olive ridley turtle (Remaining range)		FT	Unlikely
Marine Invertebrates			
White abalone	*Haliotus sorenseni*	FE	Low
Sunflower sea star	*Pycnopodia helianthoides*	FPL	Low
Black abalone	*Haliotus crachoredii*	FE	Unlikely
Fishes			
Shortfin mako or bonito shark	*Isurus oxyrinchus*	FPL	High
Gulf grouper	*Mycteroperca jordani*	FE	Low
Giant manta ray	*Manta birostris*	FT	Low
Scalloped hammerhead shark	*Sphyrna lewini*	FE	Low
Oceanic whitetip shark	*Carcharhinus longimanus*	FT	Unlikely
Steelhead (Southern California DPS) [d]	*Oncorhynchus mykiss irideus*	FE	Unlikely
Green sturgeon (Southern DPS)	*Acipenser medirostris*	FT	Unlikely

Abbreviations: FE = federally endangered; FT = federally threatened; FPL = petitioned for federal listing.

a – DPS: Distinct Population Segment.

b – Likelihood of occurrence considers the absolute frequency of occurrence relative to other species in the table. Effects from the proposed Federal Action that may occur over a long period of time may affect any species in this table, while short term effects may not. This is considered elsewhere in the impact assessment. If the

Action Area represents a location within a species' range that is more frequently utilized than other parts of its range the likelihood of occurrence is revised upward, and *vice versa*. Determination is based on preparer's review of available information and best judgement.
c – All marine mammal DPS listed under ESA are also 'depleted' stocks under the MMPA.
d – Steelhead are managed under several DPSs. Steelhead from the Southern California DPS are most likely to occur in the marine Action Area based on proximity to spawning watersheds. Steelhead from other DPSs are not likely to occur as they migrate rapidly north and offshore after leaving rivers, and therefore have not been included in this table.

The following sections describe life history information pertinent to each species listed in Table 3-1. Emphasis is given to information specifically relevant to the Action Area. Most of the information presented is compiled from key Federal Register Publications related to the listing of each species and subsequent management actions, species' Status Reviews, Recovery Plans, and (in the case of marine mammals) stock assessments. In addition to these key references, data on observations in southern California have been compiled and assessed from two broad sources. Firstly, data from several Agency-led surveys have been summarized. These surveys were identified from two key sources. The CCE LTER Datazoo[10] was queried for marine mammal data sets. This identified a data set that includes mammal observations aboard two research cruise programs:

- California Cooperative Oceanic Fisheries Investigations (CalCOFI) cruises.
- NMFS cruises.

The CalCOFI cruises are conducted quarterly off the coast of southern and central California. NMFS cruises are a part of the Rockfish Recruitment Survey off the coast of southern and central California. Annual data were available from CalCOFI surveys from 1987 through 2006 and from NMFS surveys from 2004 through 2015 (except for 2009 and 2011).

In addition to these two cruises, several Agency-led surveys used for stock assessments under the MMPA are included. These surveys are available through the OBIS-Seamap project.[11] The surveys include:

- 1991 CAMMS Survey (CAMMS91).
- 1993 PODS Survey (PODS93).
- 1996 ORCAWALE Survey (ORCA96).
- 2001 ORCAWALE Survey (ORCA01).
- 2005 CSCAPE Survey (CSCAPE05).
- 2008 ORCAWALE Survey (ORCA08).
- 2014 CalCurCEAS Survey (CALCUR14).
- 2018 CCES Survey (CCES18).

Data were restricted to a region encompassing waters adjacent to southern California from latitude 32°N to 35°N, and from longitude 122°W to 117°W. The data set includes nearly 680 observations

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[10] https://oceaninformatics.ucsd.edu/datazoo/catalogs/ccelter/datasets

[11] http://seamap.env.duke.edu/

of ESA-listed species within southern California. These surveys include areas from near to the shore to several tens of nm offshore throughout southern California and therefore provide a regional overview of the distribution and timing of species over an area much larger than the Action Area. However, they are still valuable in describing regional distributions of these wide-ranging animals.

Secondly, data from the Happywhale[12] project were accessed via the OBIS-Seamap project. These data include observations of three ESA-listed whales made by a mixture of dedicated volunteer scientists and amateur observers. Data include pictures of the animals that can be independently verified by the Happywhale project. There are 15 years of blue whale observations, 45 years of humpback whale observations, and 19 years of fin whale observations in southern California. Most observations are made relatively close to shore from whale watching boats operating out of the major harbors of Santa Barbara/Ventura, Santa Monica, Long Beach, and San Diego. Because they are close to shore compared to the Agency-led survey data, they provide a convenient compliment describing nearshore distributions. They also better represent within-year variation as they typically include near-continuous effort throughout the year, rather than discrete seasonal surveys such as many of the stock assessments. While survey effort within this data set is not continuous throughout the southern California region, many observations occur in the San Diego region. Effort is generally not species biased, therefore observations of marine mammals can be compared relative to one another to provide some indication of the nearshore distribution and animals over time and space. For comparisons, an additional 10 species of marine mammals are included in the data set. The data set includes nearly 7,000 observations of ESA-listed marine mammals in southern California, however the majority (approximately 88 percent) of these are humpback whales. Humpback whales were the initial focus of the project and therefore these have been removed from the inter-species comparisons as they overestimate effort.

3.1 Marine Mammals

3.1.1 Blue Whale

Blue whales (*Balaenoptera musculus*) are listed as endangered under the ESA throughout their range. The following information is primarily summarized from the most recent NOAA stock assessment for the Eastern North Pacific Stock (NMFS, 2020a), and information included in the Federal Register publication (83 FR 51665) associated with the most recently revised Recovery Plan (NMFS, 2020b) and 5-Year Status Review (NMFS, 2020c), unless otherwise indicated.

Blue whales are the largest known animal. They are a baleen whale found in all oceans except for the Arctic Ocean. Like most baleen whales, blue whales migrate annually between northern-latitude feeding areas and equatorial winter breeding grounds. Blue whales feed almost exclusively on krill (euphausiids) from the surface to depths of up to 985 ft. The largest individuals, which approach 110 ft in length, may consume upwards of 6 tons of krill per day.

Although blue whales are managed as one global population under the ESA, three geographically separate populations are recognized: the North Pacific, North Atlantic, and Southern Hemisphere populations. Within the North Pacific, two stocks are recognized under the MMPA: the western/central North Pacific stock and eastern North Pacific (ENP) stock. Large concentrations of blue whales have been documented by biological surveys in California and Baja California since the

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[12] www.happywhale.com

1970s. Blue whales in southern California are part of the ENP stock. The most recent estimate of the ENP stock size based on mark-recapture studies completed in 2018 estimated the population at 1,898 blue whales (Carretta et al., 2021). The global population of blue whales is estimated at less than 10,000 individuals. Prior to the 20th century whaling industry, the global population was estimated at over 200,000 blue whales.

Blue whales from the ENP stock feed in the Gulf of Alaska, along the U.S. West Coast, and in the eastern tropical Pacific, although much of their feeding activity is concentrated off California. ENP blue whales migrate to Baja California, the Gulf of California, and an oceanographic feature known as the Costa Rica Dome[13] off the coast of Costa Rica during winter and spring to breed and calve.

Blue whales may occur in waters off California year-round, however they are abundant in California from July through October. A small number of whales have been documented migrating north in the fall from California to feed in areas off Oregon and Washington, the Alaska Gyre, and Aleutian Islands during the winter season. Between the 1920s and 1960s blue whales were harvested off British Columbia, southeast Alaska, the Gulf of Alaska, and south of the eastern Aleutian Islands. However, there have been few documented sightings of blue whales during biological surveys in those areas since the 1970s.

Central and southern California are likely to be the most important feeding areas for ENP blue whales. Critical habitat has not been designated for the blue whale. However, based on small boat surveys completed from 1986 through 2011, Calambokidis et al. (2015) identified BIAs where blue whales aggregate to feed. Nine BIAs were identified, and all occur off California. Six of these occur in southern California. The southern-most BIA includes 984 km^2 of ocean habitat from Carlsbad to south of Point Loma. The inshore edge of the southern half of this BIA closest to the Action Area begins approximately 5 miles offshore of Point Loma, reflecting a generally offshore distribution of feeding blue whales observed near San Diego. Subsequently, only a small portion of this BIA overlaps the north-western edge of the SBOO Action Area. Peak feeding activity in this BIA occurs from June through October. This is the same feeding period for the remaining five southern California BIAs.

Observation data from Agency-led Surveys indicate that blue whales are the most frequently observed whale species throughout the year in the southern California region. The stock estimate for blue whales indicates the species is less abundant than humpback whales and considerably less abundant than fin whales. Based on GPS tracking data described in Szesciorka et al. (2020) many of the blue whales that calve and breed in the Costa Rica Dome region feed in the southern California region from May through December. Agency-led survey data reflect this pattern, showing higher abundance of blue whale observations in southern California from May through October with peaks in July.

Based on whale call studies described in Sirovic et al. (2015), some blue whales remain in southern California over the winter period. A small number of whales are observed in the southern California region in February in Agency-led survey data. Happywhale observations (Figure 3-1) indicate that whales arrive into the nearshore areas in southern California as early as march, with substantial arrivals occurring in April and May. The peak abundance in southern California is during June and

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[13] The Costa Rica Dome is an area of ocean off the western coast of central America (centered at 9°N, 90°W) characterized by a shallowing of the thermocline driven by cyclonic circulating wind and ocean currents. The feature delivers productive, nutrient-rich waters to the surface and supports a high level of biodiversity.

July. Whales are also present in central California, but few whales are recorded north of central California.

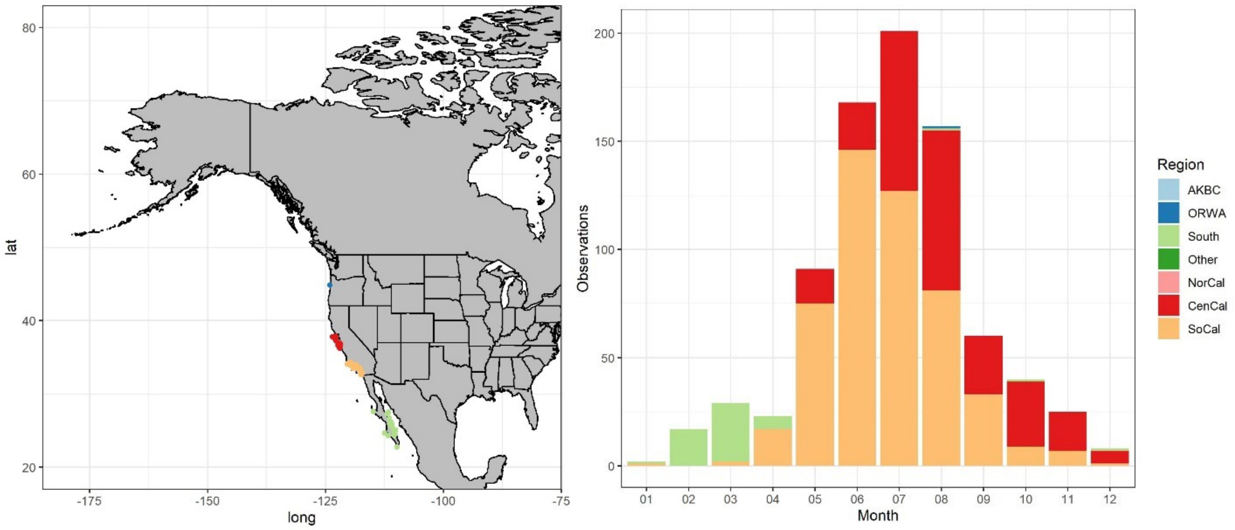

Figure 3-1. Observations of blue whales recorded by the Happywhale project. Left panel. Map of all observations throughout the northeast Pacific Ocean, colored by region. Right panel. Monthly observations, colored by region. SoCal = southern California; CenCal = central California; NorCal = northern California; ORWA = Oregon and Washington, AKBA = Alaska and British Columbia; South = South of 32°N; Other = all other sightings.

Blue whales are assessed as having a high likelihood to occur in the Action Area for several reasons. Firstly, blue whales are abundant in southern California relative to much of the remainder of their eastern Pacific Ocean range. Secondly, within the southern California region, they are especially abundant at several locations (BIAs) and one of those is offshore of Point Loma and Mission Beach, just a few nautical miles to the north of the Action Area.

3.1.2 Humpback Whale

Under the ESA, humpback whales (*Megaptera novaeangliae*) are separated into fourteen DPSs that occur throughout the world's oceans. These DPSs are primarily defined by the associated winter breeding area of the whales, although feeding areas were also considered. Whales off California primarily belong to the Central America DPS and the Mexico DPS. Whales from the Hawaii DPS have infrequently been observed feeding in California waters, however these whales primarily feed in Southeast Alaska, Northern British Columbia, northern Gulf of Alaska, and the Bering Sea.

The following information on the ESA DPSs is from the DPS designation publication in the Federal Register by NMFS (81 FR 62259) and U.S. Fish and Wildlife Service (USFWS) (81 FR 93639) and the supporting technical review on these DPSs by Bettridge et al. (2015) and Fleming and Jackson (2011). Information on humpback whale critical habitat designated under the ESA is from 86 FR 21082. Additional information on life history and distribution is from the 2020 draft California-Oregon-Washington stock assessment (Carretta et al., 2021).

Humpback whales may occur in waters off California year-round. However, they typically migrate to equatorial waters to breed from November and begin returning to California waters in March. Humpback whales from the Mexico DPS breed off mainland Mexico (including the Baja California

Peninsula) and the Revillagigedo Islands. While the humpback whales belonging to the Central America DPS may breed in areas as far north as southern Mexico, the typical breeding areas for these whales range from Guatemala in the north to Panama in the south. Panama is also a breeding area for humpback whales from the Southeastern DPS that migrate south to feed near Antarctica. Although these Southeastern DPS whales feed in Antarctica during the northern hemisphere winter breeding period, genetic evidence indicates that the Central America DPS may interbreed with whales from this southern hemisphere DPS. The population of the Mexico DPS is between 5,000 and 6,000 individuals, while the population of the Central American DPS is much smaller, maybe as few as 500 individuals.

Humpback whales from the Mexico DPS population feed in waters from California to the Aleutian Islands, with concentrations in four locations: California-Oregon, northern Washington-southern British Columbia, northern and western Gulf of Alaska, and the Bering Sea. Humpback whales from the smaller Central America DPS population preferentially feed in waters off California and Oregon and the highest proportion of these whales feed in southern California (Calambokidis et al., 2015).

ESA critical habitat was designated for Central America DPS and Mexico DPS humpback whales in 2021. In California, the critical habitat areas for both these DPSs are identical. The southern boundary of the California portion of critical habitat extends southwest from Oxnard, CA through the Santa Cruz Basin and out to 3,700-m depth contour. The SBOO wye diffuser is more than 160 miles downcoast of the critical habitat boundary. The area encompassing the SBOO (Unit 19) was considered in the critical habitat designation process, but the final draft excluded this area, largely as a reflection of the relatively lower abundance of humpback whale feeding activity in this area compared with other areas.

The critical habitat areas encompass humpback whale BIAs identified in Calambokidis et al. (2015). BIAs are areas humpback whales are more frequently observed on the Pacific coast of north America. Four of these BIAs occur in California with slight variations in seasonal occurrence noted as part of their definition. One of the BIAs occurs in the southern California region, encompassing the Santa Barbara Channel between Santa Barbara and the northern Channel Islands. This BIA is included in the Unit 18 portion of recently designated critical habitat, but no BIA for humpback whales overlaps or lies adjacent to the Action Area.

Agency-led survey data compiled for this assessment indicate that humpback whales are the most frequently encountered large baleen whale in California waters during these surveys, although they are more frequently observed along the northern and central California coastline, particularly off the San Francisco Bay entrance. Within the southern California region, they are more frequently found in the Santa Barbara channel and north of Point Conception. Humpback whales are commonly observed in California waters from fall to the beginning of winter but are most abundant in southern California in April and May.

Many humpback whale sightings are recorded in the Happywhale dataset for the northeast Pacific compared to other marine mammals in the dataset. The sightings are also largely contiguous along the North American coast. The seasonal migration of these animals is clearly shown in Figure 3-2, with an abundance of whales south of California (predominantly in Mexico) from December through April, shifting to an abundance of whales in California, Oregon, Washington, British Columbia, and Alaska regions beginning in May and continuing through November. Most whales are in Central California and the Alaska-British Columbia regions during this period. Whales peak in southern California in July with a second peak in October. It is likely that this pattern of two seasonal peaks reflects northbound and southbound migrations through the southern California region, although humpback whales also remain to feed in southern California throughout the year.

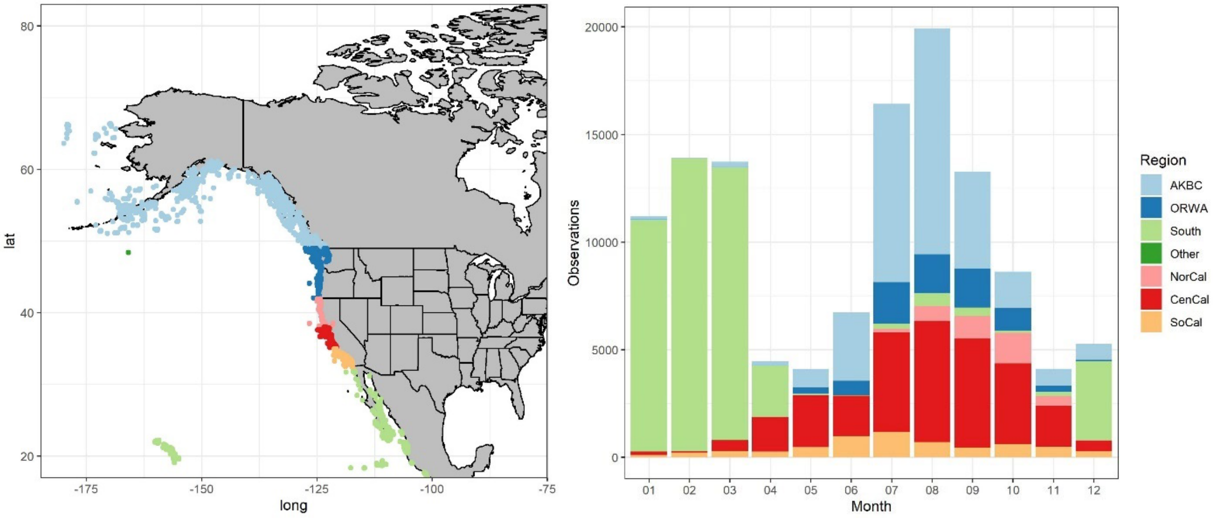

Figure 3-2. Observations of humpback whales recorded by the Happywhale project. Left panel. Map of all observations throughout the northeast Pacific Ocean, colored by region. Right panel. Monthly observations, colored by region. SoCal = southern California; CenCal = central California; NorCal = northern California; ORWA = Oregon and Washington, AKBA = Alaska and British Columbia; South = South of 32°N; Other = all other sightings.

Humpback whales are highly abundant large whales in California compared to other species of large whale and therefore are identified as having a high likelihood to occur in the Action Area. However, they are more typically abundant in northern portions of southern California, as evidenced by the designation of BIA and critical habitat in these areas. Humpback whales are more likely (but not exclusively) to be observed in the Action Area in the southern parts of the Southern California Bight region during the 'shoulder' periods of their feeding season; from late May through August and again in October and November.

3.1.3 Fin Whales

Fin whales that occur at the project site are members of the north Pacific subspecies of fin whale (*Balaenoptera physalus velifera*). There are three other subspecies of fin whale, none of which occur in the north Pacific; north Atlantic (*B. p. physalus*), southern (*B. p. quoyi*), and the pygmy fin whale (*B. p. patachonica*) (Archer et al., 2019). Fin whale is listed as endangered under the ESA throughout its range. No DPS or critical habitat has been designated for this species. The information provided below is compiled from the most recent NMFS recovery plan (NMFS, 2010), status review (NMFS, 2019a), and stock assessment (Carretta et al., 2021), unless otherwise indicated.

Three MMPA stocks are recognized for north Pacific fin whale (NPFW). These are the California-Oregon-Washington stock, the Hawaii stock, and the northeast Pacific stock. NPFW that may occur in the Action Area are considered part of the California-Oregon-Washington stock. It is estimated that before the era of industrial whaling the north Pacific Ocean supported between 42,000 and 45,000 fin whales. This was reduced to between 13,620 and 18,680 by 1973. The best current estimate for the California-Oregon-Washington stock is 9,029 whales, with a lower 20th percentile minimum population estimate of 8,127. This population stock saw an average annual rate of increase of 7.5 percent from 1991 to 2014, but this may represent immigration into these waters from adjacent population stocks, or actual growth; most likely, some combination of these two factors is involved.

Information on distribution and habitat use reviewed in the 2010 Recovery Plan describes peak abundance of fin whales in southern California in summer and fall and Sirovic et al. (2015 and 2017) describes a decline in the number of observations and call frequency in southern California during winter months. However, there is a substantial body of evidence pointing to a resident NPFW population in southern California. Compared to other large whales such as humpback, gray, and blue whales, fin whales are more streamlined and faster swimmers. They occasionally hunt in a large foraging guild with other whale and dolphin species. While similar in size to blue whales, fin whales have a more diverse diet than blue whales, consuming krill, copepods, cephalopods, and small schooling fish such as sardines, herring and anchovies. This is thought to allow these whales to remain resident in southern California year-round (Scales et al., 2017; Campbell et al., 2015; Mizroch et al., 1984).

NPFW call detection frequency increased markedly in December at a hydrophone located close to Point Vicente in Sirovic et al. (2015). Analysis by Scales et al. (2017) indicates that NPFW spend more time along the mainland coast and in the northern Catalina basin in winter and then disperse offshore and farther north in spring and summer. Kernel utilization distribution maps generated from observation and GPS tracking data showing a concentration of fin whales occurring close to shore at the San Pedro shelf during fall, winter, and spring that moves farther offshore during summer. This analysis is supported by Campbell et al. (2015), who analyzed data from the CalCOFI surveys and noted that during winter and spring, the majority of sightings occurred in continental shelf waters within the southern half of the study area, whereas summer and fall sightings were more widely distributed with the greatest concentrations offshore and in the northern portion of the study area along the northern-most survey line. Falcone et al. (2018) built on the analysis completed in Scales et al. (2017). Utilizing resighting data, they show that 22 percent of whales observed in southern California were seen repeatedly between years in the region. These individuals tend to frequent the nearshore waters, particularly in winter, where they are regularly sighted by whale watching operators that contribute photos to this study and have been observed year-round. A lack of sightings in fall in these data is consistent with satellite telemetry work from non-El Niño years, which indicates animals move offshore in the SCB during summer and fall. Some individual whales are resighted in the winter, spring, and summer period in an approximately 30 km stretch of water along the shelf break on the southwestern edge of the San Pedro shelf (Falcone et al., 2018).

Data from Happywhale includes 318 NPFW sightings in the southern California region from 2014 through 2021. NPFW observations in these data are mainly in the Santa Barbara Channel and over the San Pedro shelf offshore of Long Beach, with a smaller cluster of sightings off San Diego. These data indicate the majority of NPFW occur during winter, spring and summer in southern California and a sharp reduction in NPFW observations occurs from July through October where Happywhale data are typically recorded (Figure 3-3). This data aligns with findings in Falcone et al. (2018), Scales et al. (2017), and Campbell et al. (2015) that NPFW are abundant along the San Pedro shelf until July through October, when they likely move offshore or migrate to other areas outside of the Southern California region.

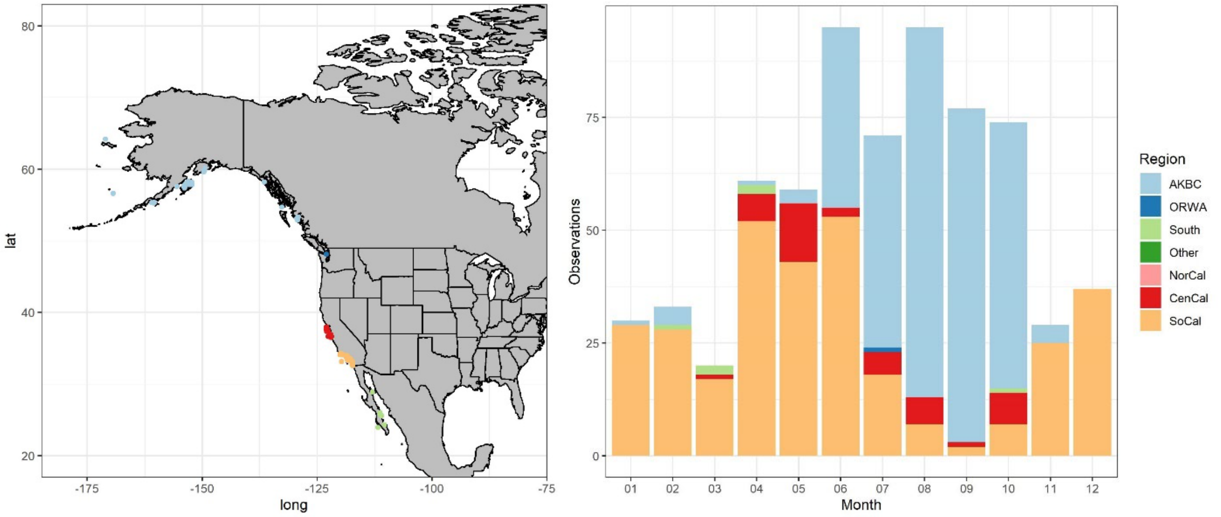

Figure 3-3. Observations of north Pacific fin whales recorded by the Happywhale project. Left panel. Map of all observations throughout the northeast Pacific Ocean, colored by region. Right panel. Monthly observations, colored by region. SoCal = southern California; CenCal = central California; NorCal = northern California; ORWA = Oregon and Washington; AKBC = Alaska and British Columbia; South = coastal sightings south of California; Other = all other sightings.

Fin whales are commonly seen in southern California throughout the year and therefore have a high likelihood to occur in the Action Area. They appear to decline in abundance in the late summer, at least in the near shore areas that include the Action Area, from July through October. It is unclear why, but this is unlikely to be an artifact of the Happywhale data set, which provides the strongest signal of this decline, as this is also a period where whale watching expeditions are highly active.

3.1.4 Gray Whale (Western North Pacific DPS)

Gray whales (*Eschrichtius robustus*) only occur in the northern Pacific Ocean. Two populations of gray whale are recognized under the ESA: the WNP and the ENP DPS. Gray whales in the WNP DPS are designated as Endangered under the ESA and no critical habitat has been designated for the gray whale. Gray whales from the ENP DPS were previously designated as Threatened under the ESA but were delisted in 1994 after the population successfully recovered. The following information is summarized for WNP gray whales from the most recent Western North Pacific Stock Assessment (NMFS, 2019b) and Technical Memorandum on eastern gray whale abundance (Stewart and Weller, 2021).

Gray whales from the WNP DPS typically spend summer months feeding in the western north Pacific along the continental shelf of Eurasia and adjacent northern north Pacific waters, particularly within the Sea of Okhotsk on the eastern shores of Russia, but also in waters to the east of the Kamchatka Peninsula and the western extent of the Aleutian Islands.

Gray whales from the WNP DPS are thought to primarily calve and breed in waters off Japan and China during the northern hemisphere winter. However, some WNP gray whales have been observed migrating to the eastern tropical Pacific, although it is unclear what proportion of whales from the WNP migrate to the eastern Pacific to breed. The most recent stock estimate according to Carretta et al. (2020) for WNP gray whales is 100 whales.

The majority of whales that migrate through California are members of the robust ENP gray whale population. The most recent stock estimate for ENP gray whales is 26,960 whales (Carretta et al., 2021) and the population is generally considered a healthy size. While only a very small proportion of gray whales that migrate through California are likely to be members of the WNP DPS that is listed under the ESA, Cooke et al. (2020) estimate 48-80 percent of WNP DPS gray whales may migrate into eastern north Pacific waters to breed. If the migratory estimates of Cooke et al. (2020) are correct, waters of the eastern Pacific are likely to represent important migratory and breeding areas for this population. Interbreeding between the small WNP population and the ENP population is likely to be important because it will contribute to greater genetic diversity within the WNP population.

Gray whales typically migrate close to shore along the continental U.S. However, between Point Conception and the Mexican border gray whales are regularly observed migrating between the Channel Islands, apparently 'cutting the corner' that constitutes the southern California bight. Subsequently, the gray whale migration route in the southern California region is spread over a much wider area offshore than along many other coastal areas of California. Observations of gray whale in agency-led survey data occur mostly inside of the Channel Islands (within 20 miles of the mainland shore), however some whales are also observed as far out as San Nicholas Island, approximately 60 miles offshore. Northward-migrating mother and calf pairs, which are more likely to occur at the end of the migratory period between January and April are more likely to remain closest to shore and therefore occur in the Action Area.

The most comprehensive information available on gray whale numbers close to shore in southern California come from the American Cetacean Society Los Angeles Chapter (ACS/LA) Gray Whale Survey. These counts during the winter migration through southern California record animals passing the Palos Verdes Peninsula, which is over 96 miles upcoast of the Action Area. However, these data are likely to be indicative of gray whale abundance in the San Diego region, as these whales almost certainly also pass this location.

Observations made by the ACS/LA gray whale migration survey show that southbound gray whale migration peaks around the last week of January through the second week of February. The northbound migration peaks from the middle through the end of March. On average, over 1,000 gray whales will migrate south, and around 2,000 whales will migrate north past this location each winter season. More whales are observed migrating north in part because they include new-born calves, but also because gray whales travelling on the northbound migration generally remain closer to shore.

The migratory seasons of 2018–2019 and 2019–2020 overlapped a designated Unusual Mortality Event (UME) for gray whales that was initiated on January 1st, 2019 and is currently ongoing. A UME is defined under the MMPA as "a stranding that is unexpected; involves a significant die-off of any marine mammal population; and demands immediate response". The UME was declared due to a marked increase in gray whale strandings throughout the Pacific coast of the U.S. beginning in 2019 and continuing through 2020 and 2021. While many stranded whales that have been necropsied were emaciated and scientific teams are investigating potential causal links with recent ocean and ecosystem perturbations, the cause of the UME has not yet been determined. In the 2019–2020 migratory season, 440 gray whales were observed travelling south and 882 were observed travelling north past the Palos Verdes peninsula. The average annual count from the 2014–2015 season through the 2017–2018 season (non-UME seasons) was 1,379 southbound whales and 2,151 northbound whales.

Agency-led survey data include areas much farther offshore than the ACS/LA survey. Gray whales are the most frequently observed whale species and the third most frequently observed marine mammal after California sea lion and short-beaked common dolphin from January through April in the agency-led survey data.

Gray whales from the WNP DPS occur in the Action Area only when they are migrating between feeding grounds in the north-western Pacific Ocean and breeding grounds in Mexico. These whales are very rare and may infrequently migrate to the eastern north Pacific, potentially more frequently migrating to breeding grounds in the western Pacific. Therefore, they are likely to have a very low frequency of occurrence at the project site. However, because the population of these whales is so small, even a few migrations may represent a significant proportion of migrations. Because mixing between ENP and WNP whales may be critical to ensuring a diverse gene pool in the critically endangered ENP population, WNP DPS gray whales are assessed as having a medium (rather than low) likelihood to occur. Furthermore, it is very difficult to determine whether gray whales in the Action Area are from the abundant and frequently observed ENP gray whales or the ESA-listed WNP DPS. In this instance, this factor has also informed the likelihood of occurrence assessment.

3.1.5 Guadalupe Fur Seal

Guadalupe fur seals (*Arctocephalus townsendi*) are a member of the eared seal family (Otariidae). The species is designated as endangered under the ESA and no critical habitat is designated for this species. The information that follows is summarized from the most recent Status Report produced by NOAA (McCue et al., 2021). The 2021 Status Report compiles life history information that was previously included in the most recent stock assessment for the species, prior Federal Register publications, and the most recent research studies for the species.

Guadalupe fur seals breed almost exclusively on a few islands off the northwest Pacific coast of Baja California, Mexico. The most numerically abundant breeding colony occurs at Guadalupe Island and a smaller number of pups are also born at the San Benito Archipelago. Some pups have been born in U.S. territory at the northern Channel Islands, most notably San Miguel Island off the coast of Santa Barbara. It is likely that at least some of these pups are hybrids between Guadalupe fur seals and California sea lions (*Zalophus californianus*).

Females arrive in May at the breeding colonies and dominant males arrive and establish territories at the colonies in June. Mating peaks in July and continues until early August when males leave the colonies to forage. Pregnant females give birth at the colony and pups rely on their mother's milk for up to nine months before weaning. During the nine-month nursing period, pups remain on land at the breeding colony while mothers alternate between a few days nursing and a few days foraging at sea. New mothers enter estrous within one week of birthing pups and then may mate with territorial males.

Less is known about Guadalupe fur seal distribution and behavior at sea than at breeding grounds. However, the species is recognized as breeding, feeding, and travelling throughout the California Current system. GPS satellite tracking data of pups and adults tagged at Guadalupe Island indicate the animals typically travel north into waters offshore of California, Oregon, and Washington. A small number of adult males have been tagged and observed travelling south into the Gulf of California. The tag data indicates the species rarely occurs in continental shelf waters (less than 200 m deep), although they remain within 800 km of the shore. Agency-led survey observations are very few and were made more than 100 miles offshore.

Average recorded dive depths of female Guadalupe fur seals are 7-27 m lasting between approximately one and four minutes. Physiological information indicates that Guadalupe fur seal have a lower capacity for breath holding than other similar pinnipeds such as California sea lions. Their diet is believed to consist mainly of squid, but also small fish such as anchovies, sardines, myctophids, and mackerels. They feed more often at night.

Guadalupe fur seals were believed to have been driven to extinction by the fur trade along the west coast of North America in the 18th and 19th centuries. Pre-exploitation numbers are believed to have been as high as 200,000 animals. In the 1950s a small breeding colony estimated at 200-500 animals was rediscovered inside a sea cave on Guadalupe Island. Following a decades-long successful conservation effort, today's minimum population abundance has been approximated at 31,000 individuals, though it is still considered threatened throughout its range. From 1984–2013 the population stock increased 5.9 percent annually, despite the various threats that this species faces, including entanglement in marine debris and shootings, though these only represent a reported mortality of 2.6 animals per year on average. This average, however, is certain to represent only a minimum due to the high likelihood of unreported mortality events. Beginning in January 2015, strandings of Guadalupe fur seal increased greatly along the California coast. The stranding event was declared an UME. The UME was declared over in September 2021.

This species is not considered to have a high likelihood to occur in the Action Area because of the relative rarity of this species and its generally offshore distribution when at sea. However, considering this species ranges to and from its breeding grounds in Mexico and oceanic feeding areas throughout the California Current, this species is considered to have a medium likelihood to occur in the Action Area.

3.1.6 Sperm Whale

Sperm whales (*Physeter macrocephalus*) are the world's largest toothed whale. They are listed as Endangered throughout their range. Critical habitat has not been designated for sperm whale. The following information is sourced from the most recent NMFS Status Review (NMFS, 2015) and the MMPA stock assessment for the California-Oregon-Washington stock (Carretta et al., 2020).

Sperm whales are one of the most widely distributed marine mammals in the open ocean. Sperm whales are found circumglobally and across all latitudes not infringed by polar pack ice. While sperm whales are managed under the ESA as a global population, several stocks are recognized under the MMPA. Sperm whales that are most likely to occur in waters off California are members of the California-Oregon-Washington (CA-OR-WA) stock. The CA-OR-WA stock is estimated to contain just under 2,000 animals (Carretta et al., 2020). According to the most recent NMFS Status Review, the best estimate for the global population is between 300,000 and 450,000 sperm whales, although the estimate is described as 'not necessarily accurate' by NMFS. It is based on extrapolation from surveyed areas and therefore may be an overestimate.

Sperm whales live in two disparate social units; adult females with their immature offspring and separately, a "bachelor group" consisting of young males that have left their mother's social unit. Male sperm whales remain within a bachelor group until they reach prime breeding age, at which point they become almost entirely solitary except for when they reunite with mature females to breed. Males mature at around 20 years of age and female ovulation begins between seven and 13 years of age. Gestation lasts well over a year for sperm whales, and calving intervals range anywhere from four to 6.5 years. The lactation period lasts for two years.

Sperm whales demonstrate a high degree of socialization. For example, calves may be cared for by females that are not the calf's mother, including nursing of calves. This is a process called alloparental care and allonursing. Sperm whales also exhibit a high degree of specialization and complexity of sounds when communicating. For example, sperm whales are known to produce a sound that is distinct to their social unit, known as a coda. Aggregations of many thousands of female sperm whales occasionally occur in the Pacific Ocean, though it is not understood why this takes place.

Sperm whales are observed throughout the year in agency-led surveys in offshore areas, typically beyond the Channel Islands. There is a minor increase in the frequency of observation during July through October in these data, which may be an artifact of increased sampling effort during this period rather than a seasonal pattern. Because of their oceanic distribution and typically offshore occurrence in the southern California region they are rarely observed in Happywhale data, which is generally closer to shore. However, a small number (five observations) of sperm whale are recorded in these nearshore areas. A single observation of a sperm whale in 2020 was made off Mission Beach San Diego around 15 nm south of the San Diego site alternative. Three of the five sightings are recorded on the same day between the San Pedro shelf break and Catalina Island, so may be the same whale.

These whales have a low likelihood to occur in the Action Area based on their more typically offshore, deep water distribution and the rarity of sighting of these whales in southern California, despite the occasional nearshore observations.

3.1.7 Sei Whale

Sei whales (*Balaenoptera borealis*) are baleen whales found circumglobally and across all latitudes not infringed by polar pack ice. No critical habitat has been designated for sei whales. The information that follows is summarized from the most recent NMFS 5-Year Status Review (NMFS, 2012a), Recovery Plan (NMFS, 2011), and eastern North Pacific Stock Assessment (Carretta et al., 2020).

Sei whales are managed as one global species under the ESA and the International Whaling Commission currently recognizes one stock. However, four stocks are designated under the MMPA, two of which occur in the north Pacific. These are the eastern north Pacific stock and the Hawaiian stock. Sei whales that may occur off California's coast most likely belong to the eastern north Pacific stock of sei whales, which is estimated to number around 519 whales. Estimates for the pre-whaling abundance of north Pacific sei whales range from 58,000 to 42,000 individuals. Sei whales experienced peak whaling efforts late in the history of commercial whaling as the industry shifted to the species having depleted populations of other baleen whale species. Barlow (1994) reports that between 1947 and 1987, 61,500 sei whales were killed in the north Pacific.

Sei whales are typically distributed far out to sea in temperate waters worldwide and do not appear to be associated with coastal features. They are typically found in deeper waters than baleen whales more commonly observed off California such as fin, humpback, blue, and minke whales. Sei whales near California are more typically observed in offshore waters of the central and northern California coast and are very rarely observed south of Point Conception. Fourteen sei whales were recorded in the southern California region in agency-led data compiled for this report. All observations are made far from the coast, with the closest observation more than 30 nm offshore of the Palos Verdes peninsula. Five observations of sei whale are recorded in Happywhale data, four of these occur in southern California. However, at least three of these observations are recorded as tentative Sei whale identifications, as the species is difficult to distinguish from other species such as Bryde's whale. One tentative observation occurred within 10 nm of the SBOO.

Sei whales tend to feed around oceanographic features that concentrate prey such as eddies. They are most common over the continental slopes throughout their range. Compared to most other baleen whales, the sei whale is likely to be restricted to more temperate waters. In the north Pacific, the diet of Sei whales is diverse, including copepods, euphausiids, and gregarious species such as pelagic squid and mackerel.

These whales have a very low likelihood to occur in the Action Area based on their very low numbers. They are also generally thought to have a more offshore distribution than other large whales that may occur in the region.

3.1.8 North Pacific Right Whale

North Pacific right whales (*Eubalaena japonica*) are one of three species of right whale that exist globally, but the only species that may range into California waters. The following information is summarized from the most recent stock assessment (Muto et al., 2021), status review (NMFS, 2017), recovery plan (NMFS, 2013), and the associated Federal Register publication (73 FR 19000) pertaining to critical habitat designation.

North Pacific right whales are one of the rarest of all large whale species. Historically, tens of thousands of north Pacific right whales lived throughout their range in the northern Pacific Rim. Current stock estimates place this population between 28 and 31 animals. Animals typically feed in either the Okhotsk Sea or the Gulf of Alaska and Bering Sea. Winter calving grounds are not known. Historical records indicate north Pacific right whale were less common below 35°N, although animals were observed as far south as 20°N. The Action Area is located at approximately 32.8°N.

Observations of this species in California are very rare. No records of this species occur in the agency-led surveys or Happywhale data reviewed for this study in southern California. However, several reliable observations of north Pacific right whales do occur in publicly available information. The most recent siting of this species in California identified in publicly available information occurred in May 2017. A whale was observed and extensively photographed near Anacapa Islands in the northern Channels Islands by a sailing vessel on a pleasure cruise. Prior to that another sighting of a different animal occurred in April 2017 offshore of La Jolla Shores, San Diego.[14] NOAA scientist Dr. Jeff Moore was quoted as stating one other record of a north Pacific right whale sighting off La Jolla occurred in 1988.[15] In January 2015, a shore-based scientist conducting pinniped surveys recorded a potential sighting from San Miguel Island of a north Pacific right whale approximately 2 miles offshore.[16] However, despite these remarkable observations,

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[14] https://www.cbs8.com/article/news/rare-right-whale-sightings-in-southern-california/509-7deb92df-3b8c-487c-a467-355b288ed419#.Wea4JuhHAL0.facebook Accessed January 2022

[15] https://www.cbs8.com/article/news/biologists-say-whale-seen-off-la-jolla-was-extremely-rare/509-ca500ccc-ece8-4367-97cc-7fd0d5b58d98

[16] https://www.petethomasoutdoors.com/2015/02/north-pacific-right-whales-likely-spotted-off-san-miguel-island.html?fbclid=IwAR1hqQImy_ovyqMpkhoS-zFADt7gqNMr872MUlnC_pGXhqaQfnykqqkCPbg Accessed January 2022.

these very rare whales are considered unlikely to occur in the Action Area because very few of these whales currently exist and they are spread over a very large area of ocean.

3.2 Sea Turtles

3.2.1 Green Sea Turtle

Green sea turtles (*Chelonia mydas*) are distributed throughout the world's tropical, subtropical, and to a lesser extent, temperate waters. Under the ESA, NOAA recognizes 11 DPS based on the status review by Seminoff et al. (2015). The East Pacific DPS, which encompasses green sea turtles that may occur in California, extends from 41°N (near the Oregon/California border) to 40°S (central Chile). The offshore extent of the area encompassing this DPS is 145°W at the most northern latitude and 96°W at the most southern latitude. This area encompasses waters from the coast of southern California to a boundary nearly 950 nm offshore. The East Pacific DPS includes the Mexican Pacific coast breeding population, which was listed as endangered in the original 1978 listing (43 FR 32800). No satellite-tagged adults have dispersed to areas outside the DPS, nor have satellite-tracked turtles from elsewhere migrated into the East Pacific. Green sea turtles from the East Pacific DPS are listed as threatened under the ESA and no critical habitat has been designated for the East Pacific DPS. The information below is summarized from the Recovery Plan (NMFS & USFWS, 1998a), the most recent 5-Year Status Review (Seminoff et al., 2015), and the associated Federal Register publication (81 FR 20057) unless otherwise indicated.

Green sea turtles, like all other marine turtles that occur in the region, lay eggs on tropical nesting beaches. Green sea turtles migrate long distances between foraging areas and egg laying beaches. A female may nest three to 11 seasons over the course of her life. The primary nesting sites for the East Pacific DPS of the green sea turtle are at Michoacán in Mexico, a complex of beaches in Costa Rica, and at the Galapagos Islands off Ecuador. No nesting beaches occur in California. Nesting beaches are characterized by sandy, ocean-facing mainland and island beaches with intact dune structures and native vegetation. Eggs must remain within a biologically-tolerable range from 26 to 32 degrees Celsius.

Hatchlings emerge from their terrestrial nests en masse almost exclusively at night. They immediately disperse to the surf zone and then swim offshore. This period of their life cycle is generally considered a discrete 'oceanic stage'. Knowledge of the diet and behavior of the oceanic stage is limited. Once in the oceanic zone, they navigate using magnetic field orientation. During this initial phase, green turtle juveniles are oceanic, feeding on the drifting algae *Sargassum* spp., and associated hydroids, bryozoans, polychaetes, gastropods, as well as cnidarians and other pelagic invertebrates, fish eggs, and debris. *Sargassum* spp. is an abundant marine algae in tropical and sub-tropical waters that is often found in highest densities where surface water currents converge to form local downwellings.

After several years in this oceanic phase, potentially between one and seven years, green sea turtles transition to nearshore coastal (neritic) environments. Green sea turtles at this transition stage in the east Pacific have a carapace length of between 35 and 40 centimeters (cm). After migrating to the neritic zone, juveniles continue maturing until they reach adulthood. Many green sea turtles maintain residency in specific foraging grounds once settled, although some may periodically move between the neritic and oceanic zones. Neritic stage juvenile and adult green sea turtles are primarily herbivorous, foraging on seagrasses and/or marine algae. Most green sea turtles spend the rest of their lives in coastal foraging grounds along open coastline or in protected bays and lagoons.

While in these nearshore foraging grounds, green sea turtles rely on marine algae and seagrass as their primary diet constituents, although some populations also forage heavily on invertebrates. In the eastern Pacific Ocean, which includes the California region, green sea turtles reportedly forage on a greater proportion of invertebrate foods than in other regions. This may be because the continental shelf north of Point Conception is narrow compared to other continental margins of the Pacific and Atlantic oceans. Areas such as the continental shelves of the U.S. experience unusually cool waters relative to other areas of similar latitude. The limited shelf areas also contribute to this region's nearly complete lack of seagrasses, a primary habitat and diet component of green sea turtles in many other regions.

A persistent population of green sea turtles occurs in San Diego Bay (Madrak et al., 2016). These animals historically associated with the warm water discharge of a power plant until it was shut down in 2010. They forage on eelgrass beds in the south end of the bay. A second foraging aggregation is recognized at Seal Beach National Wildlife Refuge and the adjacent San Gabriel River. This site is the northern-most, year-round foraging aggregation for the East Pacific DPS (Crear et al., 2017). Green sea turtles are also known to forage among shallow water habitats at La Jolla Shores. This location is popular with ocean recreation users and resident green sea turtles have habituated to human contact at this site (Hanna et al., 2021). While these animals likely spend most of their time close to shore or within San Diego Bay and the San Gabriel River, these animals will periodically migrate outside of these areas to breeding grounds in the tropics. The San Diego Bay foraging population has been shown to originate from nesting sites at the Revillagigedo Archipelago and on the coast of Michoacán, Mexico. Satellite tracking of at least one female from this population showed migration from San Diego Bay to Socorro Island (18.8°N) in the Revillagigedo. Another animal was tracked to Tres Marias Islands (approximately 21.5°N) (Dutton et al., 2019).

Green sea turtles in the East Pacific DPS are subject to several factors that continue to threaten the population. These include harvest of eggs and turtles for food and non-food uses, bycatch in coastal and offshore marine fisheries gear, coastal development, beachfront lighting, and heavy foot traffic. Green turtle interactions and mortalities with coastal and offshore fisheries in the eastern Pacific region are of concern and are considered an impediment to green turtle recovery in the East Pacific DPS.

Decades of egg harvest have impacted many nesting subpopulations in the East Pacific DPS. Mortality of turtles in foraging habitats continues to be problematic for recovery efforts. This mortality includes active hunting and incidental fishery bycatch. It is suspected that there are substantial impacts from illegal, unreported, and unregulated fishing, which cannot be mitigated without additional fisheries management efforts and international collaborations. The nearshore gill net fishery is likely to the largest contributor to bycatch mortality, but also longlines, drift nets, set nets, and trawl fisheries for species including tunas (*Thunnus* spp.), sharks (class Chondrichthyes), sardines (*Sardinella* spp.), swordfish (*Xiphias gladius*), and mahi mahi (*Coryphaena hippurus*).

East Pacific DPS nesting beaches are generally less affected by coastal development than green sea turtles in other regions around the Pacific. Coastal habitats of the eastern Pacific are relatively pristine, although green sea turtles in San Diego Bay, at the north edge of their range, have high levels of contaminants. However, nesting beaches are still subject to development throughout the region. Nesting trends are either stable or increasing throughout the DPS. Although trend information is lacking for most sites. However, data are available for Michoacán, Mexico—the largest nesting aggregation in the East Pacific DPS—that indicate green turtle nesting has increased since the population's low point in the mid-1980s. Other data from the Galapagos Archipelago and Costa Rica also indicate stable or increasing trends in nesting.

These turtles have a high likelihood of occurring in the Action Area because populations are resident in areas of San Diego Bay and around La Jolla. These areas are not within the Action Area, but it is assumed that green sea turtles from these populations at least migrate through the Action Area when travelling between feeding and breeding areas. They may also make forays out of San Diego Bay on occasion outside of their breeding migration, although this is more likely to be between coastal foraging areas north of the Action Area.

3.2.2 Leatherback Sea Turtle

Leatherback sea turtles (*Dermochelys coriacea*) are listed as Endangered under the ESA and no critical habitat is designated offshore of southern California. The following information is summarized from the most recent 5-Year Status Review (NMFS & USFWS, 2020a), Recovery Plan (NMFS & USFWS, 1998b) for the leatherback turtle and associated Federal Register publication (77 FR 4169).

Leatherback sea turtles are a species of marine turtle found in the Pacific Ocean, across the Caribbean, the Atlantic Ocean, and the Gulf of Mexico. Leatherback sea turtles that occur in California waters migrate here to feed from nesting areas in both the western Pacific and Central America. Potentially half the global population of adult females nest on the west coast of Mexico. Leatherback sea turtles are estimated to be the most common sea turtle in U.S. Pacific waters. Sightings along the coast of California peak in August. This is assumed to be due to the southward migration of individuals to breeding areas in Mexico, where the nesting season occurs from November to February. Data from telemetry studies (Benson et al., 2011) indicate leatherback sea turtles from U.S. Pacific waters that nest in the western Pacific use beaches in the eastern and central north Pacific, the western south Pacific, the South China Sea, and the Sea of Japan during the North American (boreal) summer period.

Leatherback sea turtles are assessed as having a medium likelihood to occur in the Action Area based on their known distribution patterns throughout California and their wide-ranging distribution in the ocean. Because these animals are seasonal migrants to the region, they are not likely to frequently occur in the Action Area. Furthermore, their primary foraging habitat appears to be on the central coast of California (particularly in and around Monterey Bay). However, they have also been observed foraging in waters in southern California, including off the coast of San Diego (Figure 3-4).

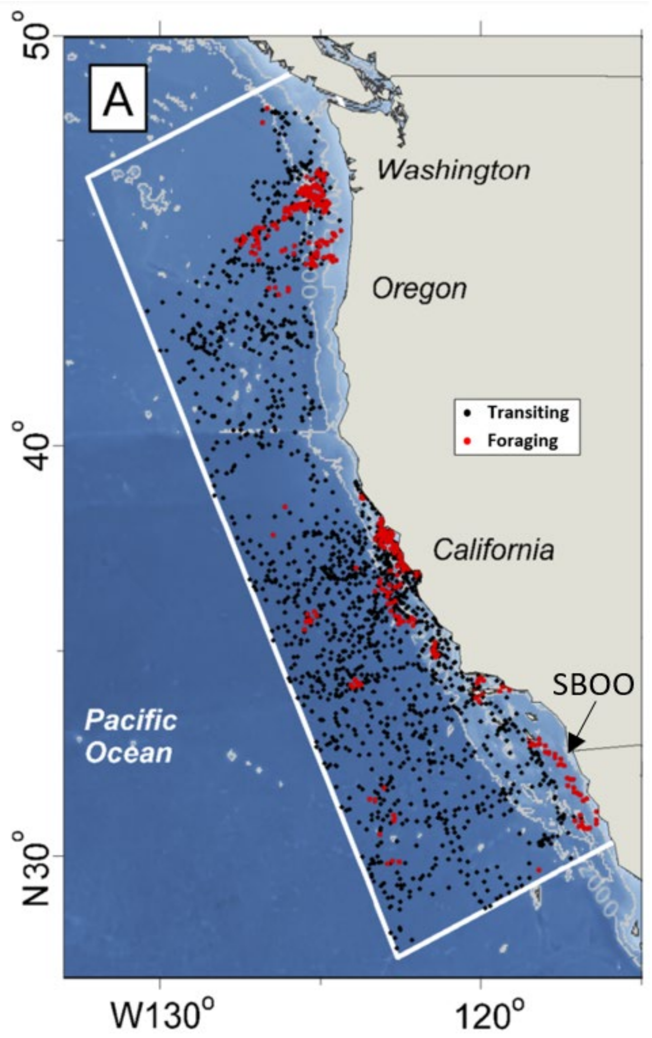

Figure 3-4. Transiting and foraging leatherback sea turtle telemetry locations in U.S.-adjacent Pacific Ocean waters. Adapted from Benson et al. (2011).

3.2.3 Loggerhead Sea Turtle

Loggerhead sea turtles (*Caretta caretta*) are divided into nine DPSs under the ESA. The North Pacific Ocean DPS encompasses all loggerhead sea turtles that may occur in Pacific waters of the U.S. Turtles in this DPS are listed as endangered under the ESA. Critical habitat has not been designated for loggerhead sea turtle in the Pacific Ocean. The following information is summarized from the most recent 5-Year Status Review (NMFS & USFWS, 2020b), Recovery Plan (NMFS & USFWS, 1998c), associated Federal Register publication (79 FR 39855), and information specific to southern California loggerhead sea turtles summarized in Eguchi et al. (2018).

Loggerhead sea turtles range throughout the world's tropical and temperate waters. In the north Pacific Ocean, loggerheads nest exclusively in Japan. Following hatching, juvenile loggerheads display a short (weeks to months) neritic stage (nearshore in waters less than approximately 660 ft) before progressing to an oceanic stage where they continue their development to maturity for several years. During this neritic stage, juvenile loggerhead sea turtles disperse eastward following the Kuroshio water current and its extensions, and eventually disperse throughout the central north Pacific Ocean. Some juveniles transition to foraging areas in the eastern Pacific Ocean, particularly along the west coast of the Baja California Peninsula. However, the most important foraging areas for loggerhead sea turtles are in the oceanic western Pacific Ocean region. This area includes the East China Sea and Kuroshio Extension Bifurcation Region. Foraging juveniles remain in these areas for decades until they mature. At maturity they leave the foraging areas and return to natal nesting sites in Japan to breed, where they remain for the rest of their lives. Therefore, loggerhead sea turtles found in the eastern Pacific, including animals in southern California, are most likely to be juveniles. In the eastern Pacific, loggerhead presence has been reported from Alaska to Sinaloa, Mexico with a major foraging hotspot identified along the Baja California Peninsula. Occasional presence of loggerheads off southern California has been reported with more sightings noted during El Niño conditions.

To determine the distribution and density of loggerhead sea turtles in the southern California region, Eguchi et al. (2018) conducted aerial surveys during September and October of 2011 and 2015 and compiled opportunist sightings from private citizens and scientists for the species in the region. The opportunist sightings included some shipboard surveys in 2006 and 2014. Some of these data are presented in Figure 3-5. There were 419 certified observations of loggerhead sea turtles in this data set in the southern California region. However, very few occurred close to the Action Area and none occurred within the Action Area. In general, observations were more common in the southern parts of the southern California region, far offshore beyond the Channel Islands.

Loggerhead sea turtles are assessed as having a medium likelihood of occurrence in the Action Area because they have been observed in offshore water adjacent to the Action Area, even though their core distribution is farther south than the Action Area in Baja California and south into the tropics.

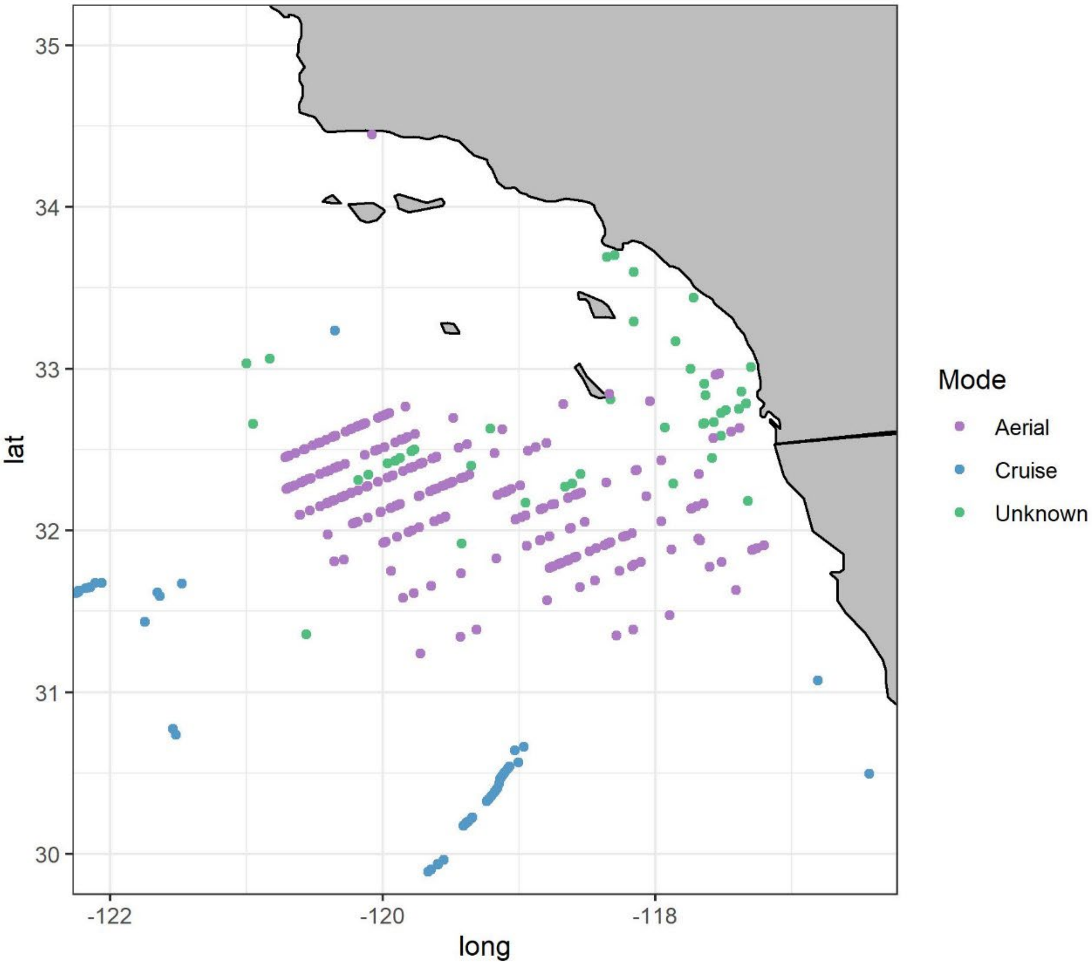

Figure 3-5. Observations of loggerhead sea turtles from Eguchi et al. (2018) in the southern California and adjacent regions. Source: Dr. J. Seminoff (NMFS) pers. comms. January 2022.

3.2.4 Olive Ridley Sea Turtle

Olive ridley sea turtles (*Lepidochelys olivacea*) are the smallest and most abundant sea turtle species with a mature carapace length of approximately 60 to 70 cm. Olive ridley sea turtles that nest on Mexico's Pacific coast are listed as Endangered under the ESA and no critical habitat has been designated for this species. The following information has been summarized from the most recent 5-Year Status Review (NMFS & USFWS, 2014) and Recovery Plan (NMFS & USFWS, 1998d) for the olive ridley sea turtle.

NMFS & USFWS (2014) indicates an eastern Pacific range from Peru to California, with "occasional sightings as far north as Alaska". A review by McAlpine et al. (2007) identified three documented sightings from California between the 1950s through the 1970s. Hodge and Wing (2000) indicate two occurrences of Olive ridley sea turtles in Alaska, suggesting on rare occasion these animals can occur well outside of their tropical and sub-tropical range in the eastern north Pacific. All information in NMFS & USFWS (2014) on the ecology and distribution of at-sea olive ridley turtles is focused on subtropical waters west of Central America.

Olive ridley sea turtles nest in the eastern Pacific on sandy beaches from Mexico to Costa Rica. Six beaches in Mexico constitute the main beaches for large-scale synchronized nesting (arribada beaches) of Olive ridley sea turtles listed as endangered under the ESA; Mismaloya, Tlacoyunque, Moro Ayuta, Ixtapilla, La Escobilla, and Chacahua, although solitary nesting occurs over a wider area. Oceanic distributions suggest an offshore nomadic feeding distribution with aggregations of turtles observed feeding at oceanic features such as upwelling currents in water offshore of Central America. The foraging biology of this species remains poorly understood, but preliminary data appears to paint a generalist picture, at least in the eastern Pacific, where adults were seen foraging on fish, salps, crustaceans, and mollusks.

The direct harvest of both adult turtles and eggs represents a substantial threat to this species. In the latter half of the 20th century commercial exploitation of this species led to a decline in global population numbers. It is estimated that at least 1 million olive ridleys were harvested in Mexican waters in the year 1968 alone. The harvest of marine turtles and their eggs has been made illegal in most of the countries of the eastern Pacific Ocean where this species is known to nest, but enforcement has proven exceedingly difficult. In Costa Rica eggs may be harvested during the ‘first wave’ of the annual arribada. This is allowed because many first wave eggs are naturally destroyed by subsequent laying efforts. By providing a regulated harvest instead of a complete ban the regulations seek to maintain a sustainable harvest that supports the local economy reliant on egg harvesting. Coastal construction and beachfront light pollution pose a threat to the quality of nesting habitat and must be regulated around beaches of local nesting importance; however, no nesting is known to take place within U.S. territory.

While olive ridley sea turtles do occasionally occur in California they are primarily a subtropical and tropical species. They are considered unlikely to occur in the Action Area based on the very limited number of accounts of this species throughout the Pacific coast of north America and their natural distribution to be south of the U.S.-Mexico border. Observations of turtles on the Pacific coast of North America, the majority of which are stranded animals, are likely to be unwell turtles that may have passively drifted on ocean currents.

3.3 Marine Invertebrates

3.3.1 White Abalone

White abalone (*Haliotus sorenseni*) are herbivorous marine gastropod mollusks (a type of snail) found along the west coast of North America from Point Conception, California to Punta Abreojos, Baja California, which includes the Action Area. White abalone are listed as endangered under the ESA and no critical habitat has been designated for this species. The following information is summarized from the most recent 5-Year Status Review (NMFS, 2018b), and Recovery Plan (NMFS, 2008).

The historical range of white abalone extended from Point Conception, California to Punta Abreojos, Baja California, Mexico, with the historical population center located at the California Channel Islands. This species is found from 5 to 60 m deep, but current remnant populations are most common from 30 to 60 m depth. Survey data indicate the highest densities of white abalone occur from 40 to 50 m depth. It is the deepest dwelling abalone species in California.

Adult white abalone occur in open, low relief rocky reefs or boulder habitat surrounded by sand. Observations in the field indicate that white abalone prefer the edges of reefs at the sand-rock interface. White abalone associate with flat, moderate complexity habitats consisting of deformed (faulted or folded) rocks and sand and the presence of brown algae such as *Agarum fimbriatum* and

Laminaria spp. It feeds upon benthic drift kelp and other algal sources. Suitable habitat is patchy, thus it is assumed that the distribution of white abalone is naturally also patchy.

Two rocky reef areas occur within the Action Area that may be affected by discharge from the SBOO. Rocky reef occurs at the Imperial Beach Kelp Forest, although this kelp forest is intermittent in nature and the seabed consists of predominantly cobble habitat, that may be intermittently covered by sand. Therefore, the Imperial Beach Kelp Forest does not represent high quality white abalone habitat. The ballast rock structure protecting the emergent portions of the SBOO provide rocky habitat at suitable depths for white abalone. The jumbled rock structure may offer reasonably good structure for white abalone to inhabit, but it is unclear if this area supports extensive and consistent kelp that could provide food to white abalone. Because white abalone are so rare and the habitat in the Action Area is low quality it is unlikely white abalone occur in the Action Area. Therefore, they are assessed as having a low likelihood of occurrence in the Action Area.

3.3.2 Sunflower Sea Star

Sunflower sea stars (*Pycnopodia helianthoides*) are currently under consideration for listing under the ESA by NMFS. During this time, the sunflower sea star is considered a candidate species under the ESA. The species was petitioned for listing by Center for Biological Diversity (CBD) in December 2021 and NMFS determined that the petition presents substantial scientific or commercial information indicating that the petitioned action may be warranted (86 FR 73230). The following information is compiled from the original petition (CBD, 2021), the International Union for Conservation of Nature (IUCN) Red List entry (Gravem et al., 2021), and the 90-day petition finding (86 FR 73230).

Sunflower sea stars occur from the Aleutian Islands, Alaska to at least the Southern California Bight. There is some data indicating that the species may range as far southwestern Baja and San Ignacio Lagoon, Mexico. It is most common from the Salish Sea to the Aleutian Islands. The species is more commonly found in waters less than 25 m deep, although it may range as deep as 300 m. The species reproduces by broadcast spawning; eggs and sperm are released into the water column and fertilize in the plankton. Larval sunflower sea stars are planktonic for between 50 and 146 days. Individuals then settle as juveniles and grow, typically living for 15 years and up to 68 years. Between 2013 and 2017 the population of sunflower sea star was severely depleted by sea star wasting syndrome. The population is believed to have declined more than 90 percent and the area over which it occupies has decreased by more than 50 percent. The species appeared to be locally extinct at the Channel Islands from 2014–2017. It is unclear if the population has shown any signs of recovery. Because the southern California population appears to have experienced such a dramatic decline it is unlikely this species occurs at the project site, although its presence cannot be ruled out. Therefore, it is assessed as having a low likelihood of occurrence in the Action Area.

3.3.3 Black Abalone

Like white abalone, black abalone is an herbivorous marine gastropod mollusk. Black abalone is the only abalone species in California that primarily occurs in rocky intertidal habitat as adults; the other abalone species are found in subtidal habitat. Black abalone were listed as endangered under the ESA in 2009 (74 FR 1937). Critical habitat was designated for black abalone in 2011 (76 FR 66806). Black abalone life history and ecology are summarized in the ESA proposed listing published by NOAA in the Federal Register (73 FR 1986), the most recent 5-year status review (NMFS, 2018c), and the most recent recovery plan for this species (NMFS, 2020d). The remainder of this section summarizes life history information from these documents.

The current geographical range for black abalone is generally accepted to extend from Point Arena (Mendocino County, California, USA) south to Bahia Tortugas, Mexico. Critical habitat includes intertidal rocky shoreline extending northwards from Point Conception. The only mainland critical habitat designated south of Point Conception is the Palos Verdes peninsula approximately 100 miles upcoast of the Action Area.

Adult black abalone are relatively sedentary, benthic gastropod mollusks that can reach eight inches in length and can live up to 30 years. Adults and juveniles inhabit rocky faces, overhangs, and cracks in the rocky intertidal and shallow rocky subtidal zone from the upper intertidal to subtidal depths of 20 ft. Rocky intertidal and shallow subtidal habitat is rare in the Action Area. The northern portion of the Action Area reflects a conservative maximum extent of the potential plume. The plume is likely to be highly diluted at its maximum extent. This portion of the Action Area includes the Zuniga Jetty, a rip-rap jetty that protects the entrance to San Diego Bay. It also includes a portion of the Point Loma headland that consists of rocky intertidal and shallow subtidal habitat. Both the headland and hard-substrate infrastructure could provide habitat for black abalone. However, surveys conducted at four rocky intertidal sites in 2015 between La Jolla and Point Loma found no black abalone (Eckdahl, 2015 as cited in NMFS, 2022) and data from long-term monitoring surveys show no records of black abalone within the area since at least 2005 (NMFS, 2011 as cited in NMFS, 2022). Since the onset of Withering Syndrome, a naturally occurring disease that severely affected black abalone in the late 1980s, populations of black abalone declined dramatically statewide and have remained depressed throughout its range. The mainland population is particularly depressed between Point Conception and Baja Mexico and is likely largely absent from suitable mainland habitat throughout the Southern California Bight region. Based on its depressed distribution in the region encompassing the Action Area and the lack of observations during surveys of potential habitat at the Point Loma headland, the species is unlikely to occur in the Action Area.

3.4 Fishes (Including Elasmobranchs)

3.4.1 Shortfin Mako

Shortfin mako sharks (*Isurus oxyrinchus*) are currently under consideration for listing under the ESA by NMFS. During this time, the shortfin mako shark is considered a candidate species under the ESA. The species was petitioned for listing by Defenders of Wildlife in January 2021 and NMFS determined that the petition presents substantial scientific or commercial information indicating that the petitioned action may be warranted (86 FR 19863). The following information is compiled from the original petition (Defenders of Wildlife, 2021), the 90-day petition finding (86 FR 19863), and Ebert (2003).

Shortfin mako sharks are found in all temperate and tropical oceans. Tagging data suggest shortfin mako sharks in the Pacific Ocean are separated into north and south populations. Within the northern Pacific Ocean, the tagging data also indicates an east-west divide. These divisions are supported by genetics data. According to Ebert (2003), shortfin mako sharks are an extremely active-swimming species famed for its jumping ability. Like many large epipelagic shark species, shortfin mako sharks follow warm waters that move seasonally north and south. Shortfin mako sharks are found in waters above 60 degrees Fahrenheit and prefer waters 63 to 72 degrees Fahrenheit. Juveniles are described by Ebert (2003) as “fairly abundant” off southern California in the summer months. Adults are less abundant and are more common on the outer banks of the Southern California Bight, particularly around the Channel Islands during late summer. Tagging studies off the U.S. and Mexico indicate that shortfin mako sharks move offshore in the winter and spring (Defenders of Wildlife, 2021). The July 2018 stock assessment presented for this species for a period up to 2016 indicated the fishery was sustainable. However, the IUCN Red List assessment of the trend over three generations (72 years) indicated a median decline of 36.5 percent. Additionally, data from the Western and Central Pacific Fisheries Commission indicate that longline catch rates of shortfin and longfin mako sharks (*Isurus paucus*) combined in the north Pacific declined significantly by an average of 3 to 11 percent annually between 1995 and 2010 (Clarke et al., 2013). Subsequently, NMFS is undertaking a detailed review of the status of this species globally under its ESA-remit.

This shark has historically been a relatively common shark species in southern California, particularly juveniles. Therefore, it is assessed as having a high likelihood to occur in the Action Area, particularly during summer and fall months before the sharks are believed to move into deeper (offshore) water through winter and spring. No data indicating a decline in the species was found in this assessment for the region encompassing the Action Area other than ocean basin-wide fisheries-dependent information in the fisheries stock assessments described in the 90-day petition finding (86 FR 19863).

3.4.2 Gulf Grouper

Gulf groupers (*Mycteroperca jordani*) are large predatory fish native to the eastern Pacific. They range from La Jolla, California to Sinaloa, Mexico including the gulf of California. The species is designated as Endangered under the ESA and no critical habitat has been designated for this species. The following information is summarized from the most recent Status Review of the gulf grouper (Dennis, 2015).

Gulf groupers, like many other groupers, are large, reef-associated fish found in tropical and sub-tropical oceanic waters. They can grow to 150 cm, can weigh up to 91 kilograms and may live up to 48 years. Gulf groupers inhabit waters less than 100 m depth and are more typically found in depths less than 30 to 45 m deep around seamounts and reefs. Juveniles may be found in tidepools. They are mostly solitary fish but seasonally aggregate to breed. While the northern distribution of the species is La Jolla, San Diego, there have been no known records of gulf groupers at the site since the 1930s. Recent records are almost exclusively within the Gulf of California, with a limited number of reports of the fish from Bahia Magdalena, over 600 miles south of the project.

Once considered abundant, their relative ease of harvest meant a rapid exhaustion of the resource across its range, with the species now reduced to less than 1 percent of its original abundance. Gulf groupers may not be caught in the U.S. but take continues in Mexican waters, albeit at a greatly reduced rate compared to historical rates. The predictable nature of gulf grouper spawning aggregations made this species easy to capture compared to many other large fishes. Furthermore, the species is slow to reach sexual maturity; young fish become sexually mature females at six years of age. Males transition from females, a process not uncommon in fishes known as protogynous hermaphrodism. The relatively slow maturation of gulf groupers compared with other fishes means population recovery in gulf groupers following a decline is relatively slow. Males are typically less common than females and typically larger than females and are therefore selectively fished, further reducing the ratio of males to females. These characteristics make gulf groupers particularly vulnerable to fishery-driven extinction compared with many other fishes.

Because the Action Area is at the northern extent of this species range and the species is relatively rare throughout its range, other than discrete aggregations in Mexico, this species is considered to have a very low likelihood of occurrence in the Action Area.

3.4.3 Giant Manta Ray

Giant manta rays (*Manta birostris*) are very large species of the order Myliobatiformes. The species is designated as threatened under the ESA throughout its range and no critical habitat is designated for this species. The following information is summarized from the most recent Status Review (Miller et al., 2017) and associated Federal Register publication (84 FR 66652) concerning critical habitat determination.

No critical habitat has been designated for this species because no physical or biological features essential to the conservation of the giant manta ray have been identified by NMFS within areas under U.S. jurisdiction. According to Ebert (2003), the giant manta ray occurs in tropical, subtropical, and warm-temperate waters around the globe. They prefer water temperatures greater than 68 F and like many large warmer water sharks, will migrate into California when the water warms and retreat as it cools. Therefore, they are more likely to occur in southern California during El Niño summers. They have been found as far north as Santa Barbara and around the Channel Islands. Ebert (2003) states that they are very common offshore of Baja, Mexico and throughout the tropical eastern Pacific to Peru and the Galapagos Islands.

They are a highly migratory species that may travel distances up to 1,500 km, although some populations of giant manta rays do not migrate. Giant manta rays spend more time in the open ocean than near the coast compared to closely related rays such as the reef manta ray (*Manta alfredi*). Giant manta rays are slow-growing, long-lived animals with low reproductive rates. Like all members of the order Myliobatiformes, giant manta rays give birth to live young. Females reach sexually maturity between eight and 13 years of age or approximately 90 percent of their maximum body size. They give birth to a single pup after a gestation period that lasts approximately one year. Some research suggests that an individual female living upwards of 40 years will only produce about 5 to 15 offspring in her lifetime, due to late sexual maturation and biannual pregnancies for the remainder of her life. These life history traits make the giant manta ray highly susceptible to over-harvesting, which remains the primary threat this species faces today.

Information on the frequency of occurrence of giant manta rays in California was not available, however based on accounts of their rare occurrence as far north as the Santa Barbara Channel this species is given a very low, but not unlikely, assessment for their likelihood to occur in the Action Area. The core distribution of this species is tropical, open ocean and island regions of the Pacific Ocean, which does not include the Action Area.

3.4.4 Scalloped Hammerhead Shark

Scalloped hammerhead sharks (*Sphyrna lewini*) occur circumglobally throughout the world's warm temperate and tropical seas. This species is divided into six DPSs: Northwest Atlantic & Gulf of Mexico DPS, Central & Southwest Atlantic DPS, Eastern Atlantic DPS, Indo-West Pacific DPS, Central Pacific DPS, and Eastern Pacific DPS. Scalloped hammerhead sharks that may occur in California are from the Eastern Pacific DPS. Scalloped hammerhead sharks from the Eastern Pacific DPS are listed as endangered under the ESA. No critical habitat is designated for scalloped hammerhead shark. The following information is summarized from the most recent Status Review (Miller et al., 2014), 5-Year Review (NMFS, 2020e), associated Federal Register publication (80 FR 71774), and Ebert (2003).

Scalloped hammerhead sharks from the Eastern Pacific DPS includes coastal waters from southern California to Ecuador. Ebert (2003) reports that scalloped hammerhead sharks are rarely seen in California. A few confirmed records of the species are noted by Ebert (2003) from fishing catches (either bottom gill net or anglers). Each catch was observed in summer months when warm waters extend into southern California, particularly during or following El Niño periods. The species typically prefers waters warmer than 72 degrees F. According to Ebert (2003) they are commonly confused with smooth hammerhead sharks (*Sphyrna zygaena*), a more temperate species that is far more common in California.

Of the six DPSs identified under the ESA Status Review (Miller et al., 2014), the Eastern Pacific DPS, alongside the Eastern Atlantic DPS, was at the highest risk of extinction. This species is described as "extremely abundant in the Gulf of California" by Ebert (2003). Global population stock information is lacking, but it is assumed that downward trends observed in the Northwest Atlantic and Gulf of Mexico DPSs are reflected in the other DPSs.

Scalloped hammerhead sharks migrate to nursery areas to give birth to live young. Newborn scalloped hammerhead sharks typically remain in the nursery habitats where they will live for up to a year before dispersing. Adult scalloped hammerhead sharks are commonly found in coastal feeding habitat as individuals or in pairs but also form schooling aggregations, including during migrations.

Although little abundance data was available at the time of the review by Miller et al. (2014), commercial and artisanal fishery pressure and a lack of effective regulatory mechanisms were determined as a significant threat to scalloped hammerhead sharks.

Based on accounts that describe this species as rarely seen in southern California, its known distribution to be in subtropical and tropical waters in the eastern Pacific, this species is considered to have a very low likelihood of occurrence in the Action Area.

3.4.5 Oceanic Whitetip Shark

Oceanic whitetip sharks (*Carcharinus longimanus*) are large oceanic sharks. The species is listed as threatened under the ESA throughout its range and no critical habitat is designated for this species. The following information is summarized from the most recent oceanic whitetip shark Status Review (Young et al., 2018), the Federal Register publication (85 FR 12898) concerning the critical habitat determination, and Ebert (2003).

Oceanic whitetip sharks occur over the outer continental shelf, around oceanic islands in the tropics and subtropics, and in open ocean basins. They feed primarily upon fish and cephalopods and may reach between 25 and 36 years of age. Ebert (2003) states the species is most common between 20ºN and 20ºS and may move beyond these latitudes following the movement of warm water masses. It is one of the most common oceanic sharks in tropical and warm-temperate seas. Young et al. (2018) and the current IUCN Red List entry describe the distribution of this shark as occurring below 30ºN from approximately Punta Colonet, Mexico. This is approximately 150 miles downcoast of the U.S. -Mexico maritime boundary. The species is typically found swimming in waters deeper than 200 m, occasionally entering inshore waters as shallow as 40 m. This species is more commonly found in water temperatures greater than 68 degrees Fahrenheit and like many large warmer water sharks, will migrate into California when the water warms and retreat as it cools. Oceanic whitetip sharks are found in at least the top 150 m of the water column, although may dive deeper. According to Ebert (2003) this is a rare species in California waters but is occasionally seen around the Channel Islands during warm-water years, with unconfirmed reports of an individual seen off central California.

Prior to the peak of commercial fishery harvests these sharks grew to 3.5 m but currently maximum sizes are rarely more than 2.7 m. Population estimates for oceanic whitetip sharks are uncertain, but data suggest substantial declines in global oceanic whitetip shark populations. For example, the oceanic whitetip shark population in the western and central Pacific Ocean is estimated to have declined by approximately 93 percent from its natural biomass in the region. These declines are driven primarily by commercial fisheries supplying the international fin trade, as well as accidental bycatch, and illegal, unreported, and unregulated fishing.

Even though this species is, on rare occasions, observed in offshore waters in California, the oceanic nature of this species and its core distribution no farther north than approximately 30°N mean this species is unlikely to occur in the Action Area.

3.4.6 Steelhead Trout

Steelhead trout (*Oncorhynchus mykiss irideus*) spawn and develop as juveniles in freshwater rivers before migrating to the ocean, where they spend several years growing before returning to rivers to spawn. Steelhead trout in the eastern Pacific Ocean are divided into 15 DPSs (Busby, 1996). Twelve of these are protected under the ESA. Steelhead that spawn in southern California rivers are members of the Southern California DPS, which is listed as endangered under the ESA. The Tijuana River is one of the southernmost watersheds that historically supported the federally endangered Southern California steelhead DPS (NMFS, 2012b).

Steelhead would have historically migrated in the main channel of the Tijuana River to move between perennial tributaries and the ocean. There is little historical or current information on steelhead in the Tijuana River watershed; surveys indicate the potential presence of resident *O. mykiss irideus* populations in upstream perennial tributaries (NMFS, 2012b), but barriers prevent these fish from migrating between ocean and freshwater. Despite the lack of information, specific recovery actions for steelhead are outlined within the NMFS Southern California Steelhead Recovery Plan (2012b).

Steelhead trout spawn in rivers in the winter and spring, beginning in late December in California and ending in May. Steelhead trout are generally understood to migrate to subarctic ocean waters in spring approximately two years after hatching in freshwater. Studies of the oceanic phase of steelhead trout are limited to fishes from rivers to the north of the southern California region and the life history of steelhead in the ocean is not as well understood (Light et al., 1989).

Tagging studies and coastal net sampling indicate that, once in the ocean, steelhead trout exit the coastal shelf quickly, dispersing across the Pacific Ocean, and rarely use coastal environments. Younger age class steelhead trout concentrate in the Gulf of Alaska with a southern extent of approximately 42°N. Older age classes extend south as low as 40°N and west as far as 150°E from this area towards Asia (Hayes and Kocik, 2014; Hayes et al., 2012). For example, purse seining and tagging work in Oregon and Washington rivers reported in Hartt and Dell (1986 *cited in* Pearcy et al. [1990]) indicate that most steelhead trout migrate directly and far offshore during their first summer in the ocean, rather than along a coastal belt where other juvenile salmonids typically migrate. Pearcy et al. (1990) report very low abundance of juvenile and adult steelhead trout inshore of 9.3 km caught by systematic purse seine net trawls off the coast of Oregon and Washington (from Cape Blanco, OR to Cape Flattery, WA). The highest number of steelhead trout caught in these surveys were approximately 37 to 46 km from the coast.

Despite the evidence that steelhead trout may leave rivers and rapidly migrate offshore and towards subarctic feeding grounds far north of their natal streams, some very limited evidence indicates alternative patterns of oceanic behavior. Everest et al. (1973) tagged approximately 17,400 steelhead trout in the Rogue River watershed. Although just eight fish were caught, all were caught downcoast of the Rogue River. Together with reports of steelhead trout landed at Fort Bragg that resembled Klamath River steelhead fish, Everest et al. (1973) propose this as evidence that Rogue River steelhead trout rear in ocean waters south of the Rogue River. Pearcy et al. (1990) speculate some oceanic phase steelhead trout may reside in the strong upwelling zone off northern California and southern Oregon rather than migrate to subarctic ocean waters. Teo et al. (2011) tagged and successfully monitored two adult steelhead trout that had completed spawning (called 'kelts') on the Sacramento River. One of these two fish left the Sacramento Estuary and San Francisco Bay, but remained relatively close to the continental U.S., never migrating farther than 41°N (Figure 3-6). Despite this evidence for the potential for steelhead trout to occasionally remain close to shore in central and northern California, it is highly unlikely that the ocean environment in southern California provides habitat for steelhead trout other than when migrating rapidly to and from spawning river mouths. Because the Tijuana River is unlikely to support steelhead trout it is highly unlikely that they will occur in the Action Area and be affected by the proposed Federal Action.

Steelhead trout are unlikely to occur in the Action Area. The Tijuana River is not believed to support migrating steelhead trout and most steelhead trout migrating out of rivers are generally believed to travel away from the river mouths relatively quickly. It is unlikely that the warmer waters of southern California, particularly in the Action Area, would be conducive to supporting steelhead trout, even if they occur in rivers close to San Diego.

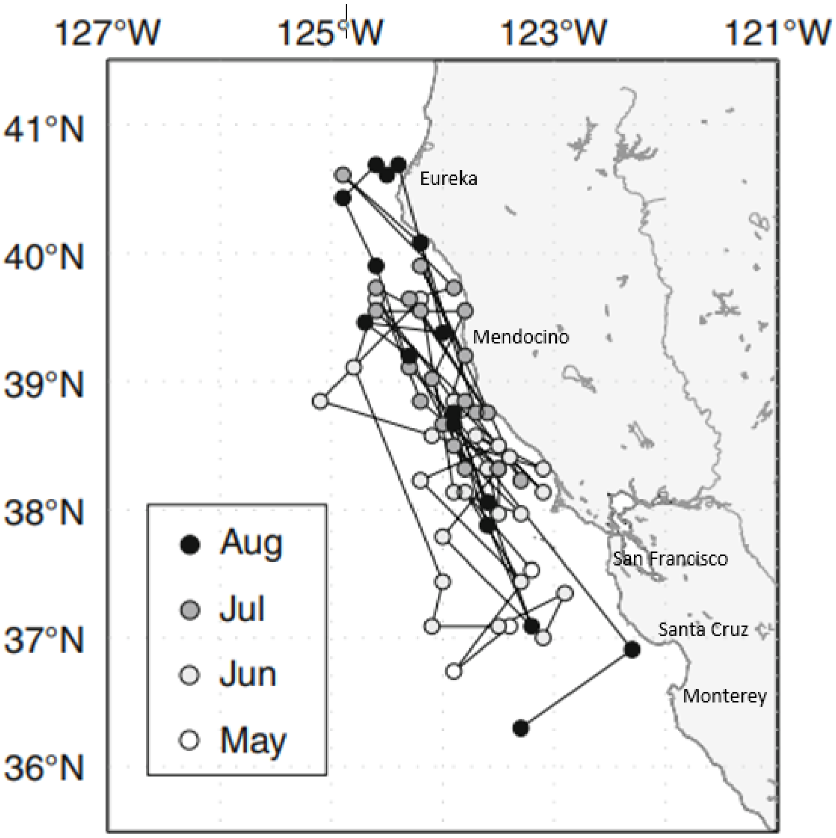

Figure 3-6. Estimated marine movements of tagged steelhead trout 'kelt' by month from May to August 2008. From Teo et al. (2011).

3.4.7 Green Sturgeon (Southern DPS)

The green sturgeon (*Acipenser medirostris*) is an anadromous fish native to the western coast of North America. The species is divided into the Southern and Northern DPS. The Southern DPS is protected under the ESA. Critical Habitat is designated for this DPS, but its southern limit is Monterey Bay, California and therefore it does not coincide with the Action Area. The following information is summarized from the most recent Recovery Plan for the green sturgeon (NMFS, 2018d) and associated Federal Register publication (74 FR 52299).

Green sturgeon spawn in rivers, the young fish (fry) remain in these rivers for several years, and then move into nearshore ocean habitat once they reach maturity. While both Southern and Northern DPS green sturgeon overlap in at least portions of their oceanic distribution, fishes from these two populations are genetically distinct and return to separate rivers to breed. The Southern DPS consists of green sturgeon that spawn in the Sacramento, Feather, and Yuba rivers. These are the southernmost rivers of green sturgeon spawning in California. The Northern DPS, which is not listed under the ESA, consists of green sturgeon that spawn in the Klamath and Eel rivers of California and the Rogue River of Oregon.

Their distribution and behavior during their oceanic phase are poorly understood compared to their riverine phase. They are considered bottom-oriented fish, understood to occur at oceanic depths of between 0 and 110 m and spend most of their time between 20 and 80 m. Telemetry, genetic, and fisheries data collected during their oceanic phase suggest that Southern DPS green sturgeon generally occur from Graves Harbor, Alaska to Monterey Bay, California and, within this range, frequent coastal waters of Washington, Oregon, Vancouver Island, and San Francisco and Monterey bays. Adult and subadult Southern DPS green sturgeon occur in relatively large concentrations from late spring to autumn within coastal bays and estuaries including the Umpqua River estuary in Oregon, the Columbia River estuary along the Washington-Oregon border, and Willapa Bay and Grays Harbor in Washington, with peaks in abundance in summer and autumn.

In contrast to the information on green sturgeon distribution north of their spawning river habitat, very little evidence exists to suggest they occur south of Monterey, California. Love & Passarelli (2020) and Love (2011) both describe the southern limit of the range as "*…south of Bahia de San Quintin…*", which is approximately 160 km (100 miles) south of Ensenada at latitude 30.433°. According to information in the most recent Biological Opinion for the PLOO (NMFS, 2022) a few records indicate green sturgeon may occur in southern California. These include the following five reported encounters over the last approximately 80 years south of Point Conception:

- Between Huntington Beach and Newport in 1941.
- Just north of Point Vicente, Los Angeles County in 1957.
- North of Santa Barbara in 1991.
- Off San Pedro in 1993.
- Off Baja California, about 200 km (125 miles) south of Bahía de Todos Santos (offshore of Ensenada in Mexico) in 2008 (Rosales-Casián and Almeda-Jáuregui, 2009).

It is unclear if any of the animals observed at the locations listed above belong to the protected Southern DPS. However, rivers with potential spawning habitat for green sturgeon are currently unlikely to occur farther south than central California. It is plausible that the species' spawning range has contracted in recent decades as the population has declined and as river habitat at the southern range of the species' distribution has deteriorated due to changing climate and increased exploitation of these natural resources. Therefore, older accounts (1941 and 1957) may have been of fishes spawning in rivers south of the Sacramento River. However, because the spawning habitat for the Southern DPS is located closer to southern California than the Northern DPS, it is more likely that green sturgeon found south of Point Conception are from the Southern DPS spawning population.

Although the sightings described above for southern California indicate green sturgeon could occur in the Action Area, the reports are very infrequent. It is most likely that green sturgeon typically range to the north of their spawning rivers and southern ranging individuals are highly anomalous. Therefore, green sturgeon are considered unlikely to occur in the Action Area.

4. POTENTIAL ENVIRONMENTAL EFFECTS

4.1 Effects Summary

The purpose of the proposed Federal Action, as previously described, is to fund and implement infrastructure projects to address ongoing transboundary flows that are currently impacting the natural environment, including the marine environment and species in the Action Area. Subsequently, the net effect of this project will have a positive impact on the marine environment. However, components of the project may have short-term negative effects on ESA-listed species.

The matrix below (Table 4-1) summarizes interactions between project activities or consequences (Project Components) and the marine biological resources in the Action Area (Resources) identified and described in this BA (Section 3). Project Components are divided into construction and operation phases. A blank cell indicates no interactions between Project Components and Resources will occur. A black dot indicates the Project Component does interact with a Resource. These interactions have potential for an adverse effect and are therefore considered further below. Effects due to the decrease in nearshore pollution are identified in this matrix, however these effects are expected to have a net positive effect on Resources. The following section provides a narrative assessment of the potential interactions between Project Components and Resources and describes our assessment of the potential for an adverse effect.

Table 4-1. Matrix identifying interactions between project activities (Project Components) and marine biological resources in the Action Area (Resources).

Project Components	Resources (Black Dot Indicates an Interaction)			
	Listed Marine Mammals	Listed Turtles	Listed Marine Invertebrates	Listed Fishes
Re-commissioning of Diffusers (Marine Construction)				
Vessel- and diver-disturbance from noise generation and other related activity	•	•	•	•
Collision risk due to vessel traffic	•	•		
Anchor deployment for construction barge	•	•	•	•
Facility Operation				
Increase in SBOO discharge volume	•	•	•	•
Decrease in nearshore pollution	•	•	•	•

4.2 Effects of Marine Construction

Most of the Project Components that will be required to construct project elements considered for funding under the proposed Federal Action will occur on the Mainland of U.S. and Mexico. These construction activities will have no direct or indirect effect on the marine environment. However, to accommodate the increase in effluent discharge volume for Projects A (Expanded ITP) and Project D (APTP Phase 1), up to 55 diffuser risers currently blind flanged on the southern leg of the SBOO wye diffuser are anticipated to be recommissioned. Currently, 18 of the 165 diffuser ports are open. A further 16 diffuser ports are installed but are currently capped/plugged. The remaining 131 diffuser ports are blind flanged and will require the installation of a diffuser head to be operational. The new plants under Projects A and D will be constructed and come online independently (i.e., not necessarily on the same schedule), and full treatment capacity for Project A will be reached in multiple phases up to 2050 in response to population growth in Tijuana. Therefore, it is assumed that ports on the wye diffuser will be opened in a similar phased manner over the course of several years.

It is anticipated that the recommissioning of a capped/plugged or a blind-flanged diffuser port will result in minor disturbance to marine wildlife and habitat. Specifically, divers will likely remove a relatively small area of habitat and species on and around a diffuser head that requires modification. At each modified diffuser head, it is assumed that this may result in the temporary loss of no more, and in most circumstances considerably less, than a 6-foot by 6-foot area of artificial reef habitat. This loss of habitat will be necessary to allow divers to access bolts, blind flanges, and other parts of the diffuser ports with hand tools to make the modifications likely to be required to recommission these features. As part of the recommissioning, contingency planning will be required to address potential failure of recommissioning methods that will allow for re-sealing of flanged or capped riser ports. Following completion of the diver activity, natural ecological-succession processes are highly likely to gradually replace the lost habitat over time.

During the recommissioning activities, boats will be required to transport divers and equipment to the site. At this stage it is unclear what size of vessel will be used or whether this vessel will require anchoring. If the vessel does require anchoring, it will be necessary for that vessel to safely deploy the anchor to avoid damaging the wye diffuser and associated structures on the seabed. It is assumed that anchors will be deployed onto sandy seabed and may be adjusted by divers once they are deployed. Alternatively, a permanent mooring may be positioned to allow divers to return over a series of days.

4.2.1 Potential Effects on ESA-listed species

Vessels used to transport the divers to and from the project site will generate noise that has the potential to disturb marine mammals, sea turtles and potentially other species. Marine mammals are highly sensitive to noise from vessels. Subsequently, it is expected that standard guidelines for vessel operation around marine mammals on construction projects will be applied. These include vessel operators and crew being aware of the potential for marine mammals and sea turtles to occur in the Action Area. Vessel operators will also be required to remain aware of their surroundings with respect to marine mammals and turtles. This will require that at least one crew, most likely the vessel operator, maintains a constant watch of the ocean surface in front and adjacent to the vessel at all times. If marine animals are observed distant to the vessel, vessel operators should adjust their course as necessary to ensure they do not disturb the natural behavior of these animals. If animals are observed within close limits of the vessel such that the vessel may disturb those animals, vessels are advised to follow close observation guidelines available through NMFS.[17] These include the following recommendations:

- Slow down and operate at a no-wake speed.
- Stay out of the path of the animal's direction of travel.
- Do not put your vessel between whales, especially mothers and calves.

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[17] Available at https://www.fisheries.noaa.gov/west-coast/marine-mammal-protection/safe-whale-watching-west-coast-be-whale-wise

- Do not chase or harass animals, and do not approach the animals head-on, from directly behind them, or from the side (t-bone). If animals are following a trajectory closely parallel to the direction of vessel travel, gradually steer the vessel to be parallel to the animals from the side and stay at least 100 yards away—i.e., the length of a football field.

Diving activities will be required to remove flanged covers on risers and replace these with port units. These activities are likely to utilize relatively low-noise methods such as hand tools and will not include noisy activities like cutting or hammering. This includes activities that may be required in the unlikely event that recommissioning methods fail resulting in damage to risers. During these diving activities, disturbance of mobile animals such as marine mammals, turtles, or marine fishes such as mako shark may occur, causing them to momentarily change their natural behavior (e.g., foraging) and exit the immediate area of the diver activity. Therefore, the area of disturbance will be within 20 ft of the activity on each riser and is most likely to be less than 12 ft from the risers. When divers descend from the boat and enter the immediate area of a riser structure, any marine mammals, sea turtles, or marine fishes such as the shortfin mako shark that may be in the immediate area of a riser structure are highly likely to leave this immediate area. However, these animals are unlikely to move far relative to their typical home range or short-term foraging range as the diver activities will remain restricted to a small area around the riser. While movement of these animals away from divers and other marine construction activity may represent a disturbance, it is not anticipated that the minor change in behavior (e.g., foraging) will result in a tangible effect on the animals because the activity will occur over a relatively short period of time (a few hours each day for a few weeks) within a small area relatively close to these animals' home ranges, and is likely to occur in phases over the course of several years as described above. Furthermore, these animals are not likely to regularly occur in the immediate vicinity of the SBOO wye diffuser and if an animal is disturbed these animals will easily move a short distance away. Therefore, this disturbance is highly unlikely to cause the animal any tangible harm.

Anchor deployment carries some risk of collision with marine mammals, sea turtles, and benthic invertebrates. However, it is highly unlikely that an anchor will strike an animal. The most likely ESA-listed animals to occur beneath the boat during anchor deployment are blue whales, because they commonly feed in the area offshore of Point Loma. Gray whales are also likely to occur in the Action Area during their winter annual migration, although WNP gray whales are very rare and therefore considerably less likely to occur than ENP gray whales. The other whale species and Guadalupe fur seal are very unlikely to occur in the Action Area. Marine turtles are also unlikely to be struck by anchors because they are generally migrating through the Action Area. In warm shallow waters green sea turtles may rest on the seafloor and frequently remain stationary on the seafloor while feeding. However, there is no likelihood of marine turtles remaining stationary on the seafloor at the types of depths anchors will be deployed. White abalone are unlikely to occur in the Action Area, but if they do occur, they will be amongst the rocks that constitute the artificial reef around the SBOO. As recommended in the PEIS, if the vessel needs to deploy any anchors, the vessel operators will check for reef with onboard sonar equipment and anchors will be deployed over sandy seabed at least 10 ft away from the edge of the rocky reef surrounding the SBOO and therefore any potential white abalone habitat. Sunflower sea star may range onto the sandy seabed. However, they are also unlikely to occur in the Action Area due to their marked decline and possible extirpation in southern California. The likelihood of an anchor striking a sunflower sea star is so small that the risk of an adverse effect is negligible.

4.3 Effects of Facility Operation

4.3.1 Changes Throughout the Action Area

The only potential operational phase impact that may result in adverse effects to marine biological resources from the projects that are proposed for funding is the increase in SBOO effluent discharge volume. The projects will also result in reductions in nearshore pollution caused by the current failure of wastewater treatment infrastructure to treat wastewater from Tijuana. Projects proposed for funding are intended to reduce this pollution and therefore represent a positive effect on marine wildlife, which is discussed in this section.

Implementation of the projects funded through the proposed Federal Action will immediately lead to significant reductions in discharges of untreated wastewater to the Pacific Ocean via SAB Creek, as summarized in Table 4-2. The majority of these improvements will be accomplished through Projects A (Expanded ITP), B (Tijuana Canyon Flows to ITP), and C (Tijuana Sewer Repairs) by improving the collection and treatment of wastewater in Tijuana.

Implementation of the Core Projects will also reduce (by up to 93 percent) the portion of sediment loads via SAB Creek that come from untreated wastewater or river water. These projects will not affect sediment loads to the Pacific Ocean resulting from stormwater and erosion within the SAB Creek watershed.

Table 4-2. Impacts on Discharges to the Pacific Ocean via SAB Creek (Initial Operations) Under the Proposed Federal Action

Projects	Untreated Wastewater Flow Volume		BOD_5 Load		Nutrient Load	
	MGD	Percent Change	Tons/yr	Percent Change	Tons/yr	Percent Change
Current conditions [a]	28.2	N/A	17,200	N/A	3,916	N/A
Proposed Federal Action [b]	2.2	-92%	1,340	-92%	275	-93%

a – Current conditions were calculated using Tijuana River flow data from January 2016 through January 2022, during a period when PB-CILA capacity was 23 MGD.

b – Reflects changes in discharges and loadings that will be achieved upon startup of new treatment facilities (i.e., before the full treatment capacity comes into service in response to population growth in Tijuana).

Table 4-2 identifies the improvements that will occur upon startup of the new treatment facilities. However, expansion of the ITP to 60 MGD under Project A will provide additional treatment capacity to accommodate projected population growth in Tijuana through the year 2050, assuming Tijuana canyon flows are treated at the ITP (Project B). The full water quality benefits of this project will be realized once this additional treatment capacity comes into service in response to population growth. To estimate these future improvements relative to baseline conditions, EPA and USIBWC projected 2050 baseline conditions for discharges to SAB Creek (i.e., assuming no infrastructure improvements are made) and estimated the impacts of the proposed Federal Action on this projected baseline. Table 4-3 summarizes these projected (2050) reductions in discharges of untreated wastewater to the Pacific Ocean via SAB Creek.

Table 4-3. Impacts on Discharges to the Pacific Ocean via SAB Creek (Projected 2050 Conditions) Under the Proposed Federal Action

Projects	Untreated Wastewater Flow Volume		BOD_5 Load		Nutrient Load	
	MGD	Percent Change	Tons/yr	Percent Change	Tons/yr	Percent Change
Projected 2050 baseline conditions [a]	44.6	N/A	27,200	N/A	5,980	N/A
Proposed Federal Action [b]	5.4	-88%	3,310	-88%	674	-89%

a – Projected conditions in 2050 reflect estimates of additional wastewater generated due to projected population growth in Tijuana with no corresponding improvements to wastewater treatment infrastructure.
b – Reflects projected operations in 2050, when the 60-MGD expanded ITP will be operating at full capacity based on estimated population growth in Tijuana.

As shown above, implementation of Project A will be projected to substantially reduce future discharges of untreated wastewater to the Pacific Ocean via SAB Creek. The added capacity will help prepare for projected conditions in 2050 and provide additional coastal water quality improvements through 2050. Projects A and D will also be projected to reduce (by up to 88 percent) the portion of projected sediment loads via SAB Creek that will come from untreated wastewater or river water. These projects will not affect sediment loads to the Pacific Ocean resulting from stormwater and erosion within the SAB Creek watershed.

Quantifying the magnitude of reduction in nearshore pollution is complicated by the unpredictable nature of marine environments and the fate of pollutants. However, Feddersen et al. (2021) provide modelled predictions of reductions in nearshore pollution based on several scenarios. While their modelled scenarios differ from the projects proposed for funding under the Federal Action, the results of their model can be used to infer the likely improvements that will be achieved under the proposed Federal Action.

During most of the year from April through November (dry-season), lack of rainfall means transboundary flows into the Tijuana River Valley do not generally reach the ocean. However, large discharges of untreated wastewater are released into the ocean at the SAB Creek mouth. Dry-season model runs for the baseline model scenario in Feddersen et al. (2021) represent summer-time (tourist season) effects of the SAB Creek pollution plume. The left panel in Figure 4-1, which represents the discharge of 35 MGD of untreated wastewater via SAB Creek,[18] shows that the model predicts elevated untreated wastewater concentrations within 1 km of the coastline from SAB/Punta Bandera to the north of Hotel del Coronado (HdC). The model scenario shown in the left panel in Figure 4-1 represents conditions following a strong and long-lived period of wave action from the south-southwest (south-swell). South-swell conditions result in northward nearshore currents that advect the pollutant plume from SAB Creek along the coastline, impacting the nearshore habitat throughout the Action Area. The retention of northward-advected water is also apparent in the diffusion of the plume throughout the semi-enclosed bay in the lee of Point Loma. This advected plume results in high levels of contaminated inshore waters, and also likely

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[18] EPA and USIBWC now estimate that, on average, approximately 28.2 MGD of untreated wastewater is discharged to the Pacific Ocean via SAB Creek. The left panel of Figure 4-1, which represents the discharge of 35 MGD of untreated wastewater, therefore likely represents a slight overestimate of the baseline plume extent due to discharges via SAB Creek.

contributes large amounts of nutrients to the waters in the lee of Point Loma, potentially driving blooms of phytoplankton that include harmful algal blooms (HABs) and accumulations of other pollutants in the Action Area.

Feddersen et al. (2021) also present a model run that assumes 1) diversion of the Tijuana River under river flow conditions of up to 35 MGD, similar to what will be achieved under the proposed Federal Action, and 2) 95 percent reduction in pollutant loadings to the Pacific Ocean via SAB Creek, which slightly overrepresents the estimated 92 percent reduction that will be achieved under the proposed Federal Action (see Table 4-2). Baseline conditions during dry-season and wet-season conditions are shown alongside the results of this reduction in the right panel in Figure 4-1. The sharp reduction in nearshore pollution between SAB Creek and the TJRE, and the elimination of the accumulation of plume in the retention zone in the lee of Point Loma is clear in the model runs.

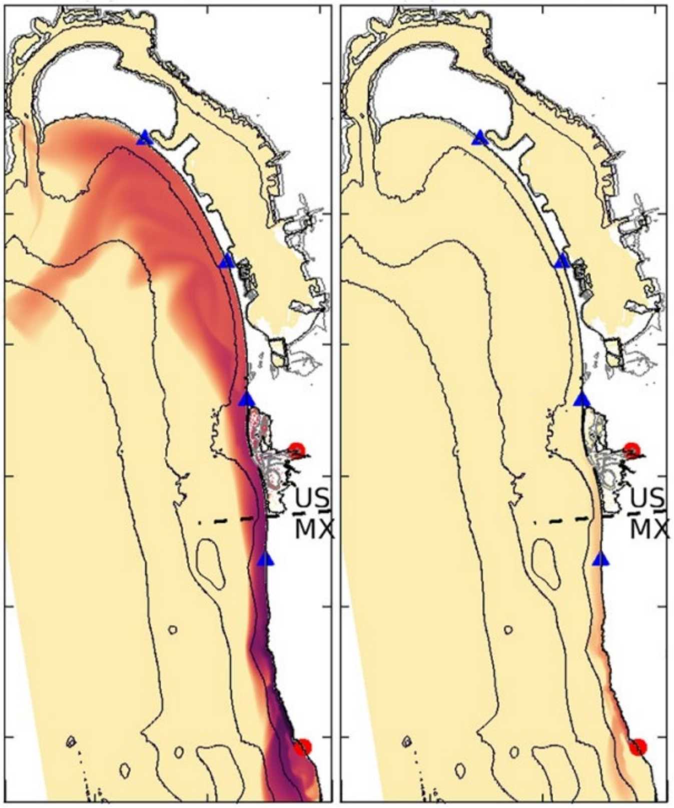
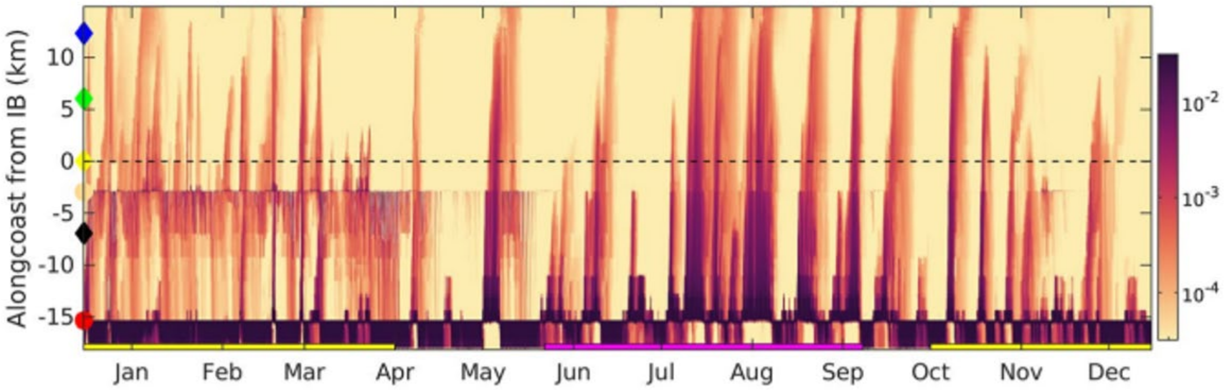


Figure 4-1. Dry-season (summer-time) modelled pollution plume during a period of south-swell. Left panel: under baseline (current conditions) and Right panel: following 95 percent reduction in pollutant loadings from SAB Creek. From Feddersen et al. (2021).

These figures illuminate the advection of the plume during a south-swell conditions in the dry-season. To better understand the behavior of the plume throughout the year, Feddersen et al. (2021) provide the images in Figure 4-2. The distribution of concentrations from the model are organized around two horizontal distances, one at approximately -3 km (south of Imperial Beach) and the second at approximately -15.5 km (south of Imperial Beach). These horizontal lines represent the mouth of the TJRE and SAB Creek, respectively. During the wet season, indicated by the horizontal yellow bar on the x-axis of the charts, the predominantly southerly distribution of the wastewater plume from both the mouth of the TJRE and SAB Creek are apparent, particularly in the baseline conditions chart (top panel). However, intermittent reversals upcoast are clearly visible during periods when there is very low, or no concentrations of wastewater detected in the model runs downcoast and increased concentrations upcoast of these two locations. Later in the year, particularly from May through the remainder of the year (including the dry season indicated by the horizontal magenta bar on the x-axis), most polluting events appear to originate from SAB Creek as upcoast incursions of the SAB Creek plume become more frequent and prolonged as compared to those during the wet season. Model results for scenarios that reduce or eliminate either SAB Creek or TJRE plumes (bottom panel) support the discrete observations described above in relation to Figure 4-1 and demonstrate some reductions from both sources (SAB Creek and TJRE) during the wet season. However, wet-season reductions from TJRE are not as pronounced as during the dry-season.



(b) Scenario A: Total Untreated Wastewater Concentration

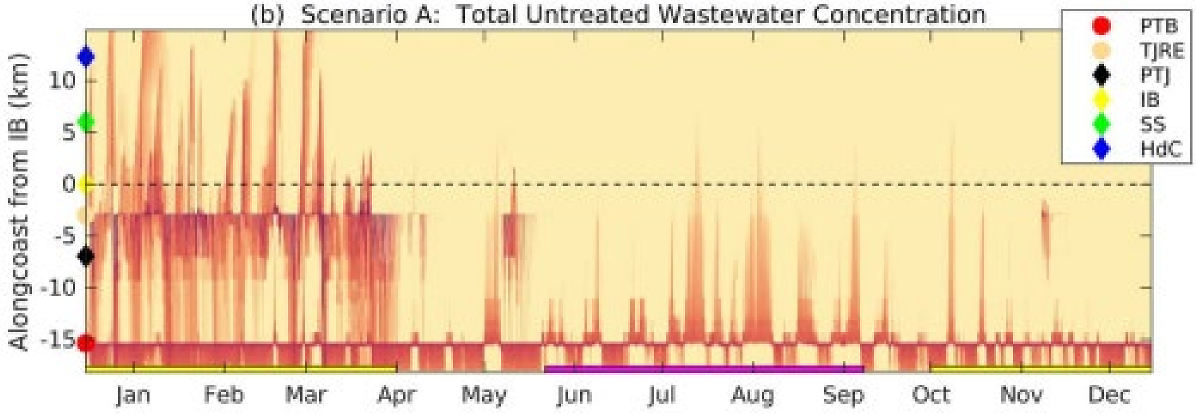


Figure 4-2. Modelled concentration of wastewater throughout the year at distances along the coast between approximately 1 km north of HdC and 2 km south of Punta Bandera (units are scaled relative to the location of Imperial Beach [IB]). Top panel under current conditions. Bottom panel most similarly matches reductions due to projects proposed under the Federal Action. From Feddersen et al. (2021).

The relative magnitude of reduction in nearshore pollution (via SAB Creek and the TJRE) due to the implementation of the proposed Federal Action is considerably greater than the magnitude of increase in the discharge of treated effluent (via the SBOO). Therefore, the net effect of the proposed Federal Action is a positive impact on the marine environment and the species and habitats that depend on a healthy marine environment to thrive. In part, this is because the pollution loading caused by untreated transboundary flows entering the marine environment will be reduced by the increase in treatment. It is also because the ejection of a plume of wastewater from a river mouth results in considerably lower rates of mixing compared to effluent ejected from diffuser nozzles on a specially designed discharge system such as the wye diffuser array on the terminus of the SBOO. Plumes released into the nearshore can become 'coastally trapped' close to shore because of the nature of alongshore currents. These coastally trapped plumes concentrate pollutants and expose marine organisms in the areas affected to higher concentrations for longer periods compared to properly ejected effluent plumes from diffuser systems.

4.3.2 Changes to the SBOO Discharge

While implementation of the Core Projects through the proposed Federal Action will reduce pollutants reaching the Pacific Ocean via SAB Creek and the TJRE, the treatment of wastewater from Mexico will result in an increase in the volume of treated effluent discharged to the Pacific Ocean via the SBOO. These increases in SBOO discharges will be in addition to the current discharges of secondary-treated effluent from the existing ITP and SBWRP. The increase in discharges via the SBOO will consist of:

1) Additional discharges of secondary-treated wastewater from the expanded ITP (Project A), with the volume of discharged effluent depending on the capacity option, and

2) New discharges of primary-treated river water from the new APTP Phase 1 (Project D).

Table 4-4 identifies the estimated changes in discharges via the SBOO that will occur upon startup of the new treatment facilities. Table 4-5 identifies the estimated changes in discharges via the SBOO as projected for the year 2050, when the 60-MGD expanded ITP (Project A) is projected to be at full capacity based on estimated population growth in Tijuana. In addition to reflecting changes in discharges expected from the proposed Federal Action, these 2050 projections also reflect an assumed increase in discharges from the SBWRP over this period. These calculations and projections are based on the analysis of a variety of data sources including influent and effluent monitoring data for the ITP, SBWRP, and SABTP; Tijuana River water quality and flow data; Tijuana sanitary collection and pumping system flow data; and North American Development Bank studies and estimates projecting future wastewater flows to the International Collector and canyons along the U.S.-Mexico border.

Full implementation of the Core Projects (including the 60-MGD expanded ITP) will result in the following changes to the flow rate, nutrient loadings, and BOD_5 loadings of discharges via the SBOO (these estimates also reflect discharges from the SBWRP):

- **Flow Rate:** The average daily SBOO effluent flow rate will immediately increase from approximately 28.8 MGD under current conditions to approximately 65.2 MGD under initial operating conditions of the expanded ITP and new 35-MGD APTP. The average daily SBOO effluent rate will then gradually increase (over the course of the 20-year period from 2030 to 2050) to approximately 84.7 MGD by 2050 as the full capacity of the 60-MGD expanded ITP comes into service in response to population growth in Tijuana. This discharge will remain well below the SBOO design capacity of 174 MGD average daily flow rate.

- **BOD_5:** The annual BOD_5 loadings in SBOO discharges will immediately increase from approximately 533 tons/yr under current conditions to approximately 2,270 tons/yr under initial operating conditions of the expanded ITP and new 35-MGD APTP. Annual BOD_5 loadings will then gradually increase (over the course of the 20-year period from 2030 to 2050) to approximately 2,640 tons/yr by 2050.

- **Nutrients:** The total annual nutrient loadings (including total annual nitrogen and phosphorous loadings) in SBOO discharges will immediately increase from approximately 1,670 tons/yr under current conditions to approximately 4,240 tons/yr under initial operating conditions of the expanded ITP and new 35-MGD APTP. The total annual nutrient loadings will then gradually increase (over the course of the 20-year period from 2030 to 2050) to approximately 5,280 tons/yr by 2050.

Table 4-4. Estimated SBOO discharge characteristics (annual averages) under current conditions and following implementation of the proposed Federal Action (initial operations).

Parameter	Units	Current Conditions (Existing ITP and SBWRP) [a]	Following Implementation of Proposed Federal Action (60-MGD ITP, 35-MGD APTP, and SBWRP) – Initial Operations [b]	% Change
Effluent flow rate	MGD	28.8	65.2	126%
Temperature	deg C	23.4	22.9	-2%
Concentrations				
Total nutrients	mg/L	38.0	42.6	12%
Total dissolved solids (TDS)	mg/L	1,320	1,360	4%
Fecal coliform	MPN/100 mL	387,000	423,000	9%
Selenium (total recoverable)	µg/L	5.11	5.03	-2%
Lead (total recoverable)	µg/L	0.121	0.189	57%
Nickel (total recoverable)	µg/L	22.7	18.8	-17%
Thallium (total recoverable)	µg/L	2.07	2.10	1%
Cadmium (total recoverable)	µg/L	0.117	0.0969	-17%
BOD_5	mg/L	12.1	22.9	88%
TSS	mg/L	11.2	10.8	-4%
Loadings				
Total nutrients	tons/yr	1,670	4,240	154%
TDS	tons/yr	57,700	135,000	135%
Selenium (total recoverable)	lb/yr	448	1,000	123%
Lead (total recoverable)	lb/yr	10.6	37.6	256%
Nickel (total recoverable)	lb/yr	1,990	3,740	88%
Thallium (total recoverable)	lb/yr	181	417	130%
Cadmium (total recoverable)	lb/yr	10.3	19.3	87%
BOD_5	tons/yr	533	2,270	326%
TSS	tons/yr	427	1,070	151%

a – Reflects continued ITP (25 MGD) and SBWRP (3.8 MGD) operations under current conditions, with no APTP. Annual average values were calculated using 2015–2020 effluent monitoring data.

b – Reflects expanded ITP treatment of wastewater, including inflows resulting from Projects B (Tijuana Canyon Flows to ITP) and C (Tijuana Sewer Repairs); APTP treatment of diverted Tijuana River water; and continued SBWRP operations. Under this scenario, projected operations reflect discharges upon startup of the APTP and expanded ITP (i.e., before the full 60-MGD ITP treatment capacity comes into service in response to population growth in Tijuana). SBWRP discharges are identical to those under current conditions.

Table 4-5. Estimated SBOO discharge characteristics (annual averages) under baseline (no action) conditions and following implementation of the proposed Federal Action (projected 2050 conditions).

Parameter	Units	No Action (Existing ITP and SBWRP) – Projected 2050 Conditions [a]	Following Implementation of Proposed Federal Action (60-MGD ITP, 35-MGD APTP, and SBWRP) – Projected 2050 Conditions [b]	% Change
Effluent flow rate	MGD	33.2	84.7	155%
Temperature	deg C	23.7	23.0	-3%
Concentrations				
Total nutrients	mg/L	34.8	40.9	18%
TDS	mg/L	1,270	1,340	6%
Fecal coliform	MPN/100 mL	375,000	412,000	10%
Selenium (total recoverable)	µg/L	4.50	4.93	10%
Lead (total recoverable)	µg/L	0.106	0.171	62%
Nickel (total recoverable)	µg/L	20.1	19.0	-5%
Thallium (total recoverable)	µg/L	2.02	2.08	3%
Cadmium (total recoverable)	µg/L	0.105	0.0992	-5%
BOD_5	mg/L	11.3	20.5	81%
TSS	mg/L	9.67	10.6	9%
Loadings				
Total nutrients	tons/yr	1,760	5,280	200%
TDS	tons/yr	64,500	173,000	169%
Selenium (total recoverable)	lb/yr	455	1,270	179%
Lead (total recoverable)	lb/yr	10.7	44.0	312%
Nickel (total recoverable)	lb/yr	2,030	4,890	141%
Thallium (total recoverable)	lb/yr	205	537	162%
Cadmium (total recoverable)	lb/yr	10.6	25.6	141%
BOD_5	tons/yr	574	2,640	360%
TSS	tons/yr	490	1,360	178%

a – Reflects continued ITP and SBWRP operations in 2050, with no APTP. Under this scenario, projected discharges from the ITP in 2050 (25 MGD) are identical to those under current conditions (see Table 4-4) and projected discharges from the SBWRP in 2050 (8.26 MGD) assume operations will increase to use the plant's full 15 MGD capacity by 2050, while continuing to reuse (and not discharge) the same percentage of treated effluent as they do under current operations (approximately 55 percent). Annual average values were calculated using 2015-2020 effluent monitoring data.

b – Reflects expanded ITP treatment of wastewater including inflows resulting from Projects B (Tijuana Canyon Flows to ITP) and C (Tijuana Sewer Repairs); APTP treatment of diverted Tijuana River water; and continued SBWRP operations. Under this scenario, projected ITP operations in 2050 reflect operation at the full 60-MGD capacity, based on estimated population growth in Tijuana; projected APTP operations in 2050 are identical to those under initial operations (see Table 4-4); and SBWRP discharges are identical to those under the projected 2050 baseline (no action) scenario.

These tables are not a comprehensive list of all potential pollutants of concern that could be discharged via the SBOO. For example, because the APTP will provide primary treatment of diverted dry-weather flows from the Tijuana River, the range and concentrations of pollutants in the treated effluent via the SBOO will be influenced by factors including industrial discharges and agricultural runoff within and upstream of Tijuana. These are pollutants that, in the absence of the proposed APTP, would have otherwise been discharged (untreated) to the Pacific Ocean via SAB

Creek, or would have potentially reached the Tijuana River Estuary and Pacific Ocean via transboundary river flows. Examples could include surfactants, pesticides, and phthalates. Of note, IBWC conducted water quality sampling in the Tijuana River and Alamar River in 2019 and identified elevated levels of bis (2-ethylhexyl) phthalate at all monitoring sites, possibly due to chemical leaching from plastics and solid waste discarded in the river (IBWC, 2020). However, the river samples had low levels of organics and pesticides, and none of the river samples had detectable levels of toxic parameters of concern such as hexavalent chromium or the carcinogenic pesticides DDT and Aldrin (IBWC, 2020). Additionally, because PB-CILA (the pump station that will convey diverted river flows to the APTP) will not be capable of operating when the instantaneous river flow rate exceeds 35 MGD, the APTP influent and subsequent discharges of primary-treated effluent via the SBOO will not be expected to include significant amounts of runoff-driven pollutants such as pesticides.

4.3.3 Changes in the Potential Extent of the ZID and Plume

To assess the potential for adverse effects, the magnitude of change in SBOO discharge extent has been estimated using a mixing model. Modeling was performed with the UM3 model from the Visual Plumes software suite (Plumes18 edition[19]). The nearfield dilution estimates for the two scenarios using the May 2019 ambient profile were linked to results from the Brooks Far Field model in Visual Plumes to estimate pollutant transport phenomena within a 20-km radius of the SBOO under the assumption of no shoreline interactions. The modeling effort was structured into two scenarios:

- Baseline Scenario: Based on current permitted wastewater sources (assumed average daily flow of 35 MGD) and discharge characteristics.
- Alternative Scenario: Addition of new permitted flows from new or existing plants (assumed average daily flow of 110 MGD, a net 75-MGD increase over baseline).[20]

The SBOO wye diffuser includes 82 risers on each leg (northern and southern legs) and one additional riser at the center of the wye diffuser on the main barrel. Each open riser consists of four ports through which effluent is discharged. Under the Baseline scenario, the model assumed that 72 diffuser ports were open, equivalent to 18 risers (17 on the southern leg diffuser and one on the main barrel). Under the Alternative scenario, the model assumed that 332 ports were open,

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[19] Visual Plumes is a free outfall modeling software suite developed by EPA and currently distributed in partnership between the State Water Resources Control Board and Walter Frick, the lead software developer/maintainer. Plumes18 edition retrieved on January 5, 2021, from: https://www.waterboards.ca.gov/water_issues/programs/ocean/

[20] This modeled alternative scenario of 110 MGD represents a 214 percent increase in average daily flow above the assumed baseline of 35 MGD. After the completion of model runs under this effort, EPA refined its estimate of current SBOO discharges to 28.8 MGD (instead of 35 MGD) and refined its estimate of projected 2050 discharges under the proposed Federal Action to 84.7 MGD (instead of 110 MGD). This refined estimate represents a 194 percent increase in projected average daily flow above current conditions. The modeled scenarios therefore represent a conservative model construction that likely overestimates the expected changes in the SBOO effluent plume under the proposed Federal Action.

equivalent to 83 risers (all 82 on the southern leg diffuser and one on the main barrel). This is likely to represent a conservative model construction.[21]

Under each model scenario, a series of nearfield dilution estimates were computed based on a series of ambient depth profiles for density, current speed, and current direction over the period of record. The ambient profile corresponding to May 2019 produced the median nearfield density estimate. Long-term average effluent salinity and temperature for the ITP and SBWRP were modeled based on monitoring data collected from 2015 through 2020. The San Diego Regional Water Board (Water Board) provided PG Environmental with ambient monitoring data (salinity and temperature) for Station I16 that is located over the junction between the main barrel and the wye diffuser of the SBOO. Quarterly depth profiles for salinity and temperature (collected in February, May, August, and November) collected between August 2018–November 2020 were used in the model to characterize ambient density stratification conditions in the nearfield. The quarterly ambient monitoring data had relevant data for depths ranging from 0 to 27 m at 1-m intervals.

Depth profiles for ambient current speed and direction were estimated for the period of records using data collected from two acoustic doppler current profilers (ADCP) deployed in the vicinity of the SBOO diffuser. The ADCP devices collected high frequency time series current speed and direction data which was aggregated by calendar monthly average for the period of record (August 2018–November 2020). To estimate potential far-field transport processes over a longer time-period, current speed and direction from the ADCP devices for the period of record were visualized (Figure 4-3) and the predominant direction of flow was identified. North-south currents predominate, with weaker east-west currents present. Monthly visualizations were also made that show currents during the period of record switching between northerly and southerly current patterns. An average current speed was used for flows traveling in each of four directions: north, east, south, and west. These speeds were:

- North (0/360 degrees): 0.124 m/s
- East (90 degrees): 0.105 m/s
- South (180 degrees): 0.146 m/s
- West (270 degrees): 0.102 m/s

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[21] After the completion of model runs under this effort, CoSD estimated that 288 open ports (rather than the assumed 332 open ports) will be optimal based on the operating conditions described in the Alternative scenario. This restricted number of port openings (44 fewer open ports) is expected to result in an increase in the rate of nearfield mixing and therefore reduce the size of the far-field dilution plume in comparison to the modeled results under this effort.

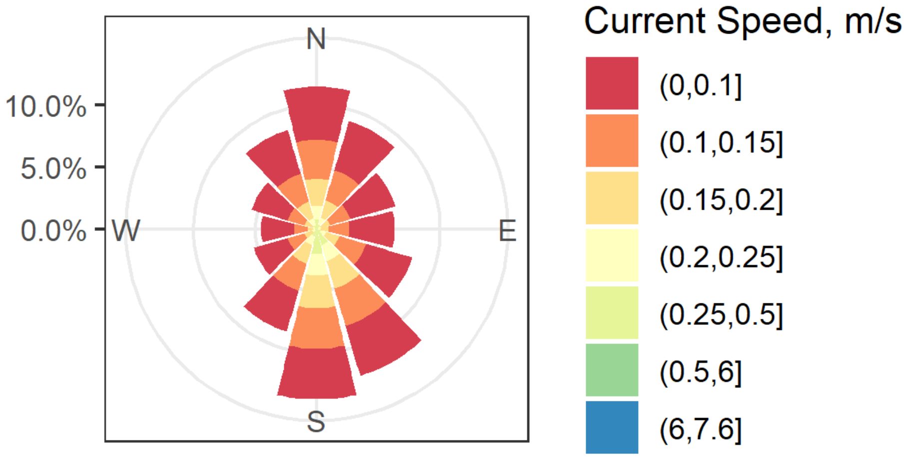

Figure 4-3. Current speed and direction measurements at the SBOO. Radius represents fraction of measurements within that speed and direction category.

The nearfield modeling results provided an estimate of the lateral extent of the ZID. As discussed in Section 2.2.2 (Zone of Initial Dilution at the SBOO), the boundary of the ZID under current conditions is estimated at 77 ft from each port, which equates to a circular ZID with a diameter of 154 ft around each of the 18 open risers. Under the 110-MGD alternative scenario (the proposed Federal Action) with 83 open risers, the boundary of the ZID is estimated at 61 ft from each port, equivalent to a circular ZID with a diameter of 122 ft around each of the 83 open risers (M. Reusswig [PG Environmental], personal communication, 2022). Figure 4-4 represents the modeled ZID under both current and expected future conditions following implementation of the proposed Federal Action.

Results of the far-field plume modeling are shown in Figure 4-5. The model predicts that an increase in volume of effluent from 35 MGD to 110 MGD will result in an approximate doubling in the overall modeled lateral plume extent, with less of an increase in the plume extent in areas closer to the SBOO where concentrations are higher. The change in lateral plume extent was smallest at higher concentrations closest to the SBOO (mean increase in distance at 75 percent dilution was approximately 85.5 percent), with the extent of some of the lower dilution rates (i.e., >80 percent dilution) skewing the average increase in plume size upwards. Per the nearfield modeling, the maximum vertical diameter of the plume at the boundary of the ZID would increase slightly from approximately 67 ft under current conditions to approximately 71 ft under future conditions.

It is important to consider that these results reflect a highly idealized comparison between two discharge volume scenarios. The contours in Figure 4-5 are not expected to represent actual plume positions in relation to the SBOO terminus. Instead, this is presented to demonstrate the approximate change in magnitude of the discharge in relation to dispersal potential. Differences due to rates of decay for two pollutants (Aldrin and PCBs) showed negligible differences in modelled plume extents.

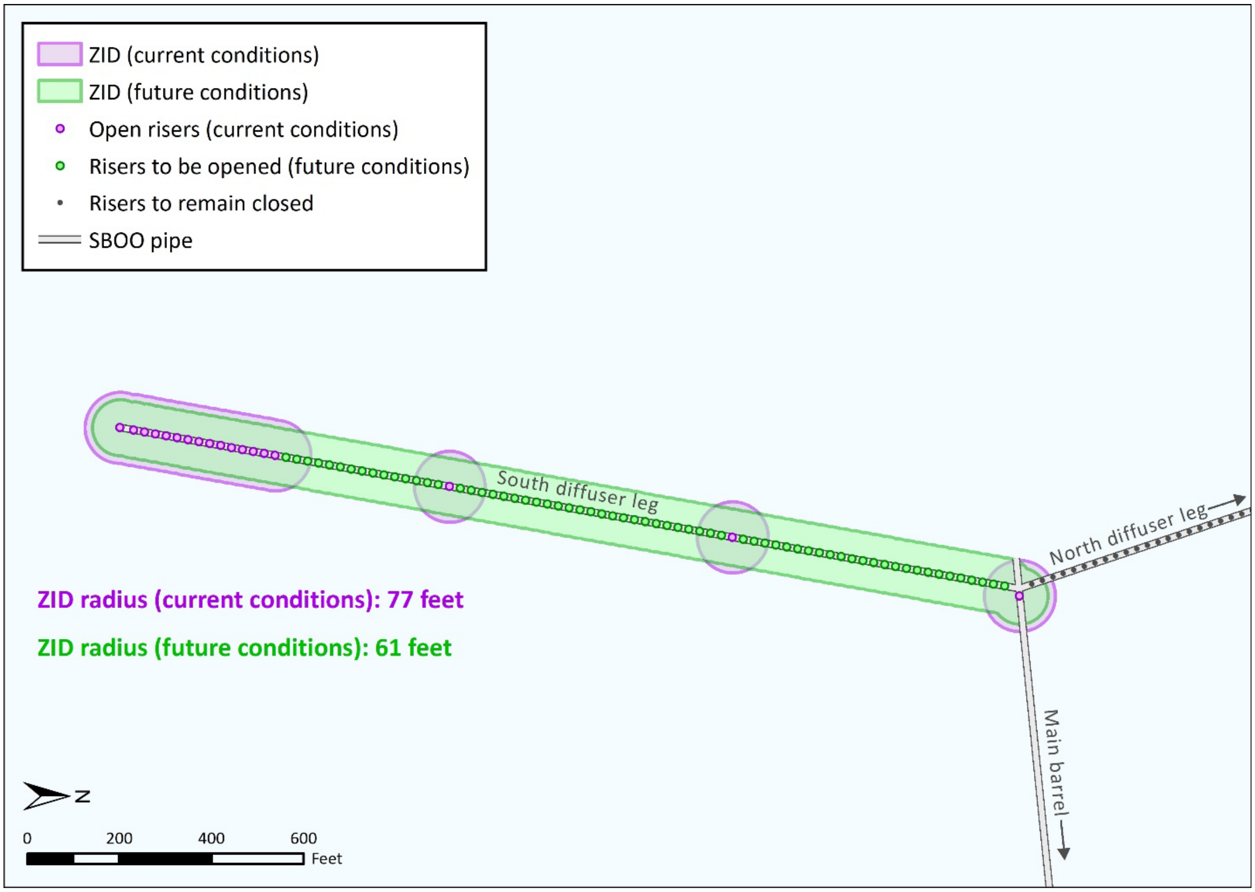

Figure 4-4. ZID around open risers on the SBOO, based on dilution modeling representing current conditions and future conditions following implementation of the proposed Federal Action.

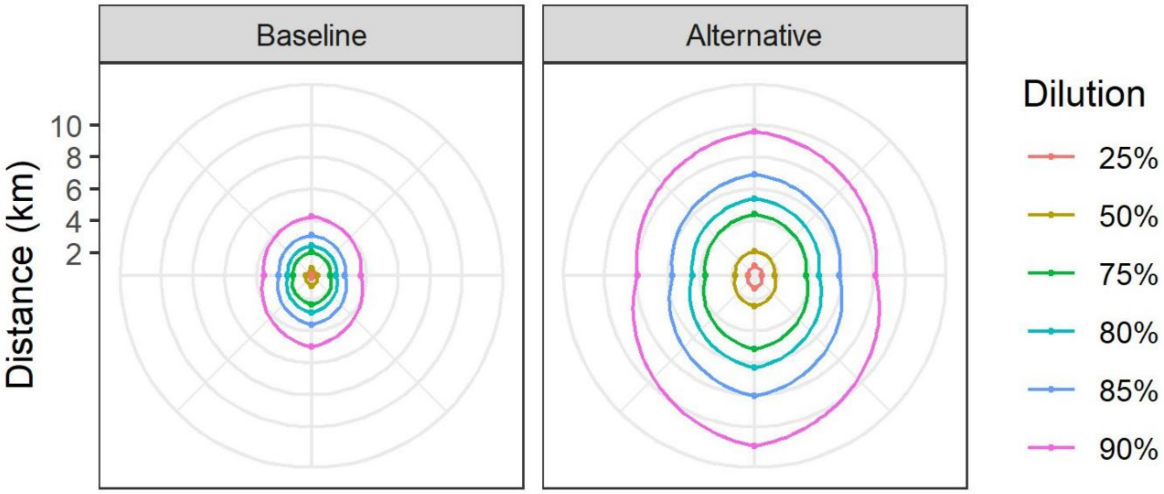

Figure 4-5. North, south, east, and west distances for percent dilution of pollutants based on coupled nearfield and far-field model. Far-field model results are highly idealized and are not expected to represent actual plume positions. Lines connecting points are provided as a visual aid and do not necessarily represent mapped contours.

4.3.4 Potential Effects on ESA-listed Species

In evaluating the proposed Federal Action, EPA and USIBWC considered the following potential pathways of exposure for ESA-listed species to polluted nearshore waters due to discharge of wastewater (treated and untreated) to the Pacific Ocean arising from the proposed Federal Action:

1. The direct ingestion, or indirect ingestion via prey, of chemicals toxic to the animals that occur in the polluted discharges.
2. An increase in the likelihood of HABs, which in turn produce toxins that directly harm animals or their prey, due to increased nutrient enrichment and other less direct ecological consequences of reduced water quality.

The following sections discuss the potential direct and indirect effects to ESA-listed species due to the proposed Federal Action with respect to these pollutant pathways.

4.3.4.1 Effects due to Toxic Pollutants

To align with assessments completed in prior Section 7 consultations between NMFS and federal agencies considering actions related to WWTP operation, chemicals toxic to ESA-listed species are organized into three categories. These are metals and ammonia, well-studied Persistent Organic Pollutants (POPs), and CECs. CECs contain many POPs that are not well-studied.

Metals become toxic at certain exposure levels and can be concentrated to these levels in wastewater. Metals also settle to the ocean floor after a period of post-discharge dispersal and can accumulate in sediments. Ammonia is a form of nitrogen that can be toxic at high concentrations. However, the primary concern around ammonia discharge to the ocean from wastewater is the potential for nutrient enrichment increasing the incidence of HABs, which have the potential to harm ESA-listed species. Modern wastewater treatment processes reduce metals and ammonia in wastewater prior to their discharge as effluent. Furthermore, both of these constituents are among the pollutants regulated under the NPDES program, which seeks to ensure that these pollutants will not degrade marine communities. Although discharge of effluent to the ocean via the SBOO will increase, the continued discharge of untreated wastewater from SAB Creek and through other transboundary flows into the marine environment (if not addressed through this Federal Action) would result in a higher loading of metals, nutrients, BOD, TSS, and other potential pollutants in the marine environment of the Action Area. Therefore, the implementation of projects through the funding provided by this Federal Action will result in a net decrease in the release of metals to the marine environment.

POPs are toxic chemical constituents that can accumulate in the food chain. These compounds will be found in much higher concentrations in the tissues of organisms higher in the food chain than lower in the food chain, or in the natural environment. Examples of POPs include:

- Pesticides such as dichloro-diphenyl-trichloroethane (DDT), and chlordane.
- PCBs.
- Flame retardants (PBDEs and chlorinated organophosphates).
- Anti-foulant paints (e.g., tributyltins [TBTs]).

PCBs and DDT were banned in the U.S. in the 1970s and 1980s. There may be legacy PCBs still in use in Mexico. TBTs and other anti-fouling paints have been in use for a long time. However, it is unclear if this compound bioaccumulates to the extent of some other pollutants monitored for this reason.

CECs include POPs and other chemicals that are less well understood. Organophosphate esters have been identified as an increasing concern; TCEP (tris[chloroethyl] phosphate), TCPP (tris[chloropropyl] phosphate) and TDCPP (tris[1,3-dichloro-2-propyl] phosphate) are three common chemicals in this category. Organophosphate esters are frequently used as flame retardants in manufactured products such as plasticizers and electronics to meet current manufacturing regulations. Other CECs include pharmaceuticals (for humans and pets) such as prescription drugs, antibiotics, anti-fungals, and hormones. Also, personal care products can have unintended environmental consequences. These include products such as sunscreens, exfoliants containing micro-plastics, etc. Even nanomaterials such as carbon nanotubes or nano-scale particulate titanium dioxide may have harmful consequences for marine life that are yet to be well documented. Secondary treatment processes may not remove CECs from effluent discharge. For example, several TCPPs were frequently detected in the Orange County Sanitation District. These included acetaminophen, DEET, carbamazepine, ibuprofen, and other compounds.

POPs persist in animal tissue by binding to fatty cells, organs like livers and kidneys, and other tissues after animals have consumed the contaminants. Because marine mammals are warm blooded, most species maintain large fat stores to support thermoregulation. These fat stores also allow for long migrations between feeding patches within foraging grounds, between forage and breeding grounds, and for suckling their young when they are first born.

POPs are likely to be absorbed into the tissue of marine mammals, sharks, and apex predatory fish like the Gulf grouper when they consume prey that have consumed the contaminants through feeding or directly across respiratory surfaces. POP levels tend to be lower in baleen whales than toothed whales and pinnipeds because toothed whales and pinnipeds consume more prey with higher levels of accumulated POPs. However, sperm whales feed on deep water species that are likely to be less affected by POPs from wastewater discharges that occur in more shallow, coastal waters. POPs may transfer between mothers and their young via suckling in marine mammals and via the eggs of marine turtles.

Blue whales are the ESA-listed species most likely to be affected by pollutants in the Action Area. This is based on the likelihood that blue whales are the most abundant species likely to remain in the Action Area to feed for extended periods. Shortfin mako, like most large oceanic sharks, occupy high trophic positions and so are especially vulnerable to bioaccumulation and biomagnification of pollutants like POPs. While they do not have blubber stores like many marine mammals, they do have large, lipid-rich livers which accumulate lipophilic pollutants. The other fishes identified in this BA are unlikely or have a low likelihood of occurring the Action Area so are not considered as vulnerable as shortfin mako sharks. Green sea turtles are most likely to occur in the Action Area relative to the three other species of sea turtle that could occur, and leatherback and loggerhead sea turtles have medium likelihood to occur in the project area. These species are unlikely to remain in the Action Area for extended periods. They also are unlikely to feed within the Action Area, except for green turtle, which may feed on seagrasses growing at the entrance to San Diego Bay. However, this area is on the very edge of the Action Area and it is highly unlikely the SBOO will affect this food source and result in an adverse effect to green sea turtles.

Pacific olive ridley sea turtles in the eastern north Pacific forage in waters off of Central America, approximately 2,000 miles to the south of the Action Area. While they may occur in southern California waters, any such occurrences are most likely sick individuals that have been passively riding currents from warmer waters of the central north Pacific. The current scientific literature on Pacific olive ridley sea turtles indicates they do not rely upon the California region in any ecologically important sense. Because still-alive animals that may occur in the Action Area are so far outside of their natural foraging range and are most likely not healthy individuals representative of the species' historic or current range, any additional effects to these animals from the discharge are considered insignificant and therefore not likely to adversely affect this species.

Humpback whales typically migrate through the region that includes the Action Area, spending most of their time in southern California in the Santa Barbara channel. Gray whales also migrate through the region between their foraging and breeding areas. Like blue whales, fin whales may feed in the Action Area for much of the year. However, observation data indicate that fin whales are less common in the San Diego area than blue whales, tending to be more abundant in other parts of southern California such as around the San Pedro shelf near the Palos Verdes peninsula or offshore of the Channel Islands. Prey items of Guadalupe fur seals include small pelagic fishes and squid that are more likely to accumulate pollutants than prey items of species of whales. Therefore, although Guadalupe fur seal are less likely to remain in the Action Area than some whale species such as blue whale, they may be more vulnerable to pollutants in the Action Area if they feed in the Action Area.

White abalone are very rare in southern California; however, they may occur at the project site because the rocky reef habitat provided by the ballast rock covering the SBOO provides food and shelter for these animals. They may also occur on small reefs throughout the Action Area. Because they are sedentary and live on the seafloor, they may be vulnerable to prolonged (chronic) exposure to pollutants emitted by the discharge. Therefore, these animals may be adversely affected by the ongoing and subsequent expansion of the SBOO discharge. Similarly, sunflower sea star are relatively sedentary seafloor animals. These are also very rare in the region encompassing the Action Area and may have been locally extirpated. However, if present, they are likely to be subject to similar effects to that of the white abalone and therefore are likely to be adversely affected by the future operation of the SBOO discharge.

All these species will gain a net benefit from reductions in nearshore pollution because of the proposed Federal Action to fund infrastructure to address transboundary flows. However, the proposed Federal Action will result in an increase in effluent from the SBOO, resulting in an increase in the ZID and an extension of the detectable extent of the plume (the far-field extent) as described above. When considered in isolation from the net benefits of the proposed Federal Action described above, this increase in the discharge of effluent at the SBOO is likely to result in adverse effects to animals that are likely to occur in the Action Area.

4.3.4.2 Effects due to Increased HABs

Phytoplankton blooms are a common feature of all ocean systems. HABs occur when populations of usually monospecific species of toxic phytoplankton rapidly increase in numbers. These toxin-producing algal blooms cause illness and death of fish, seabirds, mammals, and other marine life. Several species contribute to the formation of HABs, however the most common phytoplankton in southern California to form HABs is *Pseudo-nitzschia*. This taxon produces domoic acid and is responsible for frequent sea lion deaths, toxic blooms and associated mammal and bird illnesses in California. Other species include *Alexandrium*, *Gymnodinium*, and *Pyrodinium*, all of which are associated with paralytic shellfish poisoning (PSP). These HABs result in concentrations of toxicants in shellfish and are a serious human health risk. The contaminated shellfish and other lower invertebrates that consume and concentrate the PSP toxins are generally unaffected.

However, there is some evidence that PSPs, which transfer to higher invertebrates and vertebrates such as fishes, birds, marine mammals, and other animals, may cause harm to marine life.

In California, HABs are often related to large-scale oceanographic forcing, although studies have shown that local nutrient inputs (such as nitrification of ammonium from wastewater effluent) are important when cells reach the shore. For example, algal bloom hotspots are often associated with WWTP outfalls (Smith et al., 2018). Howard et al. (2014) evaluated the sources of nitrogen loadings to nearshore coastal ecosystems in highly urbanized areas of southern California. They reported that wastewater discharges contribute similar amounts of nitrogen as wind-driven upwelling events, with wastewater contributions in the Tijuana River coastal area being nearly an order of magnitude higher than inputs from upwelling. Howard et al. (2014) estimate that upwelling contributes approximately 2,700 tons per year of nitrogen in the San Diego area and that effluent, riverine runoff and atmospheric deposition contribute approximately 15,500 tons per year of nitrogen. It is unclear if Howard et al. (2014) included an estimate of nitrogen flux to the area from SAB Creek. SAB Creek contributes approximately 4,000 tons of nutrients to the Pacific Ocean under current conditions (Table 4-2), although this annual discharge does not enter the Action Area unless south swell conditions drive the plume northward. However, the magnitude of nitrogen enrichment suggests it is a substantial source of nitrogen to the marine environment in the region and therefore may be contributing to increased HABs.

As discussed in Section 4.3.2 (Changes to the SBOO Discharge), the proposed Federal Action will reduce overall nutrient loadings to the Pacific Ocean but will increase nutrient loadings discharged specifically via the SBOO (by approximately 154 percent under initial operations and by approximately 200 percent in 2050 when compared to the no-action baseline). It is unclear whether the increase in the SBOO discharges will increase the frequency or magnitude of HABs in the Action Area. It seems highly probable that contributions of coastally trapped raw effluent presently discharged from SAB Creek and the TJRE do contribute to an increased likelihood of HAB events. The proposed Federal Action seeks to reduce or eliminate this polluting feature. If the enrichment of coastal waters due to transboundary flows does result in increased frequency of HABs, there will likely be a net reduction in this negative consequence of pollution from Mexico due to the proposed Federal Action. This will improve water quality in the marine environment and benefit ESA-listed species in the Action Area. Because it is most likely that regional-scale contributions of nutrient enrichment drive HAB occurrence in the Action Area, and the proposed Federal Action is expected to result in a net reduction in nutrient loadings to the Action Area through the implementation of the treatment facilities, this project is expected to result in a reduction in HAB events. The proposed Federal Action is therefore not expected to result in adverse effects to ESA-listed species due to HABs.

4.4 Summary Conclusions

Table 4-6 summarizes effects determinations for ESA-listed species that may occur in the Action Area. As described in the narrative above, the proposed Federal Action will result in a net reduction in polluted wastewater in the Pacific Ocean that originates in Mexico and is transported into U.S. territory. These transboundary flows are likely to be causing harm to ESA-listed species through contamination of the natural environment, including introduction of toxic pollutants and nutrient enrichment that are likely to be causing increased HAB events known to affect these species. The proposed Federal Action will result in a net reduction in these effects and a net benefit to ESA-listed species.

However, the proposed Federal Action will increase discharges of treated effluent via the SBOO due to the expansion of treatment facilities in the U.S. This increase in discharges via the SBOO that will occur due to the proposed Federal Action ***may affect, and is likely to adversely affect*** those ESA-listed species identified as having medium to high potential to occur in the Action Area. For any ESA-listed species that are determined to be unlikely to occur or have a low likelihood to occur in the Action Area, the likelihood of occurrence is sufficiently low to warrant a finding that the proposed Federal Action ***may affect, but is not likely to adversely affect*** the species specified accordingly in Table 4-6, as these species are considered extremely unlikely to be affected.

Table 4-6. Summary of EPA's Effects Determination by ESA-listed Species for Construction and Operation.

Species and Management Unit (DPS)	Scientific Name	Status	Effects from Construction	Effects from Operation
Marine Mammals				
Blue whale	*Balaenoptera musculus*	FE	NLAA	LAA
Humpback whale (Central America DPS)	*Megaptera novaeangliae*	FE	NLAA	LAA
Humpback whale (Mexico DPS)		FT	NLAA	LAA
Fin whale	*Balaenoptera physalus*	FE	NLAA	LAA
Gray whale (Western North Pacific DPS)	*Eschrichtius robustus*	FE	NLAA	LAA
Guadalupe fur seal	*Arctocephalus townsendi*	FT	NLAA	LAA
Sperm whale	*Physeter macrocephalus*	FE	NLAA	NLAA
Sei whale	*Balaenoptera borealis*	FE	NLAA	NLAA
North Pacific right whale	*Eubalaena japonica*	FE	NLAA	NLAA
Sea Turtles				
Green sea turtle (East Pacific DPS)	*Chelonia mydas*	FT	NLAA	LAA
Leatherback sea turtle	*Dermochelys coriacea*	FE	NLAA	LAA
Loggerhead turtle (North Pacific DPS)	*Caretta caretta*	FE	NLAA	LAA
Pacific olive ridley turtle (Mexico Pacific breeding population DPS)	*Lepidochelys olivacea*	FE	NLAA	NLAA
Pacific olive ridley turtle (Remaining range)		FT	NLAA	NLAA
Marine Invertebrates				
White abalone	*Haliotus sorenseni*	FE	NLAA	LAA
Sunflower sea star	*Pycnopodia helianthoides*	FPL	NLAA	LAA
Black abalone	*Haliotus crachoredii*	FE	NLAA	NLAA
Fishes				
Shortfin mako or bonito shark	*Isurus oxyrinchus*	FPL	NLAA	LAA
Gulf grouper	*Mycteroperca jordani*	FE	NLAA	NLAA
Giant manta ray	*Manta birostris*	FT	NLAA	NLAA
Scalloped hammerhead shark	*Sphyrna lewini*	FE	NLAA	NLAA
Oceanic whitetip shark	*Carcharhinus longimanus*	FT	NLAA	NLAA
Steelhead (Southern California DPS)	*Oncorhynchus mykiss irideus*	FE	NLAA	NLAA
Green sturgeon (Southern DPS)	*Acipenser medirostris*	FT	NLAA	NLAA

Abbreviations: FE = federally endangered; FT = federally threatened; FPL = petitioned for federal listing; LAA = likely to adversely affect; NLAA = not likely to adversely affect.

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APPENDIX A

EFFLUENT LIMITATIONS IN ITP NPDES PERMIT NO. CA0108928

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4. Effluent Limitations and Discharge Specifications

4.1. Effluent Limitations and Performance Goals – Discharge Point No. 001

4.1.1. Effluent Limitations – Discharge Point No. 001

4.1.1.1. The Discharger shall maintain compliance with the following effluent limitations for the Facility, with compliance measured at Monitoring Location E-001, as described in the Monitoring and Reporting Program (MRP, Attachment E).

Table 2. Effluent Limitations at Monitoring Location E-001

Parameter [1][2]	Units [3]	Six-Month Median	Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Flow	million gallons per day (MGD)	--	25.0	--	--	--	--
Carbonaceous Biochemical Oxygen Demand 5-day @ 20°C ($CBOD_5$)	milligram per liter (mg/L)	--	25	40	--	--	--
$CBOD_5$	pounds per day (lbs/day)	--	5,213	8,340	--	--	--
$CBOD_5$	% Removal	--	≥85	--	--	--	--
Total Suspended Solids (TSS)	mg/L	--	30	45	--	--	--

Parameter [1][2]	**Units [3]**	**Six-Month Median**	**Average Monthly**	**Average Weekly**	**Maximum Daily**	**Instantaneous Minimum**	**Instantaneous Maximum**
TSS	lbs/day	--	6,255	9,383	--	--	--
TSS	% Removal	--	≥85	--	--	--	--
pH	standard units	--	--	--	--	6.0	9.0
Oil and Grease	mg/L	--	25	40	--	--	75
Oil and Grease	lbs/day	--	5,213	8,340	--	--	15,638
Settleable Solids	milliliter per liter (ml/L)	--	1.0	1.5	--	--	3.0
Turbidity	nephelometric turbidity unit (NTU)	--	75	100	--	--	225
Total Residual Chlorine	microgram per liter (µg/L)	1.90E+02	--	--	7.6E+02	--	5.70E+03
Total Residual Chlorine	lbs/day	3.96E+01	--	--	1.58E+02	--	1.19E+03
Chronic Toxicity [4][5]	“Pass/Fail”	--	--	--	“Pass”	--	--
Copper, Total Recoverable	µg/L	9.76E+01	--	--	9.58E+02	--	2.68E+03
Copper, Total Recoverable	lbs/day	2.03E+01	--	--	2.00E+02	--	5.59E+02

Parameter [1][2]	Units [3]	Six-Month Median	Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Mercury, Total Recoverable	µg/L	3.78E+00	--	--	1.52E+01	--	3.82E+01
Mercury, Total Recoverable	lbs/day	7.88E-01	--	--	3.16E+00	--	7.96E+00
Benzidine	µg/L	--	6.60E-03	--	--	--	--
Benzidine	lbs/day	--	1.38E-03	--	--	--	--
Chlordane	µg/L	--	2.20E-03	--	--	--	--
Chlordane	lbs/day	--	4.58E-04	--	--	--	--
Dichlorodiphenyltrichloroethane (DDT)	µg/L	--	1.60E-02	--	--	--	--
Dichlorodiphenyltrichloroethane (DDT)	lbs/day	--	3.39E-03	--	--	--	--
Heptachlor Epoxide	µg/L	--	1.90E-03	--	--	--	--
Heptachlor Epoxide	lbs/day	--	3.99E-04	--	--	--	--
Hexachlorobenzene	µg/L	--	2.00E-02	--	--	--	--
Hexachlorobenzene	lbs/day	--	4.19E-03	--	--	--	--
PCBs	µg/L	--	1.80E-03	--	--	--	--
PCBs	lbs/day	--	3.79E-04	--	--	--	--
TCDD Equivalents	µg/L	--	3.70E-07	--	--	--	--
TCDD Equivalents	lbs/day	--	7.77E-08	--	--	--	--
Toxaphene	µg/L	--	2.00E-02	--	--	--	--
Toxaphene	lbs/day	--	4.19E-03	--	--	--	--

Notes for Table 2

[1] See Attachment A for definitions of abbreviations and a glossary of common terms used in this Order.

[2] Scientific "E" notation is used to express certain values. In scientific "E" notation, the number following the "E" indicates that position of the decimal point in the value. Negative numbers after the "E" indicate that the value is less than 1, and positive numbers after the "E" indicate that the value is greater than 1. In this notation a value of 6.1 E-02 represents 6.1 x 10^{-2} or 0.061, 6.1E+02 represents 6.1 x 10^{2} or 610, and 6.1E+00 represents 6.1 x 10^{0} or 6.1.

[3] The Mass Emission Rate (MER) limitation, in lbs/day, was calculated based on the following equation: MER (lbs/day) = 8.34 x Q x C, where Q is the permitted flow for the Facility (25.0 MGD) and C is the concentration (mg/L).

[4] As specified in section 7.12 of this Order and section 3.3 of the MRP (Attachment E).

[5] The chronic toxicity effluent limitation is protective of both the numeric acute and chronic toxicity 2019 Ocean Plan water quality objectives. The effluent limitation will be implemented using *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms* (EPA/600/R-95/136, 1995); current USEPA guidance in the *National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document* (EPA 833-R-10-003, June 2010) (https://www3.epa.gov/npdes/pubs/wet_final_tst_implementation2010.pdf); and *USEPA Regions 8, 9, and 10, Toxicity Training Tool* (January 2010).

4.1.2. Performance Goals

Parameters that do not have reasonable potential to cause or contribute to an exceedance of water quality objectives, or for which reasonable potential to cause or contribute to an exceedance of water quality objectives cannot be determined, are referred to as performance goal parameters and are assigned the performance goals listed in Table 3. Performance goal parameters shall be monitored at Monitoring Location E-001, as described in the MRP (Attachment E). The San Diego Water Board will use the results for informational purposes only, not compliance determinations. The performance goals in Table 3 are not water quality-based effluent limitations (WQBELs) and are not enforceable, as such.

APPENDIX B

ITP 2021 ANNUAL NPDES REPORT

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VEOLIA
WATER

June 16, 2022

Dr. Yasser Fahmy
COR
International Boundary and Water Commission
2995 Clearwater Way
San Diego, CA 92154

Subject: 2021 NPDES Annual Report

Dear Dr. Fahmy:

Attached is the 2021 NPDES Annual Report for the South Bay International Wastewater Treatment Plant (SBIWTP).

If you have any questions regarding this report, please feel free to give me a call at (619) 662-7687.

Regards,

Anderson "Monty" Dill

Anderson “Monty” Dill
Plant Superintendent

INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO

UNITED STATES SECTION

SOUTH BAY INTERNATIONAL WASTEWATER TREATMENT PLANT

Prepared by: VEOLIA WATER

2021 ANNUAL NPDES REPORT

South Bay International Wastewater Treatment Plant

2021

Annual Monitoring Report

NPDES Permit CA 0108928

Order No. R9-2021-0001

June 16, 2022

Prepared By

Anderson “Monty” Dill

Plant Superintendent
Veolia Water North America – West LLC

June 16, 2022

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Discussion of the Monitoring and Reporting Program:

Discussion of the Monitoring and Reporting Program

Monitoring

Influent Constituents

The testing of the influent from the City of Tijuana was conducted from January through December 2021. All samples were collected by the Plant's staff and tested by Sierra Analytical Laboratory, in accordance with Standard Methods.

Effluent Constituents

The testing of the effluent from the City of Tijuana was conducted from January through December 2021. All samples were collected by the Plant's staff and tested by Sierra Analytical Laboratory and Nautilus Environmental, in accordance with Standard Methods. The effluent was discharged through the Ocean Outfall.

Reporting

Monthly Reports were submitted to the Regional Water Quality Control Board, as per provision of the NPDES permit.

Plant Personnel

The current roster for the operation and maintenance of the South Bay International Wastewater Treatment Plant is as follows:

Plant Manager	Anderson “Monty” Dill, Project Manager
Certification	Grade V, WWTPO #V-3587
Job Description	Responsible for the Operation and Maintenance of the South Bay International WWTP and the U.S. wastewater collection and pump stations that convey the City of Tijuana runoff.
Oper. Manager	Mark Wippler, Operations Manager
Certification	Grade V, WWTPO #V-7995
Job Description	Responsible for the Operation and Maintenance of the South Bay International WWTP and the U.S. wastewater collection and pump stations that convey the City of Tijuana runoff.
Maintenance Mgr.	Michael MacKenzie, Maintenance Manager
Certification	Grade III Mechanical Tech, Cert # 131 Grade IV Plant Maintenance Tech, Cert # 00015401
Job Description	Responsible for the Operation and Maintenance of the South Bay International WWTP and the U.S. wastewater collection and pump stations that convey the City of Tijuana runoff.
Lead Supervisor	Thomas Stickles, Lead Supervisor
Certification	Grade IV, WWTPO #IV-43672
Job Description	Responsible for the Operation and Maintenance of the South Bay International WWTP and the U.S. wastewater collection and pump stations that convey the City of Tijuana runoff.

Shift Supervisor	Renato Bartolome, Shift Supervisor
Certification	Grade V, WWTPO, #V-9718
Job Description	Responsible for the Operation and Maintenance of the South Bay International WWTP and the U.S. wastewater collection and pump stations that convey the City of Tijuana runoff.
Shift Supervisor	Thomas Brown, Shift Supervisor
Certification	Grade III, WWTPO, #III-5465
Job Description	Responsible for the Operation and Maintenance of the South Bay International WWTP and the U.S. wastewater collection and pump stations that convey the City of Tijuana runoff.
Shift Supervisor	Able Alba, Shift Supervisor
Certification	Grade III, WWTPO, #III-44659
Job Description	Responsible for the Operation and Maintenance of the South Bay International WWTP and the U.S. wastewater collection and pump stations that convey the City of Tijuana runoff.
Shift Supervisor	Nasser Georges, Grade III
Certification	Grade III, WWTPO, #III-45036
Job Description	Responsible for the Operation and Maintenance of the South Bay International WWTP and the U.S. wastewater collection and pump stations that convey the City of Tijuana runoff.
Shift Supervisor	Juan Spearman, Grade III
Certification	Grade III, WWTPO, #III-75950
Job Description	Responsible for the Operation and Maintenance of the South Bay International WWTP and the U.S. wastewater collection and pump stations that convey the City of Tijuana runoff.
Shift Supervisor	VACANT
Certification	
Job Description	Responsible for the Operation and Maintenance of the South Bay International WWTP and the U.S. wastewater collection and pump stations that convey the City of Tijuana runoff.

Operator	Hal Van Horn, Operator
Certification	Grade II, WWTPO #II-8767
Job Description	Responsible for the Operation and Maintenance of the South Bay International WWTP and the U.S. wastewater collection and pump stations that convey the City of Tijuana runoff.
Operator	Giacomo Vitko, Operator
Certification	Grade II, WWTPO #II-44104
Job Description	Responsible for the Operation and Maintenance of the South Bay International WWTP and the U.S. wastewater collection and pump stations that convey the City of Tijuana runoff.
Operator	Carlos Calderon, Operator
Certification	WWTPO #OIT-1
Job Description	Responsible for the Operation and Maintenance of the South Bay International WWTP and the U.S. wastewater collection and pump stations that convey the City of Tijuana runoff.
Operator	Cory Thornton, Operator
Certification	WWTPO #OIT-1
Job Description	Responsible for the Operation and Maintenance of the South Bay International WWTP and the U.S. wastewater collection and pump stations that convey the City of Tijuana runoff.
Operator	VACANT
Certification	
Job Description	Responsible for the Operation and Maintenance of the South Bay International WWTP and the U.S. wastewater collection and pump stations that convey the City of Tijuana runoff.
Operator	VACANT
Certification	
Job Description	Responsible for the Operation and Maintenance of the South Bay International WWTP and the U.S. wastewater collection and pump stations that convey the City of Tijuana runoff.

Mechanic	Manual Galinato, Maintenance Mechanic
Certification	None
Job Description	Responsible for the O & M of plant equipment and pump stations. Also provides O & M support at the South Bay International WWTP
Mechanic	James Caldwell, Maintenance Mechanic
Certification	None
Job Description	Responsible for the O & M of plant equipment and pump stations. Also provides O & M support at the South Bay International WWTP
Mechanic	Mike Plasterer, Maintenance Mechanic
Certification	None
Job Description	Responsible for the O & M of plant equipment and pump stations. Also provides O & M support at the South Bay International WWTP
Mechanic	Sangvourn Thang, Maintenance Mechanic
Certification	None
Job Description	Responsible for the O & M of plant equipment and pump stations. Also provides O & M support at the South Bay International WWTP
Mechanic	Ricardo Navarro, Maintenance Mechanic
Certification	None
Job Description	Responsible for the O & M of plant equipment and pump stations. Also provides O & M support at the South Bay International WWTP
Hvy. Equipment Op.	Kurt Schmidt
Certification	Grade 1, WWTPO#1-38805
Job Description	Responsible for the O & M of the canyon collectors and pumps stations. Also provides O & M support at the South Bay International WWTP.

E & I Technician	Timothy McNulty
Certification	None
Job Description	Responsible for the inspection and repair of electronic equipment in support of O & M of the South Bay International WWTP and the U.S. wastewater collection and pump stations.

I & C Technician	Rodel Resurreccion
Certification	None
Job Description	Responsible for the inspection and repair of electronic equipment in support of O & M of the South Bay International WWTP and the U.S. wastewater collection and pump stations.

Scada Sys. Analyst	Luis Olivas
Certification	SCADA, WWTPO #OIT-1
Job Description	Responsible for FISMA compliance and SCADA System functioning and management in support of Operations and Maintenance at the South Bay International WWTP and the U.S. wastewater collection and pump stations.

Office Manager	Irma Robles
Certification	None
Job Description	Responsible for the Accounting, Payroll, Human Resources and all other office procedures for the South Bay International WWTP as assigned by staff.

Operations and Maintenance Manual

The O & M manuals for the South Bay International Wastewater Treatment Plant were last updated in January 2011; the SOPs are updated on a regular basis.

The Master Set of these O & M manuals is redlined to reflect changes in the field.

These manuals are complete and valid for the current facilities CC-1, CC-2, CC-2B, CC-3, CC-4A and CC-4B.

Identification of Laboratory Performing Analysis

Veolia performed all sampling tasks. Sierra Laboratories performed with pH and Total Chlorine Residual testing. Laboratory services for sample pick up and analysis was contracted to the Sierra Laboratories.

Listed below are the California State Certified Laboratories

From January through December 2021 the laboratory analysis was performed by:

Sierra Laboratories
26052 Merit Circle
Laguna Hills, CA 92653

Nautilus Environmental
4340 Vandever Avenue
San Diego CA 92120

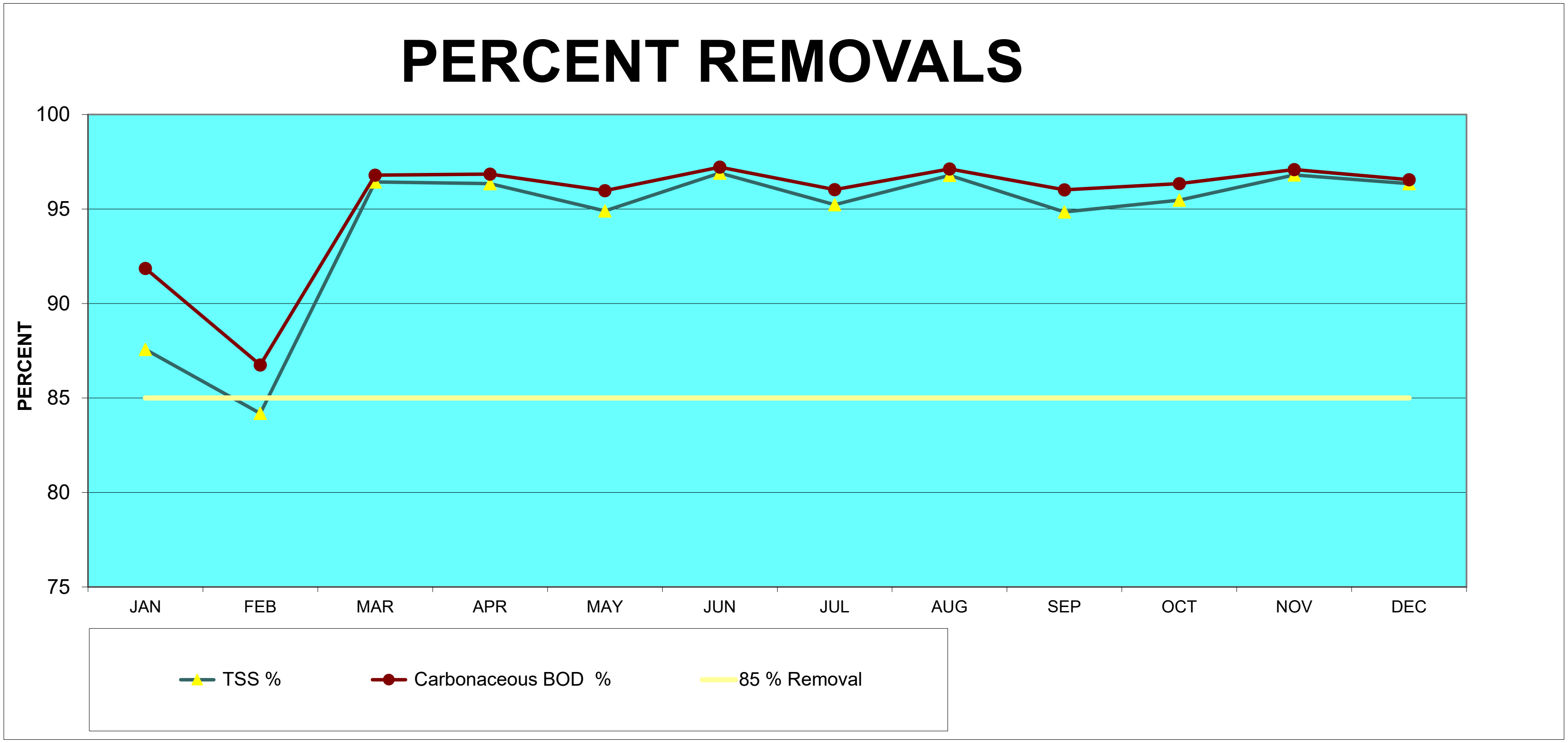
Bio-Analytical Laboratories Inc.
3240 Spurgin Road
Doyline, LA 71023

Plant Removal Efficiencies

2021 PLANT PROCESS REMOVAL EFFICIENCIES

SOUTH BAY INTERNATIONAL WTP

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVERAGE %
TSS	%	88	84	96	96	95	97	95	97	95	95	97	96	94
Carbonaceous BOD	%	92	87	97	97	96	97	96	97	96	96	97	97	95



TABULATION OF THE INFLUENT CONSTITUENTS

TABULATION OF THE INFLUENT CONSTITUENTS

SOUTH BAY INTERNATIONAL WTP

NPDES Data for the South Bay International WTP

2021 INFLUENT TABS

INFLUENT NPDES	Units	Limitations			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2021
					Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average
Influent flow	mgd				24.32	21.80	20.62	21.33	24.62	24.90	24.81	24.99	24.96	24.31	22.81	19.63	23.27
GRAB SAMPLES / OIL & GREASE																	
Settleable Solids	ml/L				5.00	4.95	5.60	2.95	3.16	3.78	3.70	3.94	4.55	3.78	3.60	3.15	4.01
weekly (7 day) average	ml/L				5.46	4.95	6.06	2.85	3.26	3.61	3.54	3.96	4.41	3.89	3.53	3.28	4.07
pH	SU				7.15	7.33	7.24	7.25	7.24	7.26	7.23	7.21	7.26	7.25	7.30	7.26	7.25
Oil/grease	mg/L				23.4	20.5	21.1	20.5	20.7	20.8	22.7	23.3	22.0	21.7	20.8	20.5	21.5
weekly (7 day) average	mg/L				23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7
Temperature	C				17.83	18.65	18.33	21.08	21.69	22.96	24.78	25.01	24.80	22.34	21.56	18.15	21.44
COMPOSITE ANALYSES																	
Total Suspended Solids	mg/L				378	372	393	392	333	321	322	322	297	391	333	310	347
weekly (7 day) average					378	372	389	398	334	322	324	316	304	387	330	312	347
Volatile Suspended Solids	mg/L				258	273	275	278	256	241	248	247	223	203	256	218	248
BOD	mg/L				381	385	394	392	350	343	343	347	318	319	353	322	354
Soluble BOD	mg/L																
Carbonaceous BOD (CBOD)	mg/L				298	304	312	309	271	261	266	269	246	243	274	245	275
weekly (7 day) average	mg/L				298	304	312	309	271	261	266	269	246	243	274	245	275
Floatables	mg/L																
Total Dissolved Solids	mg/L				1,495	1,502	1,588	1,542	1,630	1,633	1,570	1,559	1,550	1,564	1,570	1,563	1,566
Turbidity	NTU				258	221	224	266	224	262	221	252	213	360	201	201	241
weekly (7 day) average	NTU				265	221	228	255	219	269	221	237	233	347	201	200	241
Ammonia-N	mg/L				57,500	50,000	50,100	48,100	42,800	45,800	61,600	58,500	50,500	49,500	50,000	54,500	51,575
COD Chemical Oxygen Demand	mg/L				770	780	780	816	755			709	658	682	730	697	743
T.S. Total Solids	mg/L																
T.V. Volatile Solids	mg/L																
METALS AND CYANIDE		6-MTH MED	Mthly Avg	MAX													
Antimony	ug/L				2.90			2.90			6.70			6.70			4.80
Antimony	lbs/day				0.53			0.44			1.37			1.38			0.93
Arsenic	ug/L		24		2.10	2.10	2.10	2.10	3.94	6.70	6.70	6.70	6.70	6.70	6.70	6.70	4.93
Arsenic	lbs/day		5		0.47	0.36	0.35	0.37	0.80	1.32	1.40	1.37	1.38	1.37	1.24	1.14	0.96
Beryllium	ug/L		2.5		1.00			1.00		2.20	2.20	2.20	2.20	2.20	2.20	2.20	1.95
Beryllium	lbs/day		0.520		0.22			0.17		0.43	0.46	0.45	0.45	0.45	0.41	0.37	0.38
Cadmium	ug/L		61		2.20	2.20	2.28	2.20	2.16	1.90	1.90	1.90	1.90	1.90	1.90	1.90	2.03
Cadmium	lbs/day		13		0.50	0.38	0.39	0.38	0.45	0.38	0.40	0.39	0.39	0.39	0.35	0.32	0.39
Chromium Total	ug/L		1100		14.35	12.35	7.22	10.55	11.08	3.00	6.40	1.20	1.20	1.20		1.20	6.35
Chromium Total	lbs/day		230		3.58	2.14	1.30	1.94	2.25	0.59	1.35	0.25	0.25	0.25		0.20	1.28
Chromium III *	ug/L				14.35			10.55		3.90	6.40	1.20	1.20	1.20	1.20	1.20	4.40
Chromium VI	ug/L				0.06	0.06	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Copper	ug/L	150			40.75	49.75	19.80	21.25	13.40	17.00	17.00	17.00	17.00	17.00	17.00	17.00	21.60

TABULATION OF THE INFLUENT CONSTITUENTS

SOUTH BAY INTERNATIONAL WTP

NPDES Data for the South Bay International WTP

2021 INFLUENT TABS

INFLUENT NPDES	Units	Limitations			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2021
					Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average
Copper	lbs/day	32			10.70	8.82	3.35	3.53	2.74	3.36	3.54	3.48	3.51	3.47	3.16	2.89	4.29
Iron	ug/L																
Lead	ug/L		160		10.75	2.00	4.80	2.00	2.00	2.00	4.25	4.20	2.00	6.25	3.80	4.75	4.04
Lead	lbs/day		34.00		2.87	0.34	0.95	0.35	0.41	0.40	0.89	0.85	0.41	1.29	0.73	0.83	0.85
Mercury	ug/L			5.4	0.06	0.06	0.05	0.05	0.09	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.10
Mercury	lbs/day			1.1	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02
Nickel	ug/L	440			38.00	14.55	30.40	15.68	9.76	29.48	17.93	3.90	20.45	3.90	3.90	3.90	15.68
Nickel	lbs/day	93			9.53	2.70	5.16	2.86	2.04	6.00	3.77	0.80	4.28	0.80	0.72	0.66	3.19
Selenium	ug/L				14.90	4.20	4.20	4.20	8.12	14.00	14.00	14.00	14.00	14.00	14.00	14.00	11.05
Silver	ug/L	52			44.00	44.00	44.00	44.00	27.60	3.00	3.00	3.00	3.00	3.00	3.00	3.00	18.77
Silver	lbs/day	11			9.87	7.56	7.41	7.70	5.79	0.59	0.63	0.61	0.62	0.61	0.56	0.51	3.54
Thallium	ug/L				12.00			12.00		27.00	27.00	27.00	27.00	27.00	27.00	27.00	23.84
Zinc	ug/L		1100		187.50	169.75	138.80	307.25	168.80	126.75	101.25	67.20	155.00	360.00	80.20	88.25	158.81
Zinc	lbs/day		220		47.83	30.20	24.52	58.16	34.16	25.41	21.19	13.77	31.73	74.80	14.75	15.53	31.83
Cyanide	ug/L	75			2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Cyanide	lbs/day	16			0.45	0.34	0.34	0.35	0.41	0.40	0.42	0.41	0.41	0.41	0.37	0.34	0.39

RADIOACTIVITY

Alpha Radiation	pc/L																
Beta Radiation	pc/L																

CHLORINATED PESTICIDES

Aldrin	ug/L				**0.00**			**0.00**			**0.00**			**0.00**			0.00
Dieldrin	ug/L				**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**			**0.00**			0.00
alpha-BHC	ug/L																
beta-BHC	ug/L																
gamma-BHC (Lindane)	ug/L	0.420															
delta-BHC	ug/L																
Total HCH	ug/L				**1.00**			**1.00**			**1.00**			**1.00**			1.00

p,p-DDD	ug/L																
p,p-DDE	ug/L																
p,p-DDT	ug/L																
o,p-DDD	ug/L																
o,p-DDE	ug/L																
o,p-DDT	ug/L																
Total DDT	ug/L				**0.01**			**0.01**			**0.01**			**0.01**			0.01

Heptachlor	ug/L				**0.00**	**0.00**	**0.00**	**0.00**	**0.00**		**0.00**			**0.00**			0.00
Heptachlor epoxide	ug/L				**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**			**0.00**			0.00

TABULATION OF THE INFLUENT CONSTITUENTS

SOUTH BAY INTERNATIONAL WTP

NPDES Data for the South Bay International WTP

2021 INFLUENT TABS

INFLUENT NPDES	**Units**	**Limitations**			**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**2021**
					Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average
Total Heptachlor	ug/L				**0.00**			**0.00**			**0.00**			**0.00**			0.00
Alpha (cis) Chlordane	ug/L																
	ug/L																
	ug/L																
Gamma (trans) Chlordane	ug/L																
Oxychlordane	ug/L																
trans Nonachlor	ug/L																
cis Nonachlor	ug/L																
Total Chlordane	ug/L																
Alpha Endosulfan	ug/L																
Beta Endosulfan	ug/L																
Endosulfan Sulfate	ug/L				**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	0.01
Total Endosulfan	ug/L				**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	0.01
Endrin	ug/L				**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	0.00
Endrin aldehyde	ug/L																
Mirex	ug/L																
Methoxychlor	ug/L																
Toxaphene	ug/L				**0.50**			**0.50**			**0.50**			**0.50**			0.50
PCB 1016	ug/L																
PCB 1221	ug/L																
PCB 1232	ug/L																
PCB 1242	ug/L																
PCB 1248	ug/L																
PCB 1254	ug/L																
PCB 1260	ug/L																
Total PCB's	ug/L				**0.40**			**0.40**			**0.40**			**0.40**			0.40
BENZIDINE (EPA 605)																	
benzidine	ug/L				**1.00**	**1.00**	**1.00**	**1.00**	**1.00**		**1.00**	**1.00**	**1.00**	**1.00**		**1.00**	1.00
3,3-dichlorobenzidine	ug/L				**0.59**			**0.59**		**0.59**	**0.59**			**0.59**			0.59
TRIBUTYL TIN ANALYSIS																	
tributyl tin	ug/L				**1.40**			**1.40**			**1.40**			**1.40**			1.40
dibutyl tin	ug/L																
monobutyl tin	ug/L																
BASE/NEUTRAL COMPOUNDS (EPA 625)																	
bis(2-chloroethly) ether	ug/L																

TABULATION OF THE INFLUENT CONSTITUENTS

SOUTH BAY INTERNATIONAL WTP

NPDES Data for the South Bay International WTP

2021 INFLUENT TABS

INFLUENT NPDES	Units	Limitations			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2021
					Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average
metadichlorobenzene	ug/L																
orthodichlorobenzene	ug/L																
paradichlorobenzene (1,4-dichlorobenzene)	ug/L				0.26			0.26			0.36			0.36			0.31
bis-(2-chloroisopropyl) ether	ug/L																
N-nitrosodi-n-propylamine	ug/L				0.58			0.58			0.58			0.58			0.58
nitrobenzene	ug/L				0.23			0.23			0.23			0.23			0.23
hexachloroethane	ug/L				0.25			0.25			0.25			0.25			0.25
isophorone	ug/L				0.64			0.64			0.64			0.64			0.64
bis(2-chloroethoxy)methane	ug/L				0.27			0.27			13.00			0.27			3.45
1,2,4-trichlorobenzene	ug/L																
naphthalene	ug/L																
hexachlorobutadiene	ug/L				0.56			0.56			0.56			0.56			0.56
hexachlorocyclopentadiene	ug/L				1.00			1.00			1.00			1.00			1.00
acenaphthylene (pah)	ug/L																
dimethyl phthalate	ug/L				0.22			0.22			0.22			0.22			0.22
2,6-dinitrotoluene	ug/L				0.21			0.21									0.21
acenaphthene	ug/L																
2,4-dinitrotoluene	ug/L				0.45			0.45			0.45			0.45			0.45
fluorene (pah)	ug/L																
4-chlorophenyl phenyl ether	ug/L																
diethyl phthalate	ug/L				3.60			0.57			3.20			3.90			2.82
N-nitrosodiphenylamine	ug/L				0.12			0.12			0.12			0.12			0.12
4-bromophenyl phenyl ether	ug/L																
hexachlorobenzene	ug/L				0.35			0.35			0.35			0.35			0.35
phenanthrene (pah)	ug/L																
anthracene (pah)	ug/L																
di-n-butyl phthalate	ug/L				0.25			1.10			0.25			0.25			0.46
N-nitrosodimethylamine	ug/L				1.00			1.00			1.00			1.00			1.00
fluoranthene	ug/L				0.03			0.03			0.03			0.03			0.03
pyrene (pah)	ug/L																
butyl benzyl phthalate	ug/L				0.62			0.62									0.62
chrysene (pah)	ug/L																
benzo(A)anthracene	ug/L																
bis-(2-ethylhexyl) phthalate	ug/L																
di-n-octyl phthalate	ug/L				0.41			0.41						0.41			0.41
benzo(K)fluoranthene (pah)	ug/L																
3,4-benzo(B)fluoranthene (pah)	ug/L																
benzo(A)pyrene (pah)	ug/L																
indeno(1,2,3-CD)pyrene (pah)	ug/L																
dibenzo(A,H)anthracene	ug/L																
benzo(G,H,I)perylene (pah)	ug/L																
1,2-diphenylhydrazine	ug/L				1.00			1.00			1.00			1.00			1.00

TABULATION OF THE INFLUENT CONSTITUENTS

SOUTH BAY INTERNATIONAL WTP

NPDES Data for the South Bay International WTP **2021 INFLUENT TABS**

INFLUENT NPDES	**Units**	**Limitations**			**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**2021**
					Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average
Total Polynuclear aromatic hydrocarbons	ug/L				0.30			0.30			0.30			0.40			0.33

NON & CHLORINATED PHENOLS

2-chlorophenol	ug/L																
2,4-dichlorophenol	ug/L																
4-cholor-3-methylphenol	ug/L																
2,4,6-trichlorophenol	ug/L				1.00			1.00			1.00			1.00			1.00
pentachlorophenol	ug/L																
Total chlorinated phenols	ug/L				1.00			1.00			1.00			1.00			1.00

phenol	ug/L																
2-nitrophenol	ug/L																
2,4-dimethylphenol	ug/L																
2,4-dinitrophenol	ug/L				1.00			1.00			1.00			1.00			1.00
4-nitrophenol	ug/L																
2-methyl-4,6-dinitrophenol	ug/L				1.00			1.00			1.00			1.00			1.00
Total non-chlor phenols	ug/L				0.00			0.00			0.00			0.00			0.00

HALOMETHANE PURGEABLE COMPOUNDS (EPA 624) (VOC's)

chloromethane (hal)	ug/L																
bromomethane (hal)	ug/L																
vinyl chloride (hal)	ug/L				0.47			0.47			0.47			0.47			0.47
chloroethane	ug/L																
1,1-dichloroethene (1,1-dichloroethylene)	ug/L				0.07			0.07			0.07			0.07			0.07
trichlorofluoromethane	ug/L				0.19			0.19									0.19
methlyene chloride (dichloromethane)	ug/L				0.43			0.43			0.43			0.43			0.43
1,1-dichloroethane	ug/L				0.29			0.29									0.29
trans-1,2-dichloroethene	ug/L																
chloroform	ug/L				5.70			9.70			1.30			4.50			5.30
1,2-dichloroethane	ug/L				0.25			0.25			0.25			0.25			0.25
1,1,1-trichloroethane	ug/L				0.23			0.23			0.23			0.23			0.23
carbon tetrachloride	ug/L				0.38			0.38			0.38			0.38			0.38
DCBM-bromodichloromethane (hal)	ug/L				0.31			0.31			0.31			0.31			0.31
1,2-dichloropropane	ug/L				0.15			0.15									0.15
trans-1,3-dichloropropene	ug/L																
trichloroethene (trichloroethlyene)	ug/L				0.31			0.31			0.31			0.31			0.31
benzene	ug/L				0.47			0.47			0.47			0.47			0.47
dibromochloromethane (hal)	ug/L				0.36			0.36			0.36			0.36			0.36
1,1,2-trichloroethane	ug/L				0.34			0.34			0.34			0.34			0.34
cis-1,3-dichloropropene	ug/L				0.32			0.32			0.31			0.31			0.32
2-chloroethylvinyl ether	ug/L																

TABULATION OF THE INFLUENT CONSTITUENTS

SOUTH BAY INTERNATIONAL WTP

NPDES Data for the South Bay International WTP

2021 INFLUENT TABS

INFLUENT NPDES	**Units**	**Limitations**			**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**2021**
					Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average
bromoform (hal)	ug/L																
1,1,2,2-tetrachloroethane	ug/L				0.42			0.42			0.42			0.42			0.42
tetrachloroethene (tetrachloroethlyene)	ug/L				0.49			0.49			0.49			3.40			1.22
toluene	ug/L				1.50			3.00			4.90			5.00			3.60
chlorobenzene	ug/L				0.31			0.31			0.31			0.31			0.31
ethylbenzene	ug/L				0.38			0.38			1.30			0.38			0.61
2-butanone (MEK)	ug/L																
carbon disulfide	ug/L																
Total Halomethanes	ug/L				0.67			0.67			0.67			0.67			0.67

EPA METHOD 624

acrylonitrile	ug/L				1.50			1.50			1.50			1.50			1.50
acrylonitrile	lbs/day				0.28			0.23			0.31			0.31			0.28
acrolein	ug/L				2.60			2.60			2.60			2.60			2.60
acrolein	lbs/day				0.48			0.39			0.53			0.54			0.49

TCDD equivalents

2,3,7,8-tetra CDD	pg/L																
1,2,3,7,8-penta CDD	pg/L																
1,2,3,4,7,8-hexa CDD	pg/L																
1,2,3,6,7,8-hexa CDD	pg/L																
1,2,3,7,8,9-hexa CDD	pg/L																
1,2,3,4,6,7,8-hepta CDD	pg/L																
octa CDD	pg/L																
2,3,7,8-tetra CDF	pg/L																
1,2,3,7,8-penta CDF	pg/L																
2,3,6,7,8-penta CDF	pg/L																
1,2,3,4,7,8-hexa CDF	pg/L																
1,2,3,6,7,8-hexa CDF	pg/L																
1,2,3,7,8,9-hexa CDF	pg/L																
2,3,4,6,7,8-hexa CDF	pg/L																
1,2,3,4,6,7,8-hepta CDF	pg/L																
1,2,3,4,7,8,9-hepta CDF	pg/L																
octa CDF	pg/L																
TOTAL TCDD	pg/L																
TOTAL TCDD lbs/day	lbs/day																

0 = not detected: NS = not sampled

NA = not analyzed

TABULATION OF THE EFFLUENT CONSTITUENTS

TABULATION OF THE EFFLUENT CONSTITUENTS

SOUTH BAY INTERNATIONAL WTP

NPDES Data for the South Bay International WTP **2021 EFFLUENT TABS**

EFFLUENT NPDES	Units	Limitations			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2021
					Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	AVERAGE
		Limitations															
		Monthly Average															
EFFLUENT FLOW (MGD)	MGD		25.00		24.32	21.80	20.62	21.33	24.62	24.90	24.81	24.99	24.96	24.31	22.81	19.63	23.27
GRAB SAMPLES / OIL & GREASE		Limitations															
		30-day	7-day	Max													
Settleable Solids	ml/L	1.00	---	3.00	1.84	3.14	0.10	0.10	0.10	0.10	0.70	0.10	0.51	0.10	0.10	0.10	0.57
weekly (7 day) average	ml/L	---	1.50	---	1.17	3.91	0.10	0.10	0.10	0.10	0.70	0.10	0.51	0.10	0.10	0.10	0.57
Oil/grease	mg/L	0	0	75													
daily mass emission	lbs/d	0	0	16,000													
weekly (7 day) average	mg/L	0	40	0													
mass emission (7 day) average	lbs/d	0	8,300	0													
monthly (30 day) average	mg/L	25	0	0													
mass emission (30 day) average	lbs/d	5,200	0	0													
Dissolved Oxygen	mg/L	---	---	---	6.63	6.39	6.57	6.72	6.55	6.46	6.47	6.67	6.62	6.28	6.28	6.43	6.50
pH	SU	Within Limits of 6-9			7.36	7.39	7.30	7.44	7.42	7.33	7.36	7.31	7.36	7.34	7.36	7.33	7.36
Temperature	C	---	---	---	18.74	19.40	19.70	22.27	23.68	24.97	26.88	27.32	26.95	24.30	22.49	19.56	23.04
COMPOSITE ANALYSES		Limitations															
		30-day	7-day	Max													
Total Suspended Solids	mg/L	---	---	50	46.41	60.99	13.53	13.45	16.91	9.86	15.40	9.61	15.78	9.75	10.51	10.37	19.12
daily mass emission	lbs/d	---	0	10,000	9,176.32	12,249.18	2,347.12	2,420.55	3,465.67	2,053.03	3,157.54	2,002.92	3,316.96	1,980.84	1,996.48	1,723.61	3,770.03
weekly (7 day) average	mg/L	---	45	---	36.26	76.41	15.27	13.02	17.25	10.16	15.47	9.65	15.41	9.89	10.37	10.71	19.61
mass emission (7 day) average	lbs/d	---	9,400	---	7,352.65	15,252.98	2,781.00	2,277.20	3,530.42	2,129.09	3,158.69	2,012.19	3,255.35	2,006.66	1,983.37	1,845.24	3,889.66
monthly (30 day) average	mg/L	30	---	---	42.54	60.15	42.51	12.33	16.55	12.42	13.77	11.05	13.87	11.68	10.12	10.67	21.26
mass emission (30 day) average	lbs/d	6,300	---	---	9,399.04	11,911.67	8,495.00	2,038.49	3,313.47	2,577.94	2,816.87	2,284.21	2,937.50	2,410.85	1,985.26	1,949.12	4,302.54
Volatile Suspended Solids	mg/L	---	---	---	31.63	43.72	9.71	10.53	13.92	7.80	11.83	7.62	11.60	7.82	8.51	7.84	14.19
BOD	mg/L	---	---	---	34.10	59.83	15.56	15.15	18.27	11.60	17.05	11.42	15.60	11.75	12.28	12.11	19.29
Soluble BOD	mg/L	---	---	---													
Carbonaceous BOD (CBOD)	mg/L	---	---	45	23.31	41.36	9.65	9.37	10.86	7.15	10.55	7.19	9.71	7.38	7.86	7.75	12.49
daily mass emission	lbs/d	---	---	9400	4,744.09	8,369.89	1,676.43	1,679.47	2,228.00	1,485.48	2,168.15	1,501.32	2,032.25	1,498.31	1,495.10	1,286.47	2,474.83
weekly (7 day) average	mg/L	---	40	---	18.90	47.16	10.82	9.19	11.07	7.25	10.58	7.20	9.57	7.45	7.82	7.87	12.67
mass emission (7 day) average	lbs/d	---	8300	---	5,289.32	8,301.75	1,774.81	1,544.72	2,239.77	1,503.22	2,085.39	1,498.50	2,045.15	1,519.70	1,494.12	1,412.20	2,576.32
monthly (30 day) average	mg/L	25	---	---	22.33	32.57	29.12	8.87	10.89	8.33	9.55	8.02	9.00	8.13	7.62	7.93	13.43
mass emission (30 day) average	lbs/d	5200	---	---	4,894.18	6,599.35	5,860.23	1,466.02	2,177.13	1,729.87	1,954.80	1,660.74	1,901.13	1,672.79	1,496.41	1,449.80	2,718.75
		30-day	7-day	Max													
Floatables	mg/L	---	---	---	1.08	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02
Total Dissolved Solids	mg/L	---	---	---	1,302	1,366	1,335	1,383	1,496	1,562	1,521	1,484	1,459	1,457	1,543	1,487	1,450
Turbidity	NTU	---	---	225.00	23.81	26.26	3.65	4.29	4.89	2.85	5.11	2.79	5.50	3.02	2.78	2.59	7.18
weekly (7 day) average	NTU	---	100.00	---	16.27	36.80	4.21	4.09	5.14	2.91	5.11	2.81	5.42	3.05	2.78	2.65	7.41
monthly (30 day) average	NTU	75	---	---	17.63	31.12	16.69	3.78	5.16	3.45	4.34	3.52	4.71	3.73	2.88	2.65	8.17

TABULATION OF THE EFFLUENT CONSTITUENTS

SOUTH BAY INTERNATIONAL WTP

NPDES Data for the South Bay International WTP **2021 EFFLUENT TABS**

EFFLUENT NPDES	Units	Limitations			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2021
					Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	AVERAGE
C.O.D. Chemical Oxygen Demand	mg/L	---	---	---	99.06	109.89	62.58	70.53	64.17			61.29	72.14	69.90	69.17	68.68	76.54
Total Solids	mg/L	---	---	---													
Volatile Solids	mg/L	---	---	---													

TOXICITY

		Limitations															
		30-day	7-day	Max													
Acute Toxicity	TU'a	---	---	2.50													
weekly (7 day) average	TU'a	---	2.00	---	0.60	0.53	0.15	1.05	1.35	1.59	1.68	1.60	1.60	1.60	1.60	1.60	1.04
monthly (30 day) average	TU'a	1.50	---	---	0.35	0.74	0.21	0.81	1.12	1.55	1.65	1.60	1.60	1.60	1.60	1.60	1.19

CHRONIC TOXICITY

		Limitations															
		6-mnth	Daily	Instant													
	TU'c	----	100.00	----													
GIANT KELP																	
germination	TU'c	---	100.00	---													
germ Tube Length	TU'c	---	100.00	---													
RED ABALONE																	
development	TU'c	---	100.00	---													
TOPSMELT																	
survival	TU'c	---	100.00	---													
growth	TU'c	---	100.00	---													

METALS AND CYANIDE

		Limitations															
		6-Mnth	Daily	30-day													
Antimony	ug/L	---	---	120.00	2.90			2.90			6.70			6.70			4.80
Antimony	lbs/d				0.53			0.44			1.37			1.38			0.93
Beryllium	ug/L	---	---	3.30	1.00			1.00			2.20			2.20			1.60
Beryllium	lbs/d	---	---	0.69	0.22			0.17			0.46			0.45			0.33
Thallium	ug/L	---	---	1.40	12.00			12.00			27.00			27.00			19.50
Thallium	lbs/d	---	---	290.00	2.69			2.10			5.63			5.52			3.98

		Limitations															
		6-Mnth	Daily	Instant													
Arsenic	ug/L	0.51	2.90	7.80	2.10	2.10	2.10	2.10	3.94	6.70	6.70	6.70	6.70	6.70	6.70	6.70	4.93
Arsenic	lbs/d	110.00	600.00	1600.00	0.47	0.36	0.35	0.37	0.80	1.32	1.40	1.37	1.38	1.37	1.24	1.14	0.96
Cadmium	ug/L	0.10	0.40	1.00	2.20	2.20	2.28	2.20	2.16	1.90	1.90	1.90	1.90	1.90	1.90	1.90	2.03
Cadmium	lbs/d	21.00	83.00	210.00	0.50	0.38	0.39	0.38	0.45	0.38	0.40	0.39	0.39	0.39	0.35	0.32	0.39
Chromium (total)	ug/L	0.20	0.81	2.00	1.40	1.40	1.40	1.40	2.04		3.00	3.00	3.00	3.00	3.00	3.00	2.33
Chromium (total)	lbs/d	42.00	170.00	420.00	0.31	0.24	0.24	0.24	0.42		0.63	0.61	0.62	0.61	0.56	0.51	0.45
Copper	ug/L	0.10	1.00	2.80	11.00	11.00	18.80	11.00	13.40	17.00	17.00	17.00	17.00	17.00	17.00	17.00	15.44
Copper	lbs/d	21.00	210.00	580.00	2.47	1.89	3.00	1.92	2.74	3.36	3.54	3.48	3.51	3.47	3.16	2.89	2.96
Iron	ug/L	---	---	---													
Lead	ug/L	0.20	0.81	2.00	2.00	2.00	4.00	2.00	2.00	2.00	2.00	4.00	2.00	2.00	2.00	2.00	2.38
Lead	lbs/d	42.00	170.00	420.00	0.45	0.34	0.63	0.35	0.41	0.40	0.42	0.80	0.41	0.41	0.37	0.34	0.45
Mercury	ug/L	4.00	16.00	40.00	0.06	0.06	0.05	0.05	0.09	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.10
Mercury	lbs/d	0.83	3.30	8.30	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02
Nickel	ug/L	0.51	2.00	5.10	26.00	13.45	22.40	14.25	8.56	23.45	3.90	3.90	3.90	3.90	3.90	3.90	10.86

TABULATION OF THE EFFLUENT CONSTITUENTS

SOUTH BAY INTERNATIONAL WTP

NPDES Data for the South Bay International WTP **2021 EFFLUENT TABS**

EFFLUENT NPDES

DDT's	Units	Limitations			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2021
		Daily	7-day	30-day	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	AVERAGE
p,p'-DDD	ug/L	---	---	---													
p,p'-DDE	ug/L	---	---	---													
p,p'-DDT	ug/L	---	---	---													
o,p-DDD	ug/L	---	---	---													
o,p-DDE	ug/L	---	---	---													
o,p-DDT	ug/L	---	---	---													
TOTAL DDT's	ug/L	---	---	17.00	0.01			0.01			0.01			0.01			0.01
MASS EMISSION LBS/DAY	lbs/d	---	---	0.00	0.00			0.00			0.00			0.00			0.00

HEPTACHLOR	Units	Limitations			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2021
		Daily	7-day	30-day													
Heptachlor	ug/L	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00			0.00
Heptachlor	lbs/d	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00			0.00
Heptachlor Epoxide	ug/L	---	---	73.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00			0.00
Heptachlor Epoxide	lbs/d	---	---	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00			0.00

CHLORDANE	Units	Daily	7-day	30-day	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2021
Alpha (cis) Chlordane	ug/l	---	---	---													
Gamma (trans) Chlordane	ug/l	---	---	---													
Alpha (cis) Chlordane	ug/l	---	---	---													
Gamma (trans) Chlordane	ug/l	---	---	---													
Oxychlordane	ug/l	---	---	---													
trans Nonachlor	ug/l	---	---	---													
cis Nonachlor	ug/l	---	---	---													
TOTAL CHLORDANE	ug/l	---	---	2.30	0.00			0.00			0.00			0.00			0.00
MASS EMISSION LBS/DAY	lbs/d	---	---	0.00	0.00			0.00			0.00			0.00			0.00

ENDOSULFAN	Units	Limitations			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2021
		6-Mnth	Daily	Instant													
Alpha Endosulfan	ug/L	---	---	---													
Beta Endosulfan	ug/L	---	---	---													
Endosulfan Sulfate	ug/L	---	---	---	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TOTAL ENDOSULFAN	ug/L	0.91	1.80	2.70	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
MASS EMISSION LBS/DAY	lbs/d	0.19	0.38	0.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

OTHER MISC. CHLORINATED PESTICIDES	Units				JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2021
Endrin	ug/L	0.20	0.40	0.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Endrin	lbs/d	0.0399	0.0797	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Limitations															
		Daily	7-day	30-day													
Endrin aldehyde	ug/L	---	---	---													
Mirex	ug/L	---	---	---													
Methoxychlor	ug/L	---	---	---													
Toxaphene	ug/L	---	---	21	0.50			0.50			0.50			0.50			0.50

TABULATION OF THE EFFLUENT CONSTITUENTS

SOUTH BAY INTERNATIONAL WTP

NPDES Data for the South Bay International WTP **2021 EFFLUENT TABS**

EFFLUENT NPDES	Units	Limitations			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2021
					Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	AVERAGE
Toxaphene	lbs/d	---	---	0.0044	0.09			0.08			0.10			0.10			0.09
PCB's																	
PCB 1016	ug/L	``	---	---													
PCB 1221	ug/L	---	---	---													
PCB 1232	ug/L	---	---	---													
PCB 1242	ug/L	---	---	---													
PCB 1248	ug/L	---	---	---													
PCB 1254	ug/L	---	---	---													
PCB 1260	ug/L	---	---	---													
PCB 1262	ug/L	---	---	---													
TOTAL PCB's	ug/L	---	---	1.90	0.40			0.40			0.40			0.40			0.40
MASS EMISSION LBS/DAY	lbs/d	---	---	0.00	0.07			0.06			0.08			0.08			0.07
EPA METHOD 605																	
benzidine	ug/L	---	---	7.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
3,3-dichlorobenzidine	ug/L	---	---	0.82	0.59			0.59			0.59			0.59			0.59
TRIBUTYL TIN ANALYSIS																	
tributyl tin	ug/L	---	---	0.14	1.40			1.40			1.40			1.40			1.40
tributyl tin	lbs/L	---	---	0.029	0.26			0.21			0.29			0.29			0.26
dibutyl tin	ug/L	---	---	---													
monobutyl tin	ug/L	---	---	---													
BASE/NEUTRAL COMPOUNDS		Limitations															
		Daily	7-day	30-day													
bis(2-chloroethyl) ether	ug/L	---	---	4.50	0.42			0.42			0.42			0.42			0.42
DICHLOROBENZENE	ug/L																
metadichlorobenzene	ug/L	---	---	---													
orthodichlorobenzene	ug/L	---	---	---													
TOTAL DICHLOROBENZENE	ug/L	---	---	0.52	0.29			0.29			0.29			0.29			0.29
MASS EMISSION LBS/DAY	lbs/d	---		110000.00	0.05			0.04			0.06			0.06			0.05
paradichlorobenzene (1,4-dichlorobenzene)	ug/L	---	---	1.80	0.26			0.26			0.36			0.36			0.31
bis-(2-chloroisopropyl) ether	ug/L	---	---	120.00	0.38			0.38			0.38			0.38			0.38
N-nitrosodi-n-propylamine	ug/L	---	---	---	0.58			0.58			0.58			0.58			0.58
nitrobenzene	ug/L	---	---	0.49	0.23			0.23			0.23			0.23			0.23
hexachloroethane	ug/L	---	---	250.00	0.25			0.25			0.25			0.25			0.25
isophorone	ug/L	---	---	15.00	0.64			0.64			0.64			0.64			0.64
bis(2-chloroethoxy)methane	ug/L	---	---	0.44	0.27			0.27			0.27			0.27			0.27
1,2,4-trichlorobenzene	ug/L	---	---	---													
naphthalene	ug/L	---	---	---													
hexachlorobutadiene	ug/L	---	---	1.40	0.56			0.56			0.56			0.56			0.56
hexachlorocyclopentadiene	ug/L	---	---	5.90	1.00			1.00			1.00			1.00			1.00
acenaphthylene pah	ug/L	---	---	---													
dimethyl phthalate	ug/L	---	---	83.00	0.22			0.22			0.22			0.22			0.22

TABULATION OF THE EFFLUENT CONSTITUENTS

SOUTH BAY INTERNATIONAL WTP

NPDES Data for the South Bay International WTP **2021 EFFLUENT TABS**

EFFLUENT NPDES	Units	Limitations			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2021
					Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	AVERAGE
2,6-dinitrotoluene	ug/L	---	---	---	0.21			0.21									0.21
acenaphthene	ug/L	---	---	---													
2,4-dinitrotoluene	ug/L	---	---	260.00	0.45			0.45			0.45			0.45			0.45
fluorene pah	ug/L	---	---	---													
4-chlorophenyl phenyl ether	ug/L	---	---	---													
diethyl phthalate	ug/L	---	---	3.30	0.57			0.57			0.57			0.57			0.57
N-nitrosodiphenylamine	ug/L	---	---	250.00	0.12			0.12			0.12			0.12			0.12
4-bromophenyl phenyl ether	ug/L	---	---	---													
hexachlorobenzene	ug/L	---	---	21.00	0.35			0.35			0.35			0.35			0.35
phenanthrene pah	ug/L	---	---	---													
anthracene pah	ug/L	---	---	---													
di-n-butyl phthalate	ug/L	---	---	350.00	0.25			0.25			0.25			0.25			0.25
N-nitrosodimethylamine	ug/L	---	---	0.74	1.00			1.00			1.00			1.00			1.00
fluoranthene	ug/L	---	---	1.50	0.03			0.03			0.03			0.03			0.03
pyrene pah	ug/L	---	---	---													
butyl benzyl phthalate	ug/L	---	---	---	0.62			0.62									0.62
chrysene pah	ug/L	---	---	---													
benzo(A)anthracene pah	ug/L	---	---	---													
bis-(2-ethylhexyl) phthalate	ug/L	---	---	350.00	1.40			0.59			0.59			0.59			0.79
di-n-octyl phthalate	ug/L	---	---	---	0.41			0.41									0.41
benzo (K) fluoranthene pah	ug/L	---	---	---													
3,4-benzo (B) fluoranthene pah	ug/L	---	---	---													
benzo (A) pyrene pah	ug/L	---	---	---													
dibenzo (A,H) anthracene pah	ug/L	---	---	---													
benzo (G,H,I) perylene pah	ug/L	---	---	---													
1,2-diphenylhydrazine	ug/L	---	---	16.00	1.00			1.00			1.00			1.00			1.00
1,2-diphenylhydrazine	lbs/d	---	---	3.30	0.18			0.15			0.20			0.21			0.19
TOTAL PAH'S	ug/L	---	---	0.89	0.35			0.35			0.35			0.35			0.35
MASS EMISSION LBS/DAY	lbs/d	---	---	0.19	0.06			0.05			0.07			0.07			0.07

CHLORINATED PHENOLS

		Limitations															
		Daily	7-day	30-day													
2-chlorophenol	ug/L	---	---	---													
2,4-dichlorophenol	ug/L	---	---	---													
4-cholor-3-methylphenol	ug/L	---	---	---													
2,4,6-trichlorophenol	ug/L	---	---	29	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2,4,6-trichlorophenol	lbs/d	---	---	6.0	0.18	0.16	0.22	0.15	0.22	0.20	0.20	0.20	0.21	0.21	0.19	0.19	0.20
pentachlorophenol	ug/L	---	---	---													
		6-Mnth	Daily	Instant													
TOTAL CHLORINATED PHENOLIC COMP	ug/L	0.10	0.40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MASS EMISSION LBS/DAY	lbs/d	21.00	83.00	210.00	0.18	0.16	0.22	0.15	0.22	0.20	0.20	0.20	0.21	0.21	0.19	0.19	0.20

NON-CHLORINATED PHENOLS

phenol	ug/L	---	---	---													
2-nitrophenol	ug/L	---	---	---													

TABULATION OF THE EFFLUENT CONSTITUENTS

SOUTH BAY INTERNATIONAL WTP

NPDES Data for the South Bay International WTP **2021 EFFLUENT TABS**

EFFLUENT NPDES	Units	Limitations			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2021
					Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	AVERAGE
2,4-dimethylphenol	ug/L	---	---	---													
2,4-dinitrophenol	ug/L	---	---	0.40	1.00	0.36	0.36	1.00	0.36	0.36	1.00	0.36	0.36	1.00	0.36	0.36	0.57
2,4-dinitrophenol	lbs/d			83	0.18	0.06	0.08	0.15	0.08	0.07	0.20	0.07	0.07	0.21	0.07	0.07	0.11
4-nitrophenol	ug/L	---	---	---													
2-methyl-4,6-dinitrophenol	ug/L	---	---	22.00	1.00			1.00			1.00			1.00			1.00
2-methyl-4,6-dinitrophenol	lbs/d	---	---	4600.00	0.18			0.15			0.20			0.21			0.19
		6-Mnth	Daily	Instant													
TOTAL NON-CHLORINATED PHENOLIC COM	ug/L	3.00	12.00	30.00	1.00	0.36	0.36	1.00	0.36	0.36	1.00	0.36	0.36	1.00	0.36	0.36	0.57
MASS EMISSION LBS/DAY	lbs/d	630.00	2500.00	6300.00	0.18	0.06	0.08	0.15	0.08	0.07	0.20	0.07	0.07	0.21	0.07	0.07	0.11

HALOMETHANE PURGEABLE COMPOUNDS (EPA 624) (VOC's)		Limitations															
		---	---	30-day													
chloromethane (hal)	ug/L	---	---	---													
bromomethane (hal)	ug/L	---	---	---													
vinyl chloride (hal)	ug/L	---	---	3.60	0.47			0.47			0.47			0.47			0.47
chloroethene	ug/L	---	---	---													
1,1-dichloroethene (1,1-dichloroethlyene)	ug/L	---	---	72.00	0.07			0.07									0.07
trichlorofluoromethane	ug/L	---	---	---	0.19			0.19									0.19
methlyene chloride (dichloromethane)	ug/L	---	---	45.00	0.43			0.43			0.43			0.43			0.43
1,1-dichloroethane	ug/L	---	---	---	0.29			0.29			0.07			0.07			0.18
trans-1,2-dichloroethene	ug/L	---	---	---													
chloroform	ug/L	---	---	13.00	3.80			0.36			0.36			0.36			1.22
1,2-dichloroethane	ug/L	---	---	13.00	0.25			0.25			0.25			0.25			0.25
1,1,1-trichloroethane	ug/L	---	---	54.00	0.23			0.23			0.23			0.23			0.23
carbon tetrachloride	ug/L	---	---	0.91	0.38			0.38			0.38			0.38			0.38
DCBM-bromodichloromethane (hal)	ug/L	---	---		0.36	0.36		0.36	0.36		0.36	0.36		0.36	0.36		0.36
1,2-dichloropropane	ug/L	---	---		0.15			0.15									0.15
trans-1,3-dichloropropene	ug/L	---	---	0.90													
trichloroethene (trichloroethlyene)	ug/L	---	---	2.70	0.31			0.31			0.31			0.31			0.31
benzene	ug/L	---	---	0.60	0.47			0.47			0.47			0.47			0.47
dibromochloromethane (hal)	ug/L	---	---		0.36			0.36			0.36			0.36			0.36
1,1,2-trichloroethane	ug/L	---	---	4.30	0.34			0.34			0.34			0.34			0.34
cis-1,3-dichloropropene	ug/L	---	---														
2-chloroethylvinyl ether	ug/L	---	---														
bromoform (hal)	ug/L	---	---														
1,1,2,2-tetrachloroethane	ug/L	---	---	120.00	0.42			0.42			0.42			0.42			0.42
tetrachloroethene (tetrachloroethlyene)	ug/L	---	---	1.00	0.49			0.49			0.49			0.49			0.49
toluene	ug/L	---	---	8.60	0.48			0.48			0.48			1.40			0.71
chlorobenzene	ug/L	---	---	58.00	0.31			0.31			0.31			0.31			0.31
ethylbenzene	ug/L	---	---	400.00	0.38			0.38			0.38			0.38			0.38
2-butanone (MEK)	ug/L	---	---	---													
carbon disulfide	ug/L	---	---	---													
TOTAL HALOMETHANE PURGEABLE CM	ug/L	---	---	13.00	0.38	0.36		0.38	0.36		0.38	0.36		0.38	0.36		0.38
MASS EMISSION LBS/DAY	lbs/d	---	---	2700.00	0.08	0.06		0.07	0.07		0.08	0.07		0.08	0.07		0.07

TABULATION OF THE EFFLUENT CONSTITUENTS

SOUTH BAY INTERNATIONAL WTP

NPDES Data for the South Bay International WTP **2021 EFFLUENT TABS**

EFFLUENT NPDES	Units	Limitations			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2021
					Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	AVERAGE
EPA METHOD 624		Daily	7-day	30-day													
acrylonitrile	ug/L	---	---	10	1.50			1.50			1.50			1.50			1.50
acrylonitrile	lbs/L	---	---	2.1	0.28			0.23			0.31			0.31			0.28
acrolein	ug/L	---	---	22.00	2.60			2.60			2.60			2.60			2.60
acrolein	lbs/d	---	---	4600.00	0.48			0.39			0.53			0.54			0.49
TCDD EQUIVALENTS		Daily	7-day	30-day													
2,3,7,8-tetra CDD	pg/L																
1,2,3,7,8-penta CDD	pg/L																
1,2,3,4,7,8-hexa CDD	pg/L																
1,2,3,6,7,8-hexa CDD	pg/L																
1,2,3,7,8,9-hexa CDD	pg/L																
1,2,3,4,6,7,8-hepta CDD	pg/L																
octa CDD	pg/L																
2,3,7,8-tetra CDF	pg/L																
1,2,3,7,8-penta CDF	pg/L																
2,3,4,7,8-penta CDF	pg/L																
1,2,3,4,7,8-hexa CDF	pg/L																
1,2,3,6,7,8-hexa CDF	pg/L																
1,2,3,7,8,9-hexa CDF	pg/L																
2,3,4,6,7,8-hexa CDF	pg/L																
1,2,3,4,6,7,8-hepta CDF	pg/L																
1,2,3,4,7,8,9-hepta CDF	pg/L																
octa CDF	pg/L																
TOTAL TCDD	pg/L			0.39													
Mass Emission lbs/day	lbs/d			0.00													

0 = not detected: NS = not sampled

NA = not analyzed

INFLUENT GRAPHS

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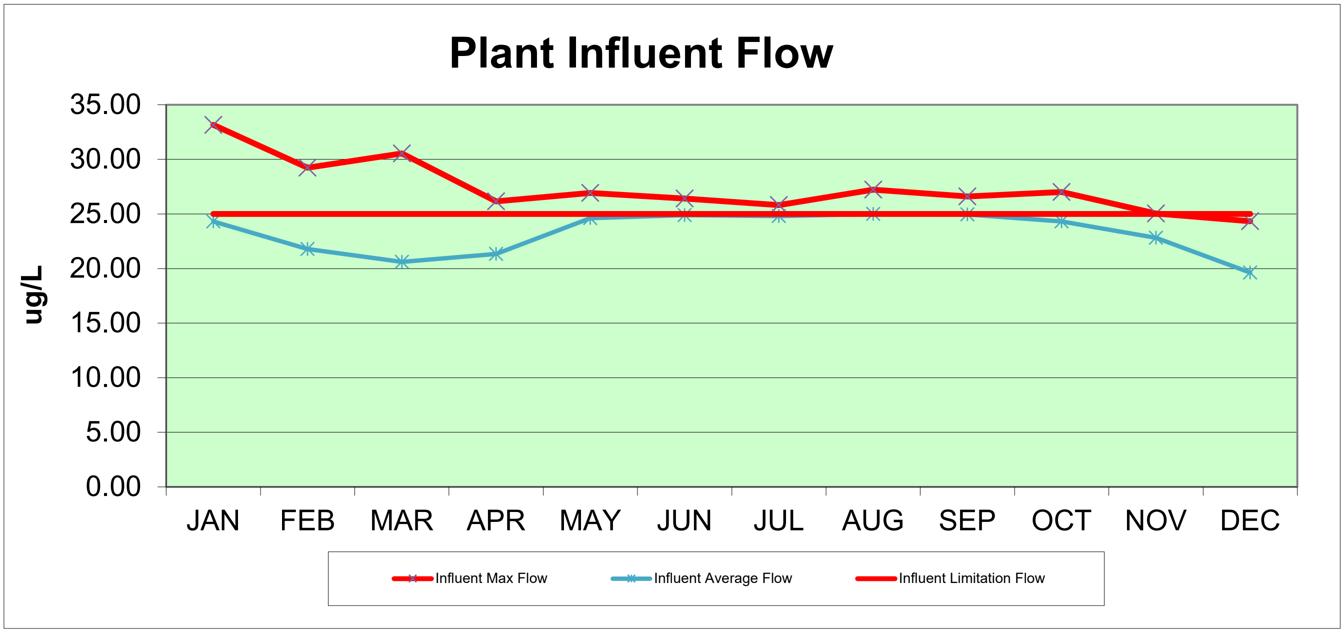
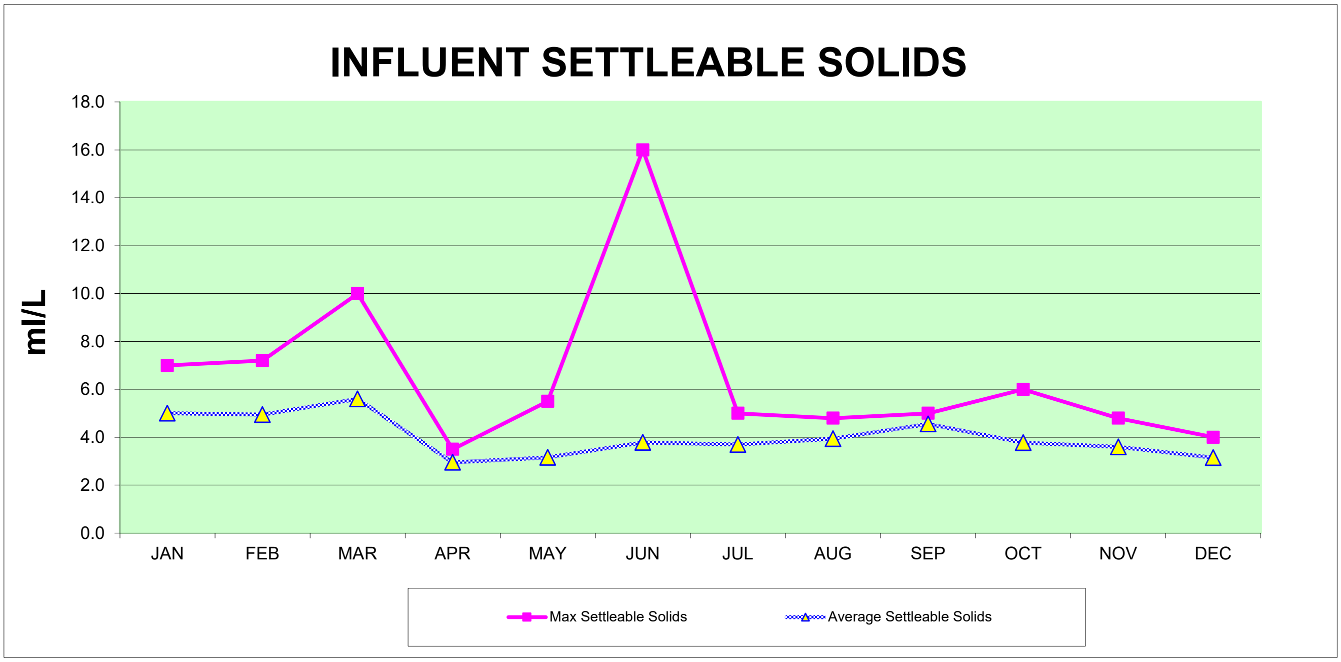


	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
MAX	33.16	29.23	30.53	26.16	26.93	26.41	25.82	27.23	26.61	27.00	25.04	24.33
AVG	24.32	21.80	20.62	21.33	24.62	24.90	24.81	24.99	24.96	24.31	22.81	19.63



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Max	7.0	7.2	10.0	3.5	5.5	16.0	5.0	4.8	5.0	6.0	4.8	4.0
Average	5.0	5.0	5.6	3.0	3.2	3.8	3.7	3.9	4.6	3.8	3.6	3.2

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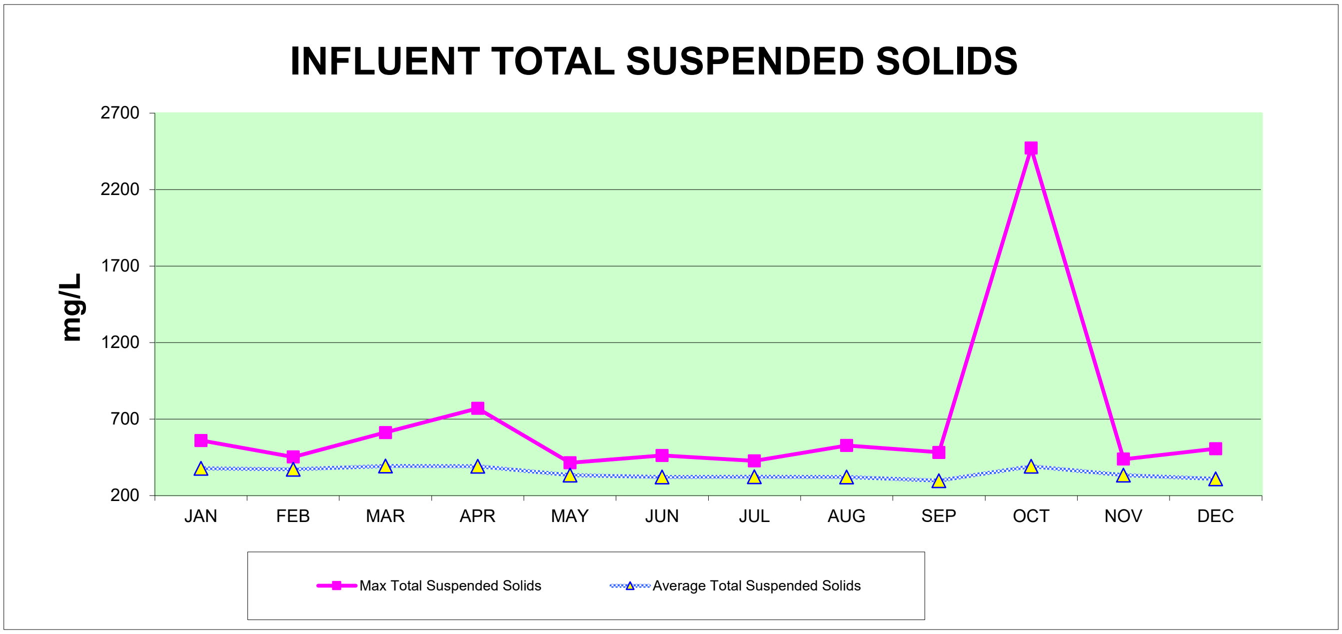
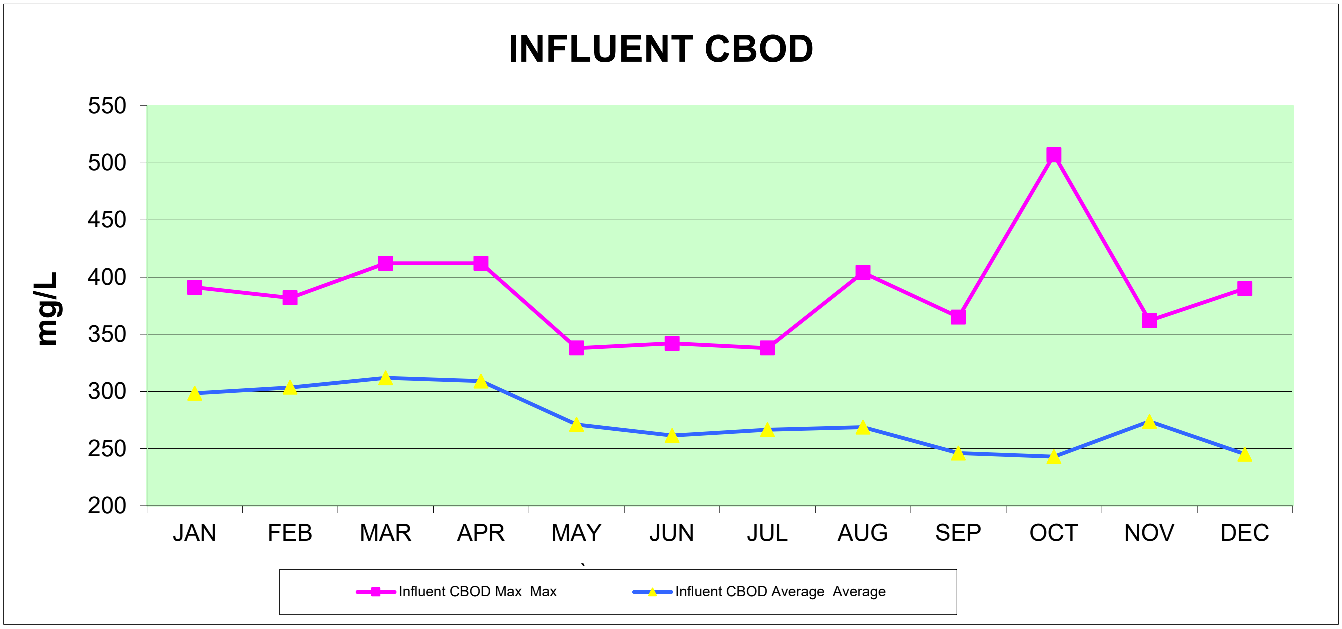
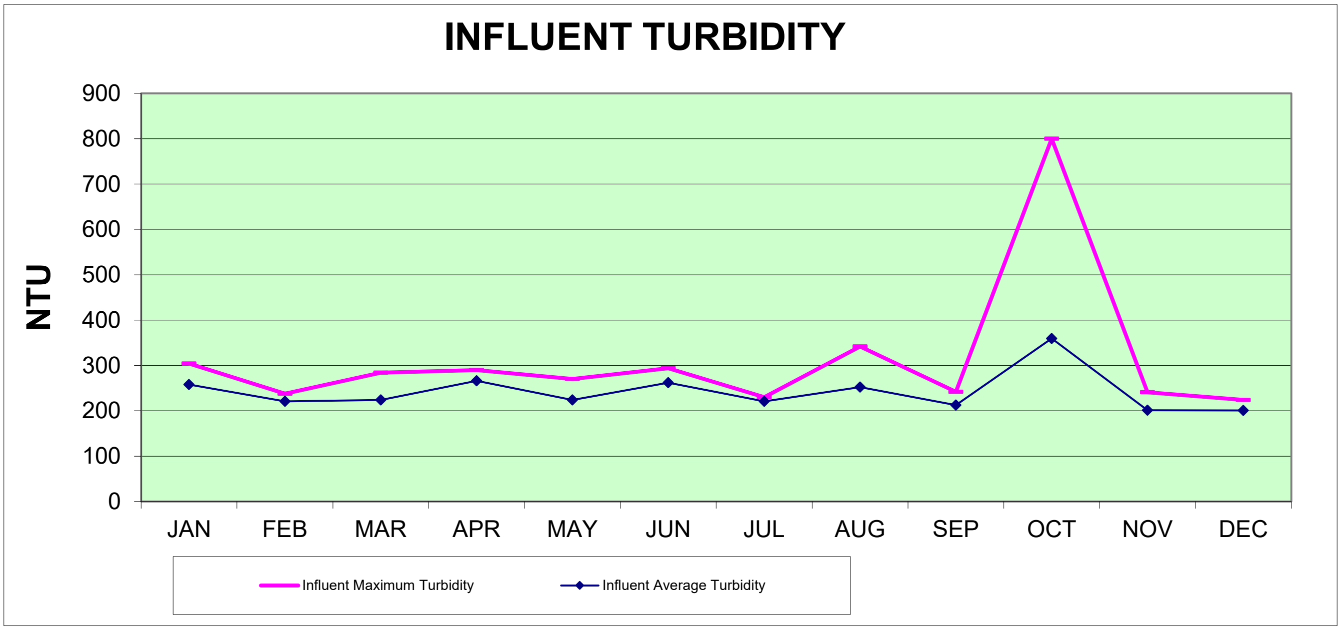


	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Max	560	452	612	770	414	462	426	528	482	2472	438	506
Average	378	372	393	392	333	321	322	322	297	391	333	310



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Max	391	382	412	412	338	342	338	404	365	507	362	390
Average	298	304	312	309	271	261	266	269	246	243	274	245



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Max	304	238	284	290	270	294	230	342	242	800	241	224
Average	258	221	224	266	224	262	221	252	213	360	201	201

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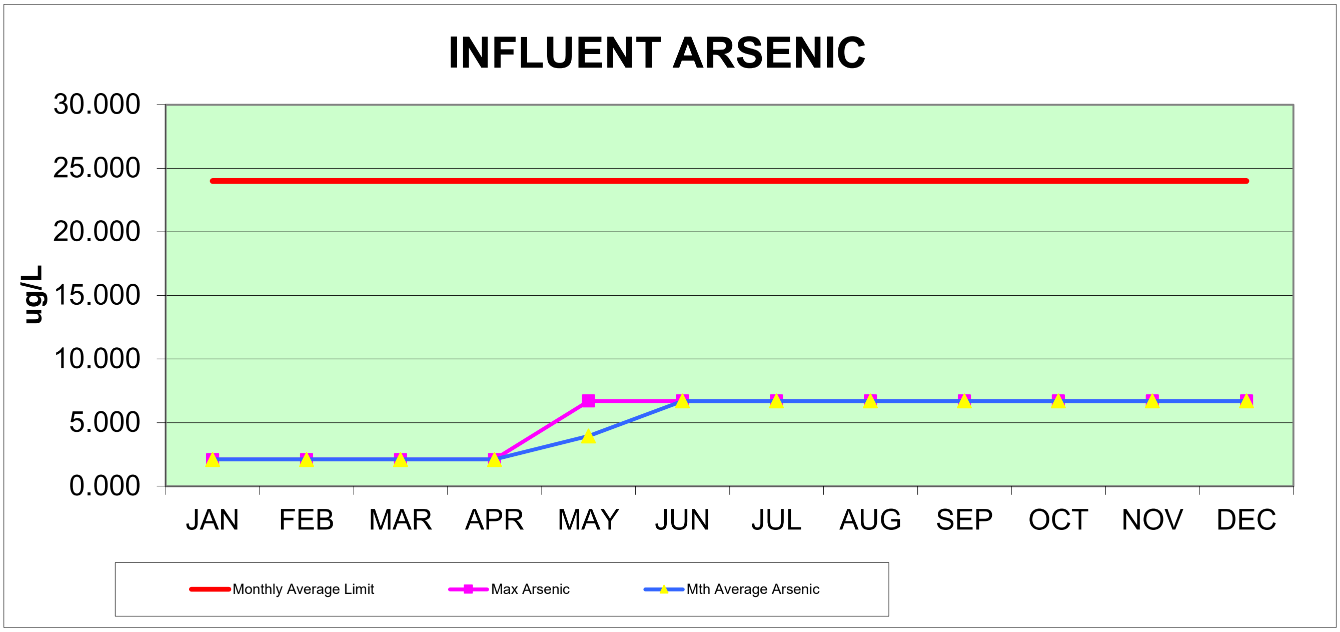
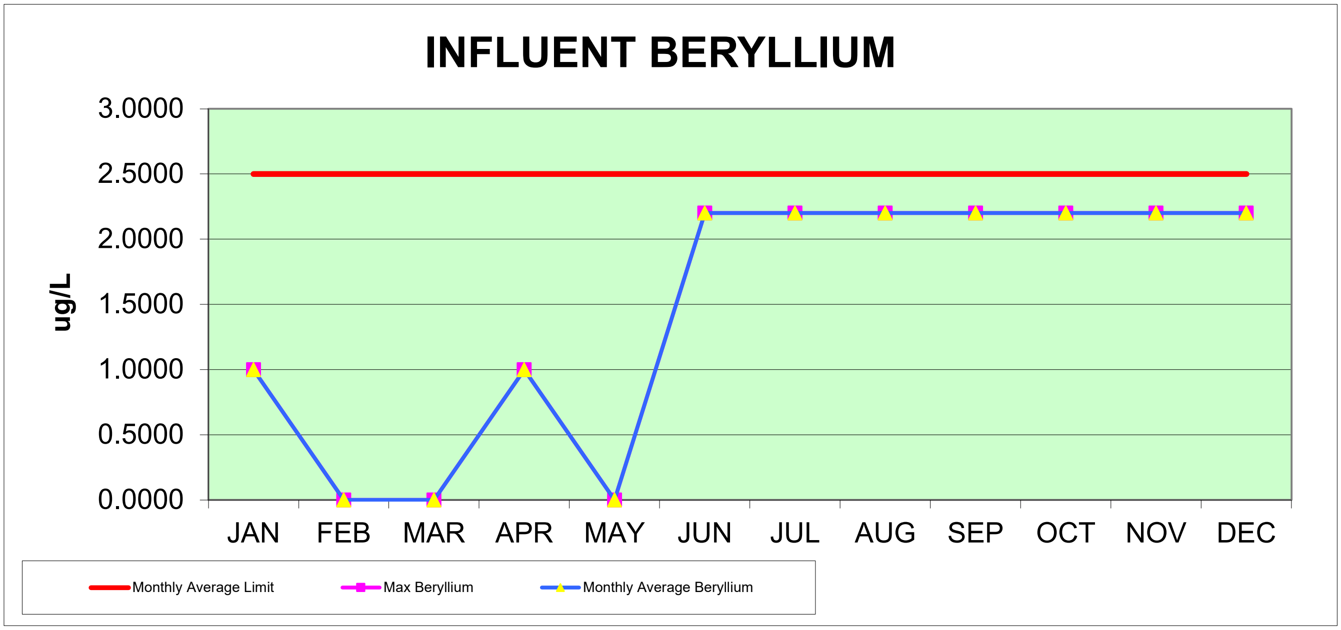
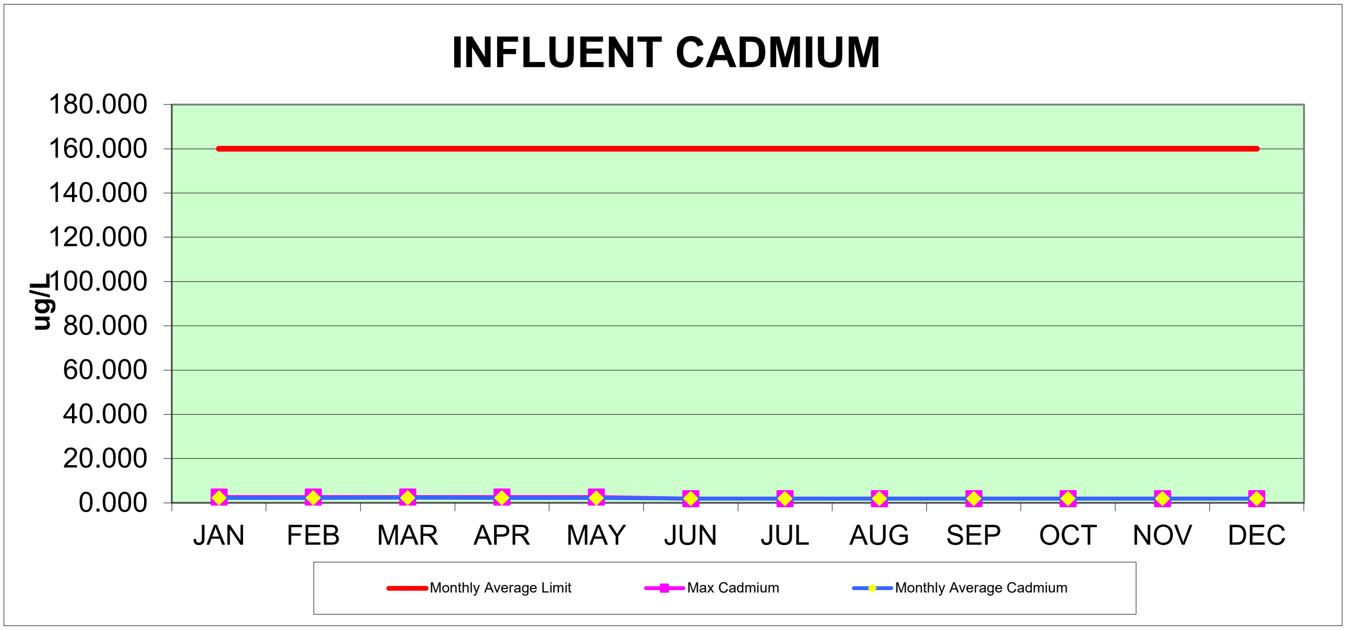


	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit Mthly	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000
Max	2.100	2.100	2.100	2.100	6.700	6.700	6.700	6.700	6.700	6.700	6.700	6.700
Average	2.100	2.100	2.100	2.100	3.940	6.700	6.700	6.700	6.700	6.700	6.700	6.700



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit Mthly	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000
Max	1.0000	0.0000	0.0000	1.0000	0.0000	2.2000	2.2000	2.2000	2.2000	2.2000	2.2000	2.2000
Average	1.0000	0.0000	0.0000	1.0000	0.0000	2.2000	2.2000	2.2000	2.2000	2.2000	2.2000	2.2000



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit Mthly	160.000	160.000	160.000	160.000	160.000	160.000	160.000	160.000	160.000	160.000	160.000	160.000
Max	2.600	2.600	2.600	2.600	2.600	1.900	1.900	1.900	1.900	1.900	1.900	1.900
Average	2.200	2.200	2.280	2.200	2.160	1.900	1.900	1.900	1.900	1.900	1.900	1.900

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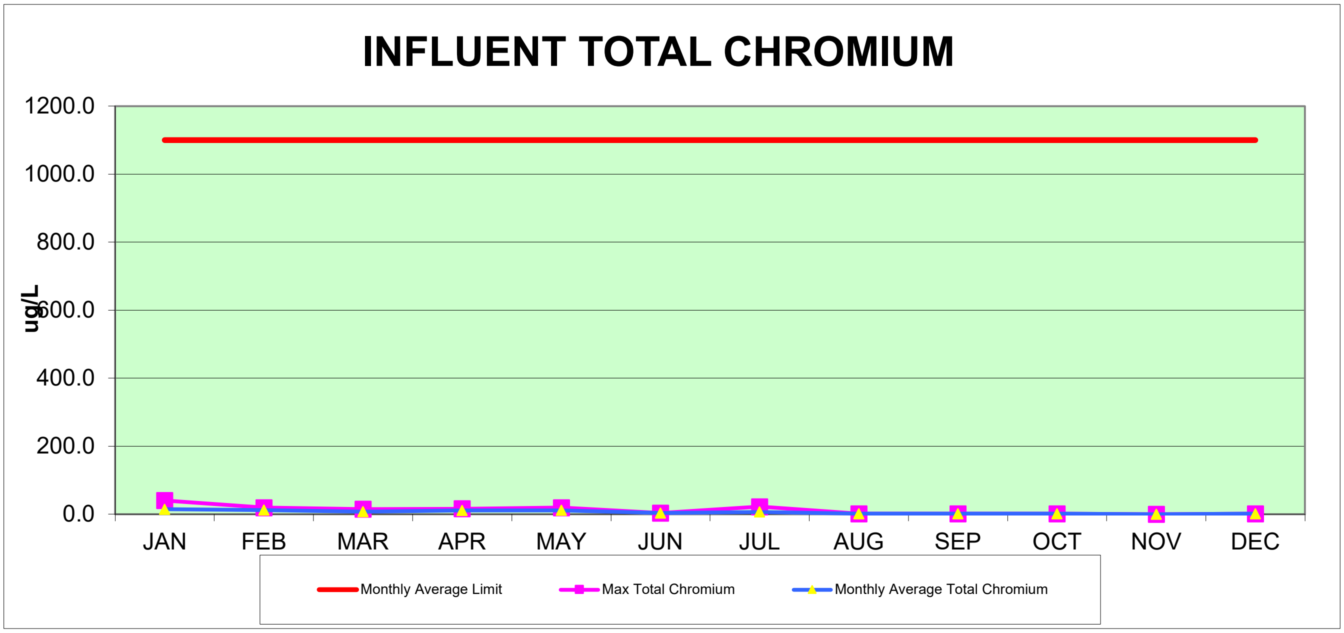

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit Mthly	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0
Max	40.000	19.000	15.000	16.000	19.000	3.000	22.000	1.200	1.200	1.200	0.000	1.200
Average	14.350	12.350	7.220	10.550	11.080	3.000	6.400	1.200	1.200	1.200	0.000	1.200

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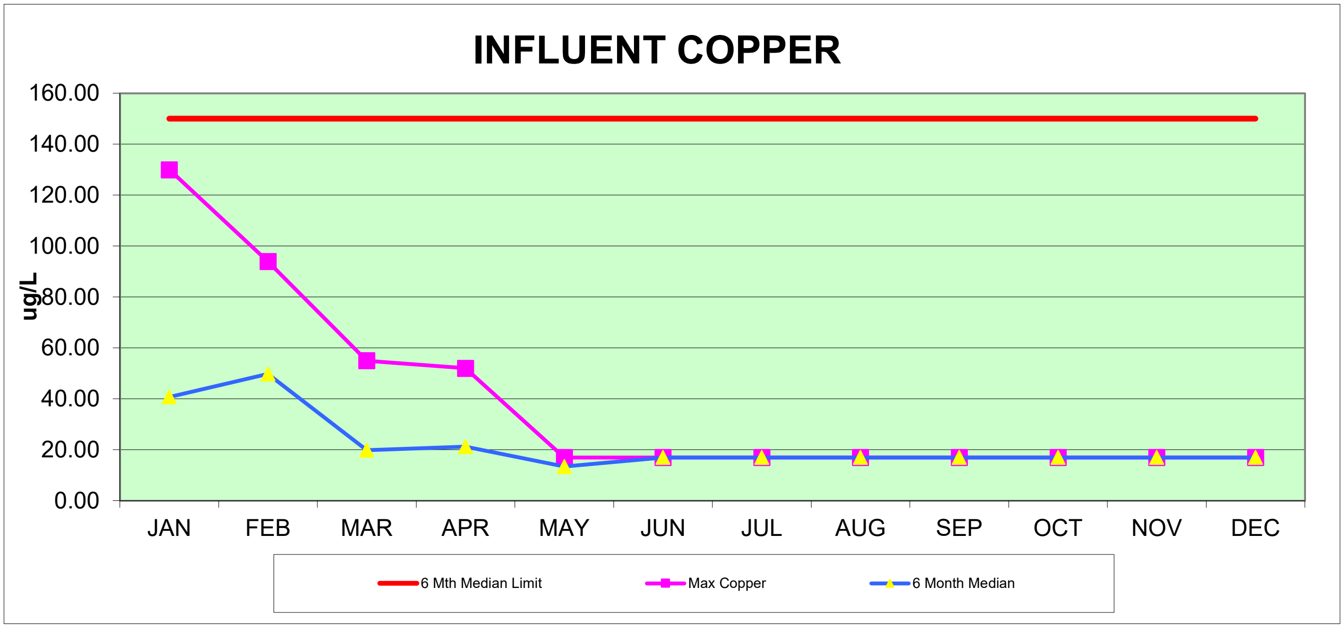
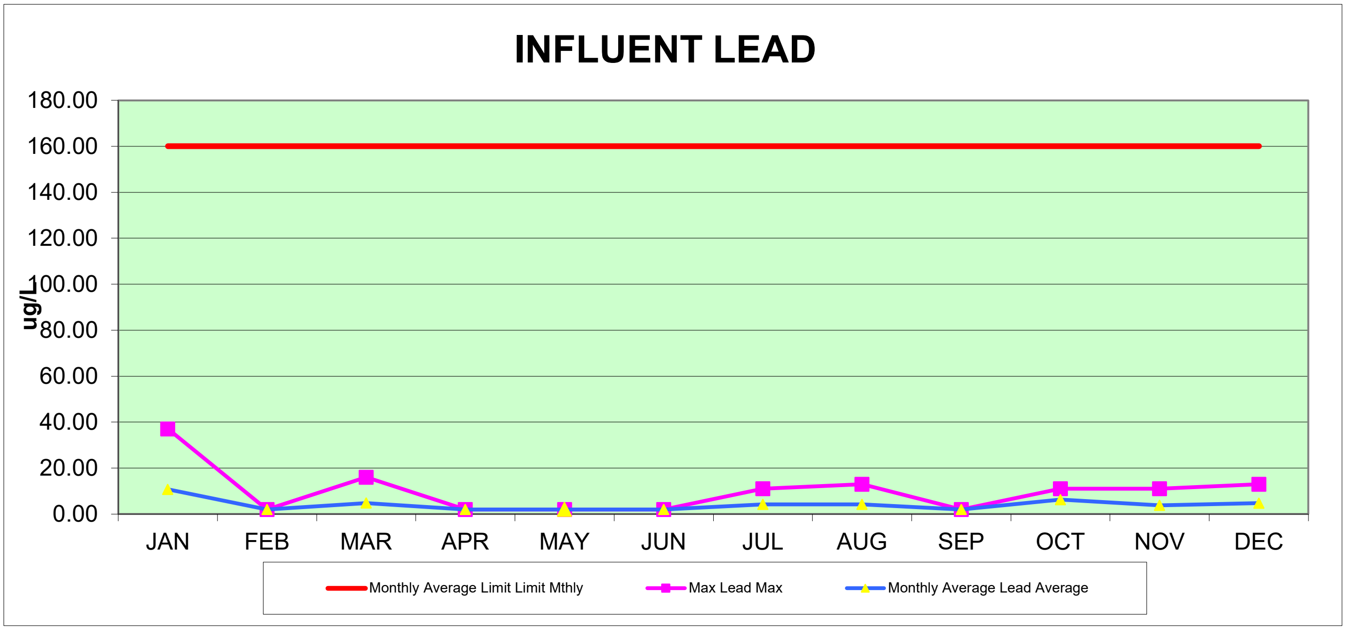
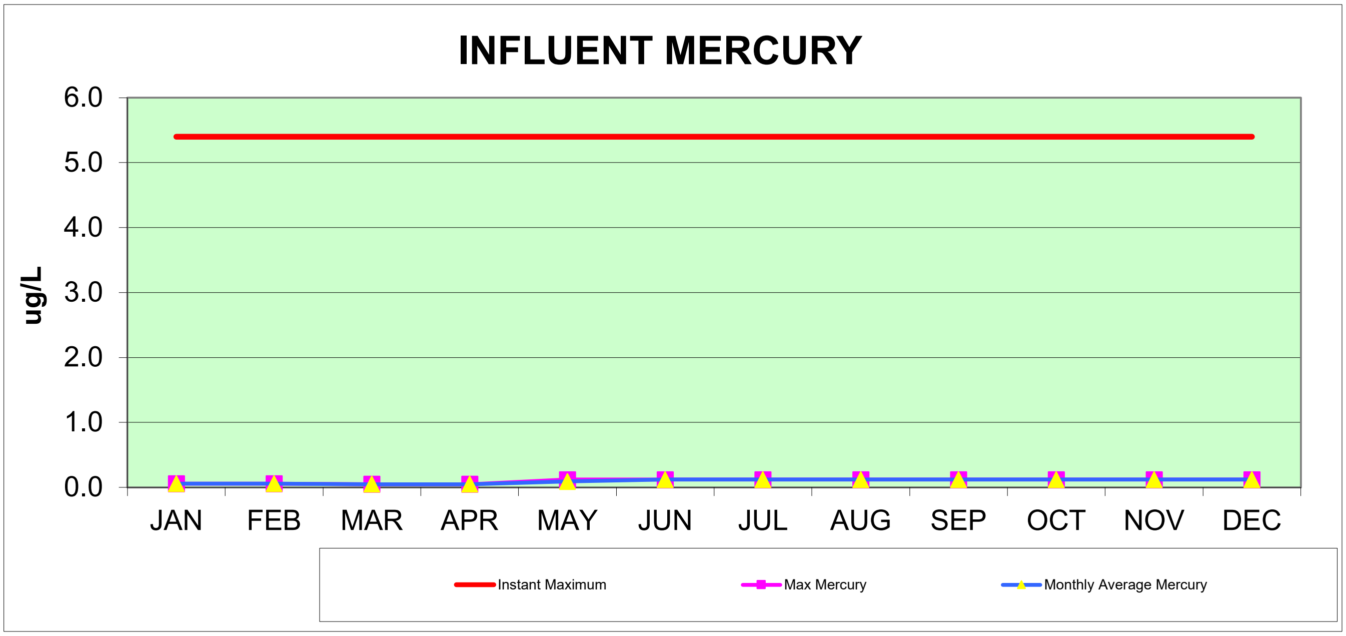


	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
6 Mth Limit	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
Max	130.000	94.000	55.000	52.000	17.000	17.000	17.000	17.000	17.000	17.000	17.000	17.000
Median	40.750	49.750	19.800	21.250	13.400	17.000	17.000	17.000	17.000	17.000	17.000	17.000



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit Mthly	160.00	160.00	160.00	160.00	160.00	160.00	160.00	160.00	160.00	160.00	160.00	160.00
Max	37.000	2.000	16.000	2.000	2.000	2.000	11.000	13.000	2.000	11.000	11.000	13.000
Average	10.750	2.000	4.800	2.000	2.000	2.000	4.250	4.200	2.000	6.250	3.800	4.750



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit Max	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Max	0.06000	0.06000	0.05000	0.05000	0.12000	0.12000	0.12000	0.12000	0.12000	0.12000	0.12000	0.12000
Average	0.06000	0.06000	0.05000	0.05000	0.09200	0.12000	0.12000	0.12000	0.12000	0.12000	0.12000	0.12000

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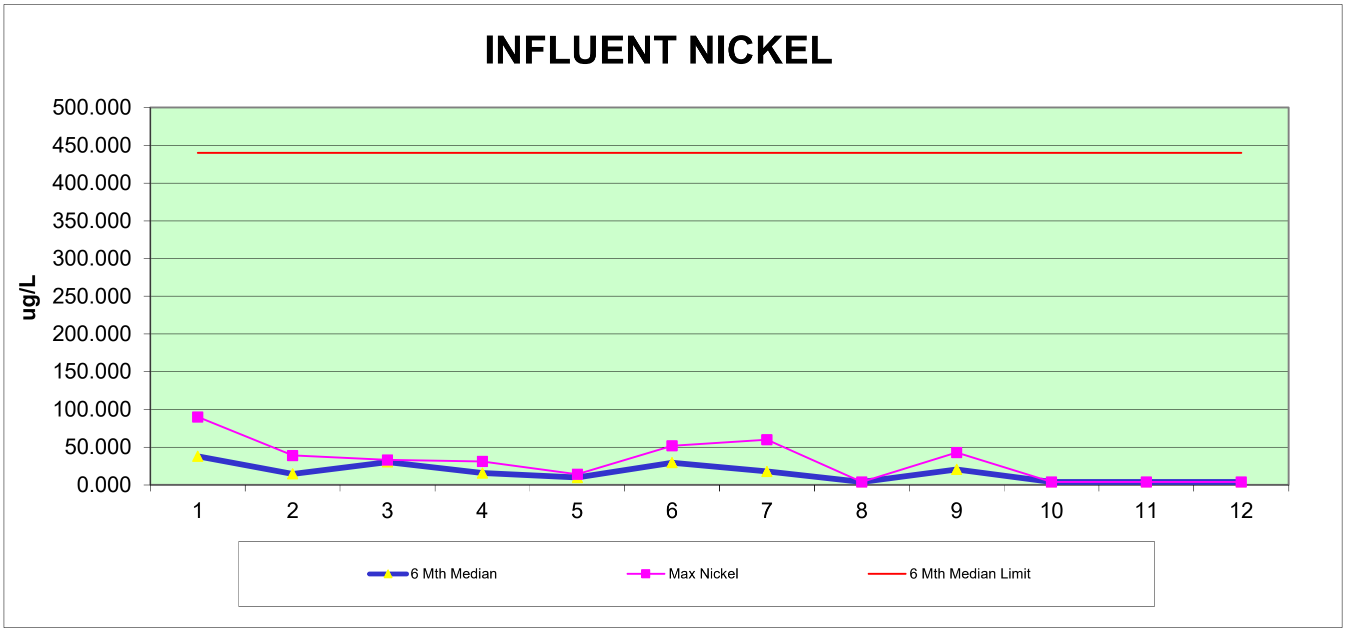

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
6 Mth Limit	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00
Max	90.000	39.000	33.000	31.000	14.000	52.000	60.000	3.900	43.000	3.900	3.900	3.900
6 Mth Median	38.000	14.550	30.400	15.675	9.760	29.475	17.925	3.900	20.450	3.900	3.900	3.900

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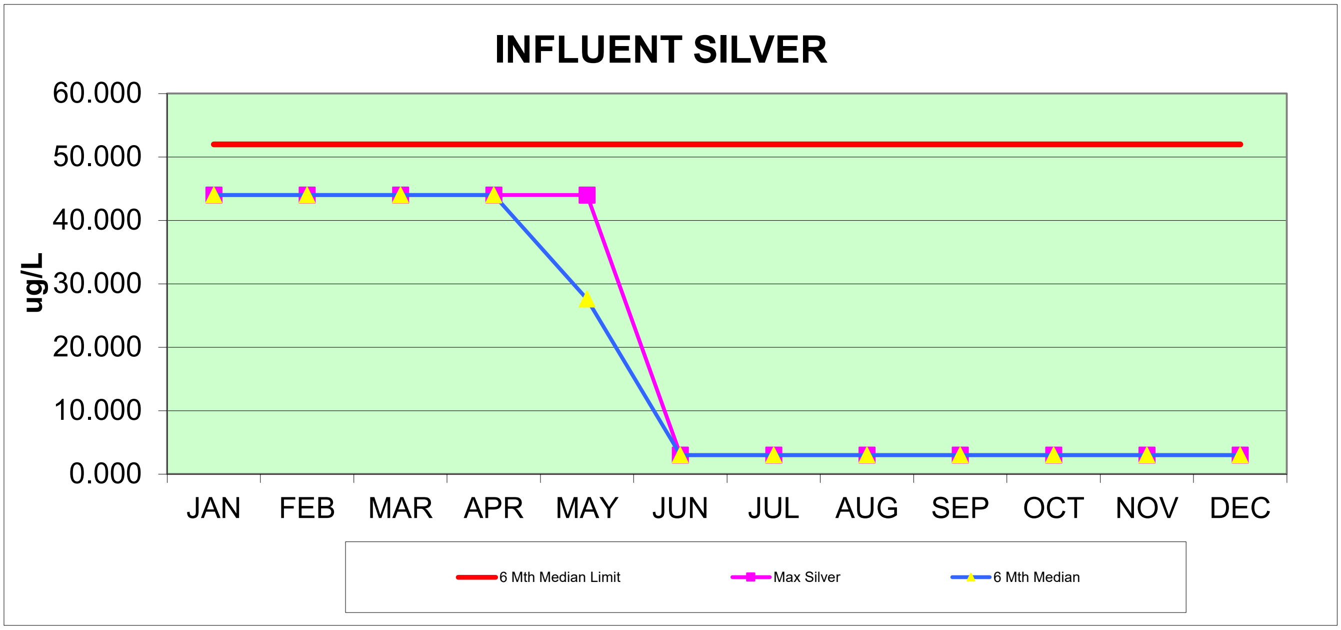

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
6 Mth Limit	52.000	52.000	52.000	52.000	52.000	52.000	52.000	52.000	52.000	52.000	52.000	52.000
Max	44.000	44.000	44.000	44.000	44.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
Median	44.000	44.000	44.000	44.000	27.600	3.000	3.000	3.000	3.000	3.000	3.000	3.000

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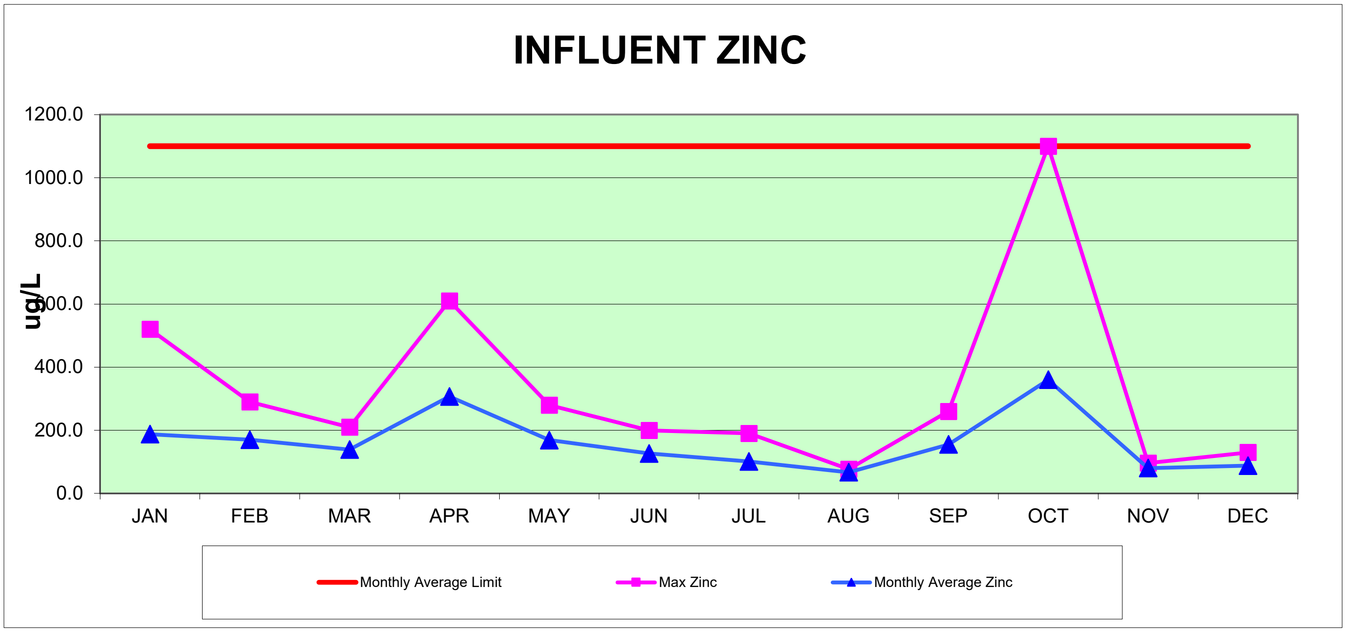

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Mthly Limit	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0
Max	520.000	290.000	210.000	610.000	280.000	200.000	190.000	77.000	260.000	1100.000	96.000	130.000
Average	187.500	169.750	138.800	307.250	168.800	126.750	101.250	67.200	155.000	360.000	80.200	88.250

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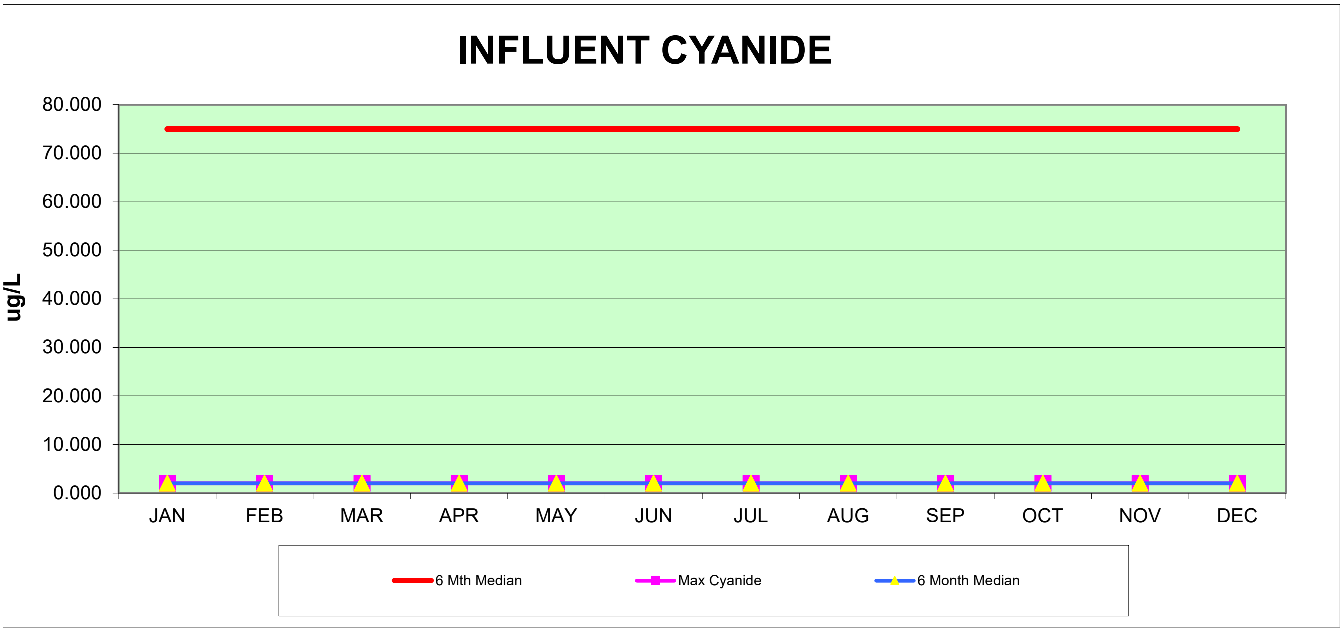

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
6 Mth Limit	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000	75.000
Max	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
Median	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000

International Boundary and Water Commission

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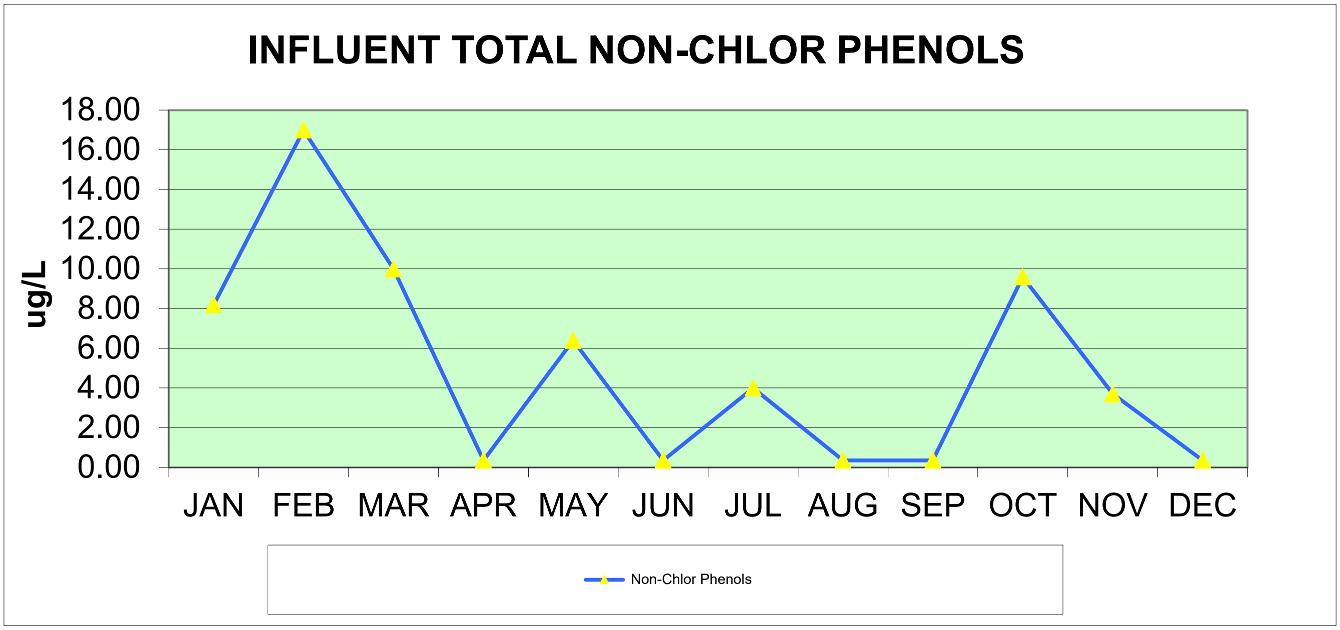
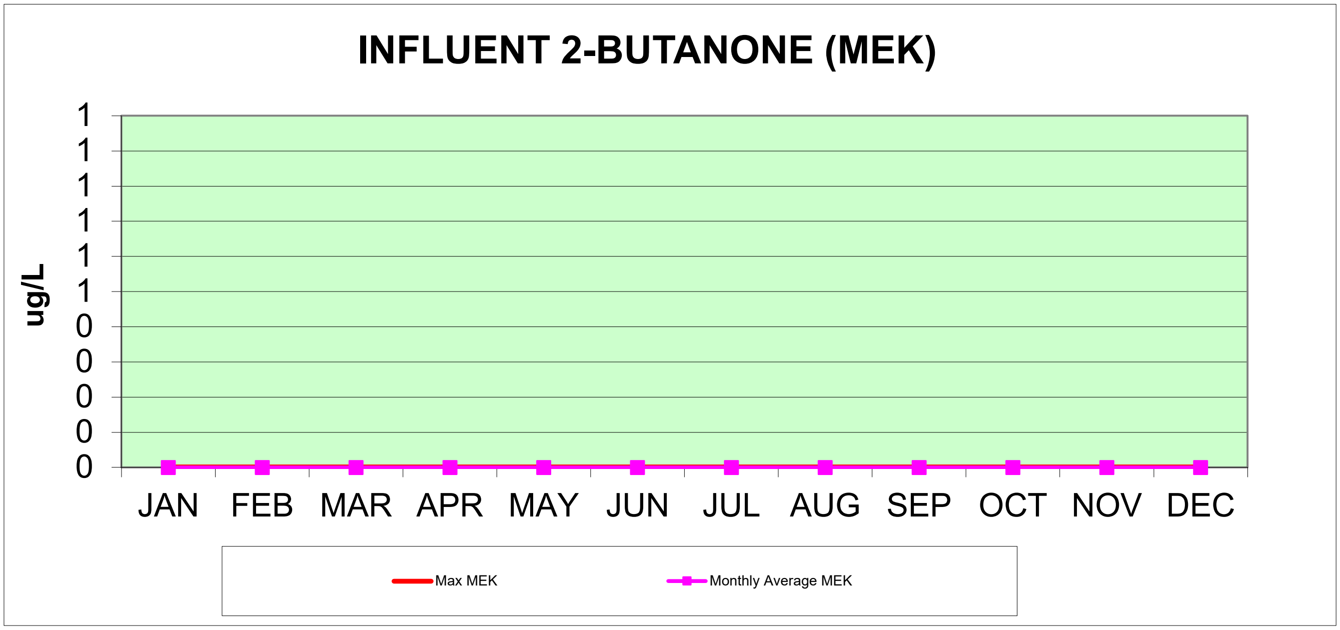


	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Average	8.200	17.000	10.000	0.360	6.400	0.360	4.000	0.360	0.360	9.600	3.700	0.360



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Max	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Average	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

International Boundary and Water Commission

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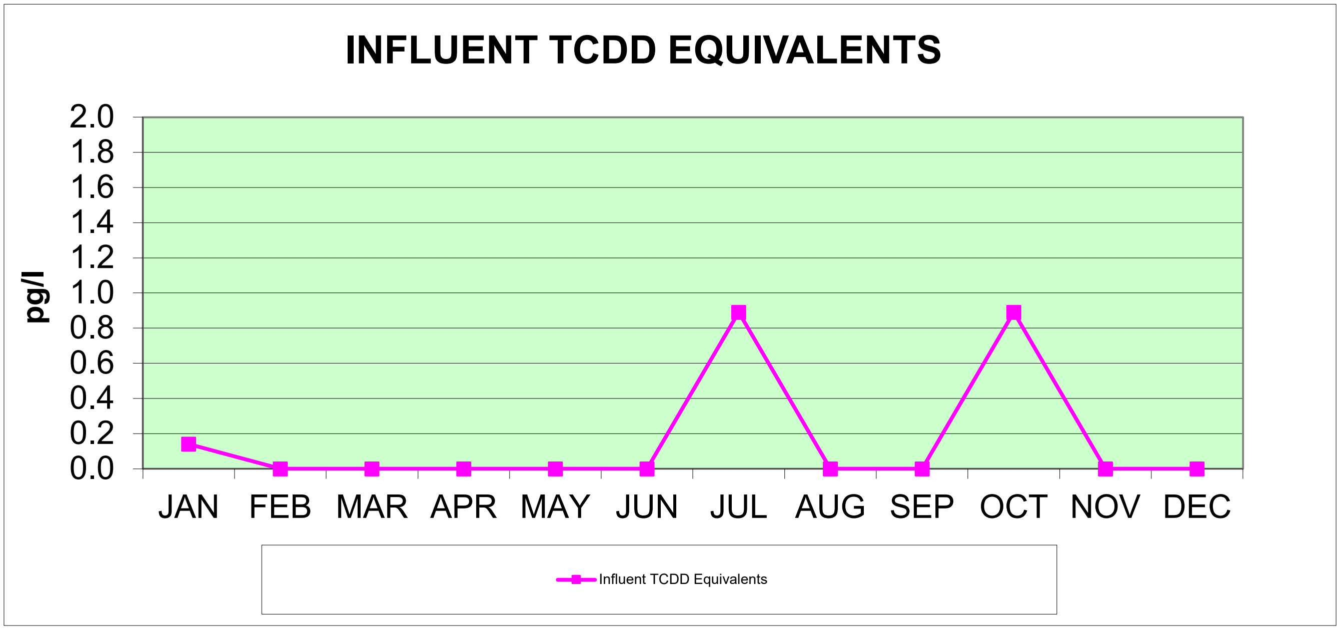

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Average	0.14	0.00	0.00	0.00	0.00	0.00	0.89	0.00	0.00	0.89	0.00	0.00

EFFLUENT GRAPHS

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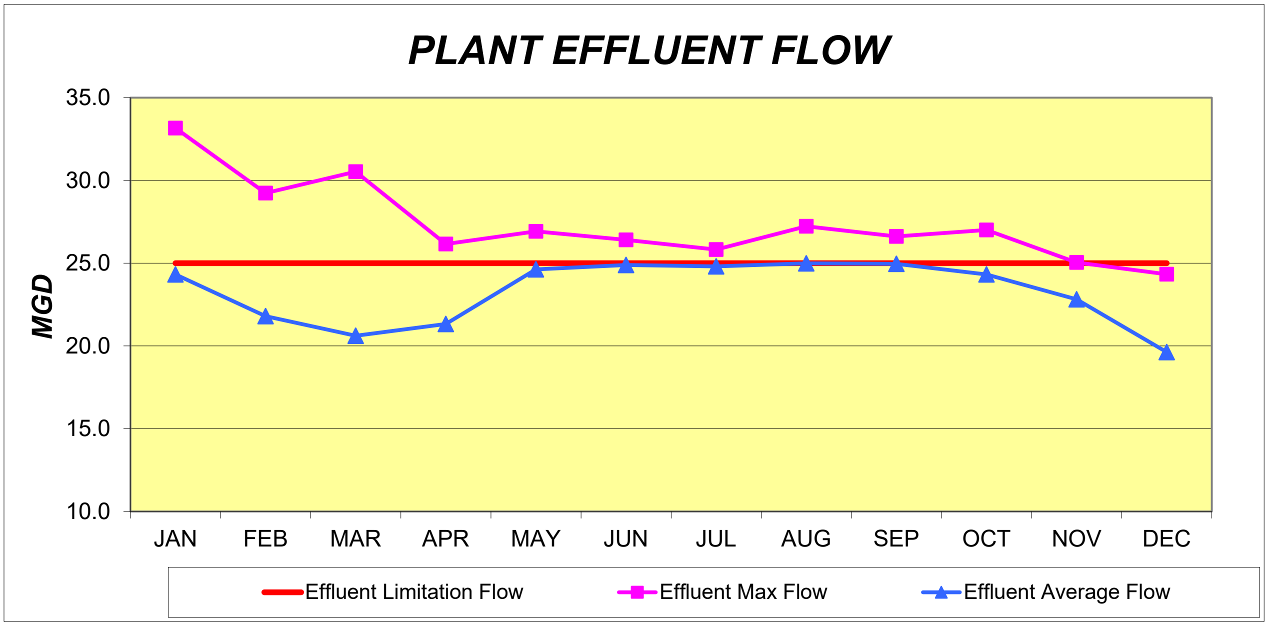

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit 30 Day	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Max	33.16	29.23	30.53	26.16	26.93	26.41	25.82	27.23	26.61	27.00	25.04	24.33
Average	24.32	21.80	20.62	21.33	24.62	24.90	24.81	24.99	24.96	24.31	22.81	19.63

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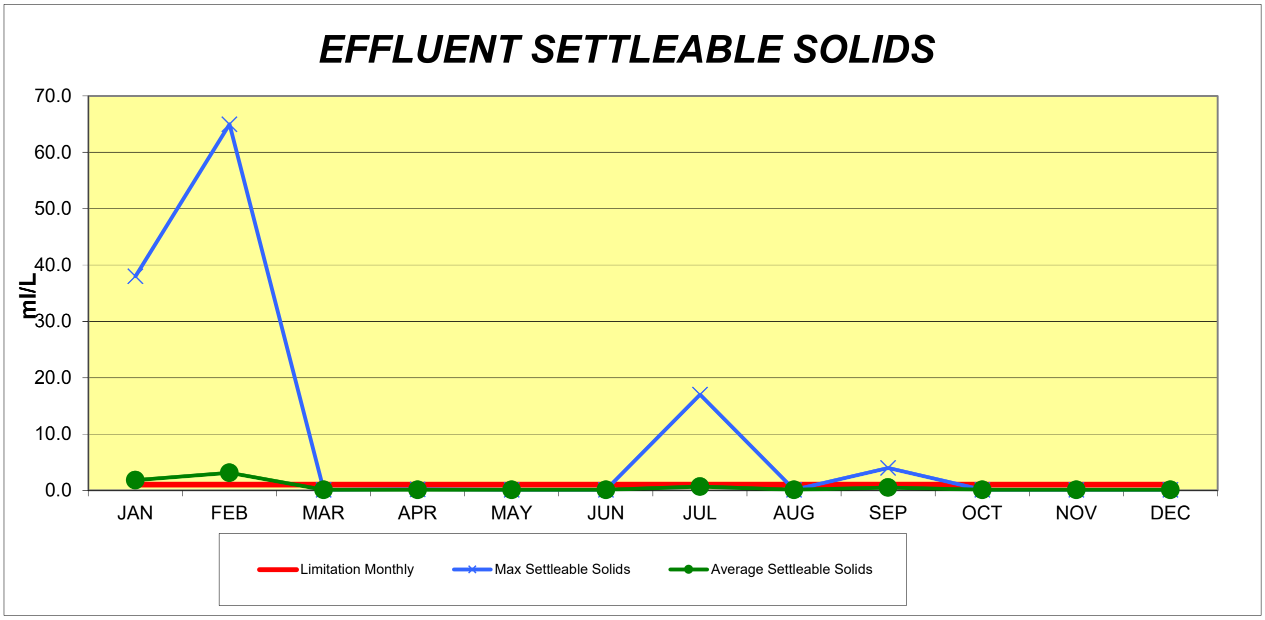

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Monthly	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Max	38.00	65.00	0.10	0.20	0.10	0.10	17.00	0.10	4.00	0.10	0.10	0.10
Average	1.84	3.14	0.10	0.10	0.10	0.10	0.70	0.10	0.51	0.10	0.10	0.10

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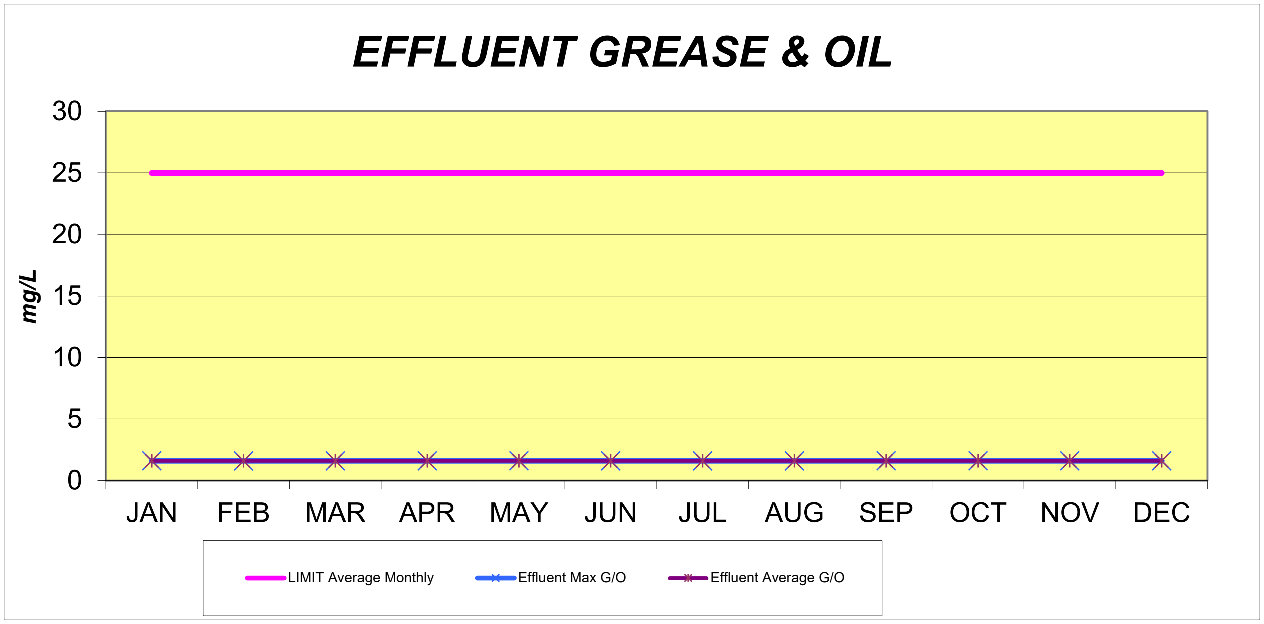
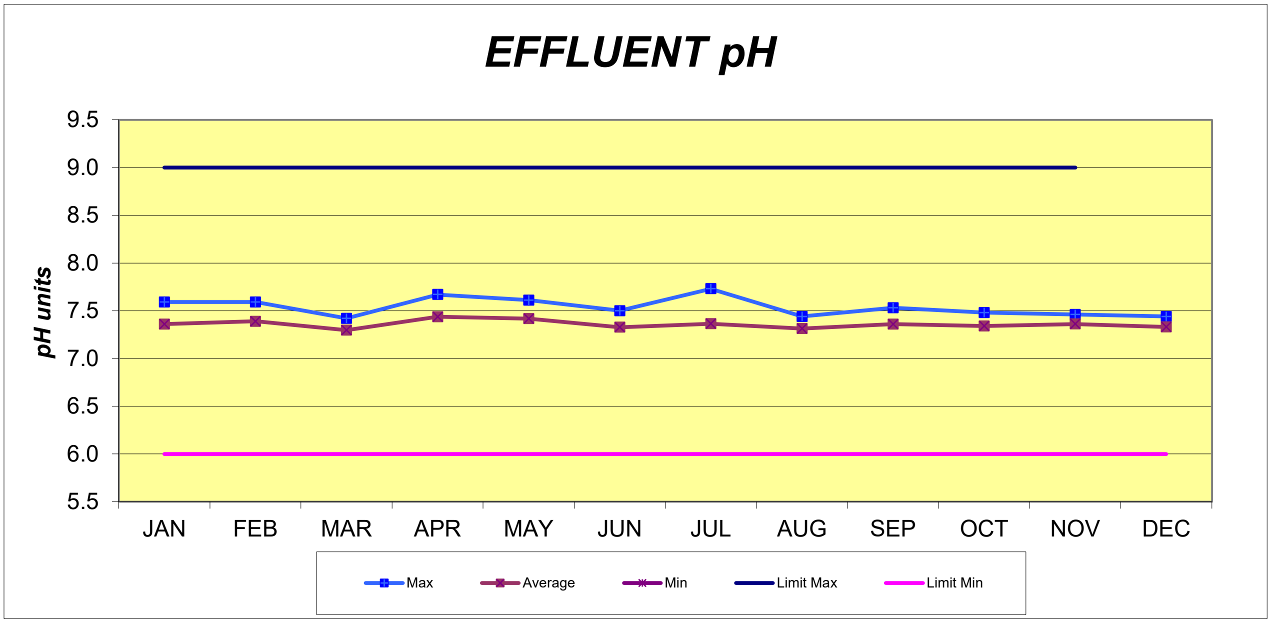


	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Monthly Avg.	25	25	25	25	25	25	25	25	25	25	25	25
Max	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Average	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit Max	9	9	9	9	9	9	9	9	9	9	9	9
Limit Min	6	6	6	6	6	6	6	6	6	6	6	6
Max	7.6	7.6	7.4	7.7	7.6	7.5	7.7	7.4	7.5	7.5	7.5	7.4
Average	7.4	7.4	7.3	7.4	7.4	7.3	7.4	7.3	7.4	7.3	7.4	7.3
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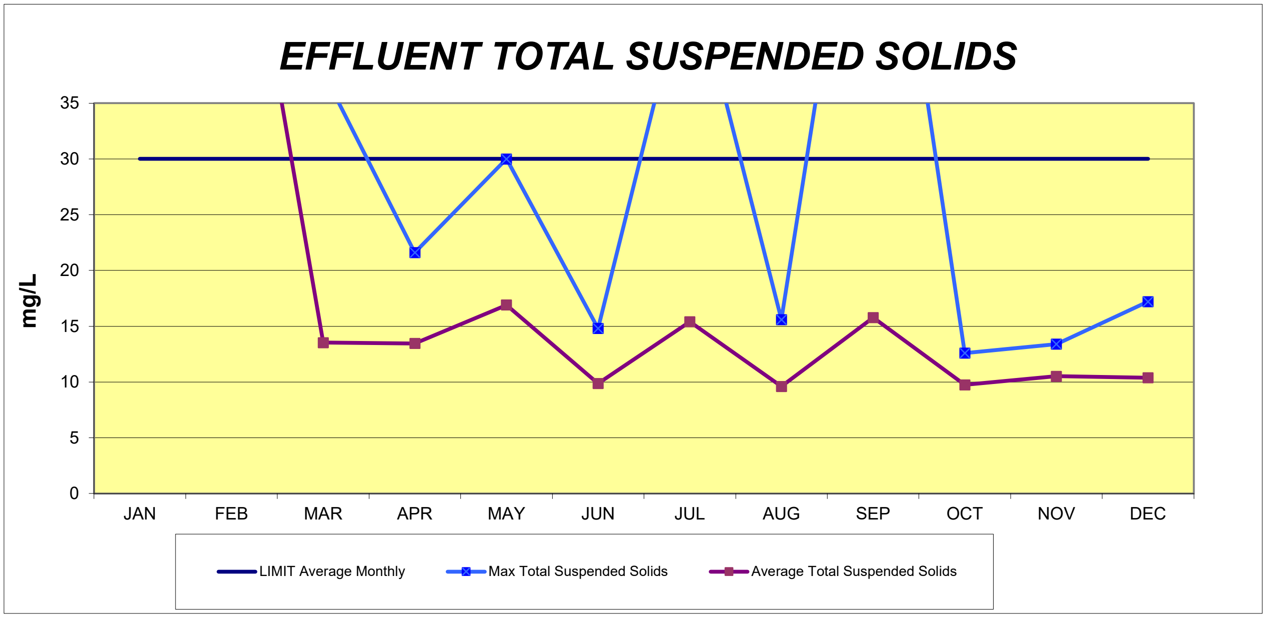

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Monthly Avg.	30	30	30	30	30	30	30	30	30	30	30	30
Max	512	336	38	22	30	15	48	16	68	13	13	17
Average	46	61	14	13	17	10	15	10	16	10	11	10

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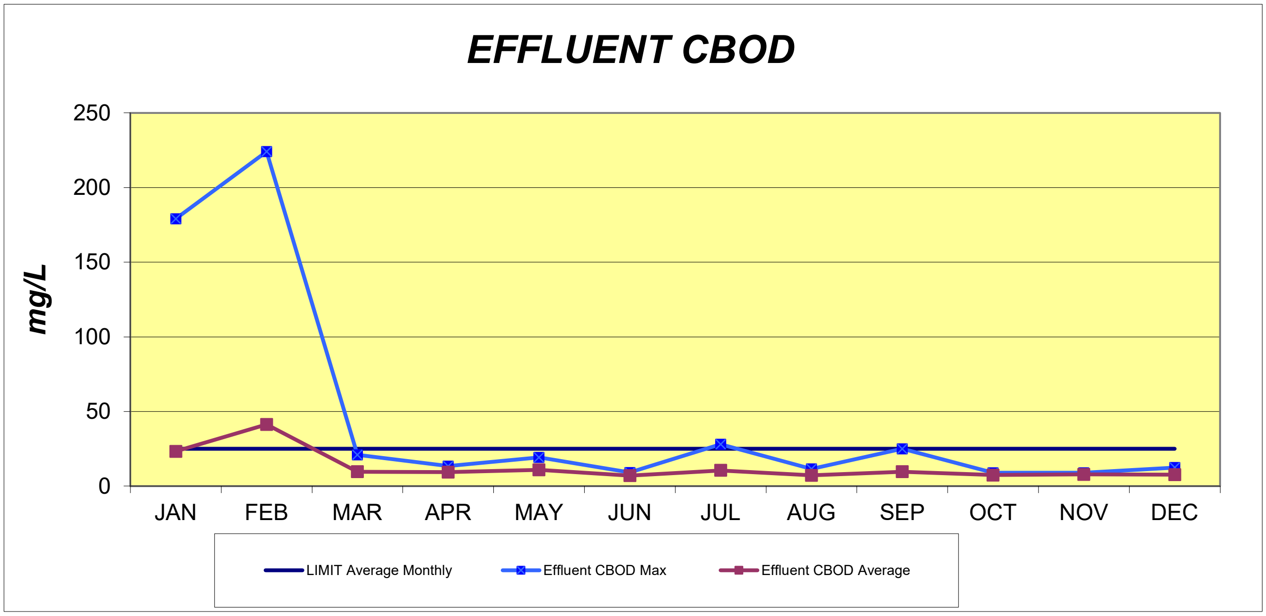

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Monthly Avg.	25	25	25	25	25	25	25	25	25	25	25	25
Max	179	224	21	13	19	9	28	12	25	9	9	12
Average	23	41	10	9	11	7	11	7	10	7	8	8

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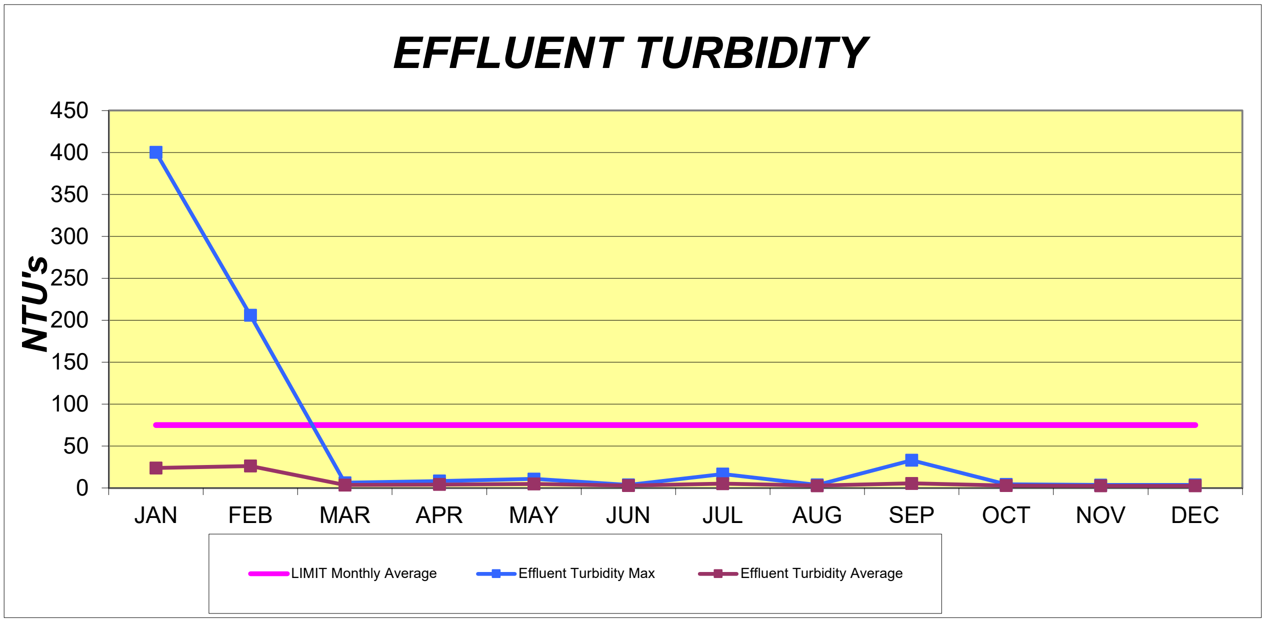
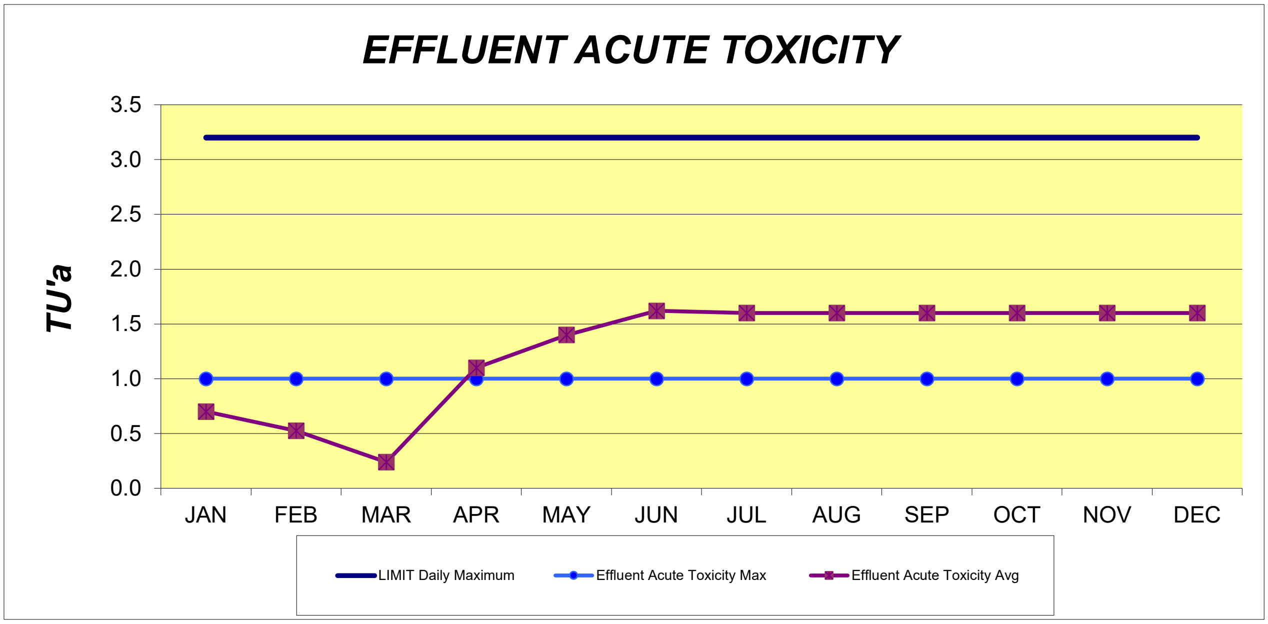
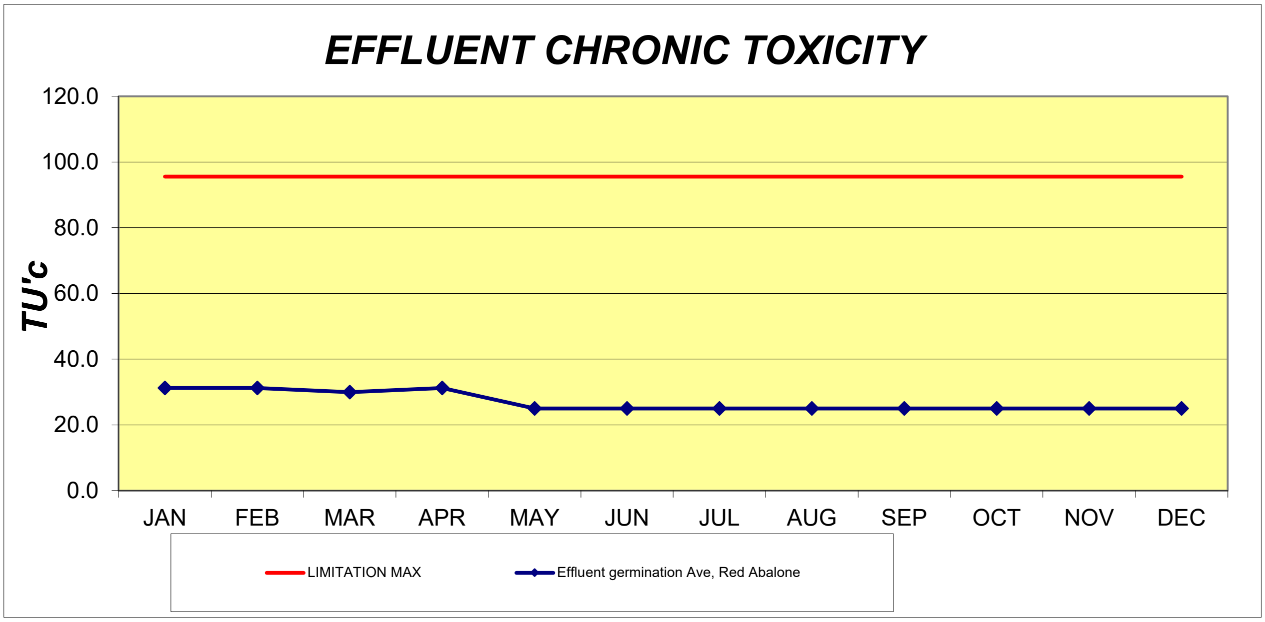


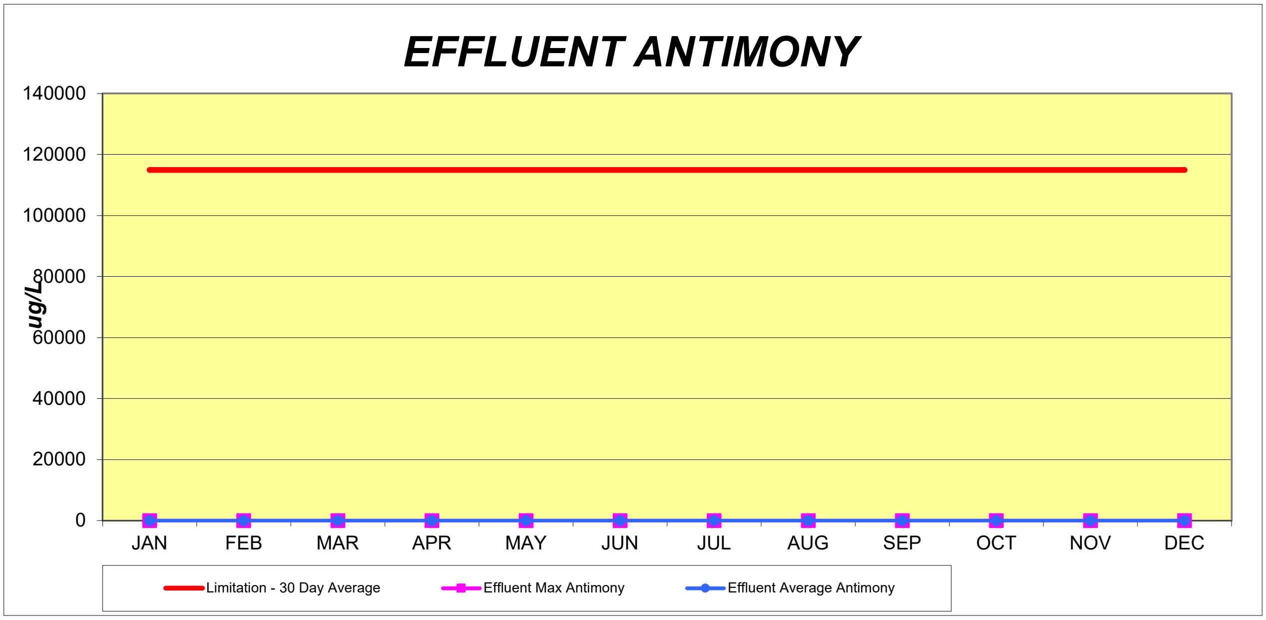
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Monthly Avg.	75	75	75	75	75	75	75	75	75	75	75	75
Max	400.0	206.0	6.4	8.4	10.8	3.8	16.6	3.9	33.1	4.4	3.6	3.8
Average	23.8	26.3	3.6	4.3	4.9	2.9	5.1	2.8	5.5	3.0	2.8	2.6



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Max	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Max	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Average	0.7	0.5	0.2	1.1	1.4	1.6	1.6	1.6	1.6	1.6	1.6	1.6



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit Max	95.6	95.6	95.6	95.6	95.6	95.6	95.6	95.6	95.6	95.6	95.6	95.6
Red Abalone, Germ.	31.3	31.3	30.0	31.3	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit 30 Day	115000	115000	115000	115000	115000	115000	115000	115000	115000	115000	115000	115000
Max	2.9000	0.0000	0.0000	2.9000	0.0000	0.0000	6.7000	0.0000	0.0000	6.7000	0.0000	0.0000
Average	2.9000	0.0000	0.0000	2.9000	0.0000	0.0000	6.7000	0.0000	0.0000	6.7000	0.0000	0.0000

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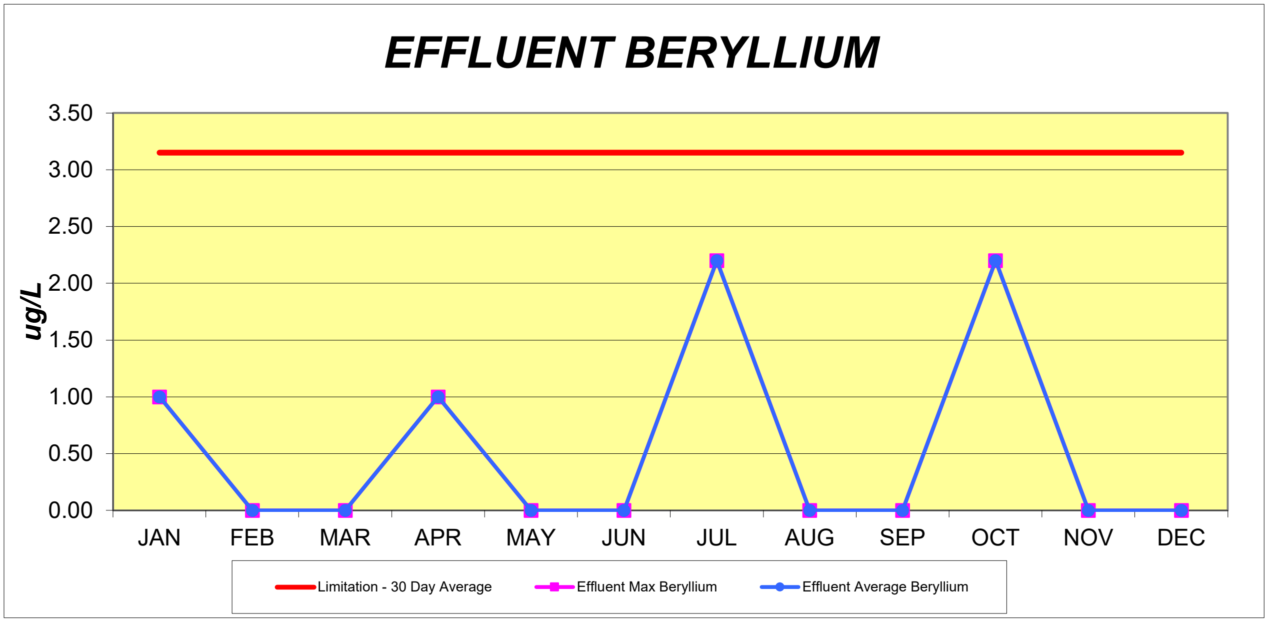
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	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit 30 Day	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15
Max	1.000	0.000	0.000	1.000	0.000	0.000	2.200	0.000	0.000	2.200	0.000	0.000
Average	1.000	0.000	0.000	1.000	0.000	0.000	2.200	0.000	0.000	2.200	0.000	0.000

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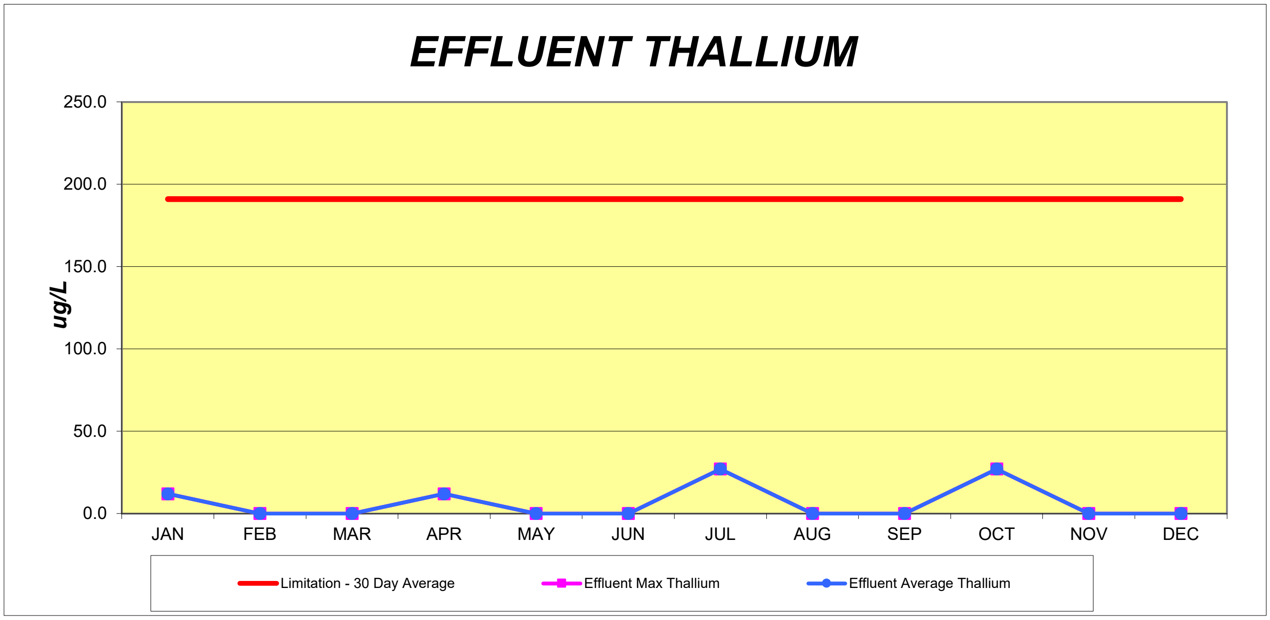

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit 30 Day	191.0	191.0	191.0	191.0	191.0	191.0	191.0	191.0	191.0	191.0	191.0	191.0
Max	12.0000	0.0000	0.0000	12.0000	0.0000	0.0000	27.0000	0.0000	0.0000	27.0000	0.0000	0.0000
Average	12.0000	0.0000	0.0000	12.0000	0.0000	0.0000	27.0000	0.0000	0.0000	27.0000	0.0000	0.0000

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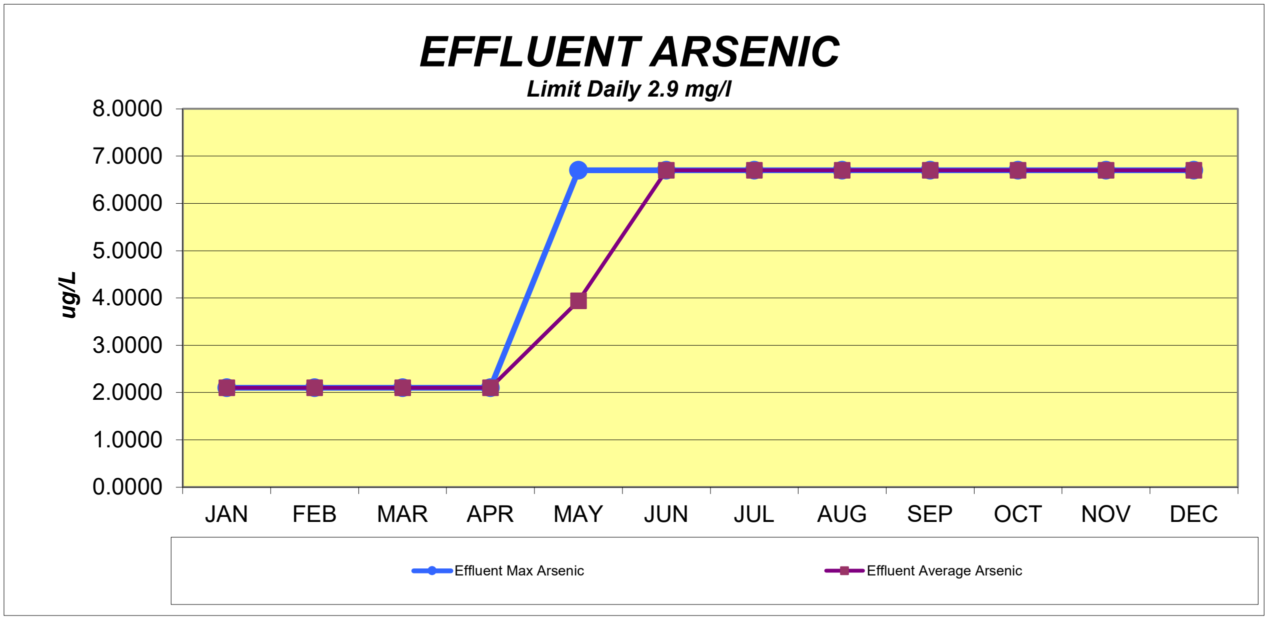
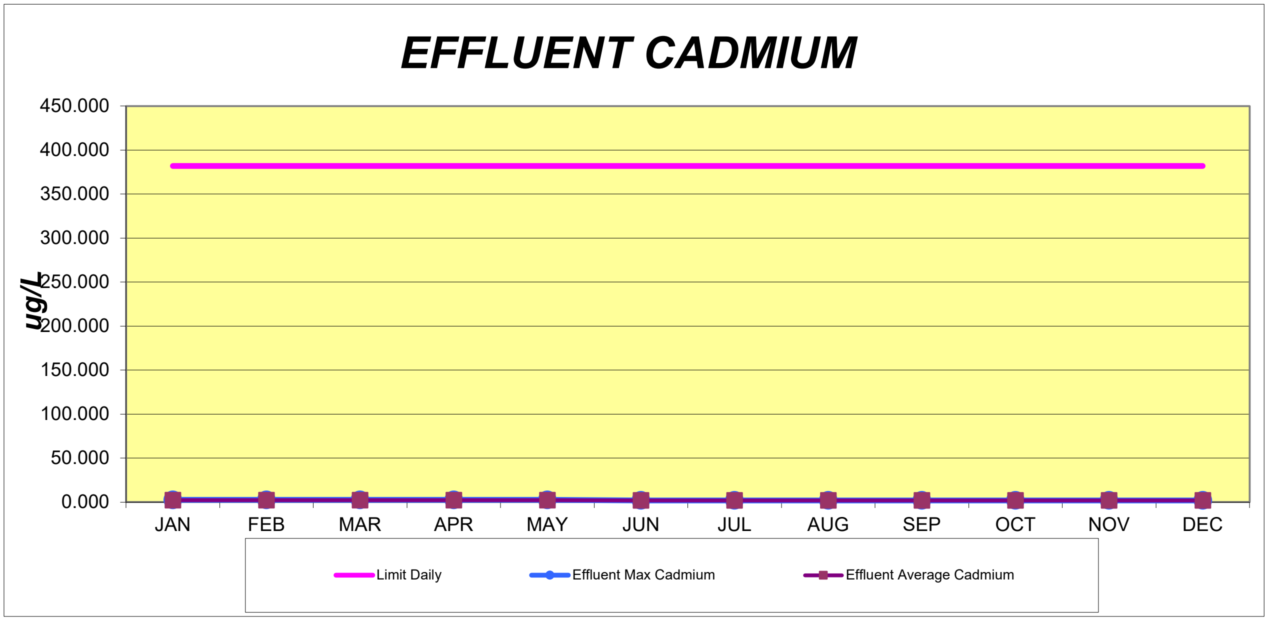


	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit Daily	2780.0	2780.0	2780.0	2780.0	2780.0	2780.0	2780.0	2780.0	2780.0	2780.0	2780.0	2780.0
Max	2.1000	2.1000	2.1000	2.1000	6.7000	6.7000	6.7000	6.7000	6.7000	6.7000	6.7000	6.7000
Average	2.1000	2.1000	2.1000	2.1000	3.9400	6.7000	6.7000	6.7000	6.7000	6.7000	6.7000	6.7000



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit Daily	382.000	382.000	382.000	382.000	382.000	382.000	382.000	382.000	382.000	382.000	382.000	382.000
Max	2.600	2.600	2.600	2.600	2.600	1.900	1.900	1.900	1.900	1.900	1.900	1.900
Average	2.200	2.200	2.280	2.200	2.160	1.900	1.900	1.900	1.900	1.900	1.900	1.900

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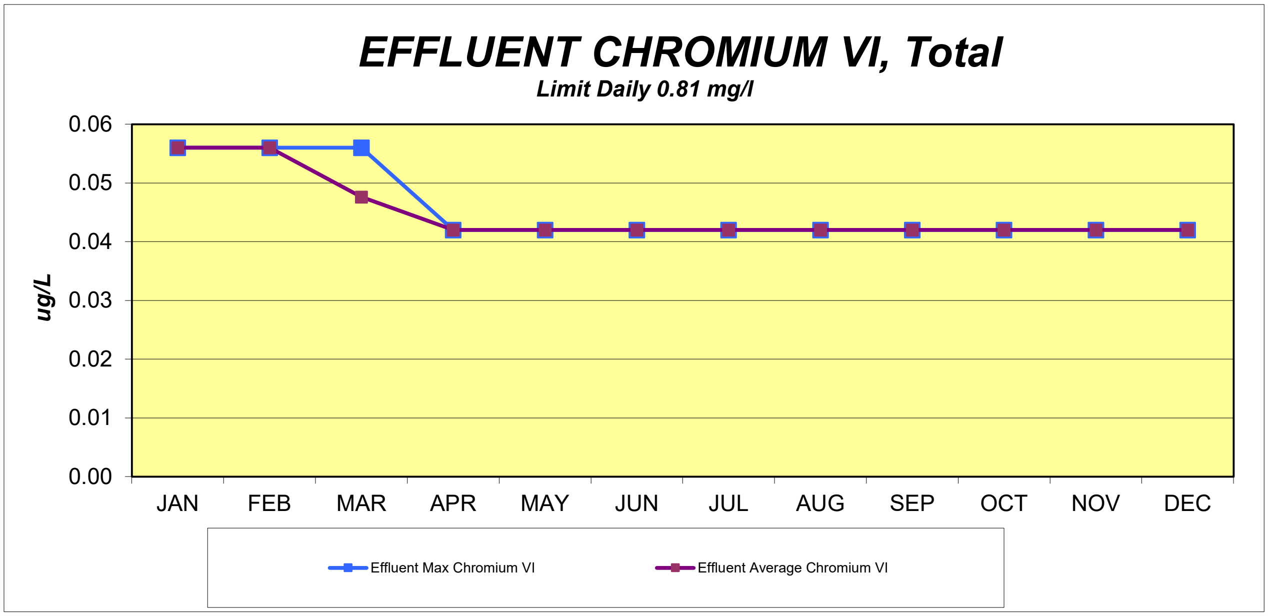

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit Daily	765.00	765.00	765.00	765.00	765.00	765.00	765.00	765.00	765.00	765.00	765.00	765.00
Max	0.06	0.06	0.06	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Average	0.06	0.06	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04

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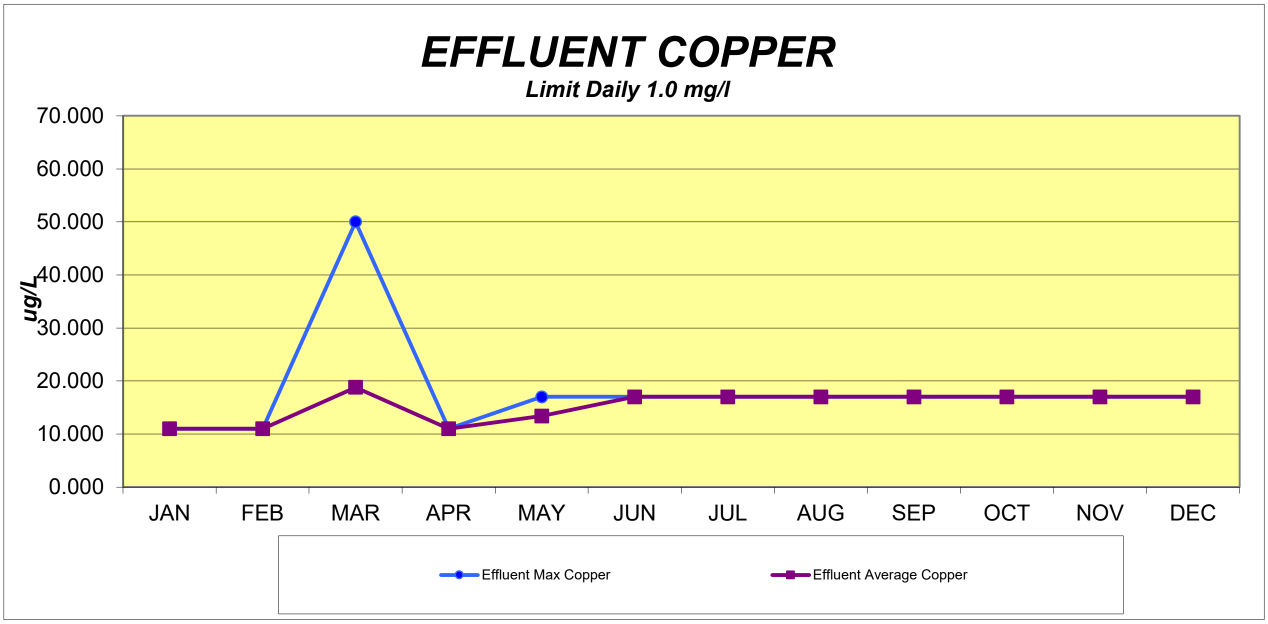

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit Daily	958.0	958.0	958.0	958.0	958.0	958.0	958.0	958.0	958.0	958.0	958.0	958.0
Max	11.000	11.000	50.000	11.000	17.000	17.000	17.000	17.000	17.000	17.000	17.000	17.000
Average	11.000	11.000	18.800	11.000	13.400	17.000	17.000	17.000	17.000	17.000	17.000	17.000

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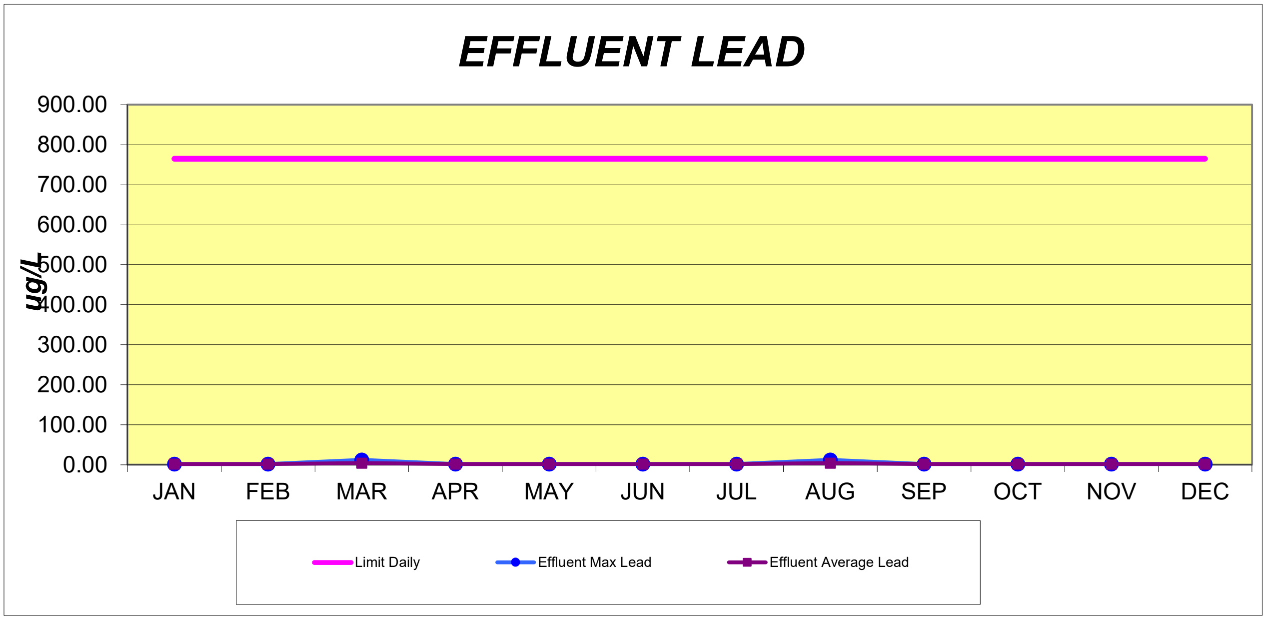

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit Daily	765.00	765.00	765.00	765.00	765.00	765.00	765.00	765.00	765.00	765.00	765.00	765.00
Max	2.000	2.000	12.000	2.000	2.000	2.000	2.000	12.000	2.000	2.000	2.000	2.000
Average	2.000	2.000	4.000	2.000	2.000	2.000	2.000	4.000	2.000	2.000	2.000	2.000

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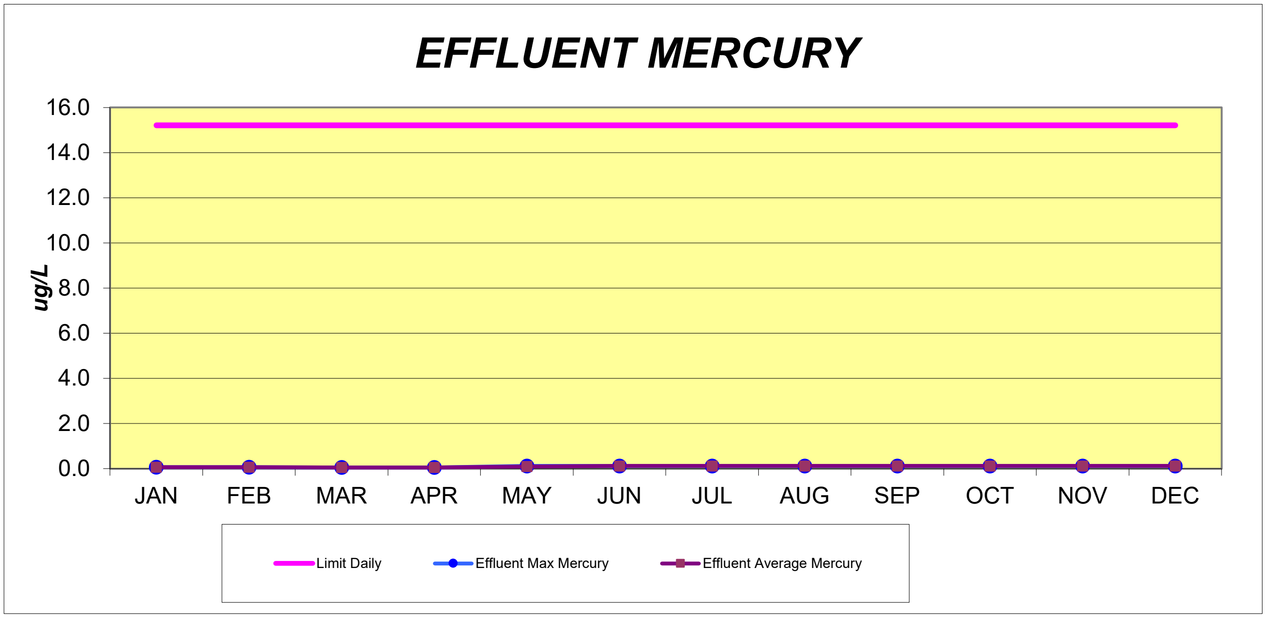

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit Daily	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2
Max	0.06	0.06	0.05	0.05	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Average	0.06	0.06	0.05	0.05	0.09	0.12	0.12	0.12	0.12	0.12	0.12	0.12

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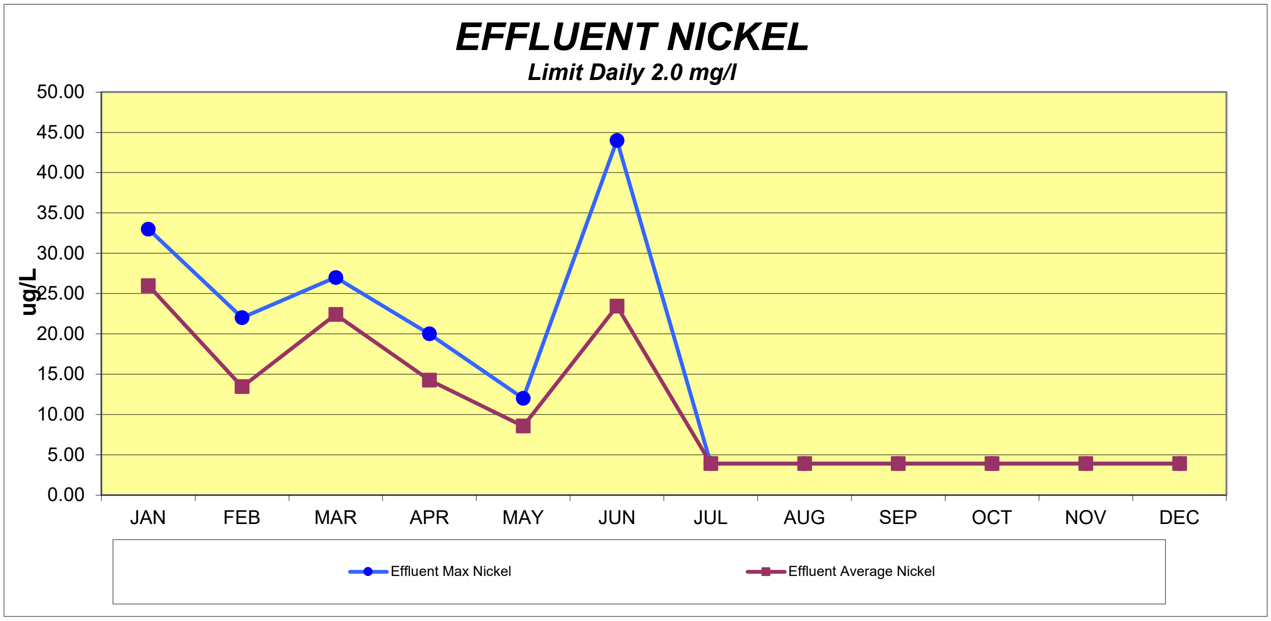
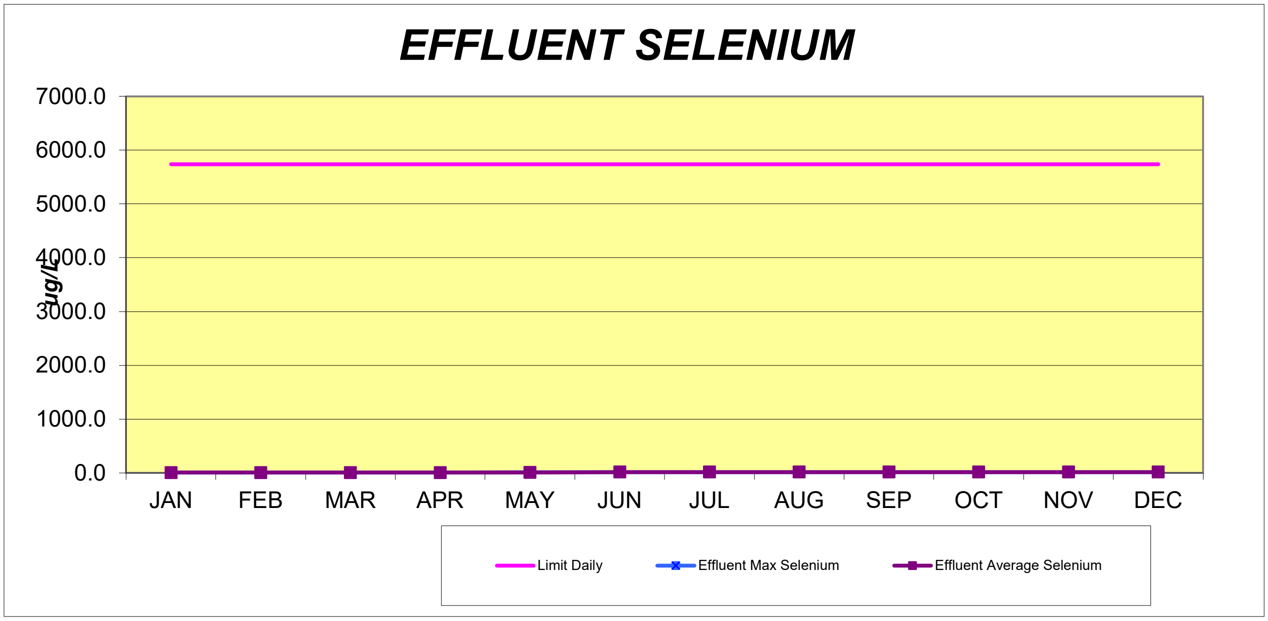


	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit Daily	1910.0	1910.0	1910.0	1910.0	1910.0	1910.0	1910.0	1910.0	1910.0	1910.0	1910.0	1910.0
Max	33.00	22.00	27.00	20.00	12.00	44.00	3.90	3.90	3.90	3.90	3.90	3.90
Average	26.00	13.45	22.40	14.25	8.56	23.45	3.90	3.90	3.90	3.90	3.90	3.90



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit Daily	5740.0	5740.0	5740.0	5740.0	5740.0	5740.0	5740.0	5740.0	5740.0	5740.0	5740.0	5740.0
Max	4.2000	4.2000	4.2000	4.2000	14.0000	14.0000	14.0000	14.0000	14.0000	14.0000	14.0000	14.0000
Average	4.2000	4.2000	4.2000	4.2000	8.1200	14.0000	14.0000	14.0000	14.0000	14.0000	14.0000	14.0000

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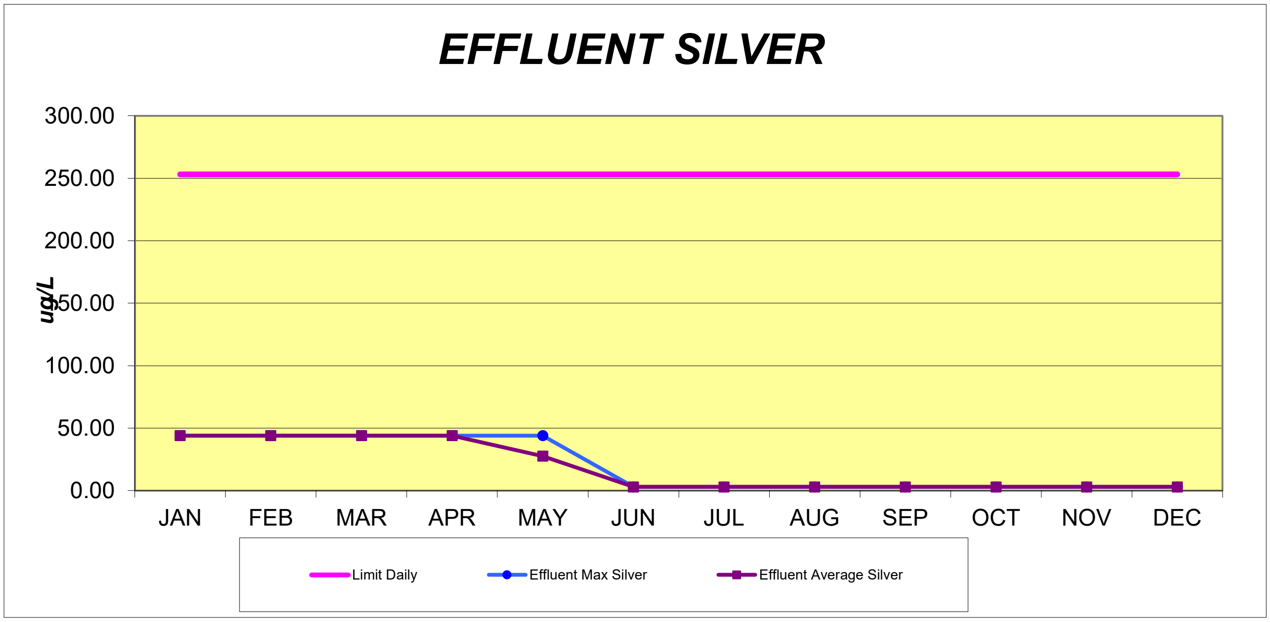

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit Daily	253.00	253.00	253.00	253.00	253.00	253.00	253.00	253.00	253.00	253.00	253.00	253.00
Max	44.000	44.000	44.000	44.000	44.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
Average	44.000	44.000	44.000	44.000	27.600	3.000	3.000	3.000	3.000	3.000	3.000	3.000

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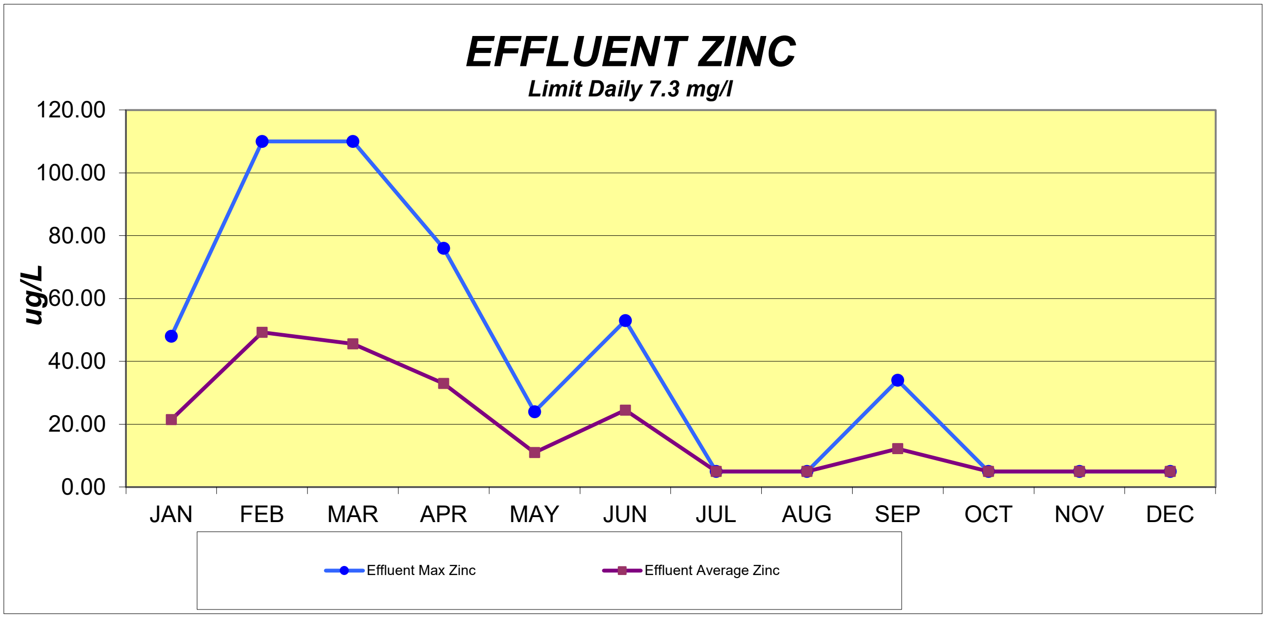

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit Daily	6890.0	6890.0	6890.0	6890.0	6890.0	6890.0	6890.0	6890.0	6890.0	6890.0	6890.0	6890.0
Max	48.00	110.00	110.00	76.00	24.00	53.00	5.00	5.00	34.00	5.00	5.00	5.00
Average	21.50	49.25	45.60	33.00	11.00	24.50	5.00	5.00	12.25	5.00	5.00	5.00

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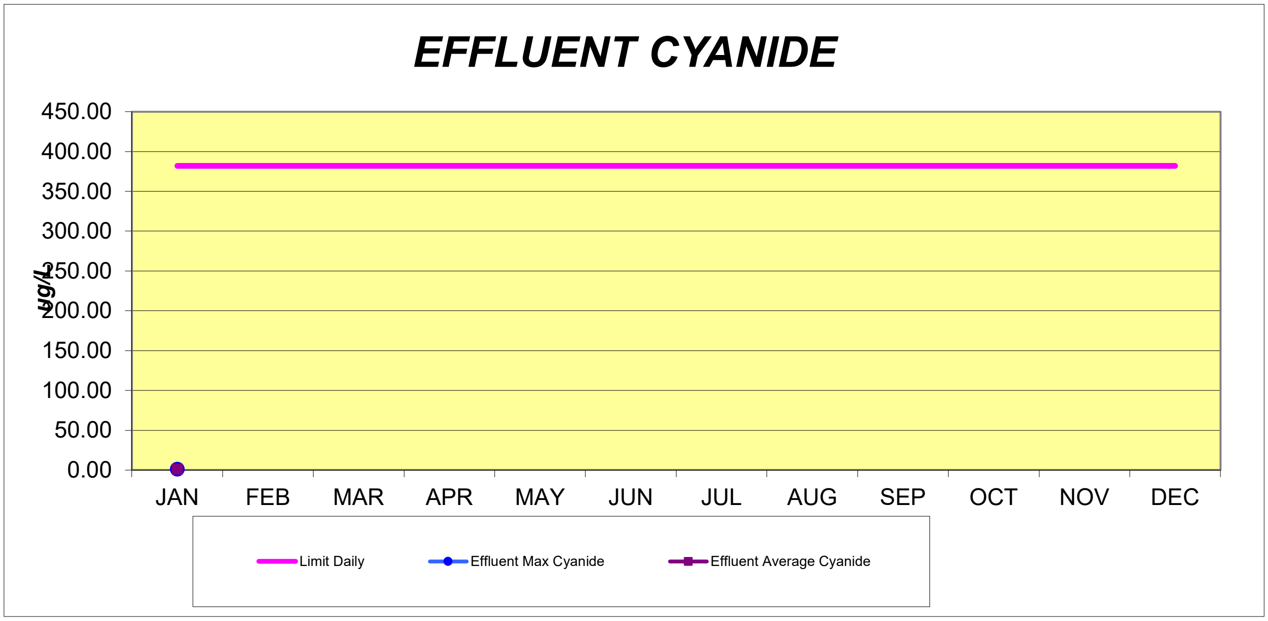
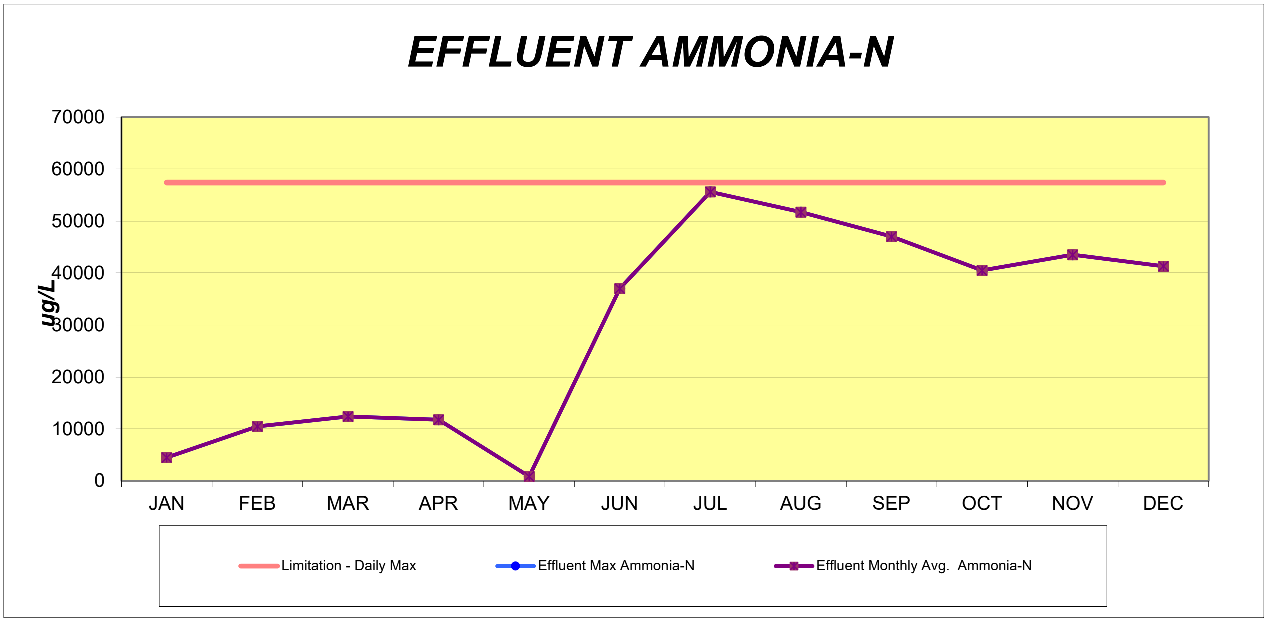


	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit Daily	382.00	382.00	382.00	382.00	382.00	382.00	382.00	382.00	382.00	382.00	382.00	382.00
Max	2.000	2.000	2.000	2.000	2.000	2.000	5.400	2.000	6.000	2.000	6.000	7.800
Average	2.000	2.000	2.000	2.000	2.000	2.000	2.850	2.000	3.000	2.000	2.800	4.750



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Daily Max	57400	57400	57400	57400	57400	57400	57400	57400	57400	57400	57400	57400
Max	4500	10500	12400	11800	870	37000	55600	51700	47000	40500	43500	41300
Monthly Avg.	4500	10500	12400	11800	870	37000	55600	51700	47000	40500	43500	41300

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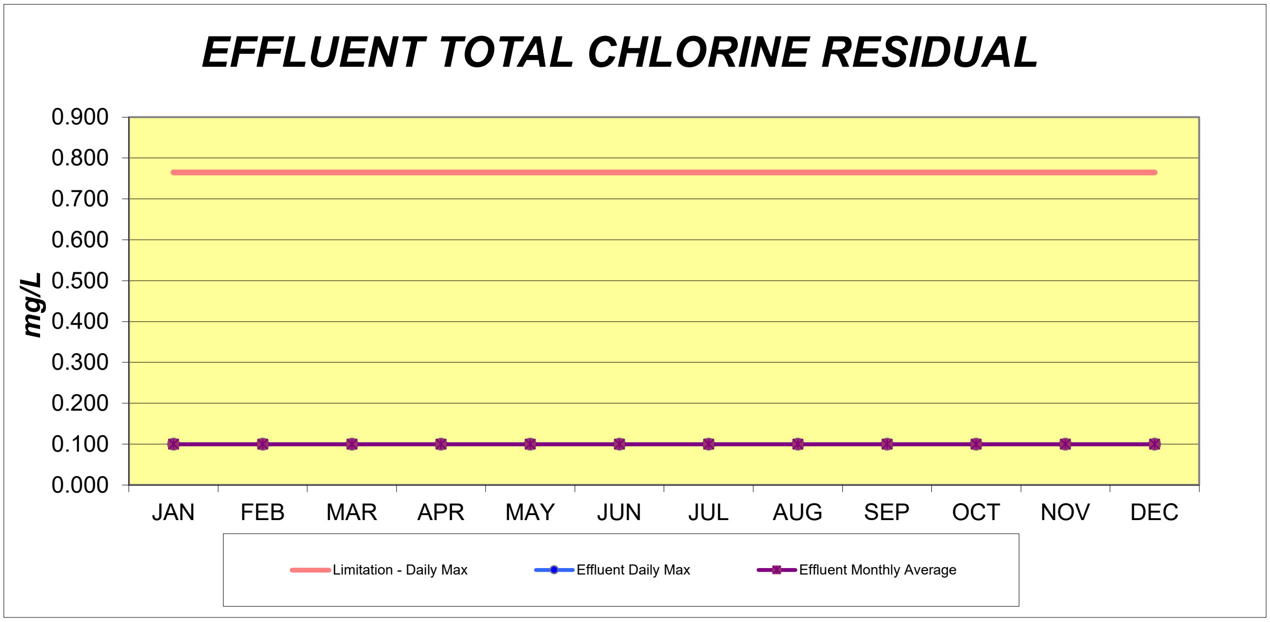

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Daily Max	0.765	0.765	0.765	0.765	0.765	0.765	0.765	0.765	0.765	0.765	0.765	0.765
Daily Max	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
Monthly Avg.	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100

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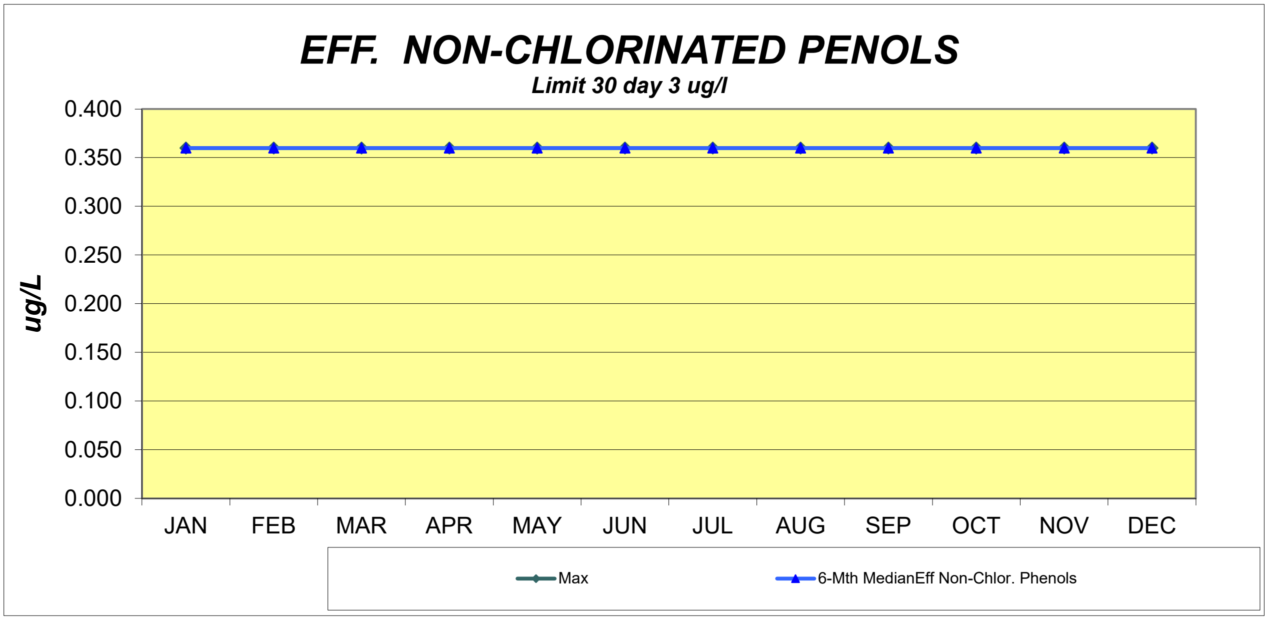
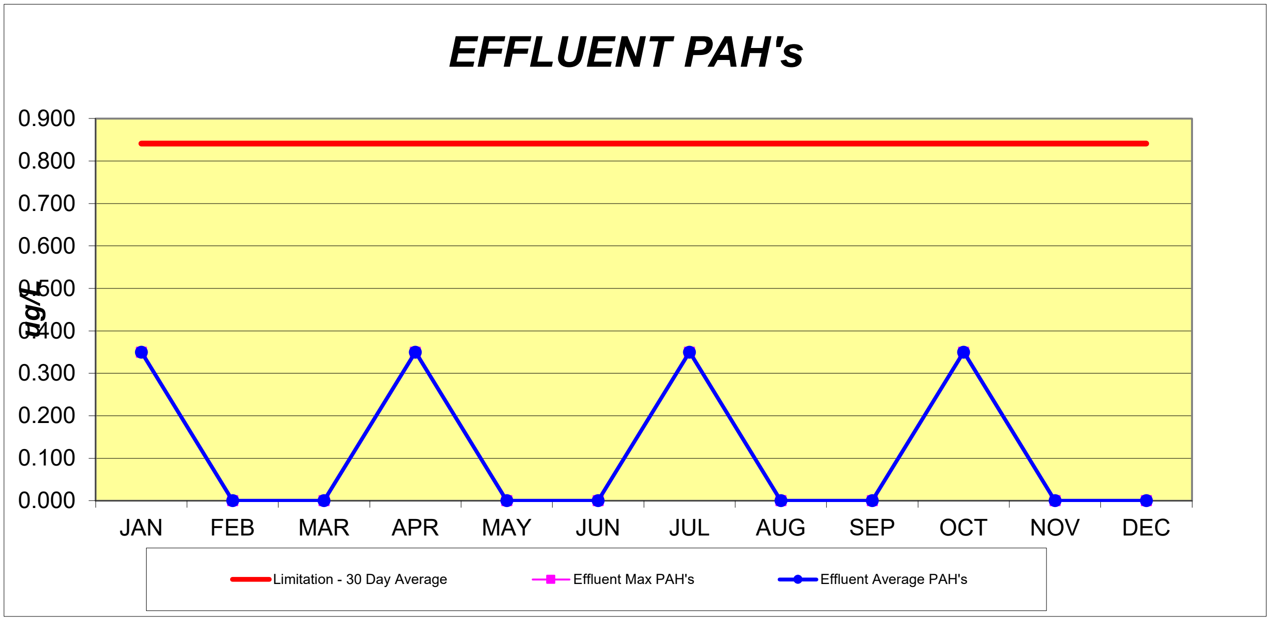


	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit 30 Day	11500	11500	11500	11500	11500	11500	11500	11500	11500	11500	11500	11500
Max	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.360
6- Mth Median	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.360	0.360



EFFLUENT PAH's

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit 30 Day	0.841	0.841	0.841	0.841	0.841	0.841	0.841	0.841	0.841	0.841	0.841	0.841
Max	0.35	0.00	0.00	0.35	0.00	0.00	0.35	0.00	0.00	0.35	0.00	0.00
Average	0.35	0.00	0.00	0.35	0.00	0.00	0.35	0.00	0.00	0.35	0.00	0.00

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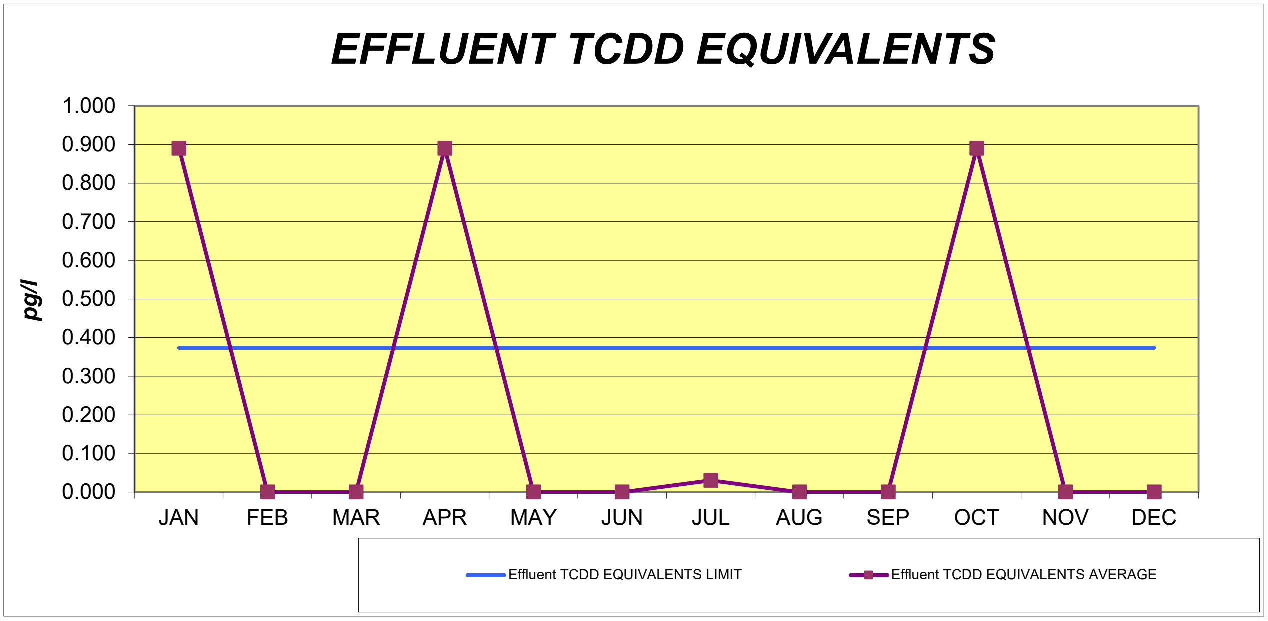

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Limit	0.373	0.373	0.373	0.373	0.373	0.373	0.373	0.373	0.373	0.373	0.373	0.373
Average	0.890	0.000	0.000	0.890	0.000	0.000	0.030	0.000	0.000	0.890	0.000	0.000

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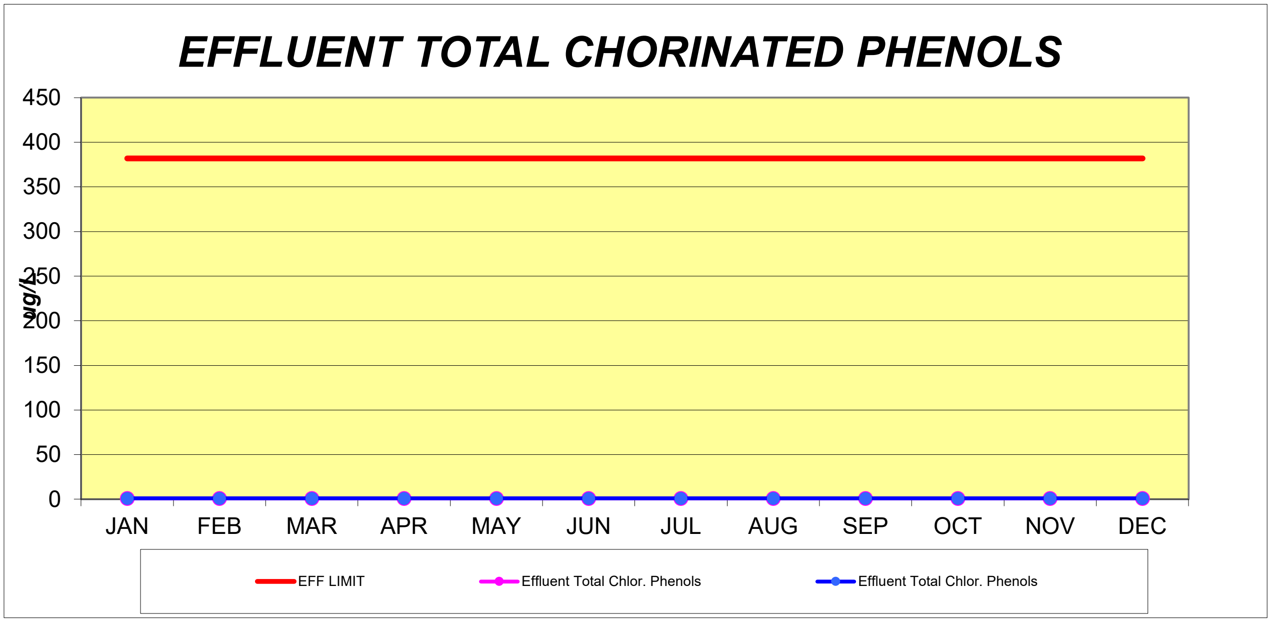

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Daily Max	382	382	382	382	382	382	382	382	382	382	382	382
Max	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Monthly Avg.	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

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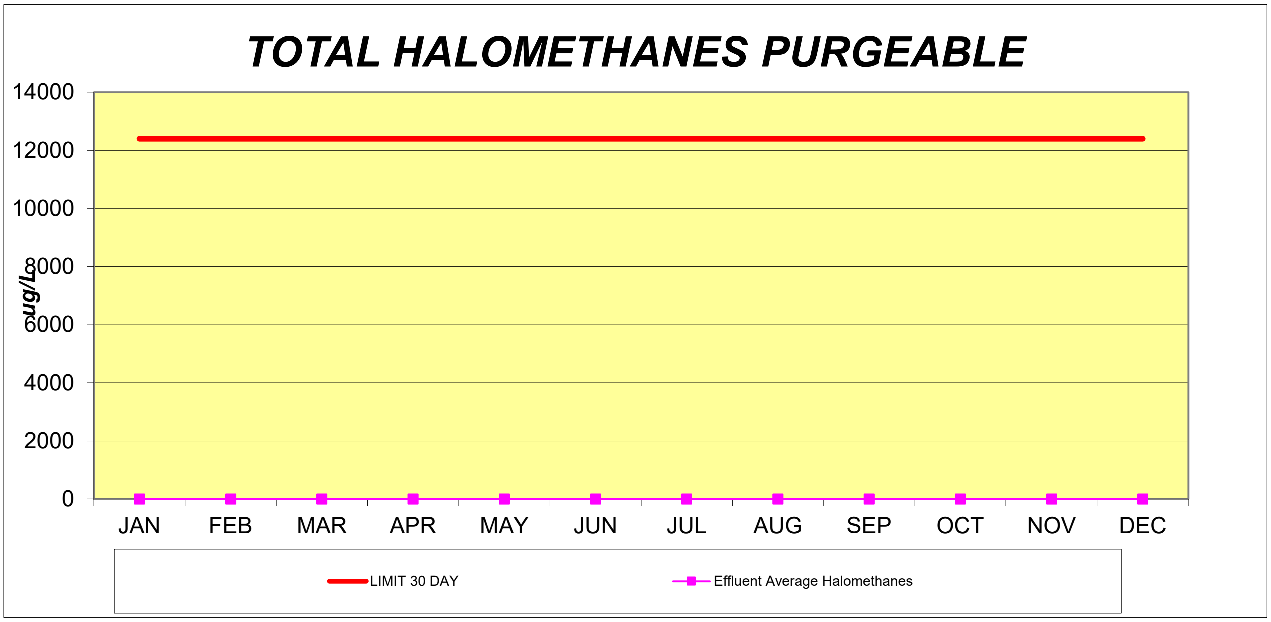

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
LIMIT 30 DAY	12400	12400	12400	12400	12400	12400	12400	12400	12400	12400	12400	12400
Effluent Average	0.6700	0.0000	0.0000	0.6700	0.0000	0.0000	0.6700	0.0000	0.0000	0.6700	0.0000	0.0000