BINATIONAL WATER QUALITY STUDY OF THE TIJUANA RIVER AND ADJACENT CANYONS AND DRAINS

December 2018 to November 2019

Prepared by:

INTERNATIONAL BOUNDARY AND WATER COMMISSION

UNITED STATES AND MEXICO

Final Report
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LEGAL FRAMEWORK

This Study and its Final Report were conducted by Mexico and the United States under the framework of Minute 320 of the International Boundary and Water Commission, entitled "General Framework for Binational Cooperation on Transboundary Issues in the Tijuana River Basin," dated October 5, 2015.

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ABBREVIATIONS AND ACRONYMS

CE-CCA:	Mexico's Ecological Water Quality Criteria
IBWC:	International Boundary and Water Commission, United States and Mexico
BOD:	Biochemical Oxygen Demand
DEHP:	Bis (2-ethylhexyl) Phthalate
COD:	Chemical Oxygen Demand
kg:	Kilogram
L:	Liters
MAL:	Maximum Allowable Levels [Mexico]
lps:	Liters per second
m:	Meters
mg:	Milligrams
MGD:	Million Gallons per Day
ml:	Milliliters
mm:	Millimeters
MPN:	Most Probable Number
PB-CILA:	IBWC Wastewater Pump Station
pH:	Hydrogen Potential
SBIWTP:	South Bay International Wastewater Treatment Plant
WWTP:	Wastewater Treatment Plant
ppb:	parts per billion
ppm:	parts per million
PVC:	Polyvinyl Chloride
SDRWQCB:	San Diego Regional Water Quality Control Board
TSS:	Total Suspended Solids
CFU:	Colony Forming Units
CaWRCB:	California State Water Resources Control Board

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EXECUTIVE SUMMARY

On October 5, 2015, the governments of the United States and Mexico, through the International Boundary and Water Commission (IBWC), signed Minute 320 entitled "General Framework for Binational Cooperation on Transboundary Issues in the Tijuana River Basin." Through the framework of this agreement, a Binational Core Group was established that incorporates representatives from the federal, state, and local governments, and the NGOs from both countries, as were three Work Groups to develop recommendations and implement measures to jointly address the issues of concern related to Sediment, Solid Waste, and Water Quality.

In the month of February 2017, a large magnitude wastewater spill occurred into the Tijuana River, crossing the border into the United States, which was caused by the collapse of one of the main collectors in the City of Tijuana’s sewage system, which led to the development of a binational investigation into what happened. As a result, a report was generated that recommended a number of measures to better understand and mitigate the discharge of untreated wastewater into the Tijuana River. One of them was the need to determine the characterization of water quality in the Tijuana River through environmental monitoring programs or through a specific study that was carried out in both Mexico and the United States.

In this context, technical personnel from both Sections of the IBWC worked to prepare a *Binational Water Quality Monitoring Plan for the Tijuana River and the Transboundary Canyons and Drains*, with the objective to jointly carry out water and sediment sampling on both sides of the border, in order to collect data under normal conditions during dry weather, before and after rain events, and at discharge events or spills to the Tijuana River or to its tributary Canyons and Drains.

This sampling plan was devised to last one year and was executed from December 2018 to November 2019. Personnel from both Sections of the IBWC participated in the field sampling, as well as accredited personnel from contractors for each country: "ABC Química Investigación y Análisis" for Mexico, and Ideal-Ageiss, LLC for the United States. Laboratory analyses to detect each of the parameters considered in this study were performed by each contractor using laboratories that are accredited in their respective countries.

A total of 8 channels or sites were considered for sampling: the Tijuana River, the Alamar River, Stewart’s Drain-Dren Puerta Blanca, Silva Drain-Dren Silva, Canyon del Sol-Cañón del Sol, Smuggler’s Gulch-El Matadero, Goat Canyon-Los Laureles, and Yogurt Canyon-Los Sauces, in which samples were collected both in Mexico and the United States.

During the aforementioned monitoring period, water samples were taken at the Tijuana River and the Alamar River sites on a monthly basis, and at the Canyons and Drains sites on a quarterly basis. Sampling from December 2018 and February 2019 corresponded to “rain monitoring events," and sampling for the month of May 2019 was considered as "baseline" sampling, and for each of these both water and sediment samples were collected at all sites.

In total, 267 parameters were analyzed in water, which are listed in Table in Appendix 1 of this report. Of these 267 parameters, a total of 131 were not detected. The parameters that were not detected in any water sample, together with those not detected in the sediment samples, are listed in the Table in Appendix 2 of this document.

The laboratory results obtained, shown in Appendix C of this report, were compared with the criteria established in the applicable regulations of both countries. From Mexico, the Ecological Water Quality Criteria (CE-CCA-001/89) for recreational use with primary contact and for protection of marine aquatic life were considered, as well as the limits under the Official Mexican Standard NOM-001-SEMARNAT-1996 for the protection of aquatic life, though only for the results in the Tijuana River and Alamar River since much of the flow in these rivers in Mexican territory are derived from treatment plant effluents. From the United States, the Water Quality Objectives for the Tijuana River issued by the California State Water Quality Control Board were considered, and the Water Quality Objectives published in the California Ocean Plan developed by the California State Water Resources Control Board.

Due to the mixture of flows from different sources in the Tijuana River (treated waters, groundwater, sewage, and stormwater), the results of the samples taken in the river showed that the concentrations of many of the parameters analyzed in this study were significantly lower than those detected in the Canyons and Drains.

However, similarities were detected in the results from the Tijuana River and the Canyons and Drains, obtaining high values at all monitoring sites that exceed the standards established in the applicable regulations in both countries for Ammonia (Ammonia (as Nitrogen), Biochemical Oxygen Demand, Chemical Oxygen Demand, Fats, Oils, and Greases, Phosphorus, Nitrates, Methylene Blue Active Substances (MBAS) and bacteria. All parameter concentrations are indicative of the presence of untreated wastewater. Additionally, these results were compared with the average levels detected in the analyses of the influent into the South Bay International Wastewater Treatment Plant (SBIWTP), and coincided to those from the wastewater characteristics of the city of Tijuana.

The high concentration of bacteria such as Fecal Coliforms, Enterococci, and E.Coli, detected in all samples of the Tijuana River and the Canyons and Drains, is of special concern considering that eventually, under high-flow regimes, this runoff impacts the waters of the Pacific Ocean. By contrast, Cholera was absent from all sampling events. Additionally, the results from this study for Total Coliforms in the Tijuana River were compared to those obtained during the same period in the IBWC Minute 270 monitoring of the coastal waters. In this comparison, the importance of the PB-CILA defensive system, which diverts flows from the Tijuana River during the dry season (when the flow in the river is less than 1,000 lps), as well as the Canyon Collectors defensive system in the Canyons, can be observed, since the results of this study show that during the 12 months of sampling, high concentrations of Total Coliform at the PB-CILA intake; whereas, the results of Minute 270 monitoring of coastal waters in the dry months were down to minimum levels, almost undetectable, due to the diversion of waters from the Tijuana River.

Typical salinity levels in wastewater are usually greater than 1,500 ppm of Total Dissolved Solids (TDS), which is comparable to the levels found in most samples collected in both the Tijuana River and the Canyons and Drains, except in Yogurt Canyon and the Tijuana River monitoring site at the mouth to the Pacific Ocean, where much higher concentrations were found due to its proximity to the Pacific Ocean and the influence of the saline ocean waters on these sites.

Metals present at levels of concern in both the Tijuana River and the Canyons and Drains are copper, nickel, and zinc, which are commonly used in the metal plating industry. Additionally, it is important to note that parameters that have caused concern from various media reports and institutions in both countries, and of particular concern to the United States, for their potential presence in large quantities in the waters of the Tijuana-San Diego transboundary Canyons and Drains, these parameters such as heavy metal Hexavalent Chromium, or the pesticides Dichlorodiphenyltrichloroethane (DDT) and Aldrín, were either not detected, or found in very low amounts below the limits established in the applicable regulations of both countries. The maximum value found for Hexavalent Chromium was 4.54 ppb in Silva Drain in the sample for the month of December 2018, analyzed in the U.S. laboratory, and the maximum levels established in the applicable regulations are 50 mg/L in Mexico's CE-CCA and 8 ppb in the California Ocean Plan. However, Hexavalent Chromium was not detected in any sample analyzed in the laboratory in Mexico. Also, DDT or Aldrin were not detected in any water sample in the Canyons and Drains.

Of the organic compounds, the presence of Bis (2-ethylhexyl) Phthalate, also known as DEHP, was persistent in all the monitoring sites for the Tijuana River and the Canyons in excess of the applicable standards of both countries. DEHP is a chemical commonly used in the production of plastics and synthetic polymers such as Nylon, polystyrene and polyvinyl chloride (PVC), and its presence at monitoring sites may come from the chemical leaching of plastics from solid waste deposited in these channels. Additionally, none of the water samples collected in this study detected the presence of carcinogenic pesticides such as Dichlorodiphenyltrichloroethane (DDT) and Aldrin.

For the sediment analysis, the parameters assessed included pathogens, metals, and organic compounds. Sediment was sampled to assess impacts to soil from chemical parameters present in the surface water flows. Sediment retains certain chemical constituents longer than water therefore it can act as a record of past exposure to these chemicals. In the review of the results obtained from these analyses, a significant difference was not observed compared to the results obtained from the water samples. Fecal Coliforms and Enterococci were also present in all the sediment samples, although at significantly lower levels than those obtained from the water samples.

Therefore, the source of the high levels of indicator parameters for untreated wastewater detected in this study in the Tijuana River and its tributaries, particularly coliform bacteria, is attributed to uncontrolled spills from the city of Tijuana's sewage sanitation system, because they were compared and found to be similar to those historically detected in the analyses of the SBIWTP influent. This highlights the importance of allocating increased resources and assistance for the construction, rehabilitation, and proper operation of sewage, pumping, and wastewater treatment systems in the city of Tijuana. Another important requirement is communication between both countries during any event that could potentially lead to transboundary flows of water so that stakeholders are informed of the events and can respond as necessary to the information.

Likewise, the presence of metals commonly used in metal plating industries, such as copper, nickel and zinc, and chemical constituents for plastics or polymers, such as DEHP, indicate the need for improvement of the pre-treatment and control of industrial wastewater discharges in the region, for allocation of greater resources toward solid waste disposal in the Tijuana River and its tributaries on both sides of the border, as well as to prevent the introduction of solid waste into channels in the basin.

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It is recommended and very important to continue with the joint monitoring and observation of the quality of the waters of the Tijuana River and its tributaries, through field inspections to detect and address wastewater discharges in a timely manner, and by establishing a permanent water quality monitoring program developed using the results of this study and focused on the systematic collection of data for the constituents of greatest concern. This type of permanent monitoring program could be established through an IBWC agreement in order to combine efforts and resources from both countries and ensure their permanent funding.

1.0 INTRODUCTION

The border between the United States and Mexico has a long history of challenges and cooperation. Rapid growth along the border and increases in agriculture, urbanization, and industry led to the signing of the Treaty of February 3, 1944, "Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande," between the United States and Mexico. The 1944 Treaty expanded the mandate of the existing Boundary Commission, establishing the new International Boundary and Water Commission (IBWC). The 1944 treaty also expanded the role of the Commission along the border to not only address border demarcation and the allocation and distribution of waters, but also to give preferential attention to the solution of all border sanitation problems.

The 1944 Treaty provided for a mechanism to address future issues through the use of "Minutes." Minutes are agreements to the treaty developed by the IBWC to analyze border issues, developing studies to assess the issues, and develop recommendations, agreeing to a final solution, and getting approval through their respective governments. To date, the IBWC has developed 323 Minutes to address various boundary and water issues along the border between the United States and Mexico.

Under Minute No. 261, by order of President Jimmy Carter and Jose Lopez Portillo, entitled, "Recommendations for the Solution to the Border Sanitation Problems," dated September 24, 1979, the IBWC defined border sanitation problems to include transboundary as one of the times in which flows cross the border, including coastal waters, or run through the limitrophe reaches of the Rio Grande and Colorado River, that have sanitation conditions that present a hazard to the health and well-being of the inhabitants of either side of the border or impair the beneficial uses of the water.

Minute 283 titled *Conceptual Plan for the International Solution to the Border Sanitation Problem in San Diego, California/Tijuana, Baja California*, approved on July 2, 1990 by both governments, provided the framework for designing, constructing, and operating defensive works that included an international sewage collection system and secondary treatment plant. Minute 283 laid the foundation for the construction and operation of the South Bay International Wastewater Treatment Plant (SBIWTP), owned by the U.S. Section of the IBWC, to attempt to address the elimination of uncontrolled sewage that continuously flowed from Mexico to the U.S. at Goat Canyon and the Tijuana River, among other locations. Although Mexico has the primary responsibility for preventing the discharge of wastewater to receiving waters in the Tijuana River Valley, per IBWC Minute 283, the USIBWC also has a role assisting with equipment, maintenance and resources in the containment of wastewater discharges through utilization of the canyon collectors, which collect and divert untreated sewage and other dry transboundary flows to the SBIWTP for treatment

Recognizing the mounting issues in the Tijuana River watershed from heavy urban growth of the two largest cities on the border between the United States and Mexico, Tijuana, Baja California and San Diego, California, the two governments signed IBWC Minute 320 on October 5, 2015 entitled, "General Framework for Binational Cooperation on Transboundary Issues in the Tijuana River Basin," creating the opportunity to address, through a framework of cooperation, the issues in the Tijuana River Basin. Through the framework of this agreement, a Binational Core Group was established that incorporates representatives from the federal, state, and local governments, and the NGOs from both countries; three binational Work Groups were also created to develop recommendations and implement measures to address the issues of concern related to Sediment, Solid Waste, and Water Quality.

In December 2016 and January 2017, the Tijuana River watershed experienced significant rainfall. Storm water from these events entered the wastewater collection system in Tijuana, Baja California and caused a 60-inch force main to rupture, resulting in untreated wastewater being discharged into the Tijuana River and crossing the international border. In order to identify the causes of this event and propose measures for future attention of related problems, the Minute 320 Water Quality Group conducted an investigation, and as a result of this research a binational report was generated.

During the investigation, the question of what the river and its tributaries (Canyons and Drains) typically carry during transboundary flow events could not be answered because of the very limited water quality data available in the watershed. The investigation recommended that the Minute 320 Water Quality Workgroup develop and conduct a study of the water quality in the Tijuana River and the transboundary canyons between the Tijuana River and the Pacific Ocean. The report recommended a baseline study to determine the character of the water in the river and the canyons to identify potential pollutants entering the watershed and the ocean.

The goal of this study was to collect water quality data in the Tijuana River and the main Canyons and Drains under normal, dry weather conditions, before and after rain events, and under site specific flow events (non-weather flows), into the canyons or the river. This study was developed and implemented by both sections of the IBWC under a joint scope of work and contracted personnel and laboratories to implement the data collection in both countries.

This Report provides a summary of the activities conducted between December 2018 and November 2019, along with the analytical results of the sampling events and assessment of the data.

2.0 MONITORING STATIONS

Monitoring stations were established in both the United States and Mexico in the Tijuana River and the adjacent Canyons and Drains west of the Tijuana River. (See Figures 1 and 2). River sites were selected in Mexico in the Alamar River, upstream of the confluence with the Tijuana River, and the Tijuana River upstream of this confluence, and a third site downstream in the area of the PB-CILA intake near the border. These locations would assist in determining the source or origin of the pollutants, and the characterization of the water from two upstream urban centers (the City of Tijuana and the City of Tecate). Four more sites along the river in the U.S. were sampled to the point it reaches the Pacific Ocean.

Canyon stations were selected at each of the six main Canyons and Drains west of the Tijuana River. Each canyon station was sampled by both countries for water and sediment samples near the border in the U.S. As part of Mexico's sampling plan samples were collected upstream of the border in Yogurt Canyon (Los Sauces), Goat Canyon (Los Laureles), and Smuggler's Gulch (El Matadero), and the U.S. team collected sediment samples at additional sites downstream of the border in Goat Canyon (Los Laureles) and Smuggler's Gulch (El Matadero).

In the U.S., samples from the monitoring stations in the canyons near the border were collected from the canyon collectors except for Yogurt Canyon, which does not have a collector of this kind. For Yogurt Canyon the samples were collected at the discharge from the stormwater structure installed at that location. A description of the sampling sites is discussed below.

Tijuana River Watershed Binational Sampling Sites

Figure 1. Sampling locations (Western sites)

Tijuana River Watershed Binational Sampling Sites

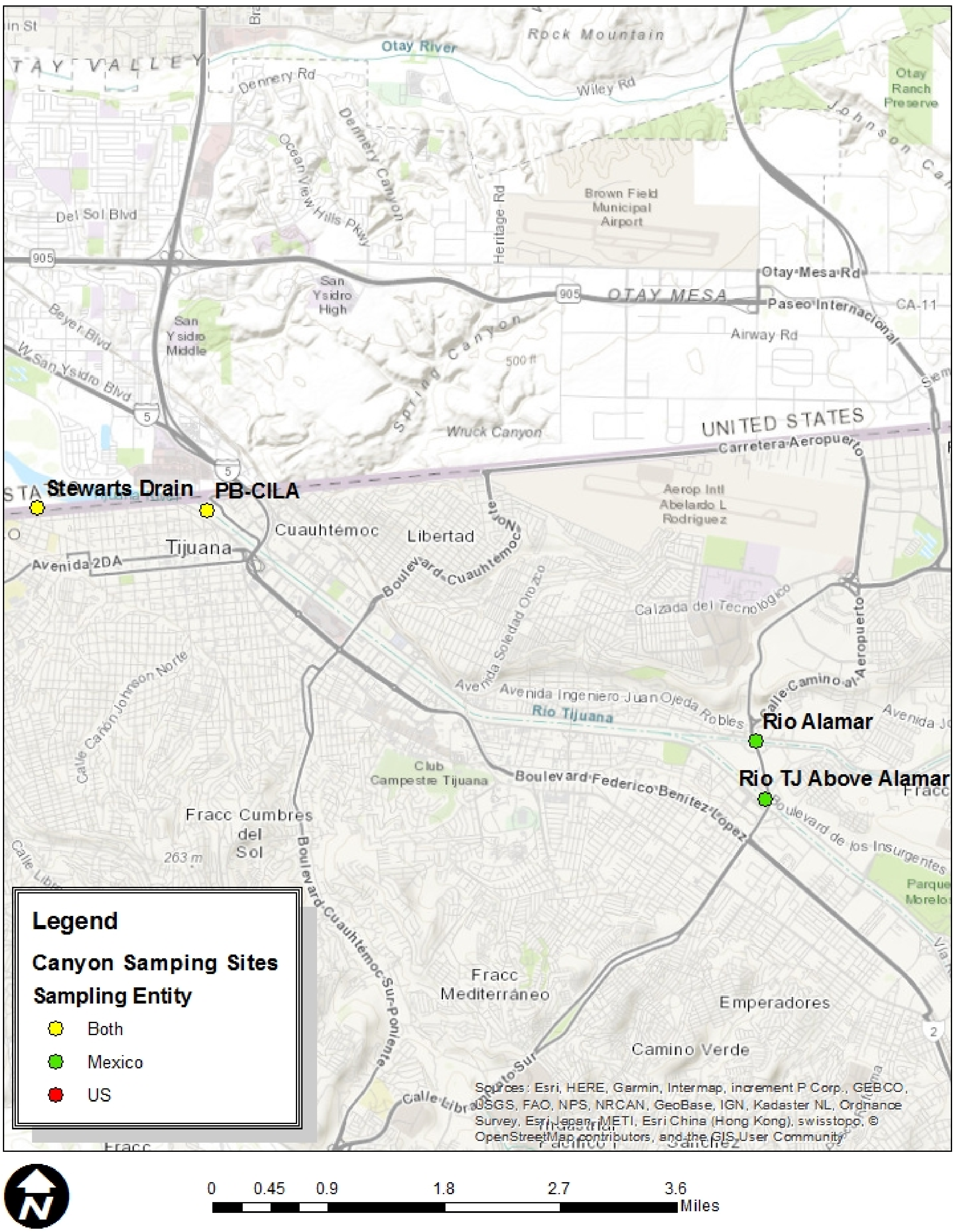

Figure 2. Sampling locations (Eastern Sites)

2.1 CANYON AND DRAINS STATIONS

Transboundary flows in the canyons are divided into dry-weather and wet-weather flows. Wet weather flows are those that occur during storm events, as the canyons are naturally occurring arroyos and drain different parts of the Tijuana Watershed and into the Tijuana River, except for Yogurt Canyon, which empties into the estuary near the beaches of the Pacific Ocean.

Dry weather flows, however, generally occur due to infrastructure issues in Tijuana, Baja California. These issues occur due to leakage from aging infrastructure, breaks or collapses in the infrastructure that lead to large flows of untreated wastewater, overflows of the infrastructure due to storm events, and areas of the city that do not have connections to the sanitation infrastructure. Because of the concern over the dry weather flows, in 1998 the IBWC constructed concrete collectors in the Canyons that were designed to capture typical dry weather occurrences and route those flows to the South Bay International Wastewater Treatment Plant (SBIWTP).

Each of the channels and/or sites monitored in this study are described below

Stewart's Drain – Puerta Blanca

Figure 3. Stewart's Drain

Stewart's Drain is located next to the SBIWTP and is one of the five canyon-drain collectors that divert dry weather flows to the treatment plant and allows stormwater to pass to the Tijuana River. During dry weather, flows in this drain are usually very low and required the flow to be dammed up using sandbags in order to collect samples. The structure installed in this drain near the boundary can capture and divert up to 1.67 MGD (73 lps) of water with a peak flow capacity of 5 MGD (219 lps).

At this site in the immediate vicinity of the international border, the study sampling teams from Mexico and the United States simultaneously collected water samples.

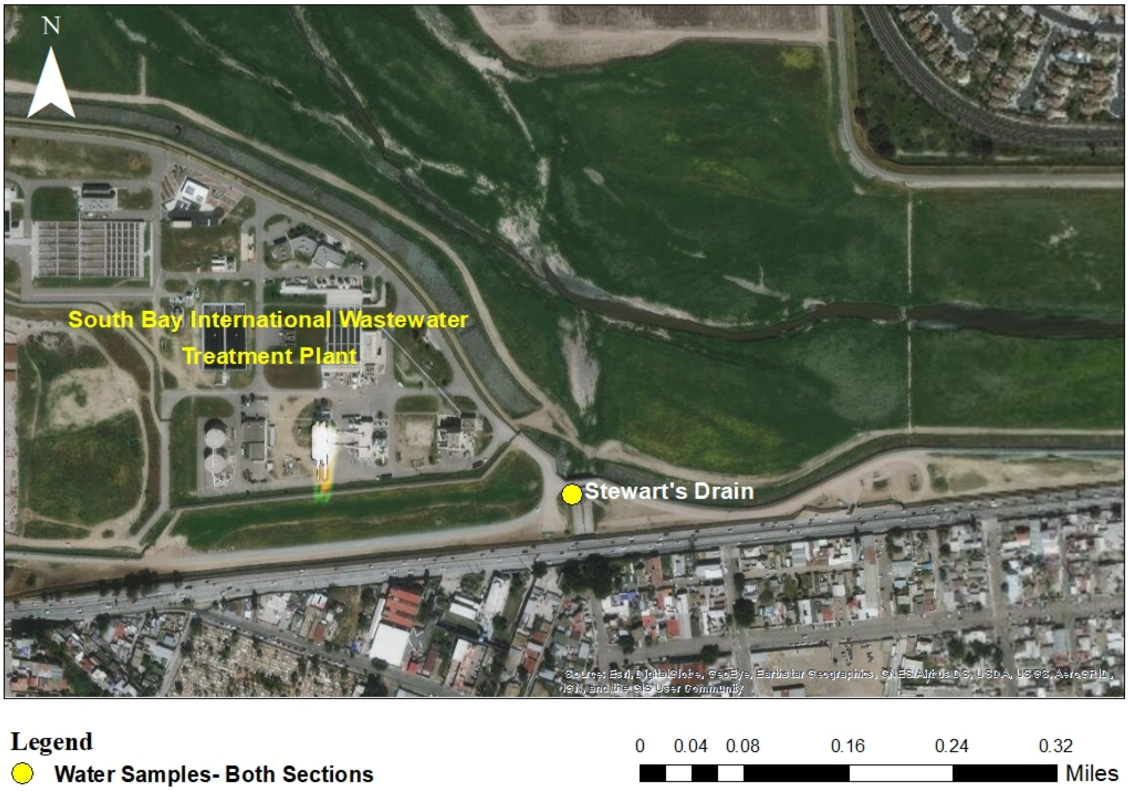

Figure 4. Stewart's Drain Location

Silva Drain

Silva Drain is also located next to the SBIWTP. It has a concrete collector to divert dry weather flows to the treatment plant and allow stormwater to pass to the Tijuana River. The capacity of this collector is 0.33 MGD (14.5 lps) with a maximum capacity of 1 MGD (44 lps). During dry weather, flows are generally very low and at many times there is not any flow in the collector.

At this site in the immediate vicinity of the international border, the study sampling teams from Mexico and the United States simultaneously collected water samples.

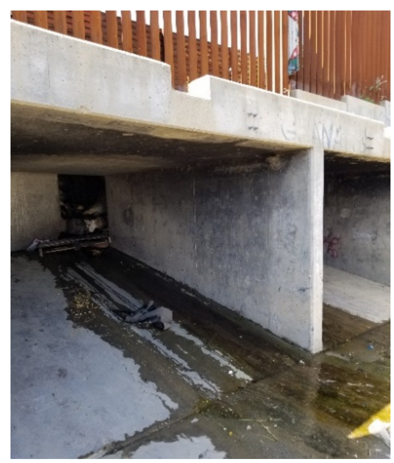

Figure 5. Silva Drain

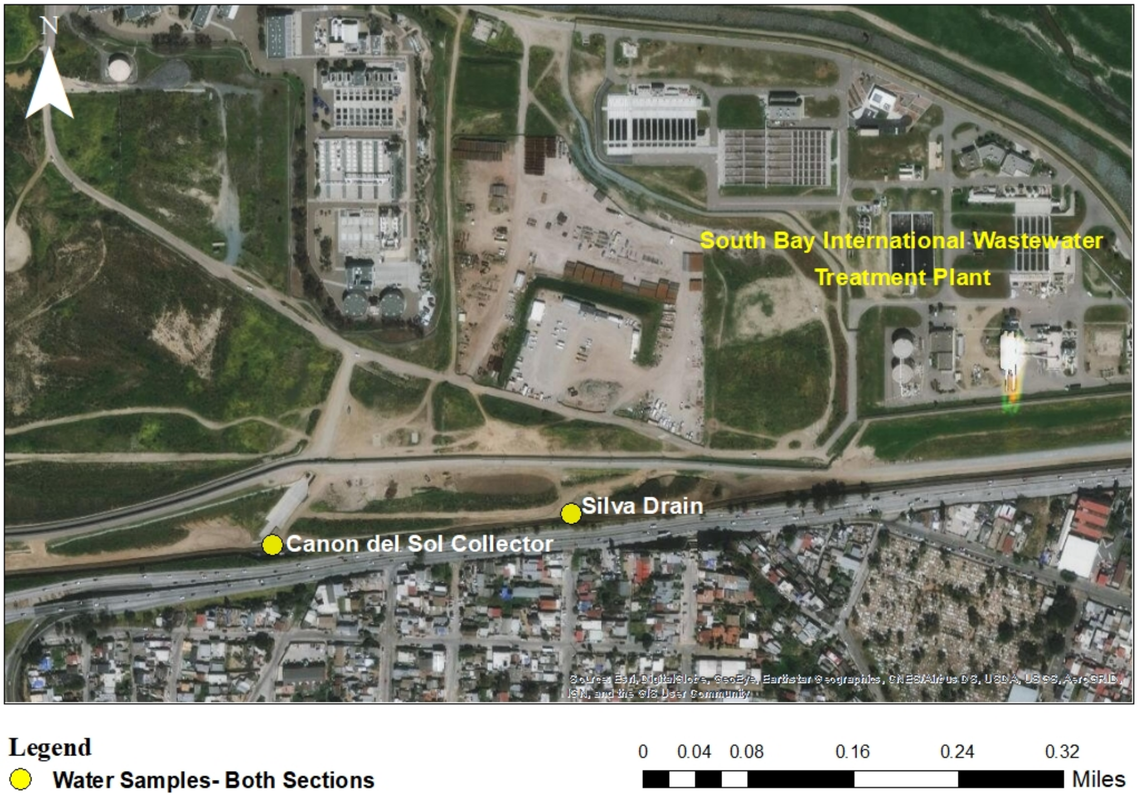

Figure 6. Canyon del Sol and Silva Drain Location

Canyon del Sol

Canyon del Sol is located just a short distance west of Silva Drain. It also has a concrete collector to divert dry weather flows to the treatment plant and allow stormwater to pass to the Tijuana River. This canyon, like Silva Drain, also usually has very low or no flows during dry weather. The diversion capacity of this collector is 0.67 MGD (29 lps) with a peak flow of 2 MGD (88 lps).

At this site in the immediate vicinity of the international border, the study sampling teams from Mexico and the United States simultaneously collected water samples.

Figure 7. Canyon del Sol with no flow and with only ponded water

Smuggler's Gulch – El Matadero

Figure 8. Smuggler's Gulch – Site 1

Smuggler's Gulch is the largest drainage canyon of the six monitored during this study. The existing stormwater drainage infrastructure at this site in the United States near the border was redone in 2008 by the U.S. Department of Homeland Security. This infrastructure included concrete tunnels from the border to the canyon collector. This site has water flowing regularly during the entire year. The capacity of the collector in this canyon is 4.67 MGD (205 lps) with a peak capacity of 14 MGD (613 lps). The flows from this canyon are downhill of the treatment plant, so a lift station had to be constructed at Hollister Street, which conveys the flows captured by the collector to the treatment plant.

Figure 9. Smuggler's Gulch – Site 2

At this site in the immediate vicinity of the international border, the study sampling teams from Mexico and the United States simultaneously collected water samples. Also, the Mexican sampling team took soil-sediment samples in Mexican territory, and likewise, the U.S. sampling team took additional samples of water and sediment in United States territory.

Figure 10. Smuggler's Gulch Location

Goat Canyon – Los Laureles

Like Smuggler's Gulch, Goat Canyon in the United States near the border also has stormwater drainage infrastructure that was also reconstructed in 2008 by the U.S. Department of Homeland Security. The expansion included the construction of concrete tunnels from the border to the canyon collector. This site has water flowing regularly throughout the year. The collector has a capacity to divert an average flow of 2.33 MGD (102 lps) and a peak flow of 7 MGD (307 lps). Like Smuggler's Gulch, Goat Canyon also needed a lift station constructed at Saturn Blvd to convey captured transboundary flows to the treatment plant.

At this site in the immediate vicinity of the international border, the study sampling teams from Mexico and the United States simultaneously collected water samples. Also, the Mexican sampling team took soil-sediment samples in Mexican territory, and likewise, the U.S. sampling team took additional samples of water and sediment in United States territory.

Figure 11. Goat Canyon Collector

Figure 12. Goat Canyon Location.

Yogurt Canyon – Cañón Los Sauces

Yogurt Canyon lies adjacent to Friendship Park near the Pacific Ocean and does not directly drain to the Tijuana River. Normal dry weather flows provide for vegetation at the end of the canyon and usually percolate into the site's shallow groundwater. During rain events, flows cross the existing dirt road and disperse into the estuary grounds. During the 2008 U.S. Department of Homeland Security projects, a concrete storm drain was created to allow roads and border fencing to be constructed in this location. The sampling location for this site was from the pool of water at the downstream side of the storm drain structure.

At this site in the immediate vicinity of the international border, the sampling teams from Mexico and the United States simultaneously collected water samples. Likewise, Mexico's sampling team took samples of soil-sediment in Mexican territory.

Figure 13. Yogurt Canyon at stormwater drain

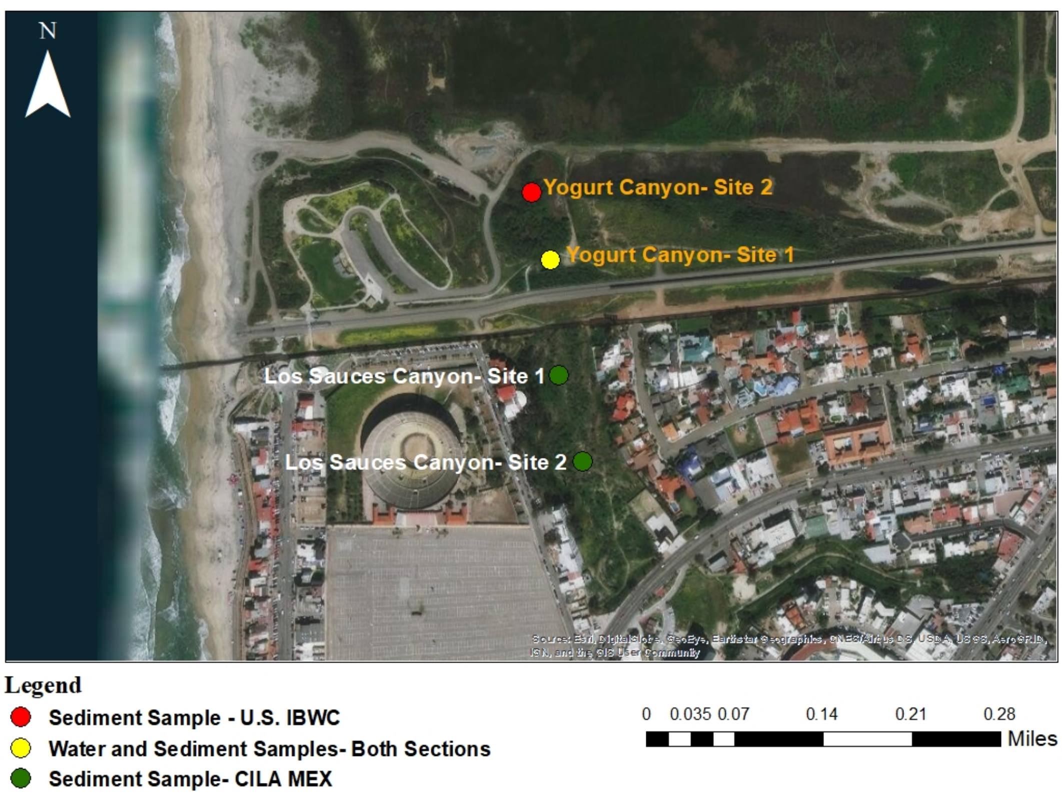

Figure 14. Yogurt Canyon Location

2.2 TIJUANA RIVER SITES

Alamar River above the confluence with the Tijuana River

The Alamar River is in the Tijuana River watershed contributing nearly 50% of the surface water in the watershed. It begins in the United States as Cottonwood Creek and moves through the City of Tecate, Baja California on its way to combine with the Tijuana River in the City of Tijuana. Because the Alamar River is not channelized until it reaches the City of Tijuana, the surface water feeds the local aquifer and has large stands of riparian vegetation. The water quality in this river is impacted by urbanization, by discharges from a small wastewater treatment plant in Tecate, and by urban runoff. This sampling site was located in the concrete lined section of the Alamar River, approximately 1000 meters upstream of its confluence with the Tijuana River. At this site, the samples were collected by the Mexican team.

Figure 15. Alamar River

Tijuana River upstream of the confluence with Alamar River

The Tijuana River is concrete lined for most of its path through the City of Tijuana, until just downstream of the Abelardo Rodriguez Dam, which impounds water from the natural watershed further upstream. The river receives freshwater every time there are dam releases and when stormwater occurs. This site in the river also receives effluent from two secondary wastewater treatment plants in Tijuana, the Arturo Herrera and La Morita. There is also a smaller percentage of water in the river that comes from urban runoff, occasional bypasses and overflows from the sanitation infrastructure. The sampling site was located in the concrete lined section of the river, approximately 1000 meters upstream of the confluence with the Alamar River. At this site, the samples were collected by the Mexican team.

Figure 16. Tijuana River upstream above confluence with Alamar River

Tijuana River at the IBWC Pump Station (PB-CILA)

Figure 17. Tijuana River at the PB-CILA diversion structure.

The Tijuana River at this site has a defensive intake structure to capture and divert flows in the Tijuana River up to 1000 liters per second (around 23 million gallons per day) to the pumping plant (PB-CILA) and then pumped to a discharge point into the Pacific Ocean near Punta Bandera. When flows in the river exceed that volume, such as during storm events, wastewater infrastructure bypasses, and during pump station maintenance, the intake is closed and the flows in the Tijuana River continue their course and cross into the United States. Water in the river at this site is made up of the sources noted for both the Tijuana River upstream as well as the water sources in the Alamar River. This site was sampled in the concrete lined section of the river at the point that it enters the diversion structure for PB-CILA. Samples at this site were collected by sampling teams from both countries and sent to their respective laboratories for analysis.

Figure 18. Map of the sampling points in the Tijuana and Alamar Rivers in Mexico.

Tijuana River at Dairy Mart Bridge

The remaining downstream sites collected in the Tijuana River are located in the United States and were collected and analyzed only by the United States team and laboratory. This site lies at the end of the flood control project and is just downstream of the concrete lined sections of the river. Water in the river flows into the U.S. when PB-CILA is not in operation and is entirely sourced as noted, from the upstream sites in the Tijuana and Alamar Rivers. The sampling location is in the largest flowing arm at a point, immediately upstream of the Dairy Mart Bridge. Samples were taken using a tethered bucket from the top of the bridge.

Figure 19. Tijuana River at Dairy Mart Bridge.

Figure 20. Tijuana River at Hollister Street.

Tijuana River at Hollister Street

This site lies on Hollister Street where the Tijuana River passes underneath a wooden bridge. Samples were collected from the upstream side of the bridge.

Tijuana River at Saturn Boulevard

This site lies on Saturn Boulevard where there is no bridge. During storm events, the Tijuana River tends to spread out and cross the road at a low water crossing towards the north or flows just south of the road. Typically, the southern site has no water and the northern arm is impounded against the road and is not flowing unless there is a storm event. Samples were collected from the impounded water unless there was flow, and then they were collected from the flowing stream.

Tijuana River at the mouth to the Pacific Ocean

This site is heavily influenced by the tidal interaction between the Pacific Ocean and the waters in Tijuana River Estuary. This site lies within the Tijuana Slough National Wildlife Refuge just upstream from the Pacific Ocean where the River empties into the ocean. Samples were collected from near the center of the river as it is very shallow at this site, and the bed consists of mostly sand.

Figure 21. Mouth of the Tijuana River at the Pacific Ocean

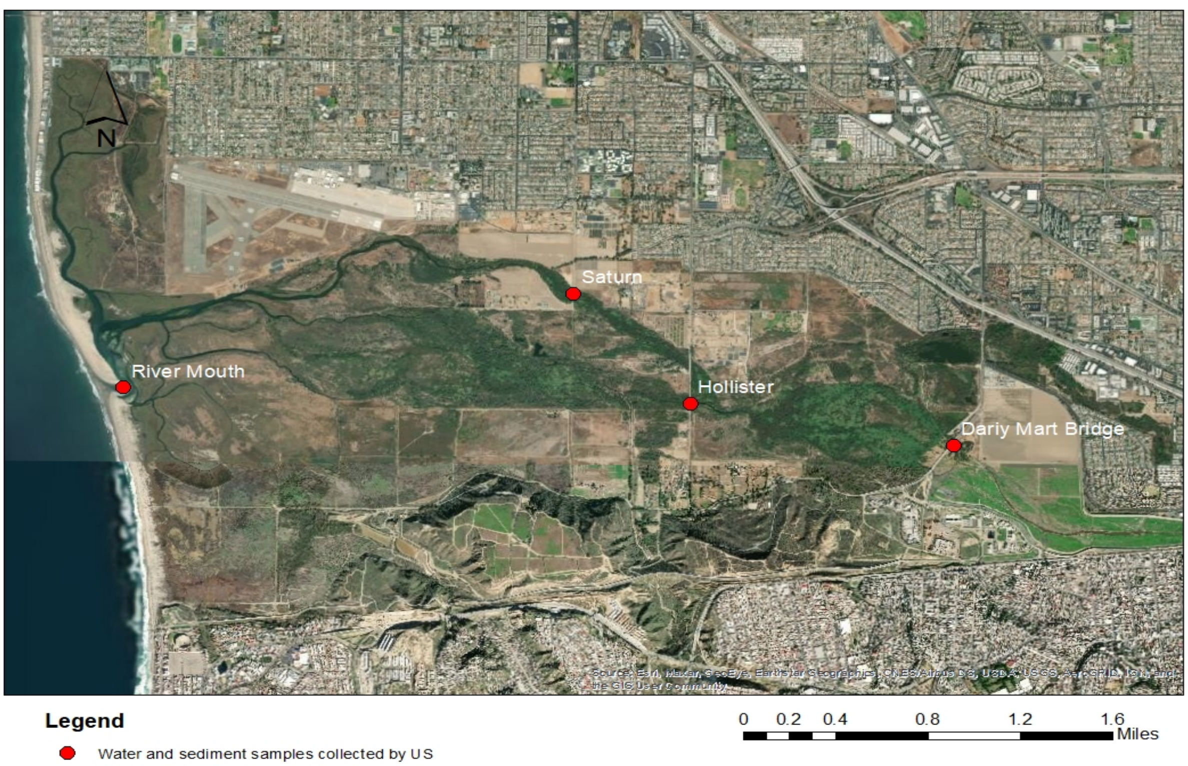

Figure 22. Map of sampling points in the Tijuana River in the U.S.

3.0 SAMPLING EVENTS

This section summarizes the sampling events that occurred from December 2018 to November 2019. All sampling events were conducted in accordance with the Project Scope of Work (SOW), official sampling procedures and standards for both countries, with the Quality Assurance Project Plan (QAPP), and participation of appropriately accredited personnel for collecting samples, and following the guidelines in the *Binational Monitoring Plan* jointly agreed upon by the IBWC, which outlined the sampling sites, sampling frequencies, and the sampling/analytical parameters. The QAPP for the U.S. sampling can be downloaded from the project website. The sampling locations detailed above were selected in both countries with the same parameters being analyzed for all sites. Appendix A in this document lists the sampling/analytical parameters analyzed in water and sediment for all sampling locations. Parameters were selected to identify pollutants of concern and to identify the sources of the pollutants with the knowledge that the most probable source is uncontained and untreated wastewater.

For the sampling events at the Canyon and Drain sites located near the border in the United States and at the PB-CILA intake in the Tijuana River located in Mexico, representatives of both countries conducted simultaneous sampling and the samples collected by each country were tested in their respective laboratories. The remaining Canyon, Tijuana River, and Alamar River sites were collected by their respective countries and analyzed by their respective laboratories.

For the canyons, water samples were only collected near the international boundary in the United States by both countries at the canyon collectors, except for Yogurt Canyon as it does not have a collector. For Yogurt Canyon, the sample was collected at the discharge of the existing stormwater structure on site.

3.1. DECEMBER 2018

The first binational sampling event occurred in December 2018 and the first introduction of the binational teams. A pre-sampling meeting with personnel from both countries was held on December 5, 2018, to discuss the sampling schedule and logistics for the one-year study. A sampling schedule was developed for the remainder of the year so that dates were not selected that conflicted with holidays in either country. Table 1 details the agreed upon sampling schedule.

Table 1. Binational Sampling Schedule

Type of Sampling / Date	Dec 6-7, 2018	Jan 29-31, 2019	Feb 20, 2018	Mar 28, 2019	Apr 23-25, 2019	May 28-30, 2019	Jun 27, 2019	Jul 29-31, 2019	Aug 29, 2019	Sep 26, 2019	Oct 28-30, 2019	Nov 13, 2019
Baseline -- Rivers & Canyons/Drains (ALL Water & Sediment Parameters)												
Monthly -- River Conventional Water Parameters ONLY)												
Quarterly -- Canyons/Drains (ALL Water Parameters)												
Rain Event -- Canyons/Drains (ALL Water & Sediment Parameters)												

Originally, the baseline sampling event was to occur in December 2018, but due to heavy rains, the event was considered as a rain event collection for all sampling sites. According to the San Diego County Flood Control District website, the 7-day rainfall total for December 7, 2018 for Goat Canyon and Smuggler's Gulch was 2.17 inches (55 mm) and 1.93 inches (49 mm), respectively, and the 24-hour rainfall summary was 1.34 inches (34 mm) at Goat Canyon and 1.14 inches (29 mm) at Smuggler's Gulch.

On December 6, 2018, sampling of the Canyons and Drains sites was conducted, which included the collection of both water and sediment samples. Due to lightning in the area, sampling was suspended and finished the following day December 7, along with sampling of the stations on the Tijuana and Alamar Rivers.

3.2. JANUARY 2019

From January 28–30, 2019, quarterly sampling of the Canyon and Drain sites, and monthly sampling of the Tijuana and Alamar River sites were conducted. According to the San Diego County Flood Control District website, the 7-day rainfall average at Goat Canyon and Smuggler's Gulch was 0.00 inches (0.00 mm) and 0.04 (0.10 mm) inches, respectively, as of January 30.

Quarterly sampling of the canyons was conducted on January 29, 2019. At both Silva Drain and the Canyon del Sol, no flow conditions were encountered, however there was standing water from recent flows from which samples were collected at these two sites on January 31, 2019.

On January 30, 2019, the Tijuana River sites were collected for conventional parameters and for pathogens in water. As noted above, the Saturn Blvd site in the United States only flows during heavy rain events and therefore samples were collected from the standing water upstream of the road.

3.3. FEBRUARY 2019

For February, the scheduled sampling was conducted for the Tijuana River to gather samples for the conventional parameters and for pathogens in water. The U.S. river sites were sampled on February 19, 2019, and the PB-CILA river site at the intake in Mexico was sampled the next day, on February 20th. At all the sites, there was adequate flow in the river for sampling due to recent rains in watershed. However, there was no measurable rainfall at this location for the 2 days prior to the collection of samples.

Significant rainfall, however, occurred on the evening of February 20 so the second rain event sampling was conducted both water and sediment at all of the canyon sampling locations. According to the San Diego County Flood Control District website, the 24-hour rainfall average at Goat Canyon and Smuggler's Gulch was 0.16 inches (4 mm) and 0.20 inches, (5 mm), respectively.

3.4. MARCH 2019

On March 28, 2019, water samples were only collected in the Tijuana and Alamar Rivers, and at the PB-CILA intake site for conventional and bacterial parameters.

3.5. APRIL 2019

For the San Diego-Tijuana region, it is typical in this month to have very little rain if at all, and the San Diego County Flood Control District website showed no rainfall in the area. The canyon monitoring locations were sampled for water on April 24, 2019. Because of the lack of rainfall, Silva Canyon and Canyon del Sol had no flow running, therefore no samples could be collected at these two sites.

On April 25, 2019, the monthly sampling of the Tijuana River, Alamar River, and the Tijuana River at the PB-CILA intake was conducted for water parameters only. Because the site for the Tijuana River at the PB-CILA diversion structure is concrete lined, no sediment samples were collected, since any sediment in the concrete section is highly mobile from higher in the watershed and do not represent impacts to riverbed.

3.6. MAY 2019

For the San Diego-Tijuana region, May is typically the driest month of record over the year, so baseline conditions were determined to be best represented during this month. Baseline sampling was conducted at all monitoring sites for all parameters in water and sediment as listed in Appendix A of this report.

Without rain events or major sanitation infrastructure issues, most of the canyons are typically dry and have no flow. During this sampling event from May 28 to 30, there was no flow at Silva Canyon. There was also minimal flow in Smuggler's Gulch and Goat Canyon, which was captured in its entirety by the defensive system collectors, so no samples were collected at the monitoring stations in these Canyons located downstream.

3.7. JUNE 2019

For June 2019, the only sampling conducted was the monthly river sites on the Tijuana and Alamar Rivers for conventional and pathogens in water. Samples were collected on June 27, 2019 at the monitoring sites in Mexico including the PB-CILA Intake.

3.8. JULY 2019

The binational sampling schedule called for quarterly sampling of the Canyons in the month of July. Because two rain events had already been collected during the first quarter, the July 30 sampling events concluded the number of rain event and dry weather events planned for the Canyons by the U.S. team; for its part, the Mexican team considered collecting additional samples in the Canyons and Drains sites in the month of October 2019. As July is also a very dry month, very minimal flow in the canyons occurred at Stewart's Drain and Goat Canyon only. The remaining Canyon sites had no flow and therefore no samples were collected. Additionally, river samples in Mexico were collected from the Tijuana and Alamar Rivers on July 31 for conventional parameters and pathogens.

3.9. AUGUST – NOVEMBER 2019

With no rain events for the remainder of the year, the Tijuana River was not subjected to high flows. Typical flows in the river are comprised of effluent from 3 treatment plants in Mexico, as well as some base flow, urban run-off, and untreated wastewater. During the dry season, the combination of these flows falls below the capabilities of the PB-CILA diversion. Additionally, the IBWC built a series of berms to capture any peak flows that exceed the diversion capacity of the PB-CILA intake. These measures prevented any transboundary flows in the Tijuana River during the remainder of the collection period, therefore, only monthly water samples were collected in the Tijuana River and the Alamar River in Mexican territory. The remaining river samples were collected on August 29, September 26, October 31, and November 13, 2019. Also, as mentioned above, the Mexican team considered carrying out an additional quarterly sampling at the Canyons and Drains monitoring sites. This sampling was carried out on October 30 and samples were only collected at Stewart's Drain, because no flows were recorded at the remaining Canyon sites, so it was not possible to take samples.

Figure 23. Photographs of sampling from each month of the study.

4.0 ANALYTICAL RESULTS

The following sections provide a summary of the analytical results and the assessment of the study data but does not include an investigation of the source or origin of the contaminants. Sampling sites were tested for the parameters listed in Appendix A for water and sediment at the sampling locations detailed in Section 2. The Table with the laboratory results is found in Appendix C and includes only those parameters that had quantifiable results. Of the 267 parameters in water that were analyzed in this study, only a total of 136 parameters had concentrations greater than the detection limit. Any parameter that was not detected is listed in the Table in Appendix B, which also includes all the parameters that were not detected in the sediment assessment. Not all parameters that were detected occurred at every site, but they are still shown in the table in Appendix C since they were found in at least one of the Canyon or River stations.

Because under high flow regimes the transboundary Canyons and Drains reach the Tijuana River and eventually the Pacific Ocean, the detected parameters were evaluated compared to the regulations and/or the criteria applicable to this aspect in both Mexico and the United States.

From Mexico, the guidelines established in the Ecological Water Quality Criteria (CE-CCA-001/89) for recreational use with primary contact and for protection for marine aquatic life were considered, as well as, for the monitoring points on the Tijuana River and Alamar River, the limits established in the Official Mexican Standard NOM-001-SEMARNAT-1996 for the protection of aquatic life, since these rivers in Mexican territory have outfalls that discharge effluent from treatment plants.

From the United States, the Water Quality Objectives for the Tijuana River issued by the California Regional Water Quality Control Board were considered, and also the Water Quality Objectives for the Pacific Ocean, from the Ocean Plan developed by the California State Water Resources Control Board (WRCB).

Additionally, the results were also compared with typical values in Tijuana wastewater, as determined by the influent testing at the South Bay International Wastewater Treatment Plant. This allows for the assessment of data to determine if the source of the water has an untreated wastewater component, or if the source is of a different origin such as industrial discharges to surface water.

4.1 CALIFORNIA OCEAN PLAN

Under Section 13000 of Division 7 of the California Water Code (CWC), the State Water Resources Control Board (WRCB) declared State of California ocean waters to be protected for the use and enjoyment by the people, which requires control of the discharge of waste to ocean waters. As such, the WRCB declared the creation of a “State Ocean Plan.”

Section IIA of the Ocean Plan defines the Water Quality Objectives (WQOs) as the limits or levels characteristic of water quality for ocean waters to ensure the reasonable protection of beneficial uses and the prevention of nuisances, and these objectives have been defined by a statistical distribution when appropriate, which recognizes the normally occurring variations in treatment efficiency, and sampling and analytical techniques, and does not condone poor operating practices.

Section IIB of the 2015 Ocean Plan states both the State of California Water Board and California Department of Public Health have established the following bacterial objectives to be maintained throughout the water column within a distance of 1,000 feet (305 m) from the shoreline or the 30-foot (9 m) depth contour; these values are based on a single sample (instantaneous) maximum:

- Total coliform density shall not exceed 10,000 colonies per 100 milliliters (mL).
- Fecal coliform density shall not exceed 400 colonies per 100 mL.
- Enterococcus density shall not exceed 104 colonies per 100 mL.

Section IID of the 2015 Ocean Plan defines the bacterial characteristics of ocean waters, which includes the chemical characteristics. The stated characteristics include the following:

- The dissolved oxygen concentration shall not at any time be depressed more than 10 percent from the natural seasonal value, for example as the result of the discharge of oxygen demanding waste materials.
- The pH shall not be changed at any time more than 0.2 units from that which occurs naturally.
- The dissolved sulfide concentration of waters in and near sediments shall not be significantly increased above that present under natural conditions.
- The concentration of substances set forth in Chapter II, Table 1, in marine sediments shall not be increased to levels which would degrade indigenous biota.
- The concentration of organic materials in marine sediments shall not be increased to levels that would degrade marine life.
- Nutrient materials shall not cause objectionable aquatic growths or degrade indigenous biota.
- Numerical Water Quality Objectives apply to all discharges within the jurisdiction of the Ocean Plan. Unless otherwise specified, all metal concentrations are expressed as total recoverable concentrations.

4.2 WATER QUALITY CONTROL PLAN FOR THE SAN DIEGO BASIN

The San Diego Regional Water Quality Control Board (SDRWQCB) is responsible for the adoption and implementation of water quality control plans, issuance of waste discharge requirements, and performing other functions concerning water quality control within its respective region, subject to State Board review or approval. Also, the SDRWQCB is required to adopt a Water Quality Control Plan, or Basin Plan, which recognizes and reflects regional differences in existing water quality, the beneficial uses of the Region's ground and surface waters, and local water quality conditions and problems. Therefore, the SDRWQCB developed the *Water Quality Control Plan for the San Diego Basin* (San Diego Basin Plan).

In addition to the San Diego Basin Plan, the SDRWQCB developed five policies for the San Diego Region, and Policy Three covers both point sources—pollutants discharged to water through any discernible, confined, and discrete conveyance, and nonpoint sources—pollutants from diffuse sources that reach water through means other than a discernable, confined, and discrete conveyance of pollution. Policy Three states that nonpoint sources will be preferably controlled by implementing best management practices, and if best management practices fail, controls will be implemented through waste discharge requirements or other regulatory actions. Chapter 3 of the San Diego Basin Plan defines the WQOs for all surface and ground waters in the Region to include ocean waters; all inland surface water; enclosed bays; estuaries; coastal lagoons; and groundwater. The Canyons and Tijuana River sampling points in this study impact surface water (Tijuana River), oceans (Pacific Ocean), and estuaries (Tijuana River Estuary). The WQOs for oceans is covered under the California Ocean Plan discussed above and the WQOs for inland surface waters and estuaries are grouped together, along with enclosed bays, coastal lagoons, and groundwater. The WQOs for inland surface waters and estuaries include the following:

Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (Thermal Plan)

- The Tijuana River is included in the definition for a Warm Interstate Water. The specific WQOs for Warm Interstate Waters are:
    - Thermal waste discharges having a maximum temperature greater than 5°F above natural receiving water temperature are prohibited.
    - Elevated temperature wastes shall not cause the temperature of warm interstate waters to increase by more than 5°F above natural temperature at any time or place.
- Agricultural Supply—Waters designated for use as agricultural supply (AGR) shall not contain concentrations of chemical constituents in amounts that adversely affect such beneficial use.
- Ammonia, Un-Ionized—The discharge of wastes shall not cause concentrations of unionized ammonia (NH_3) to exceed 0.025 mg/L (as N) in surface waters, enclosed bays and estuaries, and coastal lagoons.
- Bacteria
    - Total Coliforms—the most probable number (MPN) of total coliform organisms in the upper 60 feet of the water column shall be less than 1,000 organisms per 100 mL (1000 MPN/100 mL) provided that not more than 20 percent of the samples at any sampling station, in any 30-day period, exceeds 1,000 MPN/100 mL. When verified by a repeat sample taken within 48 hours, this shall not exceed 10,000 MPN/100 mL.
    - Fecal Coliforms—In waters designated for non-contact recreation (REC-2) and not designated for contact recreation (REC-1), the average fecal coliform concentrations for any 30-day period, shall not exceed 2,000 MPN/100 mL, nor shall more than 10 percent of samples collected during any 30-day period exceed 4,000 MPN/100 mL.
    - Enterococci and *E.Coli*—the U.S. Environmental Protection Agency (USEPA) criteria is used. The freshwater criteria for moderately/lightly used areas is 108 and 406 MPN/100 mL, respectively, for Enterococci and *E. Coli*. For infrequently used areas, the criteria are 151 and 576 MPN/100 mL, respectively.

4.3 ECOLOGICAL WATER QUALITY CRITERIA (CE-CCA 001/89)

In Mexico, the Ecological Water Quality Criteria CE-CCA-001/89 were established with the objective that the competent authorities could use them as a basis to categorize water bodies as suitable for use as a source of drinking water supply, for recreational activities with primary contact, for agricultural irrigation, for livestock use, in aquaculture, or for the protection of aquatic life.

By applying these criteria to the actual quality of water bodies, it allows the competent authorities to identify the need to establish coordinated water pollution prevention and control programs, aimed at restoring the quality of those water bodies that show signs of deterioration, or else, to protect those that currently present better conditions than those established in the criteria; to determine the need to redesign or, where appropriate, expand the national water quality monitoring network, as well as identify cases where particular conditions should be set for wastewater discharges.

For this study, the results of the analyzed parameters were compared with the ecological water quality criteria established for recreational use with primary contact and with those established for the protection of marine aquatic life. Criteria for recreational purposes focus on the protection of human health, based on the carcinogenic, toxic or organoleptic properties (color, smell or flavor) of substances, as well as on the effects that these may cause to organisms that are present in the water. The criteria for the protection of aquatic life were set for the purpose of ensuring the survival of aquatic organisms and avoiding the danger of bioaccumulation, preventing damage to species that are part of the food chain.

CE-CCA maximum levels for recreational use with primary contact are as follows:

Table 2. CE-CCA Maximum Levels for Recreational Use with Primary Contact

Parameter	Maximum Level (mg/L)
Aldrin (II)	0.00005
Visual Aspects	(V)
Cyanide (CN-)	0.02
Chlordane	0.00002
Fecal Coliforms (MPN/100 mL)	(XVIII)
DDT	0.000005
Dieldrin	0.000003
Endrin	0.000002
Phenol	0.001
Heptachlor	0.000002
Floating Matter	(V.2)
Toxaphene	0.00003
Radioactivity: Total Alpha (Bq/1)	0.1
Radioactivity: Total Alpha (Bq/1)	1.0

(V). The body of water must be free of substances attributable to sewage or other discharges that:

1.- Form deposits that adversely alter the physical characteristics of water;

2.- Contain floating matter such as particles, oils or other residues that give an unpleasant appearance;

3.- Produce color, smell, taste or turbidity; or

4.- Promote undesirable or unpleasant aquatic life.

(XVIII). Organisms should not exceed 200 as the most probable number in 100 milliliters (MPN/100ml) in fresh or marine water, and no more than 10% of monthly samples shall exceed 400 MPN/100mL.

As already mentioned, the waters of the canyons under high flow regimes reach the Tijuana River and eventually to the Pacific Ocean, therefore the pollutant levels detected were also evaluated in relation to the CE-CCA maximum levels for the Protection of Marine Aquatic Life:

Table 3. CE-CCA Maximum Levels for the Protection of Marine Aquatic Life.

Parameter	Maximum Level (mg/L)	Parameter	Maximum Level (mg/L)
Acenaphthene	0.01	Phosphates (As PO_4)	0.002
Acrolein	0.0005	Elemental Phosphorus	0.0001
Aldrin	0.001	Dissolved gasses	(XXVI)
Aluminum	0.2	Heptachlor	0.0005
Arsenic	0.01 (As A_5 III)	Hexachlorobenzene	(XVI)
Barium	0.5	Hexachlorobutadiene	0.0003
Benzene	0.005	Hexachlorocyclopentadiene	0.00007
Polychlorinated Biphenyls	0.00003	Hexachloroethane	0.009
BHC (II)	0.000003	Polynuclear Aromatic Hydrocarbons	0.1
BHC (Lindane)	0.0002	Isophorone	0.1
Bis (2-ethylhexyl) Phthalate	(X)	Mercury	0.00002
Boron	0.009	Naphthalene	0.02
Cadmium	.0009	Nickel	0.008
Cyanide (as CN-)	0.001	Nitrates (NO_3)	0.04
Chlordane (Technical mixture of metabolites)	0.00009	Nitrites (NO_2)	0.002
Residual Chlorine	0.0075	2- Nitrophenol and	0.05
Chlorobenzene	(XVI)	4-Nitrophenol	
2-Chlorophenol	0.1	Ammonia (as Nitrogen)	0.01
Chloronaphthalenes	0.00007	N-Nitrosodifenylamine	(XXIX)
Copper	0.003	N-Nitrosodimethylamine	(XXIX)
Fecal Coliforms	(XVIII)	N-Nitrosodi- n- propylamine	(XXIX)
Hexavalent Chromium	0.05	Dissolved Oxygen	5
DDD	0.00004	Parathion	0.00004
DDE	0.0001	Pentachlorophenol	0.0005
DDT	0.0001	Potential for hydrogen (pH)	(XXXII)
Dichlorobenzenes	0.02	Silver	0.002
1,2-Dichloroethane	1.1	Lead	0.006
1,1-Dichloroethylene	(XXII)	Selenium	0.04
1,2-Dichloroethylene	(XXII)	Suspended Solids	(XIX)
1,2-Dichloropropane	0.1	Methylene Blue Active Substances (MBAS)	0.1

1,2-Dichloropropylene	0.008	Sulfide (As H_2S)	0.002
Dieldrin	0.0007	Thallium	0.02
Diethyl phthalate	(X)	Temperature	Natural Conditions + 1.5 °C
Dimethyl phthalate	(X)		
2,4- Dinitrophenol	0.05	2,3,7,8- Tetrachlorodibenzo-P-Dioxin	0.00000001
Dinitro-o-cresol	0.01	1,2,2- Tetrachloroethane	0.09
2,4-Dinitrotoluene	(XXIV)	Tetrachloroethylene	0.1
2,6-Dinitrotoluene	(XXIV)	Carbon Tetrachloride	0.5
Endosulfan (alpha and beta)	0.00003	Toluene	0.06
Endrin	0.00004	Toxaphene	0.0000002
Ethylbenzene	0.5	1,1- Trichloroethane	0.3
Phenol	0.06	Trichloroethylene	0.02
Iron	0.05	Zinc	0.09
Fluoranthene	0.0004	Radioactivity: Total Alpha (Bq/1)	0.1
Fluorides (as F-)	0.5	Radioactivity: Total Alpha (Bq/1)	1

(X). Acute toxicity for marine water organisms multiplied by 0.01 indicates that the concentration of phthalic acid esters should not exceed 0.02944 mg/L.

(XVI). Acute chlorobenzene toxicity for marine water organisms multiplied by 0.01 indicates that the concentration of these (except dichlorobenzenes) should not exceed 0.00160 mg/L.

(XVIII). Organisms should not exceed 200 as the most probable number in 100 milliliters (MPN/100ml) in fresh or marine water, and no more than 10% of monthly samples shall exceed 400 MPN/100mL.

(XIX). Suspended solids (including sedimentable) in combination with color, should not reduce the depth of light compensation level for photosynthetic activity by more than 10% from the natural value.

(XXII). Acute dichloroethylene toxicity for marine water organisms multiplied by 0.01 indicates that their concentration should not exceed 2.24 mg/L.

(XXIV). Acute dinitrotoluene toxicity for marine water organisms multiplied by 0.01 indicates that their concentration should not be higher than 0.0059 mh/L.

(XXVI). The total concentration of dissolved gasses should not exceed 1.1 times the saturation value of the prevailing hydrostatic and atmospheric conditions.

(XXIX). Acute N-nitrosamine toxicity for marine water organisms multiplied by 0.01 indicates that their concentration should not be higher than 33 mg/L.

(XXXII). There may be no variations greater than 0.2 pH units, based on the natural seasonal value.

4.4 OFFICIAL MEXICAN STANDARD NOM-001-SEMARNAT-1996.

The Official Mexican Standard NOM-001-SEMARNAT-1996 establishes the maximum allowable levels of pollutants in wastewater discharges into national waters and assets, in order to protect their quality and enable their uses, and compliance is mandatory for those responsible for these discharges.

The values from this standard were used in this study only as a reference in the comparison of the results obtained in the sampling of the Tijuana River and the Alamar River, which receive effluent discharges from wastewater treatment plants. The results were compared with the limits established in the standard for the protection of aquatic life.

The maximum allowable limits indicated for the Protection of Aquatic Life in NOM-001-SEMARNAT-1996 are shown below:

Table 4. Maximum Allowable Limits under NOM-001-SEMARNAT-1996 for Discharges into Rivers and Protection of Aquatic Life.

Parameter	**MAL (mg/L)**	
	Monthly Average	**Daily Average**
Temperature (°C)	40	40
Fats and greases	15	25
Floating Matter	Absent	Absent
Settleable Solids (ml/L)	1	1
Total Suspended Solids	40	60
Biochemical Oxygen Demand	30	60
Total Nitrogen	15	25
TOTAL PHOSPHOROUS	5	10
Arsenic	0.1	0.2
Cadmium	0.1	0.2
Cyanide	1.0	2.0
Copper	4.0	6.0
Chromium	0.5	1.0
Mercury	0.005	0.01
Nickel	2	4
Lead	0.2	0.4
Zinc	10	20
Fecal Coliforms (MPN/100 mL)	1,000	2,000

4.5 WASTEWATER CHARACTERISTIC OF TIJUANA

Rapid growth and issues with wastewater infrastructure and treatment capacity issues in Tijuana were noted by Presidents George Bush and Carlos Salinas de Gortari. This recognition of binational concern in Tijuana led to the signing of IBWC Minute 283 entitled, "Conceptual Plan for the International Solution to the Border Sanitation Problem in Tijuana, Baja California- San Diego, California," dated July 8, 1990. Under this Minute, construction was undertaken of wastewater infrastructure in Tijuana, Baja California to collect untreated wastewater and send that wastewater to the existing pumping plant number 1 and a trunkline to the border, as well as the construction of a 25 MGD (1,100 lps) secondary treatment plant in the United States (SBIWTP). In addition, the Minute called for the new treatment plant to discharge to the ocean through a new ocean outfall. Minute 296 laid out cost sharing between the U.S. and Mexico, as well as operations and maintenance costs.

In January of 1999, the Minute 283 projects were completed, and the primary treated wastewater began discharging to the Pacific Ocean through the South Bay Ocean Outfall (SBOO). Secondary treatment upgrades were not realized at the time due to funding shortfalls; however, some years later funding was allocated for this purpose, allowing the SBIWTP plant to achieve the planned secondary treatment of Tijuana wastewater by January 2011.

The USIBWC does extensive testing of the influent to the SBIWTP. This influent is untreated wastewater from Tijuana entering the treatment plant and therefore representative of the character of the wastewater. Wastewater enters the Tijuana River from bypasses due to infrastructure challenges and sanitary sewer overflows. Wastewater also enters Stewart's Drain, Silva Drain, Canyon del Sol, Goat Canyon, and Smuggler's Gulch from bypasses, sanitary sewer overflows, and infrastructure failures. Table 5 below shows the average of the last 5 years of data obtained from sampling the influent to the SBIWTP treatment plant and is being used only as a reference to represent the typical wastewater characteristic of Tijuana. Comparison to wastewater characteristic of Tijuana allows confirmation of the character of the water, but also to what degree the wastewater impacts surface water, as well as identify parameters that are not sourced to typical wastewater and may require source tracking to identify the source of those parameters.

Table 5. Quality of the wastewater characteristic of the city of Tijuana.

Tijuana Wastewater as tested at the SBIWTP Influent			
Parameter	**Analyte**	**Units**	**Value**
Conventional	Ammonia (as Nitrogen)	mg/L	50.31
Conventional	Biochemical Oxygen Demand (5-day) BOD	mg/L	378.72
Conventional	Calcium	mg/L	
Conventional	Carbonaceous Biochemical Oxygen Demand (5-Day) CBOD	mg/L	327.54
Conventional	Chemical Oxygen Demand (COD)	mg/L	710.2
Conventional	Oil and Grease, Total	mg/L	20.45
Conventional	pH	pH	7.3
Conventional	Total Dissolved Solids (TDS)	mg/L	1589.42
Conventional	Total Solids	mg/L	2428.6
Conventional	Total Suspended Solids (TSS)	mg/L	384.63
Conventional	Volatile Suspended Solids (VSS)	mg/L	279.86
Metals	Antimony	ug/L	27.58
Metals	Arsenic	ug/L	5.05
Metals	Beryllium	ug/L	1.54
Metals	Cadmium	ug/L	0.46
Metals	Chromium (Total)	ug/L	4.39
Metals	Copper	ug/L	28.99
Metals	Cyanide	ug/L	0.29
Metals	Hexavalent chromium	ug/L	0.32
Metals	Iron	ug/L	3015.9
Metals	Lead	ug/L	17.19
Metals	Mercury	ug/L	0.21
Metals	Nickel	ug/L	28.94
Metals	Selenium	ug/L	5.42
Metals	Silver	ug/L	1

Metals	Thallium	ug/L	4.26
Metals	Zinc	ug/L	88.69
Organics	2,4,6-Trichlorophenol	ug/L	0.96
Organics	2,4-Dichlorophenol	ug/L	0.94
Organics	2-Butanone (MEK)	ug/L	1.8
Organics	2-Chlorophenol	ug/L	0.27
Organics	3 and 4-Methylphenol (m and p-Cresol)	ug/L	0.94
Organics	4-Nitrophenol	ug/L	0.87
Organics	Acenaphthylene	ug/L	0.17
Organics	Benzene	ug/L	0.47
Organics	Benzo(a)pyrene	ug/L	0.31
Organics	Benzo(b)fluoranthene	ug/L	0.31
Organics	Benzo(g,h,i)perylene	ug/L	0.28
Organics	Bis(2-chloroethyl) ether	ug/L	0.42
Organics	Bis(2-ethylhexyl) phthalate [Di(2-ethylhexyl) phthalate]	ug/L	10.15
Organics	Bromodichloromethane (Dichlorobromomethane) (a common THM)	ug/L	0.64
Organics	Bromoform (a common THM)	ug/L	0.51
Organics	Chlorodibromomethane	ug/L	0.976
Organics	Chloroform (a common THM)	ug/L	2.42
Organics	Chloromethane (methyl chloride)	ug/L	0.47
Organics	Diethyl phthalate	ug/L	0.7
Organics	Dimethyl phthalate	ug/L	0.23
Organics	Di-n-butyl phthalate	ug/L	0.25
Organics	Di-n-octyl phthalate	ug/L	0.398
Organics	Ethylbenzene	ug/L	0.38
Organics	Fluoranthene	ug/L	0.12
Organics	Indeno (1,2,3-cd) pyrene	ug/L	0.16
Organics	Methylene Chloride	ug/L	0.43
Organics	Naphthalene	ug/L	0.187
Organics	Pentachlorophenol	ug/L	0.95
Organics	Phenanthrene	ug/L	0.14
Organics	Phenol	ug/L	7.03
Organics	Pyrene	ug/L	0.2
Organics	Toluene	ug/L	5
Organics	Total Trihalomethanes (THM's)	ug/L	4.9
Pesticides	DDT	ug/L	2
Pesticides	Endosulfan I	ug/L	0.0297
Pesticides	Endrin aldehyde	ug/L	0.01
Pesticides	Hexachlorocyclohexane delta {BHC-delta}	ug/L	0.0015

4.6 RESULTS FROM CANYON-DRAIN STATIONS

The Tables in Appendix C provide the results for the sampling events noted in Section 3 of this document, for all of the parameters detected at the Canyons and Drains monitoring sites. The columns show the values from the applicable regulations in Mexico and the United States (CE-CCA for Mexico and the Water Quality Objectives for California), as well as the data for wastewater characteristic of Tijuana. When reviewing the data, all of the Canyons monitoring sites, except Yogurt Canyon, exhibited concentrations of certain parameters that make it possible to identify that their dry weather flows correspond to or present characteristics typical of untreated wastewater. Untreated wastewater contains higher than normal levels of ammonia, BOD, phosphorous, salts, and pathogens associated with waste from animals in the form of enterococci and coliforms.

Ammonia (as Nitrogen)

Ammonia is an inorganic nitrogen compound that is only found in trace amounts naturally in nature from the breakdown of organic matter. Ammonia at high levels in air and water poses serious risks to human and environmental health and can be toxic to aquatic life when found in surface water.

Ammonia in wastewater comes primarily from human waste as the body excretes urea from the kidneys. Ammonia can also be sourced to dumping of ammonia-based cleaning agents being discarded into sinks and drains. Ammonia is also used by agriculture in fertilizers as the high concentration of nitrogen in ammonia is essential for plant growth. In surface waters, ammonia is not naturally found, and is therefore sourced to agricultural discharge from untreated or only primary treated wastewater.

Typical ammonia values for Tijuana wastewater is 50 parts per million (ppm). In all the Canyon monitoring sites, ammonia was found at similar levels in all but Yogurt Canyon. In Canyon del Sol, high ammonia values were found only during the two rain events. Because Canyon del Sol does not have a significant stormwater drainage area, the higher values during rain events may be sourced to untreated wastewater surcharging from sewer lines that are overloaded due to intrusion of rainwater. During dry weather however, Canyon del Sol did not have levels of ammonia that are representative of untreated wastewater alone. Values for ammonia were around 15 ppm suggesting that the canyon has some small amounts of wastewater diluted with potable water or ground water. Something similar was observed in Goat Canyon, which during the rainy months from December to February, the levels of Ammonia were between 25 and 51 ppm, and in the dry weather events, the values were between 16.5 and 1.8 ppm. As mentioned, Yogurt Canyon did not show appreciable amounts of ammonia with most samples around 1 ppm to a single event high of 4.1 ppm. The very small amounts of ammonia could be coming from a small amount of waste from wastewater, or from direct discharge of commercial or industrial sources that may be entering the canyon from minimally detectable amounts resulting from the breakdown of organic sources in the soil.

Toxicity to aquatic life from ammonia can occur at levels of only 4 ppm so the WQOs for the California Ocean Plan have a limit of no more than 6 ppm of ammonia during a single instantaneous sample and only 0.6 ppm over a 6-month average. All the Canyons and Drains, except Yogurt Canyon, exceeded this limit. For inland waters, typical ammonia values are less than 2ppm and for polluted waters the value is up to 6. California's WQOs for the Tijuana River and estuary is no discharge that would raise the ammonia levels by more than 0.025 ppm. The high ammonia values in the canyons when tested (except for Yogurt) would cause such an event and therefore do not meet the standards.

On the other hand, Mexico's CE-CCA establish a maximum level of Ammonia (as Nitrogen) of 0.01 mg/L for the protection of marine aquatic life. This limit was exceeded in all samples from all the Canyons and Drains stations.

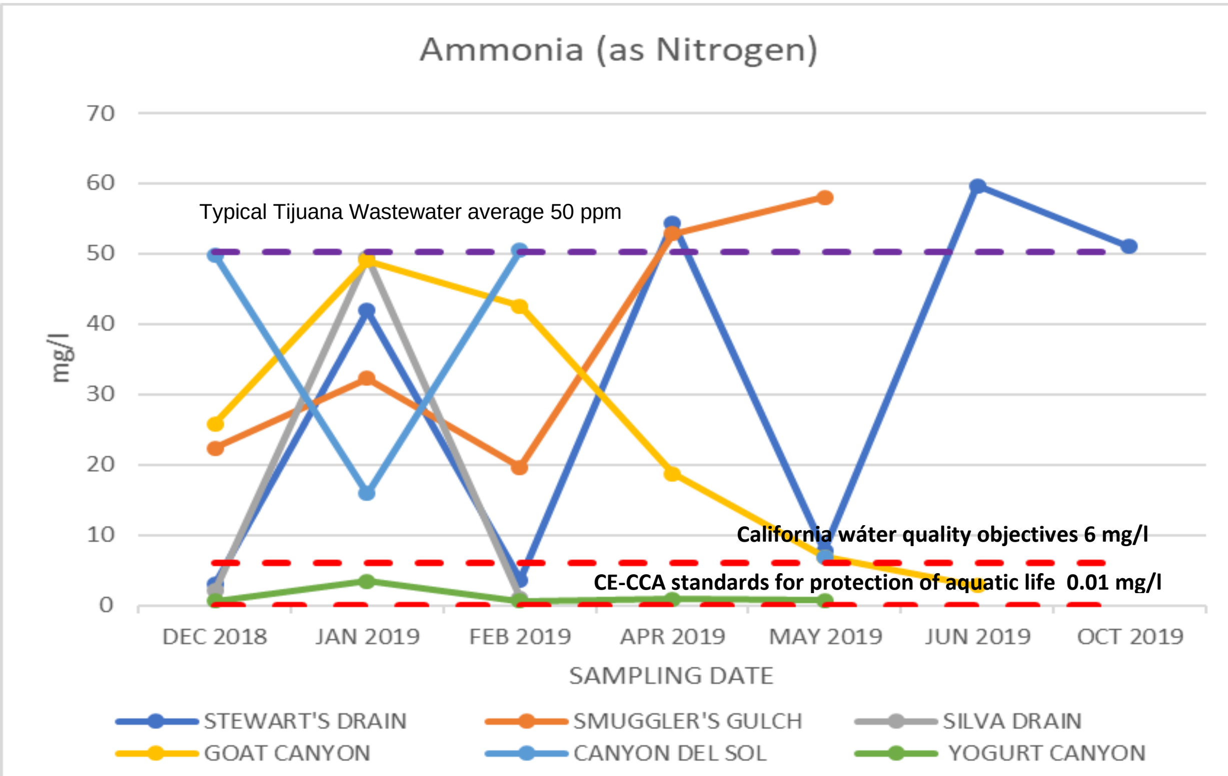

Figure 24. Graph of the detected levels of Ammonia (as Nitrogen) at the monitoring sites in the Canyons and Drains (Average of the two results obtained by the laboratories in Mexico and the United States).

Biochemical Oxygen Demand

Biochemical oxygen demand (BOD) is defined as the amount of dissolved oxygen needed by aerobic biological organisms to break down organic material present in a water sample at 20°C over a specific time period, typically 5 days. The BOD value is an indicator of the degree of organic pollution in the tested waterbody and can indicate the short-term impact on the oxygen levels of a receiving water. BOD analysis is similar in function to chemical oxygen demand (COD) analysis, both measure the amount of organic compounds in water. However, COD is the total measurement of all chemicals in the water that can be oxidized, whereas BOD only measures the amount of food (or organic carbons) that bacteria can oxidize. Wastewater characteristic of Tijuana is stronger than typical wastewater because water conservation is very prevalent due to the shortage of potable water in the region. Wastewater characteristic of Tijuana averages 378 ppm for BOD and over 700 ppm for COD. Clean surface water will have near zero BOD and slightly polluted surface water will have values around 10 ppm. None of the Canyons and Drains samples reached levels as high as the influent to the SBIWTP, but all of the Canyons and Drains exhibited high levels of BOD.

Silva Drain and Stewart's Drain recorded the lowest levels of BOD (10.8 and 13.35 ppm, respectively) during rain sampling events, compared to those obtained at dry weather sample events, in which concentrations of up to 130 and 258 ppm were reached, respectively; this is contrary to what was observed in Canyon del Sol, Smuggler's Gulch and Goat Canyon, where the highest values of BOD occurred during the precipitation sampling events.

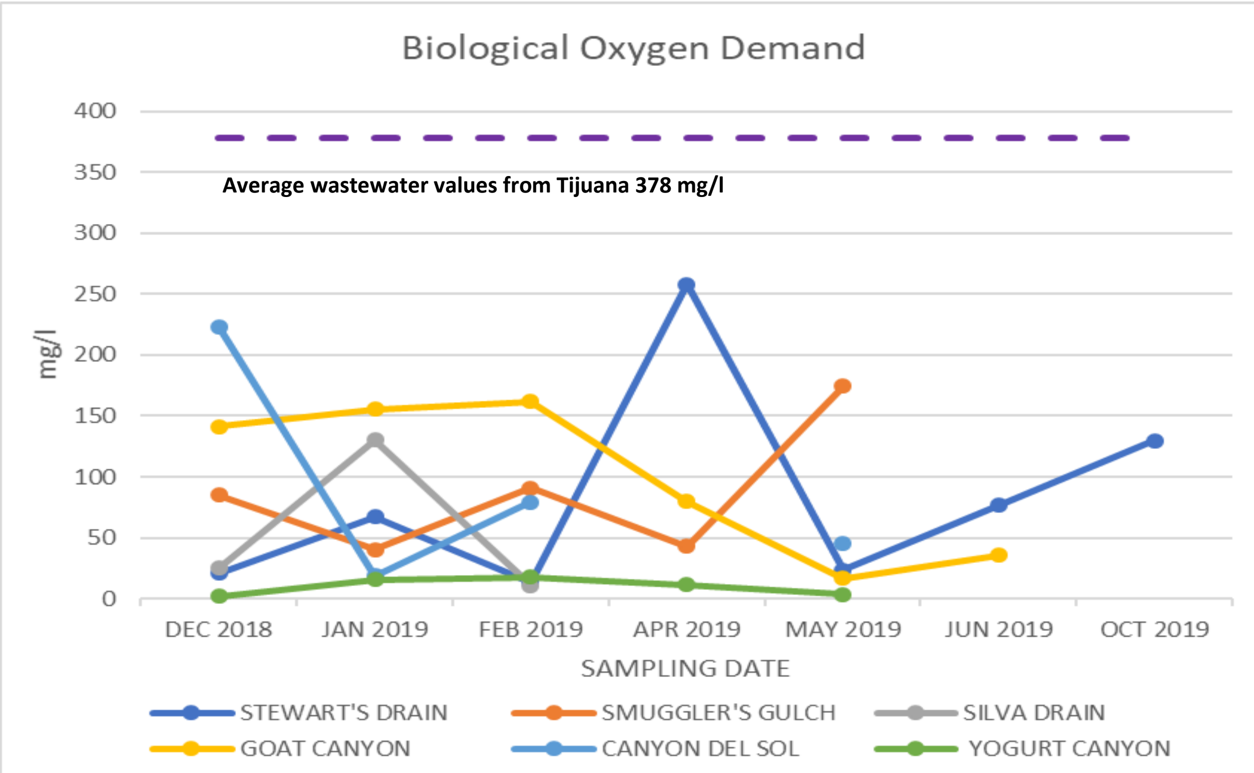

Figure 25. Graph of the detected levels of BOD at the monitoring sites in the Canyons and Drains (Average of the two results obtained by the laboratories in Mexico and the United States).

Phosphorous

Phosphorous is a naturally occurring mineral that, because it is highly reactive, is typically found in nature as phosphate (PO_4). Phosphorous is an essential nutrient for plants and is found in agricultural fertilizers. It is not allowed to be discharged to surface waters along with nitrate, since they cause excessive plant and algae growth. In a freshwater stream, algal blooms cause depressed dissolved oxygen that leads to fish kills and loss of other aquatic life. Because nitrate is difficult to control, phosphorous is controlled in the U.S. to prevent it from being discharged into freshwater streams. However, phosphorous is commonly used in detergents and cleaning supplies in Mexico and therefore is found in untreated wastewater at levels that are higher than normally found in freshwater.

California's WQOs establish limits for Phosphorous of 0.05 ppm for rivers and streams and 0.025 ppm for ponds and lakes. On the other hand, the Mexico's CE-CCA establish a maximum level of Phosphorus of 0.0001 mg/L for the protection of marine aquatic life. In all the samples analyzed from the Canyons, phosphorus levels exceeding these limits were detected, with a total phosphorus level reaching 18 ppm in Goat Canyon, averaging just below 10 ppm in the rest of the Canyons during dry weather sampling events, except for Yogurt Canyon. Yogurt Canyon did not have as high of levels of phosphorous, averaging less than 1 ppm, but still exceeded the standards. During rain sampling events, phosphorous was reduced significantly in the Canyons and Drains that are dominated by untreated wastewater like Silva Drain and Stewart's Drain and increased in canyons where spills from sewer infrastructure were seen, as appears to be the case in Canyon del Sol.

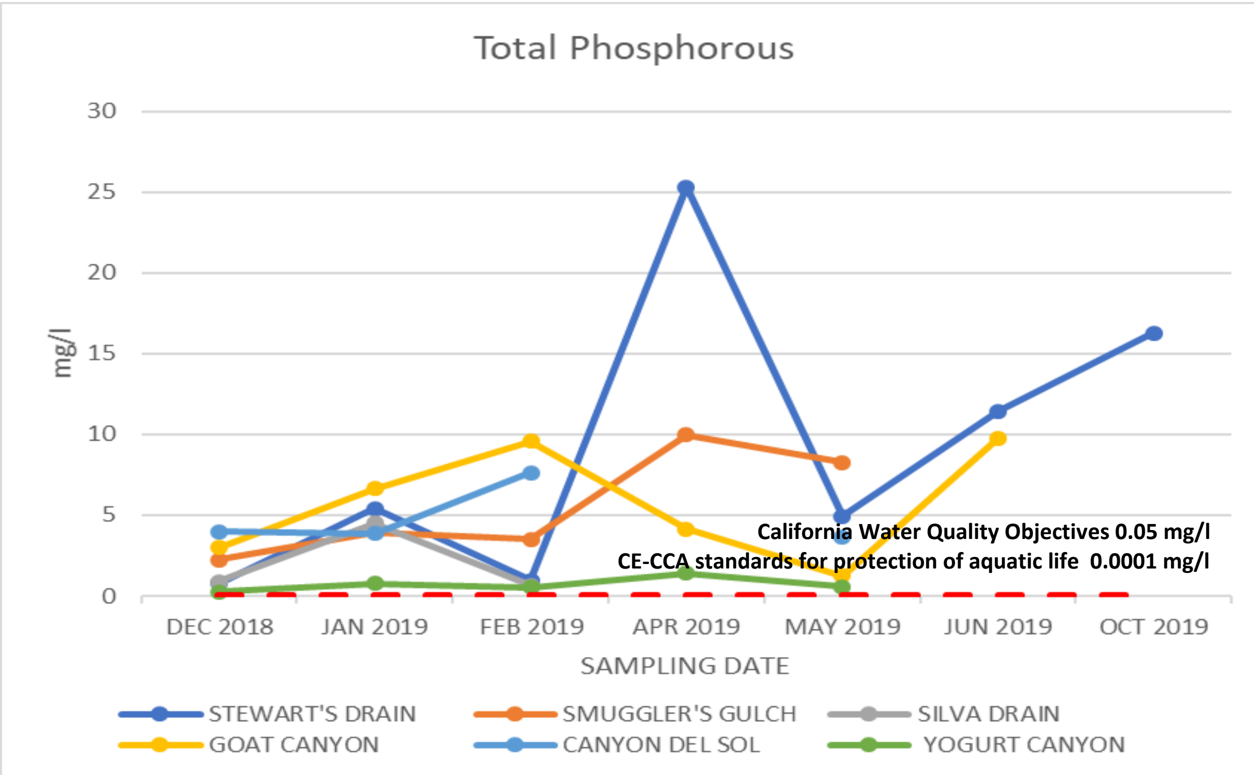

Figure 26. Graph of the detected levels of Total Phosphorous at the monitoring sites in the Canyons and Drains (Average of the two results obtained by the laboratories in Mexico and the United States).

Salts

Salinity (salt) in water is a measure of dissolved mineral salts such as calcium, magnesium, potassium, sodium, sulfate, and chloride. Surface waters tend to contain low levels of naturally occurring salt unless the water passes through highly saline geologic sources. Increases in salt can also be the result of discharges from agricultural and/or residential wastewater. Agricultural fertilizers contain some level of salt to stabilize the other nutrients. In residential wastewater, sources of salts come from the high salt content in urine as well as salts found in water softeners, detergents, cleaning products, liquid fabric softeners, soaps, and shampoos. Ocean water, however, has very high salt levels and is not adversely impacted by typical salinity of wastewater. Freshwater streams receiving high levels of salt, however, can be toxic to freshwater plants and animals.

Typical salt levels in wastewater are usually greater than 1,500 ppm of Total Dissolved Solids (TDS), which is comparable to the levels found during dry weather conditions at the monitoring stations in the Canyons and Drains, except in Yogurt Canyon. Yogurt Canyon has levels even higher exceeding 3000 ppm of TDS. This shows that much of the water in Yogurt Canyon may be coming from saline groundwater discharging at the surface due to its close proximity to the Pacific Ocean.

Given the high salt levels in the ocean, the Ocean Plan does not have water quality limits in the United States. California's WQOs also do not have set limits on salts in the Tijuana River given the river is not used as a drinking water source Likewise, there are no established TDS limits in Mexico's CE-CCA for the protection of aquatic life, however, high levels of salts in the Canyons demonstrate impacts from human sources.

Pathogens

Pathogens are the biggest concern in the waters in the rivers and canyons as they pose the greatest risk to human health from incidental contact with the water. All surface water bodies tend to have some sort of bacteria, viruses, parasites, or amoebas present but are usually found at very low or non-detectable ranges.

The standard test to determine contamination of surface water from pathogens is the calculation of the coliform colonies. A high number of this bacterial indicator can indicate the potential for many more pathogens to be in the water. Coliforms are bacteria found in the intestines of humans and other animals. The bacteria *Escherichia Coli* (E.coli) is more specific to the intestines of warm blooded mammals. California's WQOs established for the Tijuana River are for Total Coliforms limited to below 10,000 colony forming units (CFU) per 100 milliliters. Based on the receiving water use of the Tijuana River as non-contact recreation, the limit for fecal coliform is 2,000 CFU. Additionally, the limit established in Mexico's CE-CCA for Fecal Coliforms, both for waters for recreational use with primary contact and for the protection of aquatic life, is 200 MPN/100 mL in fresh or marine water, considering that no more than 10% of the monthly samples shall exceed 400 MPN/100 mL.

Also, with regard to Total Coliforms, there is an international standard established in IBWC Minute 270 entitled, ¨Recommendations for the Stage I Disposal and Treatment Works for the Solution of the Border Sanitation Problem at San Diego, California and Tijuana, Baja California," dated April 30, 1985. Resolution number 4 in Minute 270 stipulates "...that the quality of the coastal receiving waters at the international boundary shall comply with the water quality criteria established for primary contact recreation uses, in the sense that the most probable number of coliform bacteria will be less than 1,000 organisms per 100 mL, provided that not more than 20% of the total monthly samples (at least 5) exceed 1,000 per 100 mL, and that no single sample taken during a verification period of 48 hours should exceed 10,000 per 100 mL." This criterion could be applicable for the comparison of the results of this study, because, as mentioned above, transboundary Canyons and Drains under high flow regimes reach the Tijuana River, and later the Pacific Ocean where flows would eventually reach the area of the international boundary line due to the ocean currents in this area that regularly go south.

Enterococcus is also a bacterium that is found in the intestines, but is very resistant to high saline conditions, and is therefore the best indicator bacteria for saline waters. For the Pacific Ocean, California's WQOs set a limit of 104 CFU per 100 mL for Enterococci. The applicable Mexican regulations do not have a value limit for Enterococci.

None of the applicable domestic or international pathogen standards listed above were met by any of the samples from the Canyons and Drains monitoring locations, except Yogurt Canyon on one sampling event. Other pathogens tested do not have established limits in either country set for the river and ocean waters, but nonetheless indicate a concern to human health. The presence of campylobacter bacteria, which originate from raw and undercooked poultry, was found in Stewart's Drain, Silva Drain, Goat Canyon, and Yogurt Canyon. Analyses for *Vibrio cholerae* (Cholera) were also performed, but no detections occurred at any of the Canyons and Drains monitoring stations.

Additionally, Norovirus was found in all the Canyon monitoring sites, except Smuggler's Gulch and Yogurt Canyon. Norovirus is a highly contagious virus causing food poisoning symptoms that is caught from contaminated water. Enteric viruses, another highly contagious virus from human feces, were found at Canyon del Sol.

Bis (2-ethylhexyl) Phthalate

Bis(2-ethylhexyl) phthalate (also known as DEHP) is a manufactured chemical commonly added to plastics to make them more flexible. DEHP is present in most household plastic products such as wall coverings, tablecloths, floor tiles, furniture upholstery, shower curtains, garden hoses, and more. DEHP can enter the environment through releases from factories that make or use DEHP and from household items containing it. Over long periods of time, it can leach out of plastic materials into the environment. Therefore, DEHP is widespread in the environment. When DEHP is released to soil, it usually attaches strongly to the soil and does not move very far away from where it was released. When DEHP is released to water, it dissolves very slowly into underground water or surface waters that contact it. It takes years before DEHP in buried or discarded materials disappears from the environment.

DEHP was present at all the Canyons and Drains monitoring sites, with the lowest concentrations at Yogurt Canyon. Mexico's CE-CCA establishes a maximum limit for DEHP of 29.44 ppb for the protection of marine aquatic life, which was met in all the samples from all the monitoring sites; however, the San Diego Basin Plan establishes a limit of 4 ppb for inland water such as the Tijuana River, thus the majority of the samples at all of the sites (except for Yogurt Canyon) exceeded the U.S. standard, similar to the concentration of 26 ppb found in Goat Canyon.

Metals

Various metals are used heavily in industrial applications for the production of just about everything used by humans. Even though these metals are commonly found in nature, high concentrations from industrial discharges pose a risk to the environment and human health.

Tijuana, like most cities on the border between the United States and Mexico, has many maquiladoras (industrial factories owned by foreign entities like the United States) that manufacture products using metals. The waste from these factories tends to be high in materials used in the factory. Metals from this waste tend to have higher concentrations and are discharged into the wastewater system where they are not treated by the treatment plants. Wastewater characteristic of Tijuana has metals concentrations of copper at 30 ppb, nickel at 30 ppb, and zinc at 90 ppb. The California Ocean Plan sets limits on the concentrations of these metals at 30, 50, and 200 ppb respectively. For the Tijuana River, it is listed as a freshwater habitat, which limits those three metals to 7.5, 653, and 54 ppb respectively using the USEPA National Ambient Water Quality Criteria for freshwater aquatic life protection. Mexico's CE-CCA establishes maximum values for the protection of marine aquatic life of 3 ppb for copper, 8 ppb for Nickel and 90 ppb for zinc.

All of the Canyons and Drains monitoring stations, except Yogurt Canyon had copper, nickel, and zinc values that were similar to untreated wastewater characteristic of Tijuana. Using the California Ocean Plan limits for these metals as well as Mexico's CE-CCA, all of the Canyons and Drains monitoring sites exceeded the limits by a significant amount, except Yogurt Canyon, which for these metals exceeded the limits by a smaller amount.

The results from the U.S. and Mexican laboratories for the month of July in Yogurt Canyon displayed significantly higher concentrations of manganese than found in the river or other canyon sampling locations. For this parameter there is no maximum value in the regulations applicable in Mexico or the United States. Manganese is also an essential metal in steel and aluminum alloy production.

Other Chemical Parameters

The parameters discussed above were common in all of the canyons (or missing in the case of Yogurt Canyon) and are also common in untreated wastewater from Tijuana.

Other parameters that were not common to all canyons monitoring sites are discussed below

Stewart's Drain – Puerta Blanca

All of the parameters for metals tested were present in the water in Stewart's Drain except for barium. Levels for lead detected at this site exceeded the limits established in the California Ocean Plan and Mexico's CE-CCA.

Pesticides were not detected at this site. Other organic compounds did have detects for trihalomethanes, dibutyl phthalate, diethyl phthalate, and toluene, among several other very low level detects listed in Appendix C of this report. None of these compounds have a maximum value outlined in the regulations applicable in Mexico or the United States. None of these compounds exceed the maximum value indicated in the applicable regulations of Mexico or the United States, with the exception of Toluene, which was found above 60 ppb in the April sample. Trihalomethanes are common in systems where chlorine is present in wastewater.

Silva Drain

Many of the metals parameters tested were present in the water in Silva Drain, except for beryllium, mercury, selenium, silver, and thallium. Besides the metals discussed above, levels of lead were detected exceeding the limits of the California Ocean Plan and Mexico's CE-CCA. In terms of pesticides, Carbofuran, Endosulfan I and II, Endrin aldehyde, and BHC-Delta were detected. Other organic compounds detected included toluene, trihalomethanes, diethyl phthalate, and several others at low concentrations that were below limits established in the applicable regulations in both countries. Trihalomethanes are common is systems where chlorine is present in wastewater. Toluene is found in paint thinner and in industry as a solvent for plastics production. Phthalates are substances commonly used to give flexibility to plastics in industrial processes.

Canyon del Sol

Many of the parameters for metals tested were present in the water at this site except for beryllium, silver, and thallium. Pesticides had a single detection for glyphosate, a commonly used herbicide for commercial and residential purposes, which does not have an established limit in the regulations applicable in California and Mexico for assessment. Other organic compounds also detected included toluene, phenol, diethyl phthalate, and Di-n-butyl phthalate, along with several other low level detects that are below any established river or ocean limit in California or Mexico's CE-CCA. The organic compounds detected are found in plastics and PVC production, with toluene found in paint thinner and in industry as a solvent for plastics production.

Smuggler's Gulch – El Matadero

All of the parameters for metals tested were present in the water at this site except for beryllium. Of the pesticides analyzed, the U.S. laboratory detected Endosulfan I (restricted use insecticide) in the sampling carried out in December at a concentration of 0.05 ppb, higher than the limit established in the CE-CCA of 0.03 ppb. Glyphosate (commonly used herbicide) was also detected in the sampling for the month of December, and the Mexican laboratory detected Dalapon in the sampling from December and January. Also, other organic compounds detected included toluene, dibutyl phthalate, diethyl phthalate, among others, with very low level detects that do not exceed the applicable regulations in California and Mexico. Phenol was also detected in virtually all sampling at concentrations higher than the maximum level of 1 ppb indicated in the CE-CCA for recreational use with primary contact. The organic compounds detected are used in plastics and PVC production, with toluene found in paint thinner and in industry as a solvent for plastic production. Methyl tert-butyl ether (MTBE) was also detected, which is used as a fuel additive.

Goat Canyon – Los Laureles

All of the parameters for metals tested were present in the water except for beryllium. Cadmium and chromium values were below the applicable standards for all samples taken except during July. The values for these two metals during July were magnitudes higher than normal. This was detected by both countries' laboratories and may indicate a slug load or illegal dumping activities.

Pesticides detected were dalapon, Xylene, and glyphosate. Other organic compounds also detected included toluene, phenol, methylene chloride, diethyl phthalate, and some trihalomethanes, as well as several other low level detects. The organic compounds detected are used in plastics and PVC production, with toluene found in paint thinner and in industry as a solvent for plastic production. MTBE was also detected, which is used as a fuel additive. MEK (methyl ethyl ketone) was also found consistently in samples from Goat Canyon. This is commonly used in the production of polymers such as PVC.

Yogurt Canyon – Cañón Los Sauces

All of the metals tested were present in the water at this site, except for antimony, beryllium, and silver. The detected concentrations of Boron, as in the rest of the canyons, were above the maximum values established in both countries' regulations. Organic compounds had very few detections at this site, however di-n-butyl phthalate and bis(2-ethylhexyl) phthalate were present at similar levels, but they did not exceed the limits indicated in Mexico's CE-CCA.

Given the very low concentrations of indicator parameters for untreated wastewater, but the presence of metals and organics at this site, there may be very small amounts of wastewater from infrastructure losses entering the canyon that mix with groundwater. The presence of the organics and metals in relatively clean water could also indicate the presence of industrial wastewater that is not being captured by the wastewater infrastructure. However, the sources of the constituents in the water in Yogurt Canyon are unknown and warrant further study.

Flows from Yogurt Canyon met most of the water quality, with only BOD and COD exceeding limits on two occasions. Even though metals were present in Yogurt Canyon, most of them were not detected. The metals concentrations detected were lower than the water quality objectives applicable in both countries.

Sediment Assessment

Sediment samples were collected for two rain events, one in December 2018 and the other in February 2019, and once more during the baseline sampling in May 2019. Parameters analyzed in sediment can be found in Appendix A of this report, and laboratory results for the detected parameters are listed in Appendix C. Parameters assessed included pathogens, metals, and organic compounds. Sediment was sampled to assess impacts to soil between wet and dry weather flows. Sediment retains certain chemical constituents compared to the water column; therefore, it can act as a record of past exposure to these chemicals. It can also provide information on chemical retention in the soil that can lead to impacts to future rain events, soil remediation requirements, and groundwater introduction of these chemicals.

Sediment samples, when compared with the results obtained at each site for concentrations in the baseline and during rain events in U.S. territory, showed no appreciable difference. In contrast, at the monitoring sites in Mexican territory there was a significant difference in Fecal Coliform levels in the results from the rain and baseline sampling events, such as in Yogurt Canyon, which rose from 360 MPN/g at sampling point 1 and 590 MPN at sampling point 2 in December, to 150,000 and 1,700 MPN/g in May, respectively; the same was observed at sampling point 2 in Goat Canyon, where Fecal Coliforms rose from 230 MPN/g to 680 MPN/g; and in Smuggler's Gulch at sampling points 1 and 2 there was an increase of 1,160 and 25 MPN/g in December, to 7,300 and 1,700 MPN/g in May.

Fecal coliforms and enterococci were present in all of the samples and salmonella was present in most of the samples, but all were in significantly lower numbers than the water samples. There was a detection of enteric viruses at Smuggler's Gulch and Canyon del Sol, and the Mexican laboratory detected helminth ova at Smuggler's Gulch, Goat Canyon, and Yogurt Canyon.

For all of the Canyon monitoring sites, the metals found in the water samples were also present in the soil samples. For the Goat Canyon 2 and Smuggler's Canyon 2 monitoring stations in the United States, the dry weather samples were collected from dry soil with no water present. Even so, these sites still showed similar numbers and the same presence of metals as the rain event and the dry weather event sampling from the upstream monitoring sites, which did have water present.

For the metals detected in the water column that exceeded the standards such as copper, nickel, and zinc, they were all found in the sediment as well. Stewart's Drain, for example, had copper in water values averaging 30 ppm during the rain event and was the same concentration in the soil. Nickel concentrations in water were around 24 ppm and in the soil they were 14 ppm during rain events, and during dry weather they dropped to 8 ppm. Zinc values in the water samples averaged 150 ppm, and in the soil the values for zinc were the same during both wet and dry weather averaging 130 ppm.

Organic samples in soils had fewer detections than in the water samples, but this is expected as many organics are highly volatile and have very short residence times. Methylene Chloride was also persistent at every canyon monitoring site. There were low concentrations detected for a few other organics as listed in Appendix C. These values do not have environmental standards to compare against to determine standards exceedances.

4.7 SUMMARY OF CANYON AND DRAIN STATIONS ASSESSMENT

The level of pathogens entering the Canyons during stormwater events, especially viruses discovered in the December 2018 sampling, is of special concern considering the runoff from Mexico through the Canyons and Drains eventually enters the Tijuana River and ultimately the Pacific Ocean. Cholera was absent for all but one sampling event, and norovirus and enteric virus were present in water samples as well.

For all of the Canyons and Drains monitoring sites, except Yogurt Canyon, parameters that exhibited high values were ammonia, BOD, COD, Fats, Oils, and Greases, phosphorous, nitrates, surfactants, and bacteria. These are all indicative of untreated wastewater entering the system. Additionally, the parameters were compared to the influent values entering the South Bay International Wastewater Treatment Plant that showed similar values to the wastewater characteristic of the City of Tijuana.

Metals present at levels of concern are copper, nickel and zinc, all of which are used in the metals plating industries. For metals, it is also important to highlight the non-detects in many of the of samples, or the minimal presence of Hexavalent Chromium detections. Moreover, the Mexican laboratory did not detect any presence of Hexavalent Chromium in any of the samples from any monitoring site of the Canyons and Drains.

Organics and pesticides were also analyzed with just a few parameters detected and with most concentrations very low and of no concern. Of these, it is noteworthy that there was no presence of pesticides of concern such as DDT and Aldrin in any of the water samples collected in the Canyons and Drains. Two parameters that were detected were diethyl phthalate and bis(2-ethylhexyl) phthalate. These and other parameters that were detected are common chemicals used in the production of polymers such as PVC, plastics and plastic products.

For Yogurt Canyon, the results were different than the other canyons and did not contain high levels of wastewater indicators, instead had low levels of bacteria, ammonia, and phosphorous. Yogurt Canyon is located close to the Pacific Ocean and is relatively small in drainage area. This canyon also does not drain to the Tijuana River but does connect to part of the estuary and the Pacific Ocean. Yogurt Canyon did, however, exhibit high levels of manganese that are not present in typical Tijuana wastewater, and higher than normal levels of chlorides. Manganese has many uses in metallurgy and is also found in fuel additives.

Additionally, it is important to note that parameters that have caused concern from various media reports and institutions in both countries, and of particular concern to the United States, for their potential presence in large quantities in the waters of the Tijuana-San Diego transboundary Canyons and Drains, these parameters such as Hexavalent Chromium, or the pesticides Dichlorodiphenyltrichloroethane (DDT) and Aldrin, were either not detected, or found in very low amounts below the limits established in the applicable regulations of both countries. The maximum value found for Hexavalent Chromium was 4.54 ppb in Silva Drain in the sample for the month of December 2018, analyzed in the U.S. laboratory, and the maximum levels established in the applicable regulations are 50 mg/L in Mexico's CE-CCA and 8 ppb in the California Ocean Plan. However, Hexavalent Chromium was not detected in any sample analyzed in the laboratory in Mexico. Also, DDT or Aldrin were not detected in any water sample in the Canyons and Drains.

4.8 RESULTS FROM THE TIJUANA RIVER MONITORING STATIONS

The Tijuana River was sampled for the parameters listed in Appendix A of this report, for both water and sediment. Metals and organics were only sampled during the May 2019 baseline assessment. The U.S. did not collect sediment samples at the Tijuana River at PB-CILA intake as this section of the river is concrete lined and the sediment is constantly removed by stormflows and sediment removal during channel maintenance. For its part, the Mexican team decided to take sediment samples at this site during the baseline sampling in the month of May. Laboratory analysis of the samples showed no detectable levels for some of the parameters (shown in Appendix B), so they are not discussed below nor displayed in the tables of results in Appendix C.

The parameters that were detected at the Tijuana River and Alamar River monitoring sites were assessed against the applicable standard from both countries. In Mexico, the assessment was based on the CE-CCA maximum levels for recreational use with primary contact and for protection of marine aquatic life, and on the limits under the Official Mexican Standard NOM-001-SEMARNAT-1996 for river discharges and the protection of aquatic life; this standard was only used as a reference since treatment plant effluents are discharged into these rivers in Mexican territory. From the United States, the results were assessed against the Water Quality Objectives (WQO) for the Tijuana River as developed by the California Water Quality Control Board and the WQOs for the Pacific Ocean as listed in the Ocean Plan developed by the California State Water Resources Control Board. The Tijuana River was sampled at a total of 7 locations on both sides of the border (including the monitoring station in the Alamar River), the results of which are discussed below.

Water in the Tijuana River reaching the international border has many sources including untreated wastewater. However, unlike the transboundary Canyons and Drains, the primary source of water is the effluent from 3 wastewater treatment plants, one in Tecate and two in Tijuana. The results of the sampling in the Tijuana River are similar to those found at the Canyon monitoring sites described above, but at significantly reduced concentrations, because the water in the river during dry weather is comprised mostly of wastewater treatment plant effluent and groundwater but also contains untreated wastewater and urban runoff and during wet weather also contains large amounts of storm water.

Water in the Tijuana River downstream of the international boundary in the United States has no point sources, and during dry weather the river stops flowing and contains some areas of ponding. At several collection events in the United States, water had to be taken directly from ponded areas at the Dairy Mart Bridge, Hollister Street, and Saturn Blvd. monitoring sites. The sampling site at the mouth of the river is tidally influenced so it always had water flowing. During rain events, the Tijuana River flowed throughout the river's path and was comprised of a larger volume of stormwater that further reduced the wastewater concentrations through dilution.

Ammonia (as Nitrogen)

As discussed above, ammonia is not naturally found in high concentrations in rivers, thus when it is detected in large amounts, this indicates anthropogenic sources such as untreated wastewater and cleaning solutions. Average concentrations for Ammonia found in wastewater characteristic of the City of Tijuana is 50 ppm. Concentrations of ammonia were detected in the river with average values of 40 ppm at the sampling location in the Tijuana River above the confluence with the Alamar River. Values at the Alamar River site averaged 20 ppm and in the Tijuana River at the border at the PB-CILA intake, the values were around 20 as well. With no other sources of ammonia downstream of the border that could contribute Ammonia, the river concentrations remained at those levels until being diluted at the ocean with values around 10ppm. Storm events reduced the ammonia with the introduction of freshwater, with values of 11 ppm versus the average dry weather values of 20 ppm. The California Ocean Plan Water Quality Objectives establish a limit of no more than 6 ppm of ammonia during a single instantaneous sample, and Mexico's CE-CCA establish a maximum value of 0.01 ppm for the protection of marine aquatic life; therefore, the river does not meet the standards by the time it reaches the ocean. The graph below shows spatial behavior of the ammonia concentrations from upstream to downstream.

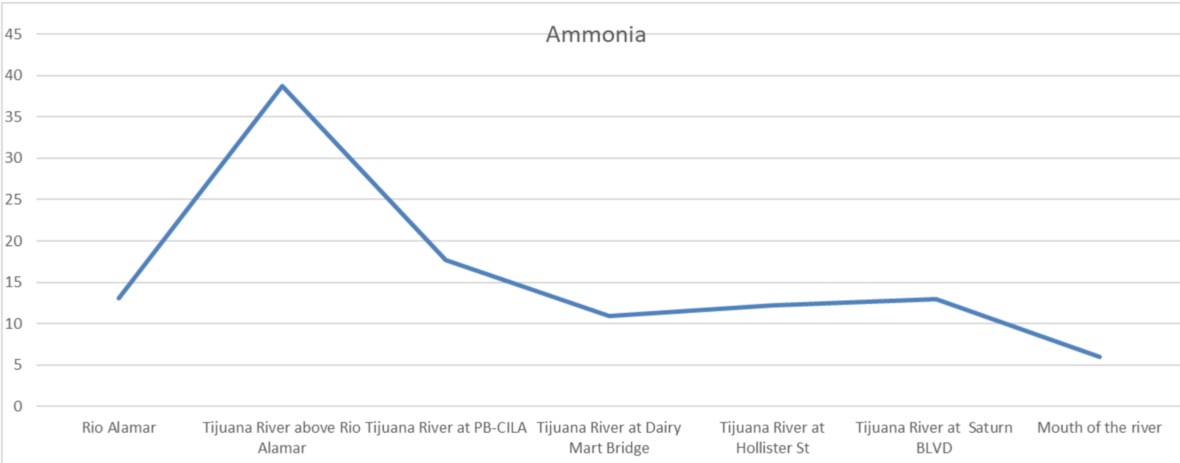

Figure 27. Spatial Graph of Ammonia in the Tijuana River.

Biochemical Oxygen Demand

Like ammonia, the values obtained for BOD at the Tijuana River monitoring sites were elevated and indicative of the presence of untreated wastewater entering the river upstream of the border. BOD is less persistent in nature and so the values drop dramatically with no other organic loading sources. Wastewater characteristic of Tijuana averages 378 ppm of BOD, whereas the river monitoring sites had values of less than 200 in Mexico, falling to around 30 ppm at the border, and then downstream falling again to around 10 ppm by the time it reaches the mouth of the river. Most samples in Mexican territory exceeded the limit of BOD indicated in NOM-001-SEMARNAT-1996 of 60 mg/L daily average. In this regard, it is important to mention that the effluents from the Arturo Herrera and La Morita WWTPs that discharge into the Tijuana River upstream of the confluence with the Alamar River, have a BOD quality of less than 10 mg/L, therefore, it is assumed that the high BOD values obtained at the monitoring sites within the study reach are due to the discharges of untreated wastewater into the river from other unknown sources.

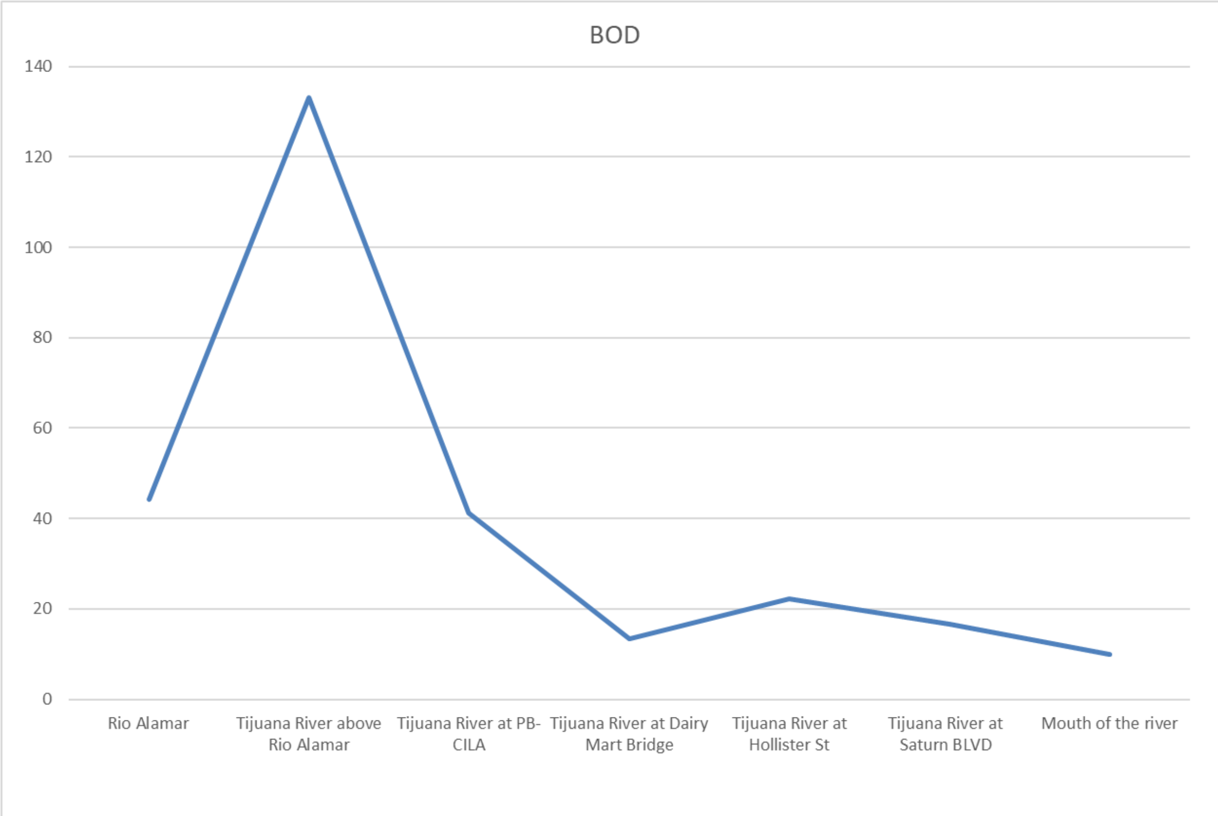

Figure 28. Spatial graph of BOD in the Tijuana River.

Phosphorous

As previously discussed, phosphates are used heavily in cleaning detergents and are found in untreated wastewater in Tijuana. California's WQOs establish a limit for Phosphorous of 0.05 ppm for rivers and streams and 0.025 ppm for ponds and lakes. Additionally, NOM-001-SEMARNAT-1996 establishes a limit for phosphorous of 10 mg/L daily average and 5 mg/L monthly average for discharges into rivers and for protection of aquatic life, and the CE-CCA establishes a maximum level for Phosphates of 0.002 mg/L for the protection of marine aquatic life. The Tijuana River monitoring sites above the confluence with Alamar River had phosphorous values averaging 7 ppm, which was just slightly less than the average obtained at the PB-CILA intake location. In the Alamar River, average phosphorous results 4 ppm were obtained. These values obtained at the monitoring sites for the Tijuana River in U.S. averaged 4 ppm and decreased at the mouth of the river to 1.5 ppm.

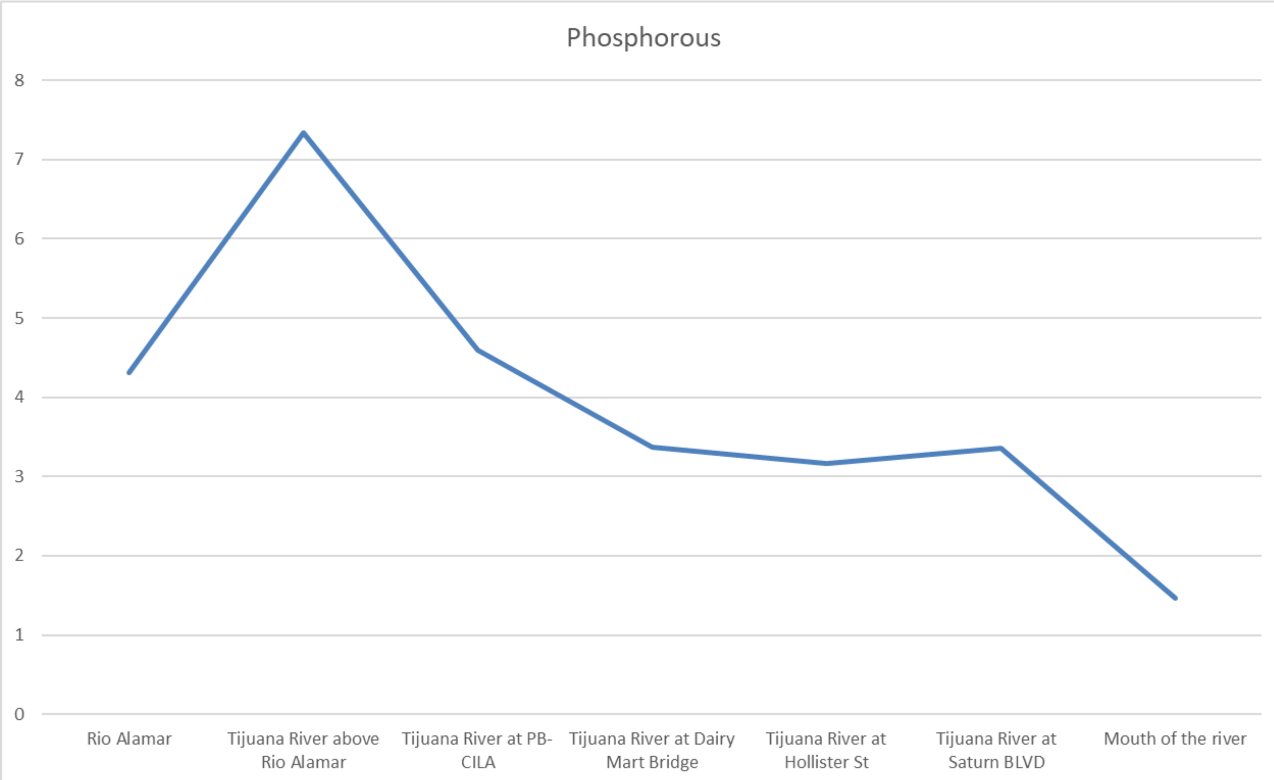

Figure 29. Spatial Graph of Total Phosphorous in the Tijuana River

Pathogens

As noted in the discussion of the results from the monitoring stations in the Canyons, indicator bacteria such as coliforms and enterococci are used to determine the potential for other more serious pathogens to be present in the water. California's WQOs for the Tijuana River establish a limit for Total Coliforms of less than 10,000 CFU for a single grab sample. Based on the receiving water use of the Tijuana River as non-contact recreation, the limit for fecal coliform is 2,000 CFU. Even though the designated use of the Tijuana River in the tested section is not listed as contact recreation, there is the potential for contact as the river passes several walking trails, private property, and horse trails. Additionally, the river supplies freshwater to the estuary, which is listed as a state and a federal park where visitors could come into contact with the water. The standard for contact recreation is 33 CFU for Enterococci and 126 CFU for E. coli. Meanwhile, Mexican regulations in NOM-001-SEMARNAT-1996 establish a limit for Fecal Coliforms of 1,000 MPN/100 mL monthly average and 2,000 MPN/100 mL daily average, and under the CE-CCA, the maximum level is 200 MPN/100 mL.

Similarly, as mentioned in the results for the Pathogens in the Canyons, IBWC Minute 270 establishes a maximum value of 10,000 organisms per 100 mL for single samples in the coastal receiving waters of the Pacific Ocean at the international boundary line. This criterion could be applicable for the comparison of the results of this study, because, under high flow regimes, the waters of the Tijuana River reach the Pacific Ocean where flows would eventually reach the area of the international boundary line due to the ocean currents in this area that regularly go south.

The following graph compares the results in this study for Total Coliforms in the Tijuana River, from the PB-CILA monitoring site to its mouth in the Pacific Ocean, to those obtained during the same period as part of the Minute 270 monitoring of the coastal waters in the area between the mouth of the river and the international border. The graph shows the importance of the PB-CILA defensive system which removes flows from the Tijuana River during the dry season (when the flow in the river is less than 1,000 lps), as well as the existing defensive system in the Canyons. It can be seen that even in dry weather, high levels of Total Coliforms were detected in the waters of the Tijuana River at the PB-CILA intake during the 12 months of sampling; whereas, in the results from the Minute 270 monitoring of the coastal waters in the dry months dropped to minimum levels due to the bypassing of the waters from the Tijuana River.

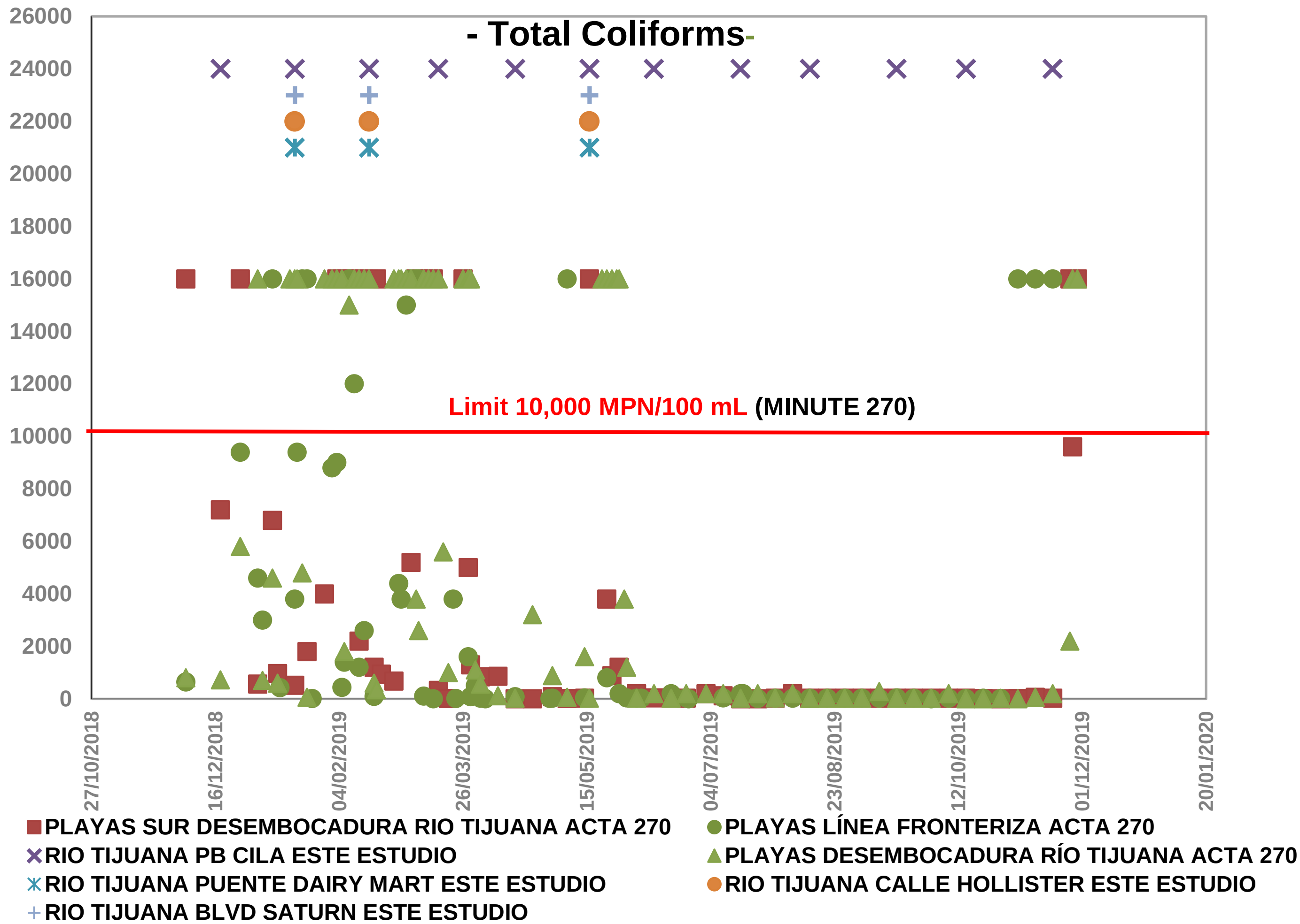

Figure 30. Comparative graph of the results of this study for Total Coliforms in the Tijuana River compared to those obtained through the Minute 270 monitoring of coastal waters. NOTE: The values plotted on the graph that are equal to or greater than 16,000 are actually higher but were plotted on the graph like this for comparison purposes only.

None of the sampling results for the Tijuana River and the Alamar River, however, met any of the indicator bacteria standards established in the regulations of either country, nor the international criteria for Total Coliforms established in Minute 270, including those corresponding to rains events, which did not reduce the high levels of pathogens. During this study, the Tijuana River was also tested for *Vibrio Cholerae* (Cholera). All of the sites and samples tested negative for cholera except for two samples. The two positive findings for cholera were detected in the samples collected by the U.S. laboratory for the months of October and November 2019, at the monitoring site for the Tijuana

River at the PB-CILA diversion structure. Cholera is an acute, diarrheal illness that is usually found in water or food sources that can be further transmitted through contaminated wastewater. Cholera symptoms have a very wide range from no effect to mild to very severe.

Salinity

Most salt in surface water is the result of discharges from agricultural and/or residential wastewater. Typical salinity levels in wastewater are usually greater than 1,500 ppm, which is comparable to the levels found in most of the samples collected in the Tijuana River and Alamar River. As expected, the monitoring site on the Tijuana River that recorded the highest levels of TDS was the one located near the mouth to the Pacific Ocean, where values of more than 20,000 ppm were obtained due to the tidal influences of the saline marine waters on this site.

California's Water Quality Objectives do not have set limits on salts in the Tijuana River given the river is not used as a drinking water source. Likewise, there are no established limits for TDS in the CE-CCA criteria nor NOM-001-SEMARNAT-1996; however, high levels of salts in the Tijuana River demonstrate impacts from human sources.

Bis (2-ethylhexyl) Phthalate

DEHP, as noted previously, was found at levels exceeding the U.S. Water Quality Objectives at all of the Canyon sites but are below the limits established for Mexico. DEHP is highly persistent in the environment and easily transported. Because it is used in plastics production, it is found throughout the world in many products. Plastics can leach DEHP over time when improperly disposed of and allowed to remain in the environment without removal to a lined landfill to prevent leaching. Industries that produce plastics also can introduce DEHP to the environment, if improperly disposed of into wastewater systems, as treatment plants do not remove DEHP effectively.

The San Diego Basin Plan establishes a limit for DEHP of 4 ppb for inland waters to include the Tijuana River, and Mexico's CE-CCA establish a maximum level of 29.44 ppb for the protection of marine aquatic life. The following DEHP concentrations were found in the baseline monitoring for the month of May 2019: In the Alamar River, 1.79 ppb; in the Tijuana River upstream of the Alamar River, 5 ppb; and in the Tijuana River at the PB-CILA diversion structure, 1.95 ppb, most likely from dilution by water from the Alamar River. Dairy Mart Bridge in the United States, however, had a value of 6.3 ppb. After a storm event, large volumes of solid waste containing mostly plastic products settle at this location. Often, this solid waste remains in the flood plain for a longer period of time. The remaining Tijuana River downstream monitoring sites have values from 3 to 5 ppb for DEHP before entering the ocean.

Metals

Typical Tijuana wastewater has average metals concentrations of copper at 30 ppb, nickel at 30 ppb, and zinc at 90 ppb. The California Ocean Plan sets limits on the concentrations of these metals at 3, 5, and 20 ppb respectively. For the Tijuana River, it is listed as a freshwater habitat, which limits those three metals to 7.5, 653, and 54 ppb respectively using the USEPA National Ambient Water Quality Criteria for freshwater aquatic life protection. Additionally, Mexico's CE-CCA for the protection of marine aquatic life establish maximum levels of 3, 8 and 90 ppb, for each of them respectively, and in NOM-001-SEMARNAT-1996 the limits are 6, 4 and 20 mg/L, respectively.

As noted, the waters of the Tijuana River in Mexico near the international border consists primarily of treated effluent and freshwater sources, but they do contain some proportion of untreated wastewater. After the Tijuana River crosses the border into the United States, there are no other sources of metals entering the river, therefore the values for metals did not increase at the downstream sampling locations. Values for copper exceeded the standards for both countries at all river locations and like other parameters had lower values in the Alamar River than the Tijuana River before combining. Values from the border to the ocean remained similar. For nickel, the values in the Alamar River were higher than the Tijuana River and remained around 20 ppb at all downstream stations. The concentration of zinc was 100 ppb for the Alamar River upstream of the confluence and was 200 ppb for the Tijuana River upstream of the confluence with the Alamar River. The concentration decreased to 79 ppb at the border at the PB-CILA intake, and then drops to 20 ppb at the U.S. monitoring stations for Hollister Street and Saturn Blvd and was not detected at the mouth of the river.

For the metals it is also important to highlight the absence of Hexavalent Chromium in all of the water samples collected in the Tijuana River. Hexavalent chromium, also known as Chromium 6 (Cr6), is the toxic form of the metal chrome and is produced mainly by industrial processes.

Organic Compounds

The pesticide Dalapon was detected in minimal quantities during the baseline sampling at all three sites in the Tijuana-Alamar River in Mexico; however, none of the pesticides analyzed were present in the baseline sampling at any of the Tijuana River sites in the U.S. There is no current standard for Dalapon in either country.

Other organics found in the river samples were some of the same low-level detections that were also found in the Canyons and so they are probably sourced from the introduction of untreated wastewater into the Tijuana River. Some of the organics detected are other chemicals used in the production of plastics that can leach from plastics when in the environment, such as diethyl phthalate and di-n-butyl phthalate.

Trihalomethanes are byproducts from the use of chlorine and the presence of organic material in water. Chlorine is commonly used for disinfection in wastewater treatment plant effluent and creates trihalomethanes in the effluent and receiving streams. Trihalomethanes are environmental pollutants and many are listed as carcinogenic. The monitoring sites from the PB-CILA intake down to Hollister had detectable levels of Trihalomethanes. This could be due to the chlorine disinfection used by the treatment plants discharging into the Tijuana River. The California Ocean Plan limits trihalomethanes to 130 ppb, while in Mexico there are no criteria for this parameter. All of the concentrations for stations sampled in the river were less than 1 ppb.

Other organics detected were Toluene in the Alamar River and Phenol in the Tijuana River above the confluence, but in concentrations below any established criteria. The Tijuana River at Hollister

Street monitoring station had detection for methyl ethyl ketone, acetone, toluene, and methyl chloride, but these were not detected at other sites. The concentrations of these organics were also too low to be of any significance or actionable.

Sediment assessment for the Tijuana River stations

Sediment samples in the Tijuana and Alamar Rivers were collected only during baseline sampling in May 2019. Parameters analyzed in sediment are listed in Appendix A of this report, those that were not detected are listed in Appendix B, and the laboratory results of only the detected parameters are listed in Appendix C. Parameters assessed included pathogens, metals, and organic compounds. Sediment was sampled to assess impacts to soil from chemical parameters present in the surface water flows. Soils retains certain chemical constituents longer than water; therefore, they can act as a record of past exposure to these chemicals. It can also provide information on chemical retention in the soil that can lead to impacts to future rain events, soil remediation requirements, and groundwater introduction of these chemicals.

Fecal Coliforms and Enterococci were present in all the sediment samples collected in the Tijuana River. At the monitoring sites in Mexican territory, Fecal Coliforms were present at levels up to 5,600 MPN/100 mL; then, the values increased to 750,000 colonies at the Dairy Mart Bridge, and fell to 90,000 colonies at Hollister Blvd. Fecal Coliforms and Enterococci were present in all the sediment samples collected in the Tijuana River. At the mouth of the river, Fecal Coliforms fell to a value of 580 and Enterococcus had a value of 260 MPN/100 ml. There was a detection of helminth ova at Dairy Mart Bridge and salmonella was present in all of the U.S. river sampling sites.

For all of the river monitoring sites, the sediment column contained the presence of heavy metals. In almost every case, values decreased at each subsequent downstream site with a few becoming non-detectable by the time it reaches the ocean.

Organic parameters exhibited the same behavior with values declining as you move downstream. These parameters do not have environmental standards in the regulations of the two countries to compare against and determine exceedances.

4.9 SUMMARY OF TIJUANA RIVER STATIONS ASSESSMENT

Like the Canyons and Drains, the samples from the Tijuana River showed the presence of untreated wastewater ; however, because of the high flows of treated effluent and naturally sourced water in the river, the concentrations of many of the parameters was lower than those detected in the Canyons and Drains because of dilution.

The results obtained were compared to the criteria established in the applicable regulations of both countries: from Mexico, the CE-CCA for recreational use with primary contact and for the protection of marine aquatic life, and to the limits in NOM-001-SEMARNAT-1996 for discharges into rivers and for protection of aquatic life; and from the United States, to the San Diego Basin Water Quality Objectives, as well as the California Ocean Plan standards. For all of the river sites, parameters that exhibited higher than normal values were ammonia, Biochemical Oxygen Demand, phosphorous, surfactants (MBAS), and bacteria. These are all parameters indicative of untreated wastewater entering the system. Additionally, metals present at levels of concern are copper, nickel and zinc, all of which are used in metals plating industries.

Also, it is important to note that no sample collected by Mexico and the United States in the Tijuana River and Alamar River detected the presence of toxic parameters of concern such as Hexavalent Chromium or the carcinogenic pesticides DDT and Aldrin.

Organics and pesticides were also analyzed in the river samples, with just a few parameters detected and with most of the detected levels very low and of no concern. Like in the Canyons and Drains, bis (2-ethylhexyl) phthalate was persistent at all of the monitoring sites and exceeded the standards of the regulations applicable in the United States, but not those applicable in Mexico. This organic compound may be sourced from the chemical leaching from plastics and solid waste discarded in the river.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The source of the high levels of indicator parameters for untreated wastewater detected in this study in the Tijuana River and its tributaries, particularly coliform bacteria, is attributed to uncontrolled spills from the city of Tijuana’s sewage sanitation system, because they were compared and found to be similar to those historically detected in the analyses of the SBIWTP influent. This highlights the importance of allocating increased resources and assistance for the construction, rehabilitation, and proper operation of sewage, pumping, and wastewater treatment systems in the city of Tijuana.

Likewise, the presence of metals commonly used in metal plating industries, such as copper, nickel and zinc, and chemical constituents for plastics or polymers, such as DEHP, indicate the need for improvement of the pre-treatment and control of industrial wastewater discharges in the region, for allocation of greater resources toward solid waste disposal in the Tijuana River and its tributaries on both sides of the border, as well as to prevent the introduction of solid waste into channels in the basin.

Finally, it is recommended and very important to continue with the joint monitoring and observation of the quality of the waters of the Tijuana River and its tributaries, through field inspections to detect and address wastewater discharges in a timely manner, and by establishing a permanent water quality monitoring program developed using the results of this study and focused on the systematic collection of data for the constituents of greatest concern. This type of permanent monitoring program could be established through an IBWC agreement in order to combine efforts and resources from both countries and ensure their permanent funding.

REFERENCES

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Official Gazette of the Federation (OGF). (1989). Decree establishing the CE-CCA-001/89 Ecological Water Quality Criteria.

Official Mexican Standard NOM-001-SEMARNAT-1996, which establishes the maximum allowable levels of contaminants in wastewater discharges into national waters or assets (published in the Official Gazette of the Federation on January 6, 1997).

IBWC Minute 270, *Recommendations for The First Stage Treatment and Disposal Facilities for The Solution of The Border Sanitation Problem at San Diego, California-Tijuana, Baja California,* April 30, 1985

IBWC Minute 283, *Conceptual Plan for The International Solution to The Border Sanitation Problem in San Diego, California/Tijuana, Baja California*, July 2, 1990

APPENDICES

Appendix A. List of Parameters Tested

Appendix B. List of Parameters Tested Not Detected

Appendix C. Laboratory Results for the Detected Parameters

Excel files containing all of the Tijuana River and the adjacent Canyon and Drain data analyzed by the US and Mexican laboratories is available for download at the IBWC project websites.
US Site: https://ibwc.gov/Organization/Environmental/Minute320.html
Mexican Site: https://cila.sre.gob.mx/cilanorte/

Appendix A. Parameters analyzed in water and sediment

PARAMETER	EPA Method/Standard Method	PARAMETER	EPA Method/Standard Method
Water Sampling/Analytical Parameters			
Conventional			
Total Solids		Total Phosphorous	4500-P-F
Total Suspended Solids (TSS)	160.2 or sm2540	Total Phosphorous as PO4	4500-P-B-5E
Volatile Suspended Solids (VSS)		Orthophosphates	4500-P, 4110B
Total Dissolved Solids (TDS)	160.1	Alkalinity	2320B
Electrical Conductivity	sm2510 B	Total Hardness ($CaCO_3$)	2340 B, C
pH	4500H B	Sulfurs	376.1 or SM4500 s,c,d
Dissolved Oxygen	4500-O-C or G	Chlorine, Total Residual	330.5, H8167
Temperature	SM2550	Fluorides	300, 340.2
Carbonaceous Biochemical Oxygen Demand (5-Day) CBOD	405.1 or 5210B	Fluorine	Calculation
Biochemical Oxygen Demand (5-day) BOD_5	405.1	Surfactants (MBAS)	5540C
Chemical Oxygen Demand (COD)	5220 D	Fats and greases	1664A
Total Organic Carbon (TOC)	sm5310 B,C,D	Chlorophyll	10200-H
Total Nitrogen		Sodium	200.8
Ammonia	350.1	Potassium	200.8
Total Kjeldahl Nitrogen	351.3	Calcium	200.8
Nitrates	300	Magnesium	200.8
Nitrites	300	Chlorides	300
Orthophosphorous	4500-P-E	Sulfates	300
Pathogens			
E. coli	1603	Enterococcus	
Total Coliforms	SM 9223-B-b	Cholera	SM 9260
Fecal Coliforms		Norovirus GIA	1615
Camphylobacter		Norovirus GIB	1615
Entieric Virus	1615	Norovirus GII	1615
Metals			
Aluminum	200.7	Lead	200.7
Antimony	200.9	Manganese	200.8
Arsenic	200.9	Nickel	200.7
Barium	200.7	Selenium	200.9
Beryllium	200.7	Silver	200.8
Boron	200.7	Thallium	200.9
Cadmium	200.8	Zinc	200.8
Chromium (Total)	200.7	Hexavalent Chromium (VI+)	H8023
Copper	200.8	Mercury	245.1 or 1631E
Iron	200.8	Cyanides (Complexes as Ion +)	335.4 / 4500CN-C, E
Organics			
1,2 Diphenylhydrazine	625	N-Nitrosodimethylamine	625
2,4 Dinitrophenol	625	p-bromodiphenyl ether	625
2,4,6-Trichlorophenol	625	p-Chloro-m-cresol	625
3,3-Dichlorobenzidine	625	Pentachlorophenol	625
4.6-dinitro-o-cresol	625	Phenanthrene	625
Alachlor	525	2,3,7,8-TCDD(Dioxin)	8280A
Benzo(a)anthracene	625	4,4-DDD	608
Benzidine	625	4,4-DDE	608
Benzo(a)pyrene	625	4,4-DDT	608
Benzo(b)fluoranthene	625	Aldrin	608

PARAMETER	EPA Method/Standard Method	PARAMETER	EPA Method/Standard Method
Organics			
Benzo(k) fluoranthene	625	Chlordane	608
Bis(2-chloroethyl) ether	625	Dieldrin	608
Bis(2-ethylhexyl) phthalate	625	Endosulfan (total)	608
Chrysene	625	Endosulfan sulfate	608
Di(2-ethylhexyl) phthalate [bis (2-ethylhexyl) phthalate]	625	Endrin	608
Dibenzo (a,h) anthracene (PAH)	625	Endrin aldehyde	608
di-n-butylphthalate	625	Heptachlor	608
Hexachlorobutadiene	625	Heptachlor epoxide	608
Hexachlorocyclopentadiene	625	Toxaphene	608
Indeno(1,2,3 cd)pyrene	625	PCB-1242	
PCB's (Archlor)	608	PCB-1248	
PCB-1016		PCB-1254	
PCB-1221		PCB-1260	
PCB-1232		Methylene Chloride	624
Pesticides			
1,2-cis-dichloroethylene		Alpha Hexachlorocyclohexane {BHC-alpha}	608
1,2-Dibromo-3-chloropropane	8270	Beta Hexachlorocyclohexane {BHC-beta}	608
1,2-dibromomethane	8011	Delta Hexachlorocyclohexane {BHC-delta}	608
2-(2,4,5-trichlorophenoxy) propionic acid {Silvex}	515.1	Gamma Hexachlorocyclohexane {Lindane}	608
2,4-Dichlorophenoxyacetic acid (2,4-D)	8150	Methoxychlor	608
Dinoseb		Toxaphene	608
Dalapon	615, 515	Alachlor	
Picloram	515.1	Atrazine	608
2,3,7,8-TCCD (dioxin)	613	Barium (as Ba)	200.7
4,4-DDD	608	Boron	200.7
4,4-DDE	608	Carbofuran	5,318,270
4,4-DDT	608	Di (2-ethylhexyl) adipate	
Aldrin	608	Diquat	549.1
Dieldrin	608	Endothall	548.1
Endosulfan (Total)	608	Glyphosate	547
Endosulfan sulfate	608	Oxamyl	531
Endrin	608	Simazine	
Endrin aldehyde	608	Styrene	8260
Heptachlor	608	Xylene	
Heptachlor epoxide	608		
BNA			
Acenaphthene	625	2-Chlorophenol	
Acenaphthylene	625	2,4-Dichlorophenol	625
Anthracene	625	Diethyl phthalate	625
Benzidine	625	Dimethyl phthalate	625
Benzo(a)anthracene	625	2,4-Dimethylphenol	625
Benzo(a)pyrene	625	4,6-Dinitro-o-cresol	625
3,4 benzo(ghi)perylene	625	2,4-Dinitrophenol	625
Benzo(k) fluoranthene	625	2,4-Dinitrotoluene	625
Bis(2-chloroethoxy)methane	625	2.6-Dinitrotoluene	625
Bis(2-chloroethyl) ether	625	1,2 Diphenylhydrazine	625
Bis(2-chloroisopropyl) ether	625	Fluoranthene	625
Bis (2-ethylhexyl) Phthalate	625	Fluorene	625
p-Bromodiphenyl ether (4-Bromophenyl phenyl ether)	625	Hexachlorocyclopentadiene	625
Benzyl butyl phthalate	625	Hexachlorobutadiene	625

PARAMETER	EPA Method/Standard Method	PARAMETER	EPA Method/Standard Method
BNA			
4-Chlorophenyl Phenyl Ether	625	Indeno(1,2,3-cd)pyrene	625
Chrysene	625	Isophorone	625
Di-n-butyl phthalate	625	2-Methyl-4,6-Dinitrophenol	625
Di-n-octyl phthalate	625	Naphthalene	625
Dibenzo(a,h)anthracene	625	N-nitrosodi-n-propylamine	625
1,2-dichlorobenzene	625	N-Nitrosodimethylamine	625
1,3-Dichlorobenzene	625	2-Nitrophenol	625
1,4-dichlorobenzene	625	4-Nitrophenol	625
3,3-dichlorobenzidine	625	Nitrobenzene	625
p-Chloro-m-cresol (4 Chloro-3-methylphenol)	625	N-Nitrosodifenylamine	625
Pentachlorophenol	625	Ethylbenzene	625
Phenanthrene	625	Hexachlorobenzene	625
Phenol	625	1,2,4-Trichlorobenzene	625
Pyrene	625	2,4,6-Trichlorophenol	625
Di (2-ethylhexyl) phthalate	625		
Volatile			
1,1,1-Trichloroethane	624	Carbon tetrachloride	624
1,2,2,2-Tetrachloroethane	624	Chlorobenzene	624
1,1,2-Trichloroethane	624	Chlorodibromomethane	624
1,1-dichloroethane	624	Chloroethane	624
1,1-Dichloroethylene	624	Chloroform	624
1,2-Dichloroethane	624	Chloromethane (Methyl Chloride)	624
1,2-Dichloropropane	624	cis-1,2-Dichloroethylene	624
1,2-trans-Dichloroethylene	624	Dichlorobromomethane	624
1,3-Dichloropropene	624	Dichloromethane (Methylene chloride)	624
1,3-dichloropropylene	624	Ethylbenzene	624
2-Chloroethyl vinyl ether	624	Tetrachloroethylene	624
Acrolein	624	Toluene	624
Acrylonitrile	624	Trichloroethylene	624
Benzene	624	Total THMs	
Bromoform	624	Vinyl Chloride	624
Bromomethane (Methyl Bromide)	624		
Additional parameters added after initial sampling plan			
2-Butanone (MEK)	624	2-MethtylPhthalene	625
2-Methylphenol (O-Cresol)	625	2-Nitroaniline	625
2,4,5-T (2,4,5-trichlorophonoxyacetic acid)	515.4	2,4,5-Triclorophenol	625
3+4-Methylphenol (m & p- Cresol)	625	3-Nitroaniline	625
4-Cloroaniline	625	Dibenzofuran	625
4-Nitroaniline	625	Dicamba	515.4
Acetone	624	Endrin Cetona	608
Bentazone	515.4	Hidróxido	SM 2320-B
Benzoic Acid	625	Methyl-t-butyl ether (MTBE)	624
Benzyl Alcohol	625	Percent Solids	SM 2540-B
Bicarbonate (HCO_3)	SM 2320-B	Pyridine	625
Carbonate (CO_3)	SM 2320-B		

PARAMETER	EPA Method/Standard Method	PARAMETER	EPA Method/Standard Method
Sediment Sampling/Analytical Parameters			
Volatile 624			
Antimony	200.7 or 6010A	Thallium	200.7 or 6010A
Aluminum	200.7 or 6010A	Zinc	200.8
Arsenic	200.7 or 6010A	Metals TCLP	200.7 or 6010A
Barium	200.7 or 6010A	Mercury	7470A or 7471
Beryllium	200.7 or 6010A	TCLP (metals and organics)	1311 (extraction)
Cadmium	200.7 or 6010A	Cyanide	335.4
Chromium	200.7 or 6010A	Ammonia	350.1
Copper	200.7 or 6010A	Total Kjeldahl Nitrogen	351.3
Lead	200.7 or 6010A	Organic Nitrogen	351.3
Nickel	200.7 or 6010A	Ammonia	350.1
Selenium	200.7 or 6010A	Nitrates	300
Silver	200.7 or 6010A	Percentage of Solids	SM2540 G
Molybdenum	200.7 or 6010A		
Pathogens			
Fecal Coliforms	9222D	Helminth eggs [parasites]	
Salmonella	1600	Enterococcus	
Enteric Virus			
Organic Compounds in Sediments			
Aldrin	8081	Beta Hexachlorocyclohexane {BHC-beta}	8081
Dieldrin	8081	Delta Hexachlorocyclohexane {BHC-delta}	8081
Chlordane	8081	Gamma Hexachlorocyclohexane {Lindane, BHC-gamma)	8081
4,4-DDT	8081	Toxaphene	8081
4,4-DDE	8081	PCB 1016	8082
4,4-DDD	8081	PCB 1221	8082
Alpha-Endosulfan	8081	PCB 1232	8082
Beta-Endosulfan	8081	PCB 1242	8082
Endosulfan sulfate	8081	PCB 1248	8082
Endrin	8081	PCB 1254	8082
Endrin aldehyde	8081	PCB 1260	8082
Heptachlor	8081	2,4-D	8151
Heptachlor epoxide	8081	2,4,5-TP (Silvex)	8151
Alpha Hexachlorocyclohexane {BHC-alpha}	8081		
Base/Neutral Extractables			
Acenaphthene	8270	3,3-Dichlorobenzidine	8270
Benzidine	8270	2,4-Dinitrotoluene	8270
1,2,4-Trichlorobenzene	8270	2,6-Dinitrotoluene	8270
Hexachlorobenzene	8270	1,2-Diphenylhydrazine	8270
Hexachloroethane	8270	Fluoranthene	8270
Bis(2-Chloroethyl) ether	8270	4-Chlorophenyl Phenyl Ether	8270
2-Chloronaphthalene	8270	4-Bromophenyl phenyl ether	8270
1,2-Dichlorobenzene	8270	Bis(2-chloroisopropyl) ether	8270
1,3-Dichlorobenzene	8270	Bis(2-Chloroethyl) Methane	8270
1,4-Dichlorobenzene	8270	Hexachlorobutadiene	8270
Hexachlorocyclopentadiene	8270	Benzo(a)anthracene	8270
Isophorone	8270	Benzo(a)pyrene	8270
Naphthalene	8270	3,4-Benzofluoranthene	8270
Nitrobenzene	8270	11,12-Benzofluoranthene	8270
N-Nitrosodimethylamine	8270	Chrysene	8270
N-Nitrosodifenylamine	8270	Acenaphthylene	8270
N-nitrosodi-N-Propylamine	8270	Anthracene	8270
Bis(2-ethylhexyl) Phthalate	8270	Benzo(g,h,i)perylene	8270
N-Benzyl butyl phthalate	8270	Fluorene	8270
Di-n-butyl phthalate	8270	Phenanthrene	8270
Di-n-octyl phthalate	8270	Dibenzo(h) anthracene	8270
Diethyl phthalate	8270	Indeno(1,2,3-cd)pyrene	8270
Dimethyl phthalate	8270	Pyrene	8270

VOCs			
Acrolein	624	1,2-Dichloropropane	624
Acrylonitrile	624	1,2-Dichloropropene	624
Benzene	624	Ethylbenzene	624
Carbon Tetrachloride	624	Methylene Chloride	624
Chlorobenzene	624	Methyl Chloride	624
1,2-Dichloroethane	624	Methyl Bromide	624
1,1,1-Trichloroethane	624	Bromoform	624
1,1-Dichloroethane	624	Bromodichloromethane	624
1,1,2-Trichloroethane	624	Dibromochloromethane	624
1,2,2,2-Tetrachloroethane	624	Tetrachloroethylene	624
Chloroethane	624	Toluene	624
2-Chloroethyl vinyl ether	624	Trichloroethylene	624
Chloroform	624	Vinyl Chloride	624
1,1-Dichloroethylene	624	2,3,7,8-TCCD (dioxin)	8280, 8290, or 613
1,2-Trans-Dichloroethylene	624		

Appendix B. List of Parameters Tested Not Detected

PARAMETER	EPA Method/Standard Method	PARAMETER	EPA Method/Standard Method
Water Sampling/Analytical Parameters			
Metals			
Beryllium	200.7		
Organics			
1,2 Diphenylhydrazine	625	N-Nitrosodimethylamine	625
2,4 Dinitrophenol	625	p-bromodiphenyl ether	625
3,3-Dichlorobenzidine	625	p-Chloro-m-cresol	625
4.6-dinitro-o-cresol	625	2,3,7,8-TCDD(Dioxin)	8280A
Alachlor	525	4,4-DDD	608
Benzo(a)anthracene	625	4,4-DDE	608
Benzidine	625	4,4-DDT	608
Benzo(a)pyrene	625	Aldrin	608
Chrysene	625	Chlordane	608
Dibenzo (a,h) anthracene (PAH)	625	Endosulfan sulfate	608
Hexachlorobutadiene	625	Endrin	608
Hexachlorocyclopentadiene	625	Heptachlor	608
Toxaphene	608	Heptachlor epoxide	608
PCB's (Archlor)	608	PCB-1242	608
PCB-1016	608	PCB-1248	608
PCB-1221	608	PCB-1254	608
PCB-1232	608	PCB-1260	608
Pesticides			
1,2-cis-dichloroethylene		Alpha Hexachlorocyclohexane {BHC-alpha}	608
1,2-Dibromo-3-chloropropane	8270	Beta Hexachlorocyclohexane {BHC-beta}	608
1,2-dibromomethane	8011	Gamma Hexachlorocyclohexane {Lindane}	608
2-(2,4,5-trichlorophenoxy) propionic acid {Silvex}	515.1	Methoxychlor	608
Dinoseb		Toxaphene	608
Picloram	515.1	Alachlor	
2,3,7,8-TCCD (dioxin)	613	Atrazine	608
4,4-DDD	608	Di (2-ethylhexyl) adipate	
4,4-DDE	608	Diquat	549.1
4,4-DDT	608	Oxamyl	531
Aldrin	608	Simazine	
Dieldrin	608	Styrene	8260
Endosulfan (Total)	608	Heptachlor	608
Endosulfan sulfate	608	Heptachlor epoxide	608
Endrin	608	Dieldrin	608
BNA			
Anthracene	625	2-Chlorophenol	
Benzidine	625	2,4-Dimethylphenol	625
Benzo(a)anthracene	625	4,6-Dinitro-o-cresol	625
p-Bromodiphenyl ether (4-Bromophenyl phenyl ether)	625	2,4-Dinitrophenol	625
Beta chloronaphthalene (2-chloronaphthalene)	625	2,4-Dinitrotoluene	625
4-Chlorophenyl Phenyl Ether	625	2.6-Dinitrotoluene	625
1,2-dichlorobenzene	625	1,2 Diphenylhydrazine	625
1,3-Dichlorobenzene	625	Fluorene	625
3,3-dichlorobenzidine	625	Hexachlorocyclopentadiene	625
p-Chloro-m-cresol (4 Chloro-3-methylphenol)	625	Hexachlorobutadiene	625
N-Nitrosodifenylamine	625	Hexachloroethane	625
Hexachlorobenzene	625	N-Nitrosodimethylamine	625

PARAMETER	EPA Method/Standard Method	PARAMETER	EPA Method/Standard Method
Volatile			
1,2,4-Trichlorobenzene	625	2-Nitrophenol	625
1,1,1-Trichloroethane	624	Acrylonitrile	624
1,2,2,2-Tetrachloroethane	624	Bromomethane (Methyl Bromide)	624
1,1-dichloroethane	624	Chlorobenzene	624
1,1-Dichloroethylene	624	Chloroethane	624
1,2-Dichloroethane	624	Chloromethane (Methyl Chloride)	624
1,2-Dichloropropane	624	cis-1,2-Dichloroethylene	624
1,2-trans-Dichloroethylene	624	Dichloromethane (Methylene chloride)	624
1,3-Dichloropropene	624	Tetrachloroethylene	624
1,3-dichloropropylene	624	Toluene	624
2-Chloroethyl vinyl ether	624	Trichloroethylene	624
Acrolein	624	Vinyl Chloride	624
Additional parameters added after initial sampling plan			
2,4,5-T (2,4,5-triclorophenoxyacetic acid)	515.4	2-Nitroanaline	625
4-Cloroanaline	625	2,4,5-Triclorophenol	625
4-Nitroanaline	625	3-Nitroanaline	625
Bentazone	515.4	Dibenzofuran	625
Benoic Acid	625	Endrin Cetona	608
Pyridine	625		

Sediment Sampling/Analytical Parameters			
Metals			
Aluminum	200.7 or 6010A	Metals TCLP	200.7 or 6010A
TCLP (metals and organics)	1311 (extraction)		
Organic Compounds in Sediments			
Aldrin	8081	Beta Hexachlorocyclohexane {BHC-beta}	8081
Dieldrin	8081	Delta Hexachlorocyclohexane {BHC-delta}	8081
Chlordane	8081	Gamma Hexachlorocyclohexane {Lindane, BHC-gamma)	8081
Alpha-Endosulfan	8081	Toxaphene	8081
Beta-Endosulfan	8081	PCB 1016	8082
Endosulfan sulfate	8081	PCB 1221	8082
Endrin	8081	PCB 1232	8082
Endrin aldehyde	8081	PCB 1242	8082
Heptachlor	8081	PCB 1248	8082
Heptachlor epoxide	8081	PCB 1254	8082
Alpha Hexachlorocyclohexane {BHC-alpha}	8081	PCB 1260	8082
2,4,5-TP (Silvex)	8151	2,4-D	8151
Base/Neutral Extractables			
Acenaphthene	8270	3,3-Dichlorobenzidine	8270
Benzidine	8270	2,4-Dinitrotoluene	8270
1,2,4-Trichlorobenzene	8270	2,6-Dinitrotoluene	8270
Hexachlorobenzene	8270	1,2-Diphenylhydrazine	8270
Hexachloroethane	8270	Fluoranthene	8270
Bis(2-Chloroethyl) ether	8270	4-Chlorophenyl Phenyl Ether	8270
2-Chloronaphthalene	8270	4-Bromophenyl phenyl ether	8270
1,2-Dichlorobenzene	8270	Bis(2-chloroisopropyl) ether	8270
1,3-Dichlorobenzene	8270	Bis(2-Chloroethyl) Methane	8270
1,4-Dichlorobenzene	8270	Hexachlorobutadiene	8270
Hexachlorocyclopentadiene	8270	Benzo(a)anthracene	8270
Isophorone	8270	Benzo(a)pyrene	8270
Nitrobenzene	8270	3,4-Benzofluoranthene	8270
N-Nitrosodimethylamine	8270	11,12-Benzofluoranthene	8270
N-Nitrosodifenylamine	8270	Chrysene	8270
N-nitrosodi-N-Propylamine	8270	Acenaphthylene	8270
Di-n-octyl phthalate	8270	Anthracene	8270
Diethyl phthalate	8270	Benzo(g,h,i)perylene	8270
Dimethyl phthalate	8270	Fluorene	8270
Pyrene	8270	Phenanthrene	8270
Indeno(1,2,3-cd)pyrene	8270	Dibenzo(h) anthracene	8270
VOCs			
Acrolein	624	1,1-Dichloroethylene	624
Acrylonitrile	624	1,2-Trans-Dichloroethylene	624
Carbon Tetrachloride	624	1,2-Dichloropropane	624
Chlorobenzene	624	1,2-Dichloropropene	624
1,2-Dichloroethane	624	Methyl Bromide	624
1,1,1-Trichloroethane	624	Bromoform	624
1,1-Dichloroethane	624	Bromodichloromethane	624
1,1,2-Trichloroethane	624	Dibromochloromethane	624
1,2,2,2-Tetrachloroethane	624	Trichloroethylene	624
Chloroethane	624	Vinyl Chloride	624
2-Chloroethyl vinyl ether	624		

Appendix C. Laboratory Results for the Detected Parameters

The data below contains the results of the laboratory analyses from both the United States and Mexico for the sampling events. Columns containing reference information are included. The reference columns give values for the wastewater characteristic of the City of Tijuana, as determined by averaging the influent from the SBIWTP; the limits established for the California Ocean Plan; the Water Quality Objectives (WQOs) for the Tijuana River in the United States; Mexico’s CE-CCA Ecological Water Quality Criteria, and the limits in the Official Mexican Standard NOM-001-SEMARNAT-1996 Blank cells indicate there is no standard or no data for that parameter.

Data cells containing NS mean that the site was not sampled for that parameter. Data cells containing ND means a test had no detection. For parameters that were not detected at their minimum detection limit, a less than the minimum detection limit is used.

Blue columns represent samples collected during a rain event; remaining columns are dry weather events.

Sediment data from Canyon and Drain Sampling Locations

Parameter	Analyte	Analytical Method	Units	Yogurt Canyon - Los Sauces							Goat Canyon - Los Laureles									
				USA			MÉXICO 1	MÉXICO 2	MÉXICO 1	MÉXICO 2	USA 1			USA 2			MÉXICO 1	MÉXICO 2	MÉXICO 1	MÉXICO 2
				DEC-18	FEB-19	MAY-19	DEC-18	DEC-18	MAY-19	MAY-19	DEC-18	FEB-19	MAY-19	DEC-18	FEB-19	MAY-19	DEC-18	DEC-18	MAY-19	MAY-19
Conventional	Ammonium-N (as NH4)	SM 4500-NH3-G	mg/Kg	26.8	22.6	24.8	NS	NS	NS	NS	18.6	19.5	25.5	26.7	16.6	38.1	NS	NS	NS	NS
Conventional	Nitrate-N	EPA 300	mg/Kg	NS	2.15	2.15	NS	NS	NS	NS	NS	1.43	4.31	NS	2.38	8.9	NS	NS	NS	NS
Conventional	Organic-N	EPA 351.3	mg/Kg	NS	362	339	NS	NS	NS	NS	NS	69.7	273	NS	75.8	333	NS	NS	NS	NS
Conventional	Percent solids (Total Solids)	SM 2540-G	%	78.3	79.1	80.4	64.2	72.6	61.2	70.8	73.5	69.7	82.4	78.9	75.8	74.3	85.3	63.8	77.6	69.6
Metals	Aluminum	EPA 6010B	mg/Kg	10800	NS	NS	NS	NS	NS	NS	4400	NS	NS	4330	NS	NS	NS	NS	NS	NS
Metals	Antimony	EPA 200.7	mg/Kg	NS	<0.47	4.47	<2.85	<2.85	<3.42	<3.42	NS	<0.53	3.16	NS	<0.49	3.69	<2.85	<2.85	<3.42	<3.42
Metals	Arsenic	EPA 6010B	mg/Kg	2.44	2.28	1.93	<2.98	<2.98	<1.0	<1.0	1.33	4.36	2.13	3.04	0.55	4.92	<2.98	<2.98	<1.0	<1.0
Metals	Barium	EPA 6010B	mg/Kg	99.7	71.2	40.7	74.63	53.76	71.51	58.23	33.6	115	38.1	53.5	54.0	103	16.2	74.97	69.03	46.45
Metals	Beryllium	EPA 6010B	mg/Kg	<0.22	<0.21	<0.21	<0.6376	<0.6376	<1.0	<1.0	< 0.23	< 0.24	< 0.21	< 0.22	< 0.22	< 0.23	<0.6376	<0.6376	<1.0	<1.0
Metals	Cadmium	EPA 6010B	mg/Kg	0.37	0.45	0.48	<0.5593	<0.5593	<1.0	<1.0	<0.29	0.57	0.33	<0.27	0.31	0.6	<0.5593	<0.5593	<1.0	<1.0
Metals	Chromium	EPA 6010B	mg/Kg	15.0	15.7	9.23	11.21	8.64	10.4	11.66	6.85	15.8	5.89	6.52	8.03	14.7	2.36	7.46	11.67	175.4
Metals	Copper	EPA 6010B	mg/Kg	13.3	12.0	9.42	12.98	7.54	21.54	9.68	4.87	9.36	4.68	6.36	4.99	119	9.72	7.5	8.23	73.62
Metals	Cyanide	EPA 9012A	mg/Kg	< 0.04	< 0.03	< 0.026	NS	NS	0.0719	0.0948	< 0.04	< 0.03	< 0.024	0.241	< 0.03	0.063	NS	NS	0.0579	0.0357
Metals	Lead	EPA 6010B	mg/Kg	9.75	13.9	7.12	8.06	4.61	15.99	9.1	4.07	4.56	4.64	2.09	2.34	14.6	<1.41	<1.41	7.28	6.9
Metals	Mercury	EPA 7471A	mg/Kg	< 0.050	< 0.049	< 0.048	<0.038	<0.038	<0.038	<0.038	< 0.053	< 0.056	< 0.047	< 0.049	< 0.051	< 0.052	<0.038	<0.038	<0.038	<0.038
Metals	Molybdenum	EPA 200.7	mg/Kg	NS	<0.16	0.28	<2.26	<2.26	1.39	<1.0	NS	0.99	0.37	NS	0.59	0.93	<2.26	<2.26	<1.0	<1.0
Metals	Nickel	EPA 6010B	mg/Kg	8.12	5.24	3.27	4.32	3.25	5.5	4.12	2.50	6.73	2.39	2.48	2.78	6.93	<1.23	3.22	4.38	95.32
Metals	Selenium	EPA 6010B	mg/Kg	< 0.92	< 0.91	< 0.90	<3.48	<3.48	<1.0	<1.0	< 0.98	< 1.03	< 0.87	2.31	< 0.95	< 0.97	<3.48	<3.48	<1.0	<1.0
Metals	Silver	EPA 6010B	mg/Kg	< 0.17	< 0.16	< 0.16	<0.6077	<0.6077	<1.0	<1.0	< 0.18	< 0.19	< 0.16	< 0.26	< 0.17	< 0.17	<0.6077	<0.6077	<1.0	<1.0
Metals	Thallium	EPA 200.7	mg/Kg	NS	< 0.53	2.45	<1.63	<1.63	<2.47	<2.47	NS	2.33	< 0.51	NS	0.88	3.55	<1.63	<1.63	<2.47	<2.47
Metals	Zinc	EPA 6010B	mg/Kg	62.0	66.0	55.70	56.88	40.01	62.2	44.85	18.8	59.0	24.10	25.2	32.6	55.5	13.41	31.21	43.29	74.9
Organics	1,2,4-Trimethylbenzene	EPA 8260B	ug/Kg	< 0.53	< 0.35	< 0.35	<3.0	<3.0	<1.07	<1.07	< 0.52	< 0.40	< 0.34	< 0.50	< 0.37	< 0.38	<3.0	<3.0	<1.07	<1.07
Organics	2,3,7,8-TCCD(dioxin)	EPA 8270C	ug/Kg	< 0.0754	< 0.0815	< 0.193	NS	NS	NS	NS	< 0.123	< 0.0534	< 0.0468	< 0.122	< 0.0548	< 0.0376	NS	NS	NS	NS
Organics	2-Butanone (MEK)	EPA 8260B	ug/Kg	< 1.35	< 0.91	< 0.90	<5.0	<5.0	<4.32	<4.32	< 1.33	< 1.03	< 0.87	< 1.29	< 0.95	< 0.97	<5.0	<5.0	<4.32	<4.32
Organics	2-Nitroaniline	EPA 8270C	ug/Kg	< 1165	< 392	< 386	<42.4	<42.4	<153.0	<153.0	< 286	< 89	< 376	< 278	< 41	< 834	<42.4	<42.4	<153.0	<153.0
Organics	3 and 4-Methylphenol (m and p-Cresol)	EPA 8270C	ug/Kg	< 714	< 240	< 236	<129	<129	3650	<168	< 175	< 55	< 231	< 170	< 25	< 511	<129	<129	<168	2260
Organics	4,4-DDD	EPA 8081A	ug/Kg	< 2.7	< 13.3	< 2.6	<0.0090	<0.0090	<0.107	<0.107	< 2.9	< 3.01	< 2.6	< 2.7	< 2.77	< 5.65	<0.0090	<0.0090	<0.107	<0.107
Organics	4,4-DDE	EPA 8081A	ug/Kg	< 2.6	< 12.6	< 2.5	<0.0108	<0.0108	<0.113	<0.113	< 2.7	< 2.87	< 2.4	< 2.5	< 2.64	< 5.38	<0.0108	<0.0108	<0.113	<0.113
Organics	4,4-DDT	EPA 8081A	ug/Kg	< 2.6	< 12.6	< 2.5	<0.0159	<0.0159	<0.098	<0.098	< 2.7	< 2.87	< 2.4	< 2.5	< 2.64	< 5.38	<0.0159	<0.0159	<0.098	<0.098
Organics	4-Isopropyltoluene	EPA 8260B	ug/Kg	< 0.51	< 0.34	< 0.34	<3.0	12.3	10	<1.16	< 0.50	< 0.39	< 0.33	< 0.48	< 0.36	< 0.36	<3.0	<3.0	<1.16	<1.16
Organics	Acetone	EPA 8260B	ug/Kg	< 93.98	< 63.2	< 62	105.4	119.5	97.7	<11.9	< 92.25	< 71.7	< 61	< 89.61	< 66	< 67	39.4	48.9	<11.9	<11.9
Organics	Benzene	EPA 8260B	ug/Kg	< 0.34	< 0.23	< 0.22	<4.0	<4.0	<0.814	<0.814	< 0.33	< 0.26	< 0.22	< 0.32	< 0.24	< 0.24	<4.0	<4.0	<0.814	<0.814
Organics	Bis(2-Ethylhexyl) Phthalate	EPA 8270C	ug/Kg	< 1955	< 657	< 647	NS	NS	NS	NS	< 480	200	2700	1700	< 69	< 1400	NS	NS	NS	NS
Organics	Dibromochloromethane	EPA 8260B	ug/Kg	< 0.36	< 0.24	< 0.24	<2.0	<2.0	<0.645	<0.645	< 0.35	< 0.27	< 0.23	< 0.34	< 0.25	< 0.26	<2.0	<2.0	<0.645	<0.645
Organics	Dichlorodifluoromethane	EPA 8260B	ug/Kg	< 0.43	< 0.29	< 0.29	<4.0	<4.0	<1.28	<1.28	< 0.42	< 0.33	< 0.28	< 0.41	< 0.30	< 0.31	<4.0	<4.0	<1.28	<1.28
Organics	Di-N-Butyl Phthalate	EPA 8270C	ug/Kg	< 2519	< 847	< 833	NS	NS	NS	NS	< 618	330	< 813	< 600	< 88	< 1803	NS	NS	NS	NS
Organics	Ethylbenzene	EPA 8260B	ug/Kg	< 0.47	< 0.32	< 0.31	<3.0	<3.0	<1.09	<1.09	0.62	< 0.36	< 0.30	< 0.45	< 0.33	< 0.34	<3.0	<3.0	<1.09	<1.09
Organics	m and p-Xylene	EPA 8260B	ug/Kg	< 0.39	< 0.27	< 0.26	<7.0	<7.0	<2.16	<2.16	< 0.39	< 0.30	< 0.25	< 0.38	< 0.28	< 0.28	<7.0	<7.0	<2.16	<2.16
Organics	Methylene Chloride	EPA 8260B	ug/Kg	12	0.9	5.6	<11.0	<11.0	<5.08	<5.08	15	2.8	4.3	14	1.4	4.8	<11.0	<11.0	<5.08	<5.08
Organics	Naphthalene	EPA 8260B	ug/Kg	< 940	< 316	< 311	<35.7	<35.7	<36.0	<36.0	< 0.52	< 0.40	< 0.34	< 0.50	< 0.37	< 0.38	<35.7	<35.7	<36.0	<36.0
Organics	N-Butyl Benzyl Phthalate	EPA 8270C	ug/Kg	< 1654	< 556	< 547	NS	NS	NS	NS	< 406	< 126	< 534	< 394	< 58	< 1184	NS	NS	NS	NS
Organics	Styrene	EPA 8260B	ug/Kg	< 0.43	< 0.29	< 0.29	<3.0	<3.0	<1.44	<1.44	3.5	< 0.33	< 0.28	< 0.41	< 0.30	< 0.31	<3.0	<3.0	<1.44	<1.44
Organics	Tetrachloroethylene	EPA 8260B	ug/Kg	< 0.38	< 0.25	< 0.25	<3.0	<3.0	<1.46	<1.46	< 0.37	< 0.29	< 0.24	< 0.36	< 0.26	< 0.27	<3.0	<3.0	<1.46	<1.46
Organics	Toluene	EPA 8260B	ug/Kg	< 0.43	< 0.29	< 0.29	<4.0	<4.0	19423.8	<0.792	< 0.42	< 0.33	< 0.28	< 0.41	< 0.30	< 0.31	<4.0	<4.0	<0.792	9.83
Organics	Total Cresol	EPA 8270C	ug/Kg	< 15038	< 5057	< 4975	<1.01	<1.01	NS	NS	< 3690	< 1148	< 4854	< 3584	< 528	< 10767	<1.01	<1.01	NS	2260
Organics	Trichlorofluoromethane	EPA 8260B	ug/Kg	< 0.47	< 0.32	< 0.31	<4.0	<4.0	<0.80	<0.80	< 0.46	< 0.36	< 0.30	< 0.45	< 0.33	< 0.34	<4.0	<4.0	<0.80	<0.80
Organics	Xylenes (total)	EPA 8260B	ug/Kg	< 0.85	< 0.57	< 0.56	NS	NS	NS	NS	< 0.83	< 0.65	< 0.55	< 0.81	< 0.59	< 0.61	NS	NS	Ns	NS
Pathogens	Enteric viruses	ASTM D 4994-89	pfu/4 g TS	<1	NS	NS	<1	<1	<1	<1	<1	NS	NS	<1	NS	NS	<1	<1	<1	<1
Pathogens	Enterococcus	SM 9230-B	MPN/g	520	3000	2900	NS	NS	NS	NS	22000	23000	4000	20000	1700	>220000	NS	NS	NS	NS
Pathogens	Fecal coliform	SM 9221-E	MPN/g	6400	160	1600	360	590	150000	1700	>22000	23000	3300	>20000	1700	47000	250	230	12	680
Pathogens	Helminth-ova	EPA 625/R92/013	Viable Ova/4g TS	NS	<1	< 1	<0.5	<0.5	0.5	<0.5	NS	<1	< 1	NS	<1	< 1	<0.5	<0.5	<0.5	0.5
Pathogens	Salmonella	EPA 1682	MPN/4 g TS	0.4	0.3	<0.3	<3	<3	<3	<3	1.3	<0.3	< 0.3	4.4	1.7	1.3	<3	<3	<3	<3

Parameter	Analyte	Analytical Method	Units	Smugglers Gulch - El Matadero										Cañón Del Sol			Silva Drain			Stewarts Drain - Puerta		
				USA 1			USA 2			MÉXICO 1	MÉXICO 2	MÉXICO 1	MÉXICO 2	USA			USA			USA		
				DEC-18	FEB-19	MAY-19	DEC-18	FEB-19	MAY-19	DEC-18	DEC-18	MAY-19	MAY-19	DEC-18	FEB-19	MAY-19	DEC-18	FEB-19	MAY-19	DEC-18	FEB-19	MAY-19
Conventional	Ammonium-N (as NH4)	SM 4500-NH3-G	mg/Kg	25.8	19.7	54.6	18.1	16.6	8.69	NS	NS	NS	NS	120	105	85.6	130	27.1	48.4	123	76.1	55.5
Conventional	Nitrate-N	EPA 300	mg/Kg	NS	0.804	0.772	NS	4.42	17.5	NS	NS	NS	NS	NS	2.58	4.76	NS	1.38	22.5	NS	11.5	5.34
Conventional	Organic-N	EPA 351.3	mg/Kg	NS	80.0	86	NS	82.0	131	NS	NS	NS	NS	NS	1760	1640	NS	73.6	618	NS	78.6	505
Conventional	Percent solids (Total Solids)	SM 2540-G	%	81.4	80	77	75.6	82	96.6	86.9	77.7	85.3	71.5	78.6	63.7	93.2	61.4	2.02	89	77.1	78.6	90.7
Metals	Aluminum	EPA 6010B	mg/Kg	2880	NS	NS	2280	NS	NS	NS	NS	NS	NS	12200	NS	NS	5030	NS	NS	12500	NS	NS
Metals	Antimony	EPA 200.7	mg/Kg	NS	0.92	2.94	NS	2.9	1.49	<2.85	<2.85	<3.42	<3.42	NS	<0.58	1.54	NS	1.68	3.63	NS	1.96	2.83
Metals	Arsenic	EPA 6010B	mg/Kg	2.36	1.40	2.94	1.30	<0.44	1.76	<2.98	<2.98	<1.0	<1.0	6.16	6.37	1.9	6.17	2.49	1.56	5.7	6.83	4.86
Metals	Barium	EPA 6010B	mg/Kg	25.8	55	1	19.9	23.4	26.7	19.1	23.01	27.71	30.1	135	252	129	95.2	43.9	55.4	201	178	131
Metals	Beryllium	EPA 6010B	mg/Kg	< 0.28	< 0.21	< 0.22	< 0.22	< 0.21	< 0.18	<0.6376	<0.6376	<1.0	<1.0	< 0.22	< 0.27	< 0.18	< 0.28	< 0.23	< 0.19	< 0.22	< 0.22	< 0.19
Metals	Cadmium	EPA 6010B	mg/Kg	< 0.35	< 0.26	< 0.27	< 0.28	0.38	0.27	<0.5593	<0.5593	<1.0	<1.0	0.6	1.29	0.77	0.35	0.66	0.49	0.41	0.64	0.79
Metals	Chromium	EPA 6010B	mg/Kg	4.19	5.88	3.88	3.21	9.02	7.63	<1.39	<1.39	5.27	4.19	19.5	25.1	15.3	38.1	15.3	24.8	16.7	16.3	16.9
Metals	Copper	EPA 6010B	mg/Kg	12.6	7.67	3.59	4.39	28.5	11.4	3.97	2.91	8.66	11.58	27.3	39.8	21.1	53.9	13.8	24.6	34	35.1	21.8
Metals	Cyanide	EPA 9012A	mg/Kg	< 0.03	< 0.03	0.0848	< 0.02	< 0.02	< 0.021	NS	NS	0.0326	0.0639	0.085	0.0885	<0.021	0.1097	< 0.03	< 0.022	0.0668	< 0.03	< 0.022
Metals	Lead	EPA 6010B	mg/Kg	6.05	3.51	3.59	3.32	2.83	5.31	<1.41	<1.41	15.71	5.6	33.8	41.4	30.7	109	20.4	614	32.6	22.2	41.4
Metals	Mercury	EPA 7471A	mg/Kg	< 0.06	< 0.049	< 0.051	< 0.052	< 0.048	< 0.04	<0.038	<0.038	<0.038	<0.038	<0.05	0.07	0.06	< 0.06	< 0.053	0.06	<0.05	0.09	0.08
Metals	Molybdenum	EPA 200.7	mg/Kg	NS	0.31	2.3	NS	0.18	0.67	<2.26	<2.26	<1.0	<1.0	NS	0.76	<0.14	NS	1.36	0.62	NS	1.25	0.25
Metals	Nickel	EPA 6010B	mg/Kg	2.26	1.86	0.26	1.55	2.12	2.3	<1.23	<1.23	2.14	2.12	8.98	20.2	7.75	7.42	3.60	6.62	13.7	14.1	8.31
Metals	Selenium	EPA 6010B	mg/Kg	< 1.20	< 0.90	< 0.9	2.1	< 0.88	< 0.75	<3.48	<3.48	<1.0	<1.0	1.37	<1.13	<0.7	< 1.17	2.02	< 0.81	2.59	<0.92	<0.79
Metals	Silver	EPA 6010B	mg/Kg	< 0.22	< 0.16	< 0.2	< 0.17	< 0.16	< 0.13	<0.6077	<0.6077	<1.0	<1.0	< 0.17	< 0.20	< 0.14	ND	5.24	1.16	< 0.17	< 0.17	< 0.14
Metals	Thallium	EPA 200.7	mg/Kg	NS	0.95	1.06	NS	2.9	1.81	<1.63	<1.63	<2.47	<2.47	NS	1760	1.82	NS	179	0.92	NS	1060	1.88
Metals	Zinc	EPA 6010B	mg/Kg	20.2	40.8	1.06	16.5	18.3	26.30	14.53	14.14	43.56	33.62	99.6	201	92.90	175	69.7	108	124	129	133
Organics	1,2,4-Trimethylbenzene	EPA 8260B	ug/Kg	< 0.47	< 0.35	< 0.36	< 0.54	< 0.34	< 0.29	<3.0	<3.0	<1.07	<1.07	< 0.36	< 0.44	< 0.30	0.97	< 0.38	< 0.31	< 0.36	< 0.36	< 0.31
Organics	2,3,7,8-TCCD(dioxin)	EPA 8270C	ug/Kg	< 0.0713	< 0.0503	< 0.0306	< 0.105	< 0.0313	< 0.0356	NS	NS	NS	NS	< 0.109	< 0.681	< 0.0545	< 0.436	< 0.0533	0.227	< 0.108	< 0.949	< 0.0575
Organics	2-Butanone (MEK)	EPA 8260B	ug/Kg	< 1.20	< 0.90	< 0.94	1.7	< 0.88	< 0.75	<5.0	<5.0	<4.32	<4.32	< 0.92	< 1.13	< 0.77	13	< 0.98	< 0.81	< 0.93	< 0.92	< 0.79
Organics	2-Nitroaniline	EPA 8270C	ug/Kg	< 1032	< 388	< 805	< 593	< 189	< 321	<42.4	<42.4	<153.0	<153.0	< 394	< 97	1600	< 1011	< 842	< 697	< 402	< 789	< 1709
Organics	3 and 4-Methylphenol (m and p-Cresol)	EPA 8270C	ug/Kg	< 632	< 238	< 494	< 363	< 116	< 197	<129	<129	<168	<168	< 242	< 60	< 579	< 619	< 516	< 427	< 246	< 483	< 1047
Organics	4,4-DDD	EPA 8081A	ug/Kg	< 2.6	< 2.6	8.1	< 2.8	< 2.6	< 4.3	<0.0090	<0.0090	<0.107	<0.107	< 2.7	< 6.59	3.5	< 3.4	< 5.7	< 2.4	< 2.72	< 13.4	14
Organics	4,4-DDE	EPA 8081A	ug/Kg	< 2.5	< 2.5	< 2.6	< 2.6	< 2.4	< 4.1	<0.0108	<0.0108	<0.113	<0.113	< 2.5	< 6.28	14	< 3.3	< 5.4	9.4	< 2.59	< 12.7	66
Organics	4,4-DDT	EPA 8081A	ug/Kg	< 2.5	21	< 2.6	< 2.6	< 2.4	< 4.1	<0.0159	<0.0159	<0.098	<0.098	< 2.5	< 6.28	3.8	< 3.3	< 5.4	11	< 2.59	< 12.7	25
Organics	4-Isopropyltoluene	EPA 8260B	ug/Kg	< 0.45	< 0.34	< 0.35	< 0.52	< 0.33	< 0.28	<3.0	<3.0	<1.16	<1.16	< 0.34	< 0.42	< 0.29	27	< 0.37	< 0.30	< 0.35	< 0.34	< 0.30
Organics	Acetone	EPA 8260B	ug/Kg	< 83.21	< 62.5	< 65	< 95.60	< 61	< 51.76	129.2	50.7	<11.9	<11.9	< 63.62	< 78.5	< 54	110	< 67.93	< 56	< 64.85	< 63.61	< 55
Organics	Benzene	EPA 8260B	ug/Kg	< 0.30	< 0.23	< 0.23	< 0.34	< 0.22	< 0.19	<4.0	<4.0	<0.814	<0.814	< 0.23	< 0.28	< 0.19	1.1	< 0.24	< 0.20	< 0.23	< 0.23	< 0.20
Organics	Bis(2-Ethylhexyl) Phthalate	EPA 8270C	ug/Kg	< 1731	< 650	< 1351	< 994	< 317	< 538	NS	NS	NS	NS	< 662	< 163	2400	24000	4000	5300	2400	< 1323	< 2867
Organics	Dibromochloromethane	EPA 8260B	ug/Kg	< 0.32	< 0.24	< 0.25	< 0.36	< 0.23	< 0.20	<2.0	<2.0	<0.645	<0.645	< 0.24	< 0.30	< 0.20	<0.31	< 0.26	< 0.21	< 0.25	< 0.24	< 0.21
Organics	Dichlorodifluoromethane	EPA 8260B	ug/Kg	0.57	< 0.29	< 0.30	< 0.44	< 0.28	< 0.24	<4.0	<4.0	<1.28	<1.28	0.35	< 0.36	< 0.25	< 0.37	< 0.31	< 0.26	< 0.30	< 0.29	< 0.25
Organics	Di-N-Butyl Phthalate	EPA 8270C	ug/Kg	< 799	2100	< 1740	< 1281	< 409	< 694	NS	NS	NS	NS	< 305	< 210	920	< 2184	4600	1900	< 869	4300	< 3693
Organics	Ethylbenzene	EPA 8260B	ug/Kg	< 0.42	< 0.31	< 0.32	< 0.48	< 0.30	< 0.26	<3.0	<3.0	<1.09	<1.09	< 0.32	< 0.39	< 0.27	0.5	< 0.34	< 0.28	< 0.32	< 0.32	< 0.28
Organics	m and p-Xylene	EPA 8260B	ug/Kg	< 0.35	< 0.26	< 0.27	< 0.40	< 0.26	< 0.22	<7.0	<7.0	<2.16	<2.16	< 0.27	< 0.33	< 0.23	2.5	< 0.29	< 0.24	< 0.27	< 0.27	< 0.23
Organics	Methylene Chloride	EPA 8260B	ug/Kg	10	1.4	6.6	5.2	1.6	3.4	25.2	<11.0	<5.08	<5.08	3.9	< 0.35	2.3	8.8	< 0.30	3.5	4.9	1.3	4.1
Organics	Naphthalene	EPA 8260B	ug/Kg	< 0.27	< 0.35	< 0.36	< 0.54	< 0.34	< 0.29	<35.7	<35.7	<36.0	<36.0	< 0.36	< 0.44	< 0.30	0.65	< 0.38	< 0.31	< 0.36	< 0.36	< 0.31
Organics	N-Butyl Benzyl Phthalate	EPA 8270C	ug/Kg	< 1464	< 550	< 1143	< 841	< 268	< 455	NS	NS	NS	NS	< 560	< 138	< 247	10000	< 1196	< 989	< 571	< 1120	< 2426
Organics	Styrene	EPA 8260B	ug/Kg	< 0.38	< 0.29	< 0.30	< 0.44	< 0.28	< 0.24	<3.0	<3.0	<1.44	<1.44	< 0.29	< 0.36	< 0.25	7.8	< 0.31	< 0.26	< 0.30	< 0.29	< 0.25
Organics	Tetrachloroethylene	EPA 8260B	ug/Kg	< 0.33	< 0.25	< 0.26	< 0.38	< 0.24	< 0.21	<3.0	<3.0	<1.46	<1.46	0.29	< 0.31	< 0.21	< 0.33	< 0.27	< 0.22	< 0.26	< 0.25	< 0.22
Organics	Toluene	EPA 8260B	ug/Kg	< 0.38	0.51	< 0.30	< 0.44	< 0.28	< 0.24	<4.0	<4.0	<0.792	<0.792	< 0.29	< 0.36	< 0.25	6.7	< 0.31	< 0.26	< 0.30	< 0.29	< 0.25
Organics	Total Cresol	EPA 8270C	ug/Kg	< 13313	< 5000	< 10390	< 7648	< 2439	< 4141	<1.01	<1.01	NS	NS	< 5090	< 1256	< 12876	< 13040	< 10870	< 8989	< 5188	< 10178	< 22051
Organics	Trichlorofluoromethane	EPA 8260B	ug/Kg	0.6	< 0.31	< 0.32	< 0.48	< 0.30	< 0.26	<4.0	<4.0	<0.80	<0.80	< 0.32	< 0.39	< 0.27	< 0.41	< 0.34	< 0.28	< 0.32	< 0.32	< 0.28
Organics	Xylenes (total)	EPA 8260B	ug/Kg	< 0.75	< 0.56	< 0.58	< 0.86	< 0.55	< 0.47	NS	NS	NS	NS	< 0.57	< 0.71	< 0.48	4.4	< 0.61	< 0.51	< 0.58	< 0.57	< 0.50
Pathogens	Enteric viruses	ASTM D 4994-89	pfu/4 g TS	<1	NS	NS	<1	NS	NS	<1	<1	<1	<1	<1	NS	NS	<1	NS	NS	<1	NS	NS
Pathogens	Enterococcus	SM 9230-B	MPN/g	6600	>20000	210000	610	6600	3400	NS	NS	NS	NS	20000	14000	840	>26000	12500	3700	570	11700	3600
Pathogens	Fecal coliform	SM 9221-E	MPN/g	>20000	>20000	>210000	>21000	2700	810	1100	7300	25	17000	>20000	8500	<190	>26000	12000	510	21000	4500	12000
Pathogens	Helminth-ova	EPA 625/R92/013	Viable Ova/4g TS	NS	<1	< 1	NS	<1	< 1	<0,5	<0,5	<0.5	1	NS	<1	< 1	NS	<1	< 1	NS	<1	< 1
Pathogens	Salmonella	EPA 1682	MPN/4 g TS	>12.9	2.4	5.1	1.9	2.2	< 0.3	<3	<3	<3	<3	8.6	3.3	< 0.3	2.0	<0.3	< 0.3	5.0	0.4	0.7

Water Quality Data from Canyon and Drain Sampling Locations

Parameter	Analyte	UNIT	Reference Standard					Stewart's Drain - Puerta Blanca												
								USA						MÉXICO						
			Ocean Plan	TJ River WQOs	TJ Wastewater	NOM-001	CE-CCA	DEC-18	JAN-19	FEB-19	APR-19	MAY-19	JUL-19	DEC-18	JAN-19	FEB-19	APR-19	MAY-19	JUL-19	OCT-19
Conventional	Alkalinity (Total as CaCO3)	mg/L						NS	380	88	590	250	680	64.7	412	91.6	664.7	276.6	663.9	705.1
Conventional	Ammonia (as Nitrogen)	mg/L	6.0	0.025	50		0.01	3.2	43.1	3.3	52.4	6.58	60.6	2.8	40.8	4.0	56.4	9.0	58.7	50.9856
Conventional	Bicarbonate (HCO3)	mg/L						NS	460.0	110.0	720	310	820	64.7	412.0	91.6	664.7	276.6	663.9	653.5
Conventional	Biochemical Oxygen Demand (5-day) BOD	mg/L		10	379	75		NS	63.0	15.0	161	22	59	20.8	71.5	11.7	355.0	25.1	94.0	129.5
Conventional	Calcium	mg/L						NS	111.0	34.8	139	60	89.5	19.3	89.2	38.6	213.2	67.9	86.5	96.4
Conventional	Carbonaceous Biochemical Oxygen Demand (5-Day) CBOD	mg/L			327			48.2	66.6	<2	159	12.5	44.5	NS	NS	NS	NS	NS	NS	NS
Conventional	Chemical Oxygen Demand (COD)	mg/L		120	710			290.0	340.0	76.0	1200	160	310	134.6	235.3	84.0	2164.0	184.0	256.0	435
Conventional	Chloride	mg/L		250				NS	195.0	61.7	409	100	251	43.4	213.8	57.0	210.4	99.8	249.2	325.1
Conventional	Chlorine, Total Residual	mg/L	0.06	0.019			0.0075	NS	<0.016	<0.016	<0.032	0.09	<0.016	<0.1	<0.2	<0.2	<0.2	0.4	<0.2	<0.2
Conventional	Chlorophyll a	mg/m3						NS	932.0	252.0	3300	483	8780	<0.05	<0.05	<0.05	103.8	<0.05	15.6	<0.05
Conventional	Chlorophyll b	mg/m3						NS	1160.0	233.0	1060	601	1550	NS	NS	NS	NS	NS	NS	NS
Conventional	Chlorophyll c	mg/m3						NS	1440.0	347.0	1040	626	501	NS	NS	NS	NS	NS	NS	NS
Conventional	Dissolved Oxygen	mg/L		>5			>5	NS	<1	7.2	<1	4.5	<1	4.0	4.7	9.2	2.2	7.0	4.0	5.3
Conventional	Electrical Conductivity (Specific)	Us/cm						NS	1880.0	553.0	2950	975	2210	500.0	2723.0	593.0	3060.0	981.0	2210.0	2387
Conventional	Fluoride	mg/L		1			0.5	NS	0.4	0.3	0.55	0.36	0.521	0.2	0.6	0.3	0.8	0.6	1.2	0.6398
Conventional	Fluorine	mg/L						NS	0.4	0.3	0.55	0.36	0.521	0.2	0.6	0.3	0.8	0.6	1.2	0.6398
Conventional	Magnesium	mg/L						NS	37.4	6.2	46.8	12.7	36.8	3.9	30.8	8.0	50.4	12.1	33.4	36.25
Conventional	Nitrate, as Nitrogen	mg/L		5			40	NS	0.1	1.6	0.06	0.11	<0.12	1.3	<0.0015	1.6	0.0	0.1	<0.0015	0.0741
Conventional	Nitrite, as Nitrogen	mg/L					2	NS	<0.018	<0.018	<0.018	0.05	<0.16	0.2	0.0	0.2	0.1	0.1	0.0	0.1768
Conventional	Oil and Grease, Total	mg/L	75		20	15		NS	6.6	5.6	6.0	2.5	3.2	9.5	17.1	7.1	30.5	35.7	8.8	8.4
Conventional	Ortho-Phosphorous as P	mg/L						NS	4.1	0.7	14.8	3.36	8.23	NS	NS	NS	NS	NS	NS	NS
Conventional	Ortho-Phosphorous as PO4	mg/L						NS	NS	2.3	29.4	10.3	25.2	NS	NS	NS	NS	NS	NS	NS
Conventional	pH	pH Units		6.5 to 8.5	7.3	5 to 10		NS	7.7	7.3	7.49	7.74	7.84	7.9	7.7	8.6	8.3	8.2	8.2	8.1
Conventional	Potassium	mg/L						NS	22.8	6.6	42.2	15.6	38.9	9.4	19.9	8.9	57.4	17.4	40.4	36.6
Conventional	Sodium	mg/L						NS	225.0	58.2	808	81.4	250	30.5	236.0	51.7	436.1	105.9	242.7	277.7
Conventional	Sulfate	mg/L		65				NS	238.0	52.0	289	55.5	77.0	34.9	229.0	50.9	102.5	66.2	101.2	188.43
Conventional	Sulfide, Total	mg/L					0.002	NS	2.0	<0.1	<0.1	<0.1	0.6	<0.0141	<0.014	<0.014	13.7	<0.014	0.2	0.9916
Conventional	Surfactants (MBAS)	mg/L					0.1	NS	4.0	0.5	4.4	2.4	5.3	1.5	4.0	0.5	4.8	2.0	5.1	3.9
Conventional	Temperature at Time of pH Measurement					40	Nat +/-1.5	NS	18.6	4.1	7.6	7.4	10.8	15.0	15.0	11.0	21.0	19.0	23.0	15.0
Conventional	Total Dissolved Solids (TDS)	mg/L		300	1589			NS	1050.0	296.0	2020	546	1120	836.0	1458.0	284.0	1860.0	848.0	1278.0	1488
Conventional	Total Hardness as CaCO3	mg/L						NS	431.0	NS	540	203	375	75.0	391.3	110.3	690.6	245.8	364.2	413.7
Conventional	Total Kjeldahl Nitrogen	mg/L						NS	56.0	7.2	110	15	94	6.6	64.8	6.9	168.3	13.2	73.5	91.588
Conventional	Total Nitrogen	mg/L				40		NS	56.1	8.8	110	15.2	94.0	8.1	8.7	8.7	168.4	13.4	73.6	91.839
Conventional	Total Organic Carbon (TOC)	mg/L						NS	52.8	15.7	171	49.1	64.4	22.4	41.0	21.0	244.0	45.8	54.7	24.616
Conventional	Total Phosphorous as P	mg/L	0.1	0.1		20	0.0001	0.2	4.2	1.0	14.8	5.91	11.1	1.3	6.6	1.0	35.8	4.0	11.8	16.2554
Conventional	Total Phosphorous as PO4	mg/L			8.5		0.002	0.7	13.0	3.0	45.5	18.1	34.0	NS	NS	NS	NS	NS	NS	NS
Conventional	Total Solids	mg/L			2428			NS	1120.0	372.0	2270.00	612.00	1200.00	184.0	1458.0	332.0	2420.0	618.0	1310.0	1678
Conventional	Total Suspended Solids (TSS)	mg/L		58	385	75		NS	108.0	64.4	305	71.8	44.5	92.5	80.0	55.7	914.3	47.0	58.9	246
Conventional	Volatile Suspended Solids (VSS)	mg/L			280			116.0	40.0	21.2	275.0	26.3	28.0	37.5	54.3	<10	857.1	40.0	32.2	56
Pathogens	Campylobacter	NA						Present	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pathogens	Cholera	NA						Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Pathogens	E. Coli	MPN/100mL		126				>24000	>24000	52000	>240000	46000	>240000	>24000	>24000	>24000	>24000	>24000	>24000	>24000
Pathogens	Enteric Virus (Enterovirus)	MPN/L						ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pathogens	Enterococcus	MPN/100mL	104	151				>24000	>24000	<100	>240000	29000	>240000	NS	NS	>24196	>24196	>2400	>24196	>24196
Pathogens	Fecal Coliform	MPN/L	400	400		1000	200	NS	NS	NS	NS	NS	NS	>24000	>24000	>24000	>24000	>24000	>24000	>24000
Pathogens	Norovirus GIA	MPN/L						7300	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pathogens	Norovirus GIB	MPN/L						ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pathogens	Norovirus GII	MPN/L						ND	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pathogens	Total Coliform	MPN/100mL	10000	1000				NS	>24000	98000	>240000	>240000	>240000	NS	NS	>24000	>24000	>24000	>24000	>24000
Metals	Aluminum	ug/L					200	13700.0	312.0	1870.0	8150	1040	899	2972.0	407.3	1445.0	32740.0	307.3	599.8	1377
Metals	Antimony	ug/L	1200.0	88.00	28			NS	3.3	2.3	9.60	ND	4.29	<1.3	<1.3	6.8	<1.3	<1.3	3.2	<1.3
Metals	Arsenic	ug/L	80.0	360	5	100	10	4.3	3.2	1.9	7.44	ND	4.08	<1.5	<1.5	<1.5	18.9	<1.5	<1.5	<1.5
Metals	Barium (as Ba)	ug/L					500	217.0	82.2	39.7	187	71	63.8	53.5	77.5	50.9	558.2	43.6	69.8	74.7
Metals	Beryllium	ug/L			1.5			<3.1	<0.31	<1.55	<3.1	<6.2	<6.2	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Metals	Boron	ug/L		500			9	63.3	182.0	58.1	407	197	385	61.1	196.3	66.9	464.2	167.2	289.9	247.9
Metals	Cadmium	ug/L	10	1.4	0.45	100	0.9	1.3	0.1	0.5	1.69	<1.48	0.464	<0.3	<0.3	<0.3	8.7	<0.3	<0.3	<0.3
Metals	Chromium (Total)	ug/L			4.4	500		NS	1.7	7.1	36.9	12.7	<3.2	15.5	ND	15.2	264.6	11.0	12.7	15.5
Metals	Copper	ug/L	30	7.5	29	4000	3	107.0	21.1	18.5	152	28.9	28.2	36.9	15.0	31.4	854.8	14.8	33.0	48
Metals	Cyanide	ug/L	10	22		1000		<0.001	<0.001	0.003	0.003	0.0055	0.0064	1.5	14.9	ND	64.6	12.4	8.3	10.4
Metals	Cyanide (WAD)	ug/L						NS	<0.001	0.0				<0.0014	<0.0014	<0.0014	0.0	0.0	0.0	<0.0014
Metals	Cyanide, Amenable to Chlorination	ug/L						NS	<0.001	0.0				<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Metals	Hexavalent chromium	ug/L	20.0	16	0.78		50	2.1	ND	2.4	0.5	0.4	ND	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Metals	Iron	ug/L		1000	3015		50	NS	934.0	2390.0	6440	240	1360	3749.0	475.8	2438.0	3192.0	1140.0	1145.0	1633
Metals	Lead	ug/L	20	25	17	200	6	96.6	4.2	9.9	49.2	ND	6.19	28.6	<0.8	<0.8	188.6	<0.8	<0.8	<0.8
Metals	Manganese	ug/L		0.05				263.0	82.1	59.8	299	188	140	69.5	53.2	8040.0	533.8	99.2	122.0	87.6
Metals	Mercury	ug/L	0.0	2.4	0.2	5	0.02	0.5	<0.094	<0.094	0.25	<0.094	<0.094	0.0	0.1	<0.027	0.7	0.0	<0.027	<0.027
Metals	Nickel	ug/L	50	653	29	2000	8	36.7	7.0	7.4	71.30	<11.8	24.5	8.8	<0.4	8.5	0.7	14.4	23.3	20.5
Metals	Selenium	ug/L	150	20	5.4		40	0.48	2.15	0.51	2.53	8.60	1.84	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7
Metals	Silver	ug/L	0.7	0.84	1		2	0.9	<0.56	<0.056	0.943	<11.2	<0.56	<0.6	<0.6	2.3	6.1	<0.6	<0.6	<0.6
Metals	Thallium	ug/L	14.0		4.25		20	NS	<0.18	<0.18	<0.18	<3.6	<0.18	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
Metals	Zinc	ug/L	200.0	54	88.7	10000	90	712.0	78.1	167.0	374	84.4	71.6	189.4	37.7	194.8	1646.0	157.8	150.1	287.5
Organics	2,4,6-Trichlorophenol	ug/L	0.29					< 1.745	1.00	< 0.349	< 8.725	< 0.698	< 0.349	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.0240
Organics	2,4-Dichlorophenol	ug/L	1					< 1.805	1.40	< 0.361	< 9.025	< 0.722	< 0.361	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024
Organics	2-Butanone (MEK)	ug/L						2.1	<0.3	<0.3	11	3.3	1.7	NS	NS	NS	NS	NS	NS	NS
Organics	2-Chlorophenol	ug/L	1					< 2.21	< 0.22	< 0.442	< 11.05	< 0.884	< 0.442	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024
Organics	2-Methylnaphthalene	ug/L						< 2.025	< 0.12	< 0.405	< 10.125	< 0.81	< 0.405	NS	NS	NS	NS	NS	NS	NS
Organics	3 and 4-Methylphenol (m and p-Cresol)	ug/L						< 2.215	44	< 0.443	35	< 0.886	40	<0.043	5	<0.043	477	<0.043	42.1	19.3

Organics	4-Nitrophenol	ug/L	30				50	< 3.8	< 13	< 0.76	< 19	< 1.52	17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.020
Organics	Acenaphthylene	ug/L	220					< 1.68	0.13	< 0.336	< 8.4	< 0.672	< 3.36	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024
Organics	Acetone	ug/L						40	81	<0.2	130	29	<0.2	NS	NS	NS	NS	NS	NS	NS
Organics	Benzene	ug/L	5.9				5	< 0.071	< 0.071	< 0.071	< 0.071	< 0.071	< 0.071	<0.041	<0.041	<0.041	<0.041	<0.041	<0.041	<0.022
Organics	Benzo(a)pyrene	ug/L						< 1.475	< 0.087	< 0.295	< 7.375	< 0.59	< 2.95	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Organics	Benzo(b)fluoranthene	ug/L						< 1.87	< 0.063	< 0.374	< 9.35	< 0.748	< 3.74	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024
Organics	Benzo(g,h,i)perylene	ug/L						< 1.545	< 0.038	< 0.309	< 7.725	< 0.618	< 3.09	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Bis(2-chloroethyl) ether	ug/L	0.45					< 2.255	0.08	< 0.451	< 11.275	< 0.902	< 4.51	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Bis(2-ethylhexyl) phthalate [Di(2-ethylhexyl) phthalate]	ug/L	3.5	4.0			29.44	5.00	3.60	5.20	17	5.9	23	10.25	2.57	6.26	8.6	3.0	4.9	12.95
Organics	Bromodichloromethane (Dichlorobromomethane) (a common THM)	ug/L	130					< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	<0.056	<0.056	<0.056	<0.056	<0.056	<0.056	<0.035
Organics	Bromoform (a common THM)	ug/L	130					< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032
Organics	Chlorodibromomethane	ug/L	8.6					< 0.045	< 0.045	< 0.045	< 0.045	< 0.045	< 0.045	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.030
Organics	Chloroform (a common THM)	ug/L	130	100				< 0.044	< 0.044	< 0.044	0.172	< 0.044	< 0.044	<0.034	2.96	0.29	<0.034	<0.034	<0.034	0.23
Organics	Chloromethane (methyl chloride)	ug/L	130					< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	<0.124	<0.124	<0.124	<0.124	<0.124	<0.124	<0.12
Organics	Diethyl phthalate	ug/L	33000				29.44	< 1.31	3.40	0.65	< 6.55	< 0.524	< 2.62	<0.022	3.01	<0.022	<0.022	<0.022	1.2	<0.022
Organics	Dimethyl phthalate	ug/L	820000				29.44	< 1.73	< 0.22	< 0.346	< 8.65	< 0.692	< 3.46	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024
Organics	Di-n-butyl phthalate	ug/L	3500					< 1.48	1.9	5.0	54	1.6	15	<0.022	4.03	<0.022	<0.022	1.7	<0.022	<0.022
Organics	Di-n-octyl phthalate	ug/L						< 1.38	< 0.26	< 0.276	< 6.9	< 0.552	< 2.76	2.55	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Ethylbenzene	ug/L	4100				500	< 0.091	0.152	< 0.091	< 0.091	< 0.091	< 0.091	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.028
Organics	Fluoranthene	ug/L	15				0.4	< 1.135	< 0.085	< 0.227	< 5.675	< 0.454	< 2.27	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Indeno (1,2,3-cd) pyrene	ug/L	0.0088					< 1.445	< 0.067	< 0.289	< 7.225	< 0.578	< 2.89	<0.034	2.96	0.29	<0.034	<0.034	<0.034	0.2
Organics	Isophorone	ug/L	730				100	< 2.49	< 11	< 0.498	< 12.45	< 0.996	< 4.98	<0.022	<0.022	<0.022	<0.022	<0.022	3.4	<0.022
Organics	Methylene Chloride	ug/L						< 0.15	0.71	1.80	0.8	1.8	4.1	<0.043	<0.043	<0.043	<0.043	<0.043	<0.043	<0.024
Organics	Methyl-t-butyl Ether (MTBE)	ug/L						NS	0.2	< 0.068	< 0.068	0.205	< 0.068	<0.058	<0.058	<0.058	<0.058	<0.058	<0.058	<0.031
Organics	Naphthalene	ug/L					20	< 2.06	0.17	< 0.412	< 10.3	2.5	< 4.12	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Pentachlorophenol	ug/L	1				0.5	0.29	< 0.011	0.18	< 0.011	< 0.011	< 0.011	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.0120
Organics	Phenanthrene	ug/L	0.0088					< 1.38	0.24	< 0.276	< 6.9	< 0.552	< 2.76	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Phenol	ug/L	300				1	< 2.27	15	< 0.454	< 11.35	< 0.908	< 4.54	<0.026	<0.026	<0.026	10.5	<0.026	3.3	1.34
Organics	Pyrene	ug/L	0.0088					< 2.005	< 0.087	< 0.401	< 10.025	< 0.802	< 4.01	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Toluene	ug/L	85000				60	<0.078	0.729	0.624	150	0.21	<0.078	<0.047	<0.047	<0.047	247.8	<0.047	23.5	1.0
Organics	Total Trihalomethanes (THM's)	ug/L						NS	3.0	<0.044	0.2	<0.044	<0.044	<0.031	2.96	0.29	<0.031	<0.031	<0.031	0.23
Pesticide	2,4-D (2,4-Dichlorophenoxyacetic acid)	ug/L		100.0				< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	<0.00115	<0.00115	0.09	<0.00115	<0.00115	<0.00115	<0.0012
Pesticide	Carbofuran	ug/L						0.32	<0.27	<0.27	<0.27	<0.27	<0.27	NS	NS	<0.0046	<0.0046	<0.0046	<0.0046	<0.0046
Pesticide	Dalapon	ug/L						<0.58	<0.58	<0.58	<0.58	<0.58	1.3	<0.00125	0.12	<0.00125	0.0	0.1	0.0	<0.00125
Pesticide	Endosulfan I	ug/L	9	0.056			0.03	0.06	< 0.004	< 0.004	< 0.02	< 0.004	< 0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010
Pesticide	Endosulfan II	ug/L	9	0.056			0.03	< 0.05	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.000090
Pesticide	Endrin aldehyde	ug/L	0.002	0.002				< 0.045	< 0.009	< 0.009	< 0.045	< 0.009	< 0.009	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010
Pesticide	Glyphosate	ug/L						< 2.1	< 2.1	< 2.1	< 21	< 2.1	< 2.1	NS	NS	<0.380	<0.380	<0.380	<0.380	<0.380
Pesticide	Hexachlorocyclohexane delta {BHC-delta}	ug/L						<0.03	<0.006	<0.006	<0.03	<0.006	<0.006	<0.00007	<0.00007	<0.00007	<0.00007	<0.00007	<0.00007	<0.000070
Pesticide	Styrene	ug/L						< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	<0.046	<0.046	<0.046	<0.046	<0.046	<0.046	<0.025
Pesticide	Xylene (total)	ug/L		1750.000				<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14

Parameter	Analyte	UNIT	Reference Standard					Silva Drain				
			Ocean Plan	TJ River WQOs	TJ Wastewater	NOM-001	CE-CCA	USA			MÉXICO	
								DEC-18	JAN-19	FEB-19	DEC-18	FEB-19
Conventional	Alkalinity (Total as CaCO3)	mg/L						NS	530	90	89.6	91.6
Conventional	Ammonia (as Nitrogen)	mg/L	6.0	0.025	50		0.01	2.1	49.5	0.7	2.1	1.4
Conventional	Bicarbonate (HCO3)	mg/L									89.6	91.6
Conventional	Biochemical Oxygen Demand (5-day) BOD	mg/L		10	379	75		NS	130.0	12.0	24.9	9.6
Conventional	Calcium	mg/L						NS	147.0	28.7	32.8	38.3
Conventional	Carbonaceous Biochemical Oxygen Demand (5-Day) CBOD	mg/L			327			34.3	245.0	<2	NS	NS
Conventional	Chemical Oxygen Demand (COD)	mg/L		120	710			240.0	560.0	78.0	181.9	94.2
Conventional	Chloride	mg/L		250				NS	243.0	50.1	78.8	55.6
Conventional	Chlorine, Total Residual	mg/L	0.06	0.019			0.0075	NS	<0.016	<0.016	<0.1	<0.2
Conventional	Chlorophyll a	mg/m3						NS	2480.0	1060.0	<0.05	<0.05
Conventional	Chlorophyll b	mg/m3						NS	3140.0	1290.0	NS	NS
Conventional	Chlorophyll c	mg/m3						NS	3760.0	1610.0	NS	NS
Conventional	Dissolved Oxygen	mg/L		>5			>5	NS	<1	9.0	4.3	9.9
Conventional	Electrical Conductivity (Specific)	Us/cm						NS	2330.0	463.0	720.0	445.0
Conventional	Fluoride	mg/L		1			0.5	NS	0.3	0.3	0.3	0.3
Conventional	Fluorine	mg/L						NS	0.3	0.3	NS	NS
Conventional	Magnesium	ug/L						NS	37000	3890	6300	6880
Conventional	Nitrate, as Nitrogen	mg/L		5			40	NS	0.1	2.6	3.1	2.2
Conventional	Nitrite, as Nitrogen	mg/L					2	NS	<0.018	<0.018	0.2	0.2
Conventional	Oil and Grease, Total	mg/L	75		20	15		NS	6.6	2.7	13.0	6.5
Conventional	Ortho-Phosphorous as P	mg/L						NS	3.2	0.4	NS	NS
Conventional	Ortho-Phosphorous as PO4	mg/L						NS	NS	1.4	NS	NS
Conventional	pH	pH Units		6.5 to 8.5	7.3	5 to 10		NS	7.5	9.1	7.9	8.3
Conventional	Potassium	mg/L						NS	32.5	6.6	17.3	9.9
Conventional	Sodium	ug/L						NS	260.0	56.4	59.6	55.7
Conventional	Sulfate	mg/L		65				NS	249.0	43.6	70.2	43.1
Conventional	Sulfide, Total	mg/L					0.002	NS	0.3	<0.1	<0.014	<0.014
Conventional	Surfactants (MBAS)	°C mg/L					0.1	NS	3.9	0.2	1.3	0.4
Conventional	Temperature at Time of pH Measurement					40	Nat +/- 1.5	NS	20.2	4.5	15.0	10.0
Conventional	Total Dissolved Solids (TDS)	mg/L		300	1589			NS	1240.0	296.0	478.0	276.0
Conventional	Total Hardness as CaCO3	mg/L						NS	519.0	NS	132.3	104.4
Conventional	Total Kjeldahl Nitrogen	mg/L						NS	47.0	3.2	10.1	3.8
Conventional	Total Nitrogen	mg/L				40		NS	47.0	5.8	13.3	6.2
Conventional	Total Organic Carbon (TOC)	mg/L						NS	109.0	18.1	31.1	22.3
Conventional	Total Phosphorous as P	mg/L	0.1	0.1		20	0.0001	0.2	4.5	0.5	1.6	0.8
Conventional	Total Phosphorous as PO4	mg/L			8.5		0.002	0.6	13.7	1.5	NS	NS
Conventional	Total Solids	mg/L			2428			NS	1330.0	390.0	332.0	400.0
Conventional	Total Suspended Solids (TSS)	mg/L		58	385	75		NS	68.7	88.0	117.5	87.1
Conventional	Volatile Suspended Solids (VSS)	mg/L			280			37.3	58.7	22.0	76.7	<10
Pathogens	Camphylobacter	NA						Present	NS	NS	NS	NS

Pathogens	Cholera	NA						Absent	Absent	Absent	Absent	Absent
Pathogens	E. Coli	MPN/100mL		126				>24000	>24000	82000	>24000	>24000
Pathogens	Enteric Virus (Enterovirus)	MPN/L						ND	NS	NS	NS	NS
Pathogens	Enterococcus	MPN/100mL	104	151				>24000	>24000	240000	NS	>24196
Pathogens	Fecal Coliform	MPN/L	400	400		1000	200	NS	NS	NS	>24000	>24000
Pathogens	Norovirus GIA	MPN/L						ND	NS	NS	NS	NS
Pathogens	Norovirus GIB	MPN/L						1100	NS	NS	NS	NS
Pathogens	Norovirus GII	MPN/L						ND	NS	NS	NS	NS
Pathogens	Total Coliform	MPN/100mL	10000	1000				NS	>24000	>24000	NS	>24000
Metals	Aluminum	ug/L					200	3510.0	186.0	2340.0	4213.0	2450.0
Metals	Antimony	ug/L	1200.0	88.00	28			NS	2.3	1.7	<1.3	<1.3
Metals	Arsenic	ug/L	80.0	360	5	100	10	4.9	2.2	3.3	<1.5	<1.5
Metals	Barium (as Ba)	ug/L					500	55.8	96.6	33.2	53.0	61.5
Metals	Beryllium	ug/L			1.5			< 3.1	< 1.55	< 1.55	<1.1	<1.1
Metals	Boron	ug/L		500			9	89.0	279.0	50.4	95.3	72.4
Metals	Cadmium	ug/L	10	1.4	0.45	100	0.9	0.3	<0.074	0.1	<0.3	<0.3
Metals	Chromium (Total)	ug/L			4.4	500		NS	1.9	6.4	19.5	12.1
Metals	Copper	ug/L	30	7.5	29	4000	3	36.4	15.5	15.1	39.2	32.3
Metals	Cyanide	ug/L	10	22		1000		0.010	0.008	0.003	7.3	8.7
Metals	Cyanide (WAD)	ug/L						NS	0.002	NS	6.7	6.7
Metals	Cyanide, Amenable to Chlorination	ug/L						NS	<0.001	0.002	<0.0005	<0.0005
Metals	Hexavalent chromium	ug/L	20.0	16	0.78		50	4.5	<0.094	1.8	<10	<10
Metals	Iron	ug/L		1000	3015		50	NS	2420	2640	4535	4027
Metals	Lead	ug/L	20	25	17	200	6	24.9	1.7	11.1	26.6	19.3
Metals	Manganese	ug/L		0.05				70.9	427.0	49.8	72.0	6880.0
Metals	Mercury	ug/L	0.0	2.4	0.2	5	0.02	< 0.94	< 0.094	< 0.094	<0.027	<0.027
Metals	Nickel	ug/L	50	653	29	2000	8	7.3	8.1	4.6	9.9	7.5
Metals	Selenium	ug/L	150	20	5.4		40	0.7	1.3	0.717	<2.7	<2.7
Metals	Silver	ug/L	0.7	0.84	1		2	< 0.56	< 0.56	< 0.56	<0.6	<0.6
Metals	Thallium	ug/L	14.0		4.25		20	NS	< 0.18	< 0.18	<1.2	<1.2
Metals	Zinc	ug/L	200.0	54	88.7	10000	90	158.0	50.9	72.9	202.6	143.6
Organics	2,4,6-Trichlorophenol	ug/L	0.29					< 1.745	0.16	< 0.349	<0.026	<0.026
Organics	2,4-Dichlorophenol	ug/L	1					< 1.805	< 0.12	< 0.361	<0.024	<0.024
Organics	2-Butanone (MEK)	ug/L						1.4	5	<0.03	NS	NS
Organics	2-Chlorophenol	ug/L	1					< 2.21	< 0.21	< 0.442	<0.024	<0.024
Organics	2-Methylnaphthalene	ug/L						< 2.025	< 0.11	< 0.405	NS	NS
Organics	3 and 4-Methylphenol (m and p-Cresol)	ug/L						< 2.215	10	< 0.443	<0.043	<0.043
Organics	4-Nitrophenol	ug/L	30				50	< 3.8	< 12	< 0.76	<0.02	<0.02
Organics	Acenaphthylene	ug/L	220					< 1.68	< 0.075	< 0.336	<0.024	<0.024
Organics	Acetone	ug/L						45	150	< 0.2	NS	NS
Organics	Benzene	ug/L	5.9				5	< 0.071	< 0.071	< 0.071	<0.041	<0.041
Organics	Benzo(a)pyrene	ug/L						< 1.475	0.09	< 0.295	<0.025	<0.025
Organics	Benzo(b)fluoranthene	ug/L						< 1.87	< 0.094	< 0.374	<0.024	<0.024
Organics	Benzo(g,h,i)perylene	ug/L						< 1.545	0.07	< 0.309	<0.022	<0.022
Organics	Bis(2-chloroethyl) ether	ug/L	0.45					< 2.255	< 0.036	< 0.451	<0.022	<0.022

Organics	Bis(2-ethylhexyl) phthalate [Di(2-ethylhexyl) phthalate]	ug/L	3.5	4.0			29.44	14.00	22.00	6.80	12.17	6.59
Organics	Bromodichloromethane (Dichlorobromomethane) (a common THM)	ug/L	130					< 0.06	< 0.06	< 0.06	<0.056	<0.056
Organics	Bromoform (a common THM)	ug/L	130					< 0.053	< 0.053	< 0.053	<0.032	<0.032
Organics	Chlorodibromomethane	ug/L	8.6					< 0.045	< 0.045	< 0.045	<0.039	<0.039
Organics	Chloroform (a common THM)	ug/L	130	100				<0.044	1.1	<0.044	0.28	<0.034
Organics	Chloromethane (methyl chloride)	ug/L	130					< 0.055	< 0.055	< 0.055	<0.124	<0.124
Organics	Diethyl phthalate	ug/L	33000				29.44	< 1.31	21.00	< 0.262	<0.022	<0.022
Organics	Dimethyl phthalate	ug/L	820000				29.44	< 1.73	0.41	< 0.346	<0.024	<0.024
Organics	Di-n-butyl phthalate	ug/L	3500					< 1.48	1.8	5.4	<0.022	<0.022
Organics	Di-n-octyl phthalate	ug/L						1.9	< 0.25	< 0.276	<0.022	2.55
Organics	Ethylbenzene	ug/L	4100				500	< 0.091	< 0.091	< 0.091	<0.032	<0.032
Organics	Fluoranthene	ug/L	15				0.4	< 1.135	< 0.079	< 0.227	<0.022	<0.022
Organics	Indeno (1,2,3-cd) pyrene	ug/L	0.0088					< 1.445	0.072	< 0.289	<0.034	<0.034
Organics	Isophorone	ug/L	730				100	< 2.49	< 10	< 0.498	<0.022	<0.022
Organics	Methylene Chloride	ug/L						< 0.15	< 0.15	1.60	<0.043	<0.043
Organics	Methyl-t-butyl Ether (MTBE)	ug/L						NS	< 0.068	< 0.068	<0.058	<0.058
Organics	Naphthalene	ug/L					20	< 2.06	< 0.11	< 0.412	<0.022	<0.022
Organics	Pentachlorophenol	ug/L	1				0.5	< 0.011	< 0.011	0.098	<0.012	<0.012
Organics	Phenanthrene	ug/L	0.0088					< 1.38	0.098	< 0.276	<0.022	<0.022
Organics	Phenol	ug/L	300				1	< 2.27	18	< 0.454	<0.026	<0.026
Organics	Pyrene	ug/L	0.0088					< 2.005	< 0.081	< 0.401	<0.022	<0.022
Organics	Toluene	ug/L	85000				60	<0.078	0.703	1.1	<0.047	<0.047
Organics	Total Trihalomethanes (THM's)	ug/L						NS	1.1	<0.044	0.28	<0.031
Pesticide	2,4-D (2,4-Dichlorophenoxyacetic acid)	ug/L		100.0				< 0.074	< 0.074	< 0.074	<0.00115	0.02
Pesticide	Carbofuran	ug/L						0.57	<0.27	<0.27	NS	NS
Pesticide	Dalapon	ug/L						< 0.58	< 0.58	< 0.58	<0.00125	<0.00125
Pesticide	Endosulfan I	ug/L	9	0.056			0.03	0.10	ND	ND	<0.0001	<0.0001
Pesticide	Endosulfan II	ug/L	9	0.056			0.03	0.28	ND	ND	<0.00009	<0.00009
Pesticide	Endrin aldehyde	ug/L	0.002	0.002				<0.009	0.02	<0.009	<0.0001	<0.0001
Pesticide	Glyphosate	ug/L						< 2.1	< 2.1	< 2.1	NS	NS
Pesticide	Hexachlorocyclohexane delta {BHC-delta}	ug/L						<0.006	0.04	<0.006	<0.00007	<0.00007
Pesticide	Styrene	ug/L						< 0.22	< 0.22	< 0.22	<0.046	<0.046
Pesticide	Xylene (total)	ug/L		1750				< 0.25	< 0.25	< 0.25	<0.14	<0.14

Parameter	Analyte	UNIT	Reference Standard					Cañón del Sol						
								USA				MÉXICO		
			Ocean Plan	TJ River WQOs	TJ Wastewater	NOM-001	CE-CCA	DEC-18	JAN-19	FEB-19	MAY-19	DEC-18	FEB-19	MAY-19
Conventional	Alkalinity (Total as CaCO3)	mg/L						NS	490	380	250	329.3	413.7	253.7
Conventional	Ammonia (as Nitrogen)	mg/L	6.0	0.025	50		0.01	43.4	15.9	48.0	5.57	56.3	53.0	8.0
Conventional	Bicarbonate (HCO3)	mg/L						NS	590	460	300	329.3	366.4	253.7
Conventional	Biochemical Oxygen Demand (5-day) BOD	mg/L		10	379	75		NS	19	22	44	223.5	136.1	45.9
Conventional	Calcium	mg/L						NS	197.0	82.6	65.1	70.2	80.3	78.0
Conventional	Carbonaceous Biochemical Oxygen Demand (5-Day) CBOD	mg/L			327			NS	NS	NS	44.1	NS	NS	NS
Conventional	Chemical Oxygen Demand (COD)	mg/L		120	710			113.0	15.8	98.2	150	463.1	350.8	177.0
Conventional	Chloride	mg/L		250				510.0	220.0	260.0	90.1	199.1	163.4	90.0
Conventional	Chlorine, Total Residual	mg/L	0.06	0.019			0.0075	NS	<0.016	<0.016	<0.016	<0.1	<0.2	<0.2
Conventional	Chlorophyll a	mg/m3						NS	1840.0	441.0	90	<0.05	<0.05	<0.05
Conventional	Chlorophyll b	mg/m3						NS	2280.0	422.0	106	NS	NS	NS
Conventional	Chlorophyll c	mg/m3						NS	2630.0	473.0	424	NS	NS	NS
Conventional	Dissolved Oxygen	mg/L		>5			>5	NS	<1	<1	<1	5.6	9.1	1.5
Conventional	Electrical Conductivity (Specific)	us/cm						NS	1910.0	1730.0	1010	1600.0	1650.0	1006.0
Conventional	Fluoride	mg/L		1			0.5	NS	0.3	0.5	0.273	0.4	0.6	0.5
Conventional	Fluorine	mg/L						NS	0.3	0.5	0.273	<0.022	<0.022	<0.022
Conventional	Magnesium	mg/L						NS	32.8	31.5	11.9	22.7	26.6	13.5
Conventional	Nitrate, as Nitrogen	mg/L		5			40	NS	<0.012	0.1	0.07	0.1	0.0	0.1
Conventional	Nitrite, as Nitrogen	mg/L					2	NS	<0.018	<0.018	0.07	0.1	0.7	0.1
Conventional	Oil and Grease, Total	mg/L	75		20	15		NS	3.1	15.6	1.6	28.1	40.1	ND
Conventional	Ortho-Phosphorous as P	mg/L						NS	3.27	4.92	2.7	NS	NS	NS
Conventional	Ortho-Phosphorous as PO4	mg/L						NS	NS	15.1	8.28	NS	NS	NS
Conventional	pH	pH Units		6.5 to 8.5	7.3	5 to 10		NS	7.7	8.2	7.19	8.0	8.0	7.5
Conventional	Potassium	mg/L						NS	22.6	29.4	13.1	30.0	27.1	16.7
Conventional	Sodium	mg/L						NS	227.0	176.0	81.8	105.3	210.8	106.6
Conventional	Sulfate	mg/L		65				NS	253.0	258.0	111	203.6	290.6	159.9
Conventional	Sulfide, Total	mg/L					0.002	NS	3.0	<0.1	<0.1	<0.014	<0.014	<0.014
Conventional	Surfactants (MBAS)	mg/L					0.1	NS	2.2	2.3	2.2	5.3	2.5	2.9
Conventional	Temperature at Time of pH Measurement					40	Nat +/- 1.5	NS	20.7	5.1	7.5	19.0	12.0	17.0
Conventional	Total Dissolved Solids (TDS)	mg/L		300	1589			NS	1220.0	780.0	594	1024.0	990.0	650.0
Conventional	Total Hardness as CaCO3	mg/L						NS	627.0		212	296.1	304.1	258.8
Conventional	Total Kjeldahl Nitrogen	mg/L						NS	23.0	110.0	13	65.8	76.8	8.8
Conventional	Total Nitrogen	mg/L				40		NS	23.0	110.0	13.4	66.0	77.5	9.0
Conventional	Total Organic Carbon (TOC)	mg/L						NS	33.9	93.8	48.7	76.2	74.4	49.6
Conventional	Total Phosphorous as P	mg/L	0.1	0.1		20	0.0001	0.7	3.9	8.3	3.84	7.3	7.0	3.4
Conventional	Total Phosphorous as PO4	mg/L			8.5		0.002	2.0	11.8	25.3	11.8	NS	NS	NS
Conventional	Total Solids	mg/L			2428			NS	1290.0	900.0	640.00	1156.0	1066.0	656.0
Conventional	Total Suspended Solids (TSS)	mg/L		58	385	75		NS	40.0	92.0	44.9	143.3	100.0	21.0
Conventional	Volatile Suspended Solids (VSS)	mg/L			280			110.0	13.0	74.5	28.6	73.3	65.0	14.0
Pathogens	Camphylobacter	NA						ND	NS	NS	NS	NS	NS	NS
Pathogens	Cholera	NA						Absent	Absent	Absent	Absent	Absent	Absent	Absent
Pathogens	E. Coli	MPN/100mL		126				>24000	46000	>24000	>240000	>24000	>24000	>24000
Pathogens	Enteric Virus (Enterovirus)	MPN/L						78000	NS	NS	NS	NS	NS	NS
Pathogens	Enterococcus	MPN/100mL	104	151				>24000	93000	>24000	73000	NS	>24196	>2400
Pathogens	Fecal Coliform	MPN/L	400	400		1000	200	NS	NS	NS	NS	>24000	>24000	>24000
Pathogens	Norovirus GIA	MPN/L						72000	NS	NS	NS	NS	NS	NS
Pathogens	Norovirus GIB	MPN/L						2300	NS	NS	NS	NS	NS	NS
Pathogens	Norovirus GII	MPN/L						2900	NS	NS	NS	NS	NS	NS
Pathogens	Total Coliform	MPN/100mL	10000	1000				NS	>24000	>24000	>240000	NS	>24000	>24000
Metals	Aluminum	ug/L					200	781.0	55.1	331.0	295	852.3	550.6	439.1
Metals	Antimony	ug/L	1200.0	88.00	28			NS	3.2	1.4	<26	<1.3	<1.3	<1.3
Metals	Arsenic	ug/L	80.0	360	5	100	10	4.0	3.6	3.5	<6.2	<1.5	<1.5	<1.5
Metals	Barium (as Ba)	ug/L					500	75.1	58.7	66.5	33.7	72.4	83.5	29.9
Metals	Beryllium	ug/L			1.5			< 0.31	< 0.31	< 0.31	<6.2	<1.1	<1.1	<1.1
Metals	Boron	ug/L		500			9	37.6	206.0	125.0	288	172.5	165.1	224.8

Metals	Cadmium	ug/L	10	1.4	0.45	100	0.9	0.3	0.1	0.1	<1.48	<0.3	<0.3	<0.3
Metals	Chromium (Total)	ug/L			4.4	500		NS	0.8	1.6	6.6	5.8	5.5	6.3
Metals	Copper	ug/L	30	7.5	29	4000	3	41.7	14.3	26.2	13.1	43.4	42.2	15.1
Metals	Cyanide	ug/L	10	22		1000		<0.001	< 0.001	0.007	0.002	1.5	8.5	4.4
Metals	Cyanide (WAD)	ug/L						NS	< 0.001	0.003	NS	<1.4	6.6	<1.4
Metals	Cyanide, Amenable to Chlorination	ug/L						NS	< 0.001	0.003	NS	<0.5	<0.5	<0.5
Metals	Hexavalent chromium	ug/L	20.0	16	0.78		50	<0.094	0.1	0.3	0.2	<10	<10	<10
Metals	Iron	ug/L		1000	3015		50	NS	1080	61	1230	1116.0	987.8	1048.0
Metals	Lead	ug/L	20	25	17	200	6	4.8	3.9	2.8	<15.2	<0.8	<0.8	<0.8
Metals	Manganese	ug/L		0.05				84.2	323.0	35.9	135	66.0	26590.0	94.6
Metals	Mercury	ug/L	0.0	2.4	0.2	5	0.02	< 0.094	< 0.094	0.1	<0.094	0.1	<0.27	0.2
Metals	Nickel	ug/L	50	653	29	2000	8	7.7	13.3	5.8	< 11.8	7.6	<0.4	10.7
Metals	Selenium	ug/L	150	20	5.4		40	NS	1.2	2.4	< 7.8	<2.7	<2.7	<2.7
Metals	Silver	ug/L	0.7	0.84	1		2	NS	< 0.56	< 0.56	< 11.2	<0.6	<0.6	<0.6
Metals	Thallium	ug/L	14.0		4.25		20	NS	< 0.18	< 0.18	< 3.6	<1.2	<1.2	<1.2
Metals	Zinc	ug/L	200.0	54	88.7	10000	90	166.0	28.5	109.0	< 54	169.4	175.2	115.5
Organics	2,4,6-Trichlorophenol	ug/L	0.29					< 1.745	0.08	< 0.349	< 0.698	<0.026	<0.026	<0.026
Organics	2,4-Dichlorophenol	ug/L	1					< 1.805	< 0.058	< 0.361	< 0.722	<0.024	<0.024	<0.024
Organics	2-Butanone (MEK)	ug/L						2.7	<0.3	<0.3	3.6	NS	NS	NS
Organics	2-Chlorophenol	ug/L	1					< 2.21	< 0.10	< 0.442	< 0.884	<0.024	<0.024	<0.024
Organics	2-Methylnaphthalene	ug/L						< 2.025	< 0.057	< 0.405	< 0.81	NS	NS	NS
Organics	3 and 4-Methylphenol (m and p-Cresol)	ug/L						75	7.8	17	5.6	<0.043	<0.043	<0.043
Organics	4-Nitrophenol	ug/L	30				50	< 3.8	< 5.9	< 0.76	< 1.52	<0.02	<0.02	<0.02
Organics	Acenaphthylene	ug/L	220					< 1.68	< 0.038	< 0.336	< 0.672	<0.024	<0.024	<0.024
Organics	Acetone	ug/L						240	35	56	15	NS	NS	NS
Organics	Benzene	ug/L	5.9				5	<0.071	<0.071	<0.071	<0.071	<0.041	<0.041	<0.041
Organics	Benzo(a)pyrene	ug/L						< 1.475	< 0.041	< 0.295	< 0.59	<0.025	<0.025	<0.025
Organics	Benzo(b)fluoranthene	ug/L						< 1.87	0.043	< 0.374	< 0.748	<0.024	<0.024	<0.024
Organics	Benzo(g,h,i)perylene	ug/L						< 1.545	0.04	< 0.309	< 0.618	<0.022	<0.022	<0.022
Organics	Bis(2-chloroethyl) ether	ug/L	0.45					< 2.255	< 0.018	< 0.451	< 0.902	<0.022	<0.022	<0.022
Organics	Bis(2-ethylhexyl) phthalate [Di(2-ethylhexyl) phthalate]	ug/L	3.5	4.0			29.44	16.00	9.10	3.40	7.6	13.21	2.8	8.8
Organics	Bromodichloromethane (Dichlorobromomethane) (a common THM)	ug/L	130					< 0.06	< 0.06	< 0.06	<0.06	<0.056	<0.056	<0.056
Organics	Bromoform (a common THM)	ug/L	130					< 0.053	< 0.053	< 0.053	<0.053	<0.032	<0.032	<0.032
Organics	Chlorodibromomethane	ug/L	8.6					< 0.045	< 0.045	< 0.045	<0.045	<0.039	<0.039	<0.039
Organics	Chloroform (a common THM)	ug/L	130	100				0.500	< 0.044	< 0.044	<0.044	<0.034	<0.034	<0.034
Organics	Chloromethane (methyl chloride)	ug/L	130					< 0.055	< 0.055	< 0.055	<0.055	<0.124	<0.124	<0.124
Organics	Diethyl phthalate	ug/L	33000				29.44	5.30	4.80	0.71	4.8	5.52	4.2	18.0
Organics	Dimethyl phthalate	ug/L	820000				29.44	< 1.73	< 0.10	< 0.346	< 0.692	<0.024	<0.024	<0.024
Organics	Di-n-butyl phthalate	ug/L	3500					< 1.48	0.60	8.6	1.3	3.19	<0.022	<0.022
Organics	Di-n-octyl phthalate	ug/L						< 1.38	< 0.12	< 0.276	< 0.552	4.02	<0.022	<0.022
Organics	Ethylbenzene	ug/L	4100				500	< 0.091	< 0.091	< 0.091	< 0.15	<0.032	<0.032	<0.032
Organics	Fluoranthene	ug/L	15				0.4	< 1.135	< 0.040	< 0.227	< 0.454	<0.022	<0.022	<0.022
Organics	Indeno (1,2,3-cd) pyrene	ug/L	0.0088					< 1.445	0.037	< 0.289	< 0.578	<0.034	<0.034	<0.034
Organics	Isophorone	ug/L	730				100	< 2.49	< 5.1	< 0.498	< 0.996	<0.022	<0.022	<0.022
Organics	Methylene Chloride	ug/L						< 0.15	< 0.15	1.80	< 0.091	<0.043	<0.043	<0.043
Organics	Methyl-t-butyl Ether (MTBE)	ug/L						NS	< 0.068	< 0.068	< 0.068	<0.058	<0.058	<0.058
Organics	Naphthalene	ug/L					20	< 2.06	0.055	< 0.412	< 0.824	<0.022	<0.022	<0.022
Organics	Pentachlorophenol	ug/L	1				0.5	< 0.011	< 0.011	< 0.011	2.6	<0.012	<0.012	<0.012
Organics	Phenanthrene	ug/L	0.0088					< 1.38	0.041	< 0.276	< 0.552	<0.022	<0.022	<0.022
Organics	Phenol	ug/L	300				1	15	0.38	2.6	1	11.37	9.0	6.1
Organics	Pyrene	ug/L	0.0088					< 2.005	0.042	< 0.401	< 0.802	<0.022	<0.022	<0.022
Organics	Toluene	ug/L	85000				60	<0.078	0.974	0.491	0.416	<0.047	<0.047	<0.047
Organics	Total Trihalomethanes (THM's)	ug/L						NS	<0.044	<0.044	<0.044	0.28	0.3	0.3
Pesticide	2,4-D (2,4-Dichlorophenoxyacetic acid)	ug/L		100.0				< 0.074	< 0.074	< 0.074	<0.074	<0.00115	<0.00115	<0.00115
Pesticide	Carbofuran	ug/L						< 0.27	< 0.27	< 0.27	<0.27	NS	NS	NS
Pesticide	Dalapon	ug/L						< 0.58	< 0.58	< 0.58	<0.58	<0.00125	<0.00125	<0.00125
Pesticide	Endosulfan I	ug/L	9	0.056			0.03	< 0.004	< 0.004	< 0.004	< 0.004	<0.0001	<0.0001	<0.0001

Pesticide	Endosulfan II	ug/L	9	0.056			0.03	< 0.01	< 0.01	< 0.01	< 0.01	<0.00009	<0.00009	<0.00009
Pesticide	Endrin aldehyde	ug/L	0.002	0.002				< 0.009	< 0.009	< 0.009	<0.009	<0.0001	<0.0001	<0.0001
Pesticide	Glyphosate	ug/L						12.00	< 2.1	< 2.1	<2.1	NS	NS	NS
Pesticide	Hexachlorocyclohexane delta {BHC-delta}	ug/L						< 0.003	< 0.003	< 0.003	<0.003	<0.00007	<0.00007	<0.00007
Pesticide	Styrene	ug/L						< 0.22	< 0.22	< 0.22	<0.22	<0.046	<0.046	<0.046
Pesticide	Xylene (total)	ug/L		1750				< 0.25	< 0.25	< 0.25	<0.25	<0.14	<0.14	<0.14

Parameter	Analyte	UNIT	Reference Standard					Smugglers Canyon - El Matadero											
			Ocean Plan	TJ River WQOs	TJ Wastewater	NOM-001	CE-CCA	USA 1					USA 2		MÉXICO				
								DEC-18	JAN-19	FEB-19	APR-19	MAY-19	DEC-18	FEB-19	DEC-18	JAN-19	FEB-19	APR-19	MAY-19
Conventional	Alkalinity (Total as CaCO3)	mg/L						NS	480	220	520	400	NS	200	213.9	486.2	218.7	529.3	445.8
Conventional	Ammonia (as Nitrogen)	mg/L	6.0	0.025	50		0.01	21.8	33.6	21.1	54.7	59.5	6.1	14.0	22.9	31.0	18.2	50.9	56.6
Conventional	Bicarbonate (HCO3)	mg/L						NS	580.0	250.0	640	490			213.9	486.2	218.7	473.6	445.8
Conventional	Biochemical Oxygen Demand (5-day) BOD	mg/L		10	379	75		NS	35.0	104.0	20	165	NS	112.0	84.8	45.6	77.8	65.7	184.0
Conventional	Calcium	mg/L						NS	148.0	64.8	119	79.4	NS	62.8	53.2	138.1	60.3	106.2	91.8
Conventional	Carbonaceous Biochemical Oxygen Demand (5-Day) CBOD	mg/L			327			91.0	40.4	80.8	20.9	131	29.5	155.0	NS	NS	NS	NS	NS
Conventional	Chemical Oxygen Demand (COD)	mg/L		120	710			300.0	150.0	150.0	250	430	92.0	290.0	232.9	156.6	249.3	242.0	379.0
Conventional	Chloride	mg/L		250				NS	215.0	105.0	224	189	NS	102.0	153.7	232.8	103.6	232.9	196.7
Conventional	Chlorine, Total Residual	mg/L	0.06	0.019			0.0075	NS	<0.016	<0.016	<0.016	<0.016	NS	<0.016	<0.1	0.2	<0.2	<0.2	0.2
Conventional	Chlorophyll a	mg/m3						NS	1840.0	1280.0	10700	199	NS	301.0	<0.05	<0.05	<0.05	65.1	<0.05
Conventional	Chlorophyll b	mg/m3						NS	2440.0	1620.0	3090	186	NS	316.0	NS	NS	NS	NS	NS
Conventional	Chlorophyll c	mg/m3						NS	2890.0	1930.0	670	288	NS	441.0	NS	NS	NS	NS	NS
Conventional	Dissolved Oxygen	mg/L		>5			>5	NS	<1	<1	<1	<1	NS	<1	5.1	6.6	10.3	8.1	3.5
Conventional	Electrical Conductivity (Specific)	Us/cm						NS	2100	1120	2100	2050	NS	1000	1200	2130	1050	2210	2034
Conventional	Fluoride	mg/L		1			0.5	NS	0.4	0.4	0.436	0.373	NS	0.4	0.4	0.6	0.4	0.6	0.6
Conventional	Fluorine	mg/L						NS	0.4	0.4	0.436	0.373	NS	0.4	NS	NS	NS	NS	NS
Conventional	Magnesium	mg/L						NS	45.2	16.2	418	25.4	NS	16.9	16.0	40.0	19.6	36.4	29.0
Conventional	Nitrate, as Nitrogen	mg/L		5			40	NS	0.04	0.17	0.06	0.06	NS	0.1	1.3	0.1	0.9	0.1	ND
Conventional	Nitrite, as Nitrogen	mg/L					2	NS	<0.018	<0.018	<0.018	<0.018	NS	<0.018	0.1	0.0	0.7	0.0	0.1
Conventional	Oil and Grease, Total	mg/L	75		20	15		NS	3.7	11.2	2.9	5.7	NS	16.2	19.7	10.5	22.8	22.8	13.9
Conventional	Ortho-Phosphorous as P	mg/L						NS	2.4	2.2	4.02	4.02	NS	1.7	NS	NS	NS	NS	NS
Conventional	Ortho-Phosphorous as PO4	mg/L						NS	NS	NS	12.3	12.3	NS	NS	NS	NS	NS	NS	NS
Conventional	pH	pH Units		6.5 to 8.5	7.3	5 to 10		NS	7.7	7.8	8.11	7.64	NS	7.6	8.1	7.8	7.9	8.5	8.0
Conventional	Potassium	mg/L						NS	17.2	13.1	22.3	23.1	NS	14.0	22.3	18.2	16.2	24.3	27.7
Conventional	Sodium	mg/L						NS	244.0	127.0	223	170	NS	113.0	100.4	226.8	100.0	250.6	211.1
Conventional	Sulfate	mg/L		65				NS	292.0	145.0	238	28	NS	139.0	175.3	253.7	157.0	242.4	363.4
Conventional	Sulfide, Total	mg/L					0.002	NS	<0.1	<0.1	<0.1	<0.1	NS	<0.1	<0.014	<0.04	<0.014	0.2	0.4
Conventional	Surfactants (MBAS)	mg/L					0.1	NS	3.1	2.1	5.4	6.5	NS	2.9	4.3	3.1	1.6	2.1	5.1
Conventional	Temperature at Time of pH Measurement					40	Nat +/- 1.5	NS	18.6	5.0	7.8	7.5	NS	5.9	17.0	16.0	13.0	23.0	21.0
Conventional	Total Dissolved Solids (TDS)	mg/L		300	1589			NS	120.0	616.0	1290	916	NS	618.0	830.0	1326.0	600.0	1262.0	1146.0
Conventional	Total Hardness as CaCO3	mg/L						NS	555.0	229.0	469	302	NS		252.7	503.1	244.7	457.7	364.1
Conventional	Total Kjeldahl Nitrogen	mg/L						NS	45.0	35.0	66	79	NS	35.0	31.6	45.6	30.4	159.8	76.3
Conventional	Total Nitrogen	mg/L				40		NS	45.0	35.2	66.1	79.1	NS	35.1	33.0	31.9	31.9	160.0	76.4
Conventional	Total Organic Carbon (TOC)	mg/L						NS	50.7	40.4	49.4	103	NS	43.9	43.7	30.9	55.2	48.9	72.6
Conventional	Total Phosphorous as P	mg/L	0.1	0.1		20	0.0001	0.7	3.6	3.2	5.98	9.07	1.1	3.3	3.8	4.3	3.8	14.0	7.5
Conventional	Total Phosphorous as PO4	mg/L			8.5		0.002	2.1	11.1	10.0	18.3	27.8	3.4	10.0	NS	NS	NS	NS	NS
Conventional	Total Solids	mg/L			2428			NS	1270.0	912.0	1250.00	1040.00	NS	1200.0	704.0	1326.0	878.0	1258.0	1830.0
Conventional	Total Suspended Solids (TSS)	mg/L		58	385	75		NS	20.9	291.0	25.5	112.0	NS	622.0	170.0	43.0	233.6	240.0	130.0
Conventional	Volatile Suspended Solids (VSS)	mg/L			280			44.0	14.6	94.0	25.5	93.5	<7.7	201.0	90.0	36.0	<10	235.0	110.0
Pathogens	Camphylobacter	NA						ND	NS	NS	NS	NS	ND	NS	NS	NS	NS	NS	NS
Pathogens	Cholera	NA						Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Pathogens	E. Coli	MPN/100mL		126				>24000	>24000	>24000	>240000	>240000	>24000	>24000	>24000	>24000	>24000	>24000	>24000
Pathogens	Enteric Virus (Enterovirus)	MPN/L						ND	NS	NS	NS	NS	9300	NS	NS	NS	NS	NS	NS
Pathogens	Enterococcus	MPN/100mL	104	151				>24000	>24000	>24000	>240000	>240000	17000	>24000	NS	NS	>24196	>24196	>2400
Pathogens	Fecal Coliform	MPN/L	400	400		1000	200	NS	NS	NS	NS	NS	NS	NS	>24000	>24000	>24000	>24000	>24000
Pathogens	Norovirus GIA	MPN/L						ND	NS	NS	NS	NS	ND	NS	NS	NS	NS	NS	NS
Pathogens	Norovirus GIB	MPN/L						ND	NS	NS	NS	NS	1500	NS	NS	NS	NS	NS	NS
Pathogens	Norovirus GII	MPN/L						ND	NS	NS	NS	NS	100	NS	NS	NS	NS	NS	NS
Pathogens	Total Coliform	MPN/100mL	10000	1000				NS	>24000	>24000	>240000	>240000	NS	>24000	NS	NS	>24000	>24000	>24000
Metals	Aluminum	ug/L					200	3130.0	102.0	5320.0	45.9	246	500.0	9460.0	2905.0	362.1	9907.0	90.4	284.5
Metals	Antimony	ug/L	1200.0	88.00	28			NS	<1.3	1.8	<1.3	<26	NS	1.4	<1.3	<1.3	<1.3	<1.3	<1.3
Metals	Arsenic	ug/L	80.0	360	5	100	10	5.2	5.1	5.1	2.70	<6.2	4.8	5.0	<1.5	<1.5	<1.5	<1.5	<1.5
Metals	Barium (as Ba)	ug/L					500	86.8	78.4	106.0	78.7	71.4	73.3	204.0	72.1	79.7	124.6	82.7	67.5
Metals	Beryllium	ug/L			1.5			< 1.55	< 0.31	< 1.55	< 0.31	< 6.2	ND	ND	<1.1	<1.1	<1.1	<1.1	<1.1
Metals	Boron	ug/L		500			9	132.0	208.0	114.0	284	265	95.5	121.0	142.0	255.9	159.0	259.7	20.2
Metals	Cadmium	ug/L	10	1.4	0.45	100	0.9	0.2	<0.074	0.3	<0.074	<1.48	<0.074	0.4	<0.3	<0.3	<0.3	<0.3	<0.3
Metals	Chromium (Total)	ug/L			4.4	500		NS	0.5	7.7	1.30	7.78	NS	15.8	9.0	ND	14.8	ND	22.4
Metals	Copper	ug/L	30	7.5	29	4000	3	34.2	8.6	29.0	12.3	20.1	12.5	46.8	30.8	6.2	45.5	13.8	23.0
Metals	Cyanide	ug/L	10	22		1000		<0.001	0.003	0.003	0.002	0.0012	<0.001	0.002	4.2	7.7	0.5	12.9	4.2
Metals	Cyanide (WAD)	ug/L						NS	0.003	0.002	NS	NS	NS	NS	<1.41	<1.4	<1.4	3.0	3.8
Metals	Cyanide, Amenable to Chlorination	ug/L						NS	<0.001	0.003	NS	NS	NS	NS	0.7	<0.5	<0.5	<0.5	<0.5
Metals	Hexavalent chromium	ug/L	20.0	16	0.78		50	1.4	<0.094	0.5	0.4	0.3	0.3	1.2	<10.0	<10.0	<10.0	<10.0	<10.0
Metals	Iron	ug/L		1000	3015		50	NS	1920.0	7750.0	1140	767	NS	11400.0	4304.0	1327.0	14950.0	856.5	626.7
Metals	Lead	ug/L	20	25	17	200	6	9.6	<0.76	16.0	<0.76	<15.2	1.8	25.6	<0.8	<0.8	<0.8	<0.8	<0.8
Metals	Manganese	ug/L		0.05				190.0	1060.0	204.0	413	172	211.0	241.0	152.3	810.5	19560.0	378.2	0.2
Metals	Mercury	ug/L	0.0	2.4	0.2	5	0.02	< 0.094	< 0.094	0.1	< 0.094	< 0.094	<0.094	0.2	0.0	<0.027	<0.027	<0.027	0.0
Metals	Nickel	ug/L	50	653	29	2000	8	8.2	7.6	7.9	5.74	<11.8	6.7	11.5	6.8	<0.4	8.7	<0.4	13.4
Metals	Selenium	ug/L	150	20	5.4		40	1.2	2.2	1.4	0.899	< 7.8	NS	1.260	0.7	<2.7	<2.7	<2.7	<2.7
Metals	Silver	ug/L	0.7	0.84	1		2	< 0.56	< 0.56	< 0.56	< 0.56	< 11.2	NS	< 0.56	0.7	<0.6	<0.6	<0.6	<0.6
Metals	Thallium	ug/L	14.0		4.25		20	NS	< 0.18	< 0.18	< 0.18	< 3.6	NS	< 0.18	0.7	<1.2	<1.2	<1.2	<1.2
Metals	Zinc	ug/L	200.0	54	88.7	10000	90	109.0	18.8	725.0	25	82.5	17.6	407.0	125.2	36.7	191.9	38.4	157.6
Organics	2,4,6-Trichlorophenol	ug/L	0.29					< 1.745	< 0.0092	< 0.349	< 8.725	< 0.698	< 0.349	< 0.349	<0.026	<0.026	<0.026	<0.026	<0.026

Organics	2,4-Dichlorophenol	ug/L	1					< 1.805	0.76	< 0.361	< 9.025	< 0.722	< 0.361	< 0.361	<0.024	<0.024	<0.024	<0.024	<0.024
Organics	2-Butanone (MEK)	ug/L						< 0.3	< 0.3	< 0.3	3.7	3.3	<0.3	<0.3	NS	NS	NS	NS	NS
Organics	2-Chlorophenol	ug/L	1					< 2.21	0.03	< 0.442	< 11.05	< 0.884	<0.442	<0.442	<0.024	<0.024	<0.024	<0.024	<0.024
Organics	2-Methylnaphthalene	ug/L						< 2.025	0.012	< 0.405	< 10.125	< 0.81	<0.405	<0.405	NS	NS	NS	NS	NS
Organics	3 and 4-Methylphenol (m and p-Cresol)	ug/L						20	< 0.53	< 0.443	< 11.075	11	0.7	11	<0.043	<0.043	<0.043	<0.043	<0.043
Organics	4-Nitrophenol	ug/L	30				50	< 3.8	< 1.2	< 0.76	< 19	< 1.52	<0.76	<0.76	<0.02	<0.02	<0.02	<0.02	<0.02
Organics	Acenaphthylene	ug/L	220					< 1.68	< 0.0076	< 0.336	< 8.4	< 0.672	<0.336	<0.336	<0.024	<0.024	<0.024	<0.024	<0.024
Organics	Acetone	ug/L						110	< 0.2	< 0.2	54	110	<0.2	68	NS	NS	NS	NS	NS
Organics	Benzene	ug/L	5.9				5	< 0.071	< 0.071	< 0.071	< 0.071	< 0.071	<0.071	<0.071	<0.041	<0.041	<0.041	<0.041	<0.041
Organics	Benzo(a)pyrene	ug/L						< 1.475	< 0.0082	< 0.295	< 7.375	< 0.59	< 0.295	< 0.295	<0.025	<0.025	<0.025	<0.025	<0.025
Organics	Benzo(b)fluoranthene	ug/L						< 1.87	< 0.0059	< 0.374	< 9.35	< 0.748	< 0.34	< 0.34	<0.024	<0.024	<0.024	<0.024	<0.024
Organics	Benzo(g,h,i)perylene	ug/L						< 1.545	< 0.0036	< 0.309	< 7.725	< 0.618	< 0.309	< 0.309	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Bis(2-chloroethyl) ether	ug/L	0.45					< 2.255	< 0.0036	< 0.451	< 11.275	< 0.902	< 0.451	< 0.451	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Bis(2-ethylhexyl) phthalate [Di(2-ethylhexyl) phthalate]	ug/L	3.5	4.0			29.44	7.2	1.4	5.3	ND	8.6	0.67	10	6.58	9.74	3.48	3.6	11.8
Organics	Bromodichloromethane (Dichlorobromomethane) (a common THM)	ug/L	130					< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	<0.06	<0.06	<0.056	<0.056	<0.056	<0.056	<0.056
Organics	Bromoform (a common THM)	ug/L	130					< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	<0.053	<0.053	<0.032	<0.032	<0.032	<0.032	<0.032
Organics	Chlorodibromomethane	ug/L	8.6					< 0.045	< 0.045	< 0.045	< 0.045	< 0.045	<0.045	<0.045	<0.039	<0.039	<0.039	<0.039	<0.039
Organics	Chloroform (a common THM)	ug/L	130	100				< 0.044	< 0.044	1.2	< 0.044	0.538	<0.044	1.6	1.73	2.075	0.255	<0.034	<0.034
Organics	Chloromethane (methyl chloride)	ug/L	130					< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	<0.055	<0.055	<0.124	<0.124	<0.124	<0.124	<0.124
Organics	Diethyl phthalate	ug/L	33000				29.44	4	2.0	1.3	< 6.55	2.1	2.3	1.4	3.44	10.72	3.32	2.5	10.2
Organics	Dimethyl phthalate	ug/L	820000				29.44	< 1.73	< 0.021	< 0.346	< 8.65	< 0.692	<0.346	<0.346	<0.024	<0.024	<0.024	<0.024	<0.024
Organics	Di-n-butyl phthalate	ug/L	3500					2	0.57	11	28	2.8	0.65	8.9	2.88	<0.022	4.16	<0.022	<0.022
Organics	Di-n-octyl phthalate	ug/L						< 1.38	< 0.025	< 0.276	< 6.9	< 0.552	<0.276	0.44	2.93	<0.022	<0.022	<0.022	<0.022
Organics	Ethylbenzene	ug/L	4100				500	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	<0.032	<0.032	<0.032	<0.032	<0.032
Organics	Fluoranthene	ug/L	15				0.4	< 1.135	< 0.0080	< 0.227	< 5.675	< 0.454	< 0.227	< 0.227	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Indeno (1,2,3-cd) pyrene	ug/L	0.0088					< 1.445	< 0.0063	< 0.289	< 7.225	< 0.578	< 0.289	< 0.289	<0.034	<0.034	<0.034	<0.034	<0.034
Organics	Isophorone	ug/L	730				100	< 2.49	< 1.0	< 0.498	< 12.45	< 0.996	< 0.498	< 0.498	<0.022	<0.022	<0.022	3.9	<0.022
Organics	Methylene Chloride	ug/L						< 0.15	0.171	1.4	0.505	< 0.15	< 0.15	1.5	<0.043	<0.043	<0.043	<0.043	<0.043
Organics	Methyl-t-butyl Ether (MTBE)	ug/L						NS	0.162	< 0.068	< 0.068	< 0.068	NS	1.1	<0.058	<0.058	<0.058	<0.058	<0.058
Organics	Naphthalene	ug/L					20	< 2.06	0.037	< 0.412	< 10.3	< 0.824	<0.412	<0.412	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Pentachlorophenol	ug/L	1				0.5	< 0.011	< 0.011	< 0.011	< 0.011	< 0.011	< 0.011	< 0.011	<0.012	<0.012	<0.012	<0.012	<0.012
Organics	Phenanthrene	ug/L	0.0088					< 1.38	< 0.0076	< 0.276	< 6.9	< 0.552	< 0.276	< 0.276	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Phenol	ug/L	300				1	4.3	0.26	1.7	< 11.35	< 0.908	< 0.454	1.9	2.94	2.44	<0.026	4.1	33.3
Organics	Pyrene	ug/L	0.0088					< 2.005	< 0.0082	< 0.401	< 10.025	< 0.802	< 0.401	< 0.401	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Toluene	ug/L	85000				60	< 0.078	0.417	< 0.078	0.225	0.202	<0.078	0.464	<0.047	<0.047	<0.047	<0.047	<0.047
Organics	Total Trihalomethanes (THM's)	ug/L						NS	1.1	1.2	< 0.044	0.538	NS	1.6	1.73	ND	61	ND	ND
Pesticide	2,4-D (2,4-Dichlorophenoxyacetic acid)	ug/L		100.0				< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	<0.074	<0.074	<0.00115	<0.00115	<0.00115	<0.00115	<0.00115
Pesticide	Carbofuran	ug/L						< 0.27	< 0.27	< 0.27	< 0.27	< 2.7	<0.27	<0.27	NS	NS	NS	NS	NS
Pesticide	Dalapon	ug/L						< 0.58	< 0.58	< 0.58	< 0.58	< 0.58	<0.58	<0.58	3.90	78.90	<0.00125	0.018	0.043
Pesticide	Endosulfan I	ug/L	9	0.056			0.03	0.05	< 0.004	< 0.004	< 0.04	< 0.004	< 0.004	< 0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Pesticide	Endosulfan II	ug/L	9	0.056			0.03	< 0.01	< 0.01	< 0.01	< 0.1	< 0.01	< 0.01	< 0.01	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009
Pesticide	Endrin aldehyde	ug/L	0.002	0.002				< 0.009	< 0.009	< 0.009	< 0.09	< 0.009	<0.009	<0.009	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Pesticide	Glyphosate	ug/L						6.9	< 2.1	< 2.1	< 21	< 2.1	<2.1	<2.1	NS	NS	NS	NS	NS
Pesticide	Hexachlorocyclohexane delta {BHC-delta}	ug/L						< 0.006	< 0.006	< 0.006	< 0.06	< 0.006	<0.006	<0.006	<0.00007	<0.00007	<0.00007	<0.00007	<0.00007
Pesticide	Styrene	ug/L						< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	<0.22	<0.22	<0.046	0.13	0.13	<0.046	<0.046
Pesticide	Xylene (total)	ug/L		1750				< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	<0.25	<0.25	<0.14	<0.14	<0.14	<0.14	<0.14

Parameter	Analyte	UNIT	Reference Standard					Goat Canyon - Los Laureles													
								USA 1						USA 2		MÉXICO					
			Ocean Plan	TJ River WQOs	TJ Wastewater	NOM-001	CE-CCA	DEC-18	JAN-19	FEB-19	APR-19	MAY-19	JUL-19	DEC-18	FEB-19	DEC-18	JAN-19	FEB-19	APR-19	MAY-19	JUL-19
Conventional	Alkalinity (Total as CaCO3)	mg/L						NS	490	370	290	210	420	NS	160	243.8	420.2	354.6	310.4	217.9	127.4
Conventional	Ammonia (as Nitrogen)	mg/L	6.0	0.025	50		0.01	25.4	51.1	41.3	16.5	7.4	3.75	22.2	14.2	26.2	47.0	43.9	20.9	6.4	1.8
Conventional	Bicarbonate (HCO3)	mg/L						NS	590.0	450.0	350	260	520	NS	200	243.8	420.2	354.6	310.4	168.2	127.4
Conventional	Biochemical Oxygen Demand (5-day) BOD	mg/L		10	379	75		NS	158.0	145.0	48	18	33	NS	88	141.5	153.3	179.0	111.5	15.1	37.9
Conventional	Calcium	mg/L						NS	114.0	82.6	114	65.5	162	NS	68.3	62.2	103.8	97.9	99.1	77.2	195.4
Conventional	Carbonaceous Biochemical Oxygen Demand (5-Day) CBOD	mg/L			327			111.0	13.9	187.0	40.1	13.9	18.7	39	68.3	NS	NS	NS	NS		NS
Conventional	Chemical Oxygen Demand (COD)	mg/L		120	710			570.0	480.0	320.0	360	100	65	520	380	440.8	403.0	860.4	288.0	118.0	622.0
Conventional	Chloride	mg/L		250				NS	232.0	256.0	203	182	412	NS	115	196.1	249.4	227.1	1144.8	181.0	405.6
Conventional	Chlorine, Total Residual	mg/L	0.06	0.019			0.0075	NS	< 0.016	< 0.016	< 0.016	< 0.016	< 0.016	NS	<0.016	<0.1	<0.2	<0.2	0.2	0.2	<0.2
Conventional	Chlorophyll a	mg/m3						NS	1100.0	104.0	1030	2070	241	NS	242	<0.05	<0.05	<0.05	27.4	<0.05	10.2
Conventional	Chlorophyll b	mg/m3						NS	1410.0	109.0	1520	1660	<1	NS	223	NS	NS	NS	NS	NS	NS
Conventional	Chlorophyll c	mg/m3						NS	1760.0	160.0	<14	2060	<1	NS	308	NS	NS	NS	NS	NS	NS
Conventional	Dissolved Oxygen	mg/L		>5			>5	NS	<1	<1	<1	6.1	6.9	NS	<1	6.0	4.5	9.3	5.8	8.0	7.2
Conventional	Electrical Conductivity (Specific)	Us/cm						NS	2290.0	1920.0	1780	1540	2360	NS	851	1250.0	2129.0	1607.0	1767.0	1541.0	2320.0
Conventional	Fluoride	mg/L		1			0.5	NS	0.4	0.6	0.489	0.492	1.73	NS	0.584	0.5	0.6	0.6	0.7	0.7	2.0
Conventional	Fluorine	mg/L						NS	0.4	0.6	0.489	0.492	1.73	NS	0.584	NS	NS	NS	NS	NS	NS
Conventional	Magnesium	mg/L						NS	42.7	28.5	39.2	20.8	238	NS	42.7	28.4	35.0	46.3	34.5	25.3	493.8
Conventional	Nitrate, as Nitrogen	mg/L		5			40	NS	0.1	0.1	0.06	0.27	1.75	NS	0.86	<0.0015	0.1	<0.0015	0.1	0.3	1.0
Conventional	Nitrite, as Nitrogen	mg/L					2	NS	<0.018	<0.018	<0.018	0.08	<0.018	NS	<0.018	0.0	0.0	0.1	0.0	0.1	0.2
Conventional	Oil and Grease, Total	mg/L	75		20	15		NS	8.1	6.3	5.6	<1.47	5.5	NS	3.2	15.4	18.9	7.9	6.8	ND	ND
Conventional	Ortho-Phosphorous as P	mg/L						NS	4.3	4.3	2.52	0.87	0.5650	NS	2.12	NS	NS	NS	NS	NS	NS
Conventional	Ortho-Phosphorous as PO4	mg/L						NS	NS	13.1	7.73	2.6	1.73	NS	6.52	NS	NS	NS	NS	NS	NS
Conventional	pH	pH Units		6.5 to 8.5	7.3	5 to 10		NS	7.4	8.2	7.62	8.53	7.75	NS	7.99	8.1	7.8	8.0	8.4	8.8	8.2
Conventional	Potassium	mg/L						NS	35.4	25.6	20.5	16.8	132	NS	31.2	31.3	32.2	47.3	21.4	21.6	303.3
Conventional	Sodium	mg/L						NS	300.0	232.0	194	156	374	NS	107	102.3	268.7	306.5	235.4	207.4	544.9
Conventional	Sulfate	mg/L		65				NS	362.0	237.0	322	296	369.0	NS	130	223.3	324.6	229.5	317.4	332.0	525.2
Conventional	Sulfide, Total	mg/L					0.002	NS	<0.1	<0.1	<0.1	<0.1	<0.1	NS	<0.1	<0.014	<0.014	<0.014	0.4	<0.014	<0.014
Conventional	Surfactants (MBAS)	mg/L					0.1	NS	8.1	2.8	1.8	1.9	0.18	NS	2.1	5.3	7.1	1.6	2.0	2.7	0.2
Conventional	Temperature at Time of pH Measurement					40	Nat +/- 1.5	NS	18.6	4.2	8.2	7.6	12.4	NS	5.1	17.0	16.0	13.0	21.0	21.0	24.0
Conventional	Total Dissolved Solids (TDS)	mg/L		300	1589			NS	1170.0	948.0	1260	766	634	NS	508	1098.0	1528.0	1084.0	1380.0	884.0	1972.0
Conventional	Total Hardness as CaCO3	mg/L						NS	460.0	NS	445	249	1380	NS	346	296.1	400.4	389.6	420.6	315.8	788.1
Conventional	Total Kjeldahl Nitrogen	mg/L						NS	81.0	77.0	39	11	33	NS	36	47.2	69.8	79.0	23.3	9.2	24.7
Conventional	Total Nitrogen	mg/L				40		NS	81.1	77.1	39.1	11.4	34.8	NS	36.9	47.6	79.1	79.1	23.4	9.6	25.8
Conventional	Total Organic Carbon (TOC)	mg/L						NS	107.0	82.8	45.1	33.2	28.7	NS	37.7	83.9	68.4	226.2	86.7	38.7	27.9
Conventional	Total Phosphorous as P	mg/L	0.1	0.1		20	0.0001	0.1	4.9	7.6	3.2	1.22	1.34	0.156	3.70	5.9	8.4	11.5	5.1	1.3	18.2
Conventional	Total Phosphorous as PO4	mg/L			8.5		0.002	0.3	15.0	23.3	9.8	3.74	4.09	0.478	11.3	NS	NS	NS	NS	NS	NS
Conventional	Total Solids	mg/L			2428			NS	1340	1500	1380	842	23800	NS	6580	1828	1528	2058	1654	878	32592
Conventional	Total Suspended Solids (TSS)	mg/L		58	385	75		NS	87.6	493.0	144	31.2	22200	NS	5940	716.7	153.3	880.0	1130.0	23.0	24300.0
Conventional	Volatile Suspended Solids (VSS)	mg/L			280			216.0	54.0	118.0	53.0	<10	2800.0	<333.5	687	90.0	130.0	10.0	75.0	13.5	1750.0
Pathogens	Camphylobacter	NA						Present	NS	NS	NS	NS	NS	ND	NS	NS	NS	NS	NS	NS	NS
Pathogens	Cholera	NA						Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Pathogens	E. Coli	MPN/100mL		126				>24000	>24000	>24000	>240000	160000	>240000	>24000	>240000	>24000	>24000	>24000	>24000	>24000	>24000
Pathogens	Enteric Virus (Enterovirus)	MPN/L						ND	NS	NS	NS	NS	NS	ND	NS	NS	NS	NS	NS	NS	NS
Pathogens	Enterococcus	MPN/100mL	104	151				>24000	>24000	>24000	>240000	25000	>240000	>24000	>240000	NS	NS	NS	>24196	>2400	>24196
Pathogens	Fecal Coliform	MPN/L	400	400		1000	200	NS	NS	NS	NS	NS	NS	NS3	NS	>24000	>24000	>24000	>24000	>24000	>24000
Pathogens	Norovirus GIA	MPN/L						ND	NS	NS	NS	NS	NS	ND	NS	NS	NS	NS	NS	NS	NS
Pathogens	Norovirus GIB	MPN/L						2900	NS	NS	NS	NS	NS	ND	NS	NS	NS	NS	NS	NS	NS
Pathogens	Norovirus GII	MPN/L						ND	NS	NS	NS	NS	NS	ND	NS	NS	NS	NS	NS	NS	NS
Pathogens	Total Coliform	MPN/100mL	10000	1000				NS	>24000	>24000	>240000	240000	>240000	NS	>240000	NS	NS	>24000	>24000	>24000	>24000
Metals	Aluminum	ug/L					200	4410.0	295.0	1800.0	6950	952	370000	41300	69700	16460.0	1026.0	59630.0	8334.0	187.9	891700.0
Metals	Antimony	ug/L	1200.0	88.00	28			NS	<1.3	1.4	2.27	<26	<1.3	NS	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3
Metals	Arsenic	ug/L	80.0	360	5	100	10	10.1	3.2	7.3	7.28	<6.2	15.8	10.4	11.6	<1.5	<1.5	<1.5	<1.5	<1.5	285.1
Metals	Barium (as Ba)	ug/L					500	253.0	78.6	273.0	168	58.4	3270	324	56	236.6	88.9	703.1	153.5	45.6	4099.0
Metals	Beryllium	ug/L			1.5			< 7.75	< 0.31	< 0.31	< 3.1	< 6.2	< 6.2	<40	<31	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Metals	Boron	ug/L		500			9	1130.0	219.0	150.0	259	243	477	236	<95	289.7	250.7	525.9	249.8	200.4	2864.0
Metals	Cadmium	ug/L	10	1.4	0.45	100	0.9	0.4	0.1	0.5	0.338	<1.48	7.03	0.392	1.27	<0.3	<0.3	3.3	<0.3	<0.3	<0.3
Metals	Chromium (Total)	ug/L			4.4	500		NS	1.6	24.3	9.7	6.74	316	NS	74.2	36.1	3.5	74.1	9.7	ND	1019.0
Metals	Copper	ug/L	30	7.5	29	4000	3	52.7	16.3	50.5	37.3	9.46	292	54.9	137	42.4	17.3	150.6	31.5	8.6	519.0
Metals	Cyanide	ug/L	10	22		1000		<0.001	0.004	0.005	0.0016	0.004	0.0054	<0.001	0.0044	15.8	18.5	9.0	14.3	4.4	4.2
Metals	Cyanide (WAD)	ug/L						NS	0.003	NS	NS	NS	NS	NS	NS	13.2	18.5	3.7	<0.0014	2.7	4.2
Metals	Cyanide, Amenable to Chlorination	ug/L						NS	<0.001	0.0	NS	NS	NS	NS	NS	0.8	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Metals	Hexavalent chromium	ug/L	20.0	16	0.78		50	1.7	<0.094	0.4	0.4	0.4	<0.094	0.7	ND	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Metals	Iron	ug/L		1000	3015		50	NS	1080.0	29300.0	8660	1550	541000	NS	8500	23850.0	1463.0	97410.0	11280.0	276.1	1573000.0
Metals	Lead	ug/L	20	25	17	200	6	17.8	2.6	23.6	8.7	<15.2	212	20.2	129	<0.8	<0.8	<0.8	<0.8	<0.8	271.3
Metals	Manganese	ug/L		0.05				358.0	161.0	418.0	412	64.4	10800	399	2140	319.1	139.4	46330.0	293.7	34.2	17700.0
Metals	Mercury	ug/L	0.0	2.4	0.2	5	0.02	< 0.094	0.1	0.1	< 0.094	< 0.094	0.8	0.11	0.31	0.0	0.1	0.1	<0.027	<0.027	0.5
Metals	Nickel	ug/L	50	653	29	2000	8	20.3	7.0	15.9	13.1	<11.8	294	22.8	51.3	17.6	3.4	34.1	5.9	3.7	399.9
Metals	Selenium	ug/L	150	20	5.4		40	3.5	2.0	1.5	1.4	< 7.8	8.9	3.26	<7.8	0.8	<2.7	<2.7	<2.7	<2.7	<2.7
Metals	Silver	ug/L	0.7	0.84	1		2	< 0.56	< 0.56	< 0.56	< 0.56	< 11.2	0.669	<0.56	<0.56	0.8	<0.6	<0.6	<0.6	<0.6	<0.6
Metals	Thallium	ug/L	14.0		4.25		20	NS	< 0.18	0.3	< 0.18	< 3.6	9	NS	<3.6	0.8	<1.2	<1.2	<1.2	<1.2	<1.2
Metals	Zinc	ug/L	200.0	54	88.7	10000	90	251.0	69.2	199.0	163	<54	1770	238	988	256.5	111.3	604.6	152.0	17.7	2699.0
Organics	2,4,6-Trichlorophenol	ug/L	0.29					< 0.698	0.22	< 0.349	< 1.745	< 0.698	< 0.349	<1.745	<1.745	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026
Organics	2,4-Dichlorophenol	ug/L	1					< 0.722	0.91	< 0.361	< 1.804	< 0.722	< 0.361	<1.805	<1.805	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024
Organics	2-Butanone (MEK)	ug/L						3.7	< 0.3	< 0.3	9.2	1	< 0.3	<0.3	<0.3	NS	NS	NS	NS	NS	NS
Organics	2-Chlorophenol	ug/L	1					< 0.884	< 0.21	< 0.442	< 2.21	< 0.884	< 0.442	<2.21	<2.21	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024
Organics	2-Methylnaphthalene	ug/L						< 0.81	< 0.11	< 0.405	< 2.025	< 0.81	< 0.405	<2.025	<2.025	NS	NS	NS	NS	NS	NS
Organics	3 and 4-Methylphenol (m and p-Cresol)	ug/L						15	< 5.2	17	< 2.215	11	< 0.443	6.6	7.0	<0.043	<0.043	<0.043	<0.043	<0.043	<0.043

Organics	4-Nitrophenol	ug/L	30				50	< 1.52	< 12	< 0.76	< 3.8	< 1.52	< 0.76	<3.8	<0.76	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Organics	Acenaphthylene	ug/L	220					< 0.672	< 0.075	< 0.336	< 1.68	< 0.672	< 0.336	<1.68	<0.336	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024
Organics	Acetone	ug/L						180	97	< 0.2	38	< 0.2	< 0.2	130	<0.2	NS	NS	NS	NS	NS	NS
Organics	Benzene	ug/L	5.9				5	< 0.071	< 0.071	0.726	< 0.071	< 0.071	< 0.071	<0.071	<0.071	<0.041	<0.041	0.27	<0.041	<0.041	<0.041
Organics	Benzo(a)pyrene	ug/L						< 0.59	< 0.080	< 0.295	< 1.475	< 0.59	< 0.295	< 1.475	< 0.295	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Organics	Benzo(b)fluoranthene	ug/L						< 0.748	< 0.058	< 0.374	< 1.87	< 0.748	< 0.374	< 1.87	< 0.374	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024
Organics	Benzo(g,h,i)perylene	ug/L						< 0.618	< 0.036	< 0.309	< 1.545	< 0.618	< 0.309	< 1.545	< 0.309	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Bis(2-chloroethyl) ether	ug/L	0.45					< 0.902	0.08	< 0.451	< 2.255	< 0.902	< 0.451	< 2.255	< 0.451	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Bis(2-ethylhexyl) phthalate [Di(2-ethylhexyl) phthalate]	ug/L	3.5	4.0			29.44	1.80	26.00	4.10	2.3	6	23	2.2	1.7	10.89	20.47	<0.022	3.2	2.0	0.7
Organics	Bromodichloromethane (Dichlorobromomethane) (a common THM)	ug/L	130					< 0.06	< 0.06	< 0.06	0.359	0.704	< 0.06	<0.06	<0.06	<0.056	<0.056	<0.056	<0.056	0.8	<0.056
Organics	Bromoform (a common THM)	ug/L	130					< 0.053	< 0.053	< 0.053	< 0.053	0.133	< 0.053	< 0.053	< 0.053	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032
Organics	Chlorodibromomethane	ug/L	8.6					< 0.045	< 0.045	0.443	< 0.045	0.843	< 0.045	< 0.045	< 0.045	<0.039	<0.039	<0.039	<0.039	0.9	<0.039
Organics	Chloroform (a common THM)	ug/L	130	100				0.13	2.4	1.9	1.4	1.7	1.3	< 0.044	1.1	<0.034	2.26	0.375	2.3	1.8	1.0
Organics	Chloromethane (methyl chloride)	ug/L	130					< 0.055	< 0.055	< 0.055	0.518	< 0.055	< 0.055	< 0.055	< 0.055	<0.124	<0.124	<0.124	<0.124	<0.124	<0.124
Organics	Diethyl phthalate	ug/L	33000				29.44	3.30	14.00	0.41	< 1.31	< 0.524	< 0.262	9.7	< 0.262	4.85	15.51	4.09	<0.022	<0.022	0.2
Organics	Dimethyl phthalate	ug/L	820000				29.44	< 0.692	0.39	< 0.346	< 1.73	< 0.692	< 0.346	< 1.73	< 0.346	<0.024	<0.024	<0.024	<0.024	<0.024	<0.024
Organics	Di-n-butyl phthalate	ug/L	3500					0.81	2.3	12	8.1	2.8	1.8	1.6	9.3	<0.022	2.64	2.2	<0.022	<0.022	1.7
Organics	Di-n-octyl phthalate	ug/L						< 0.552	< 0.24	< 0.276	< 1.38	< 0.552	< 0.276	< 1.38	< 0.276	3.72	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Ethylbenzene	ug/L	4100				500	< 0.091	< 0.091	1.6	< 0.091	< 0.091	< 0.15	< 0.091	< 0.091	<0.032	<0.032	1.46	<0.032	<0.032	<0.032
Organics	Fluoranthene	ug/L	15				0.4	< 0.454	< 0.079	< 0.227	< 1.135	< 0.454	< 0.227	< 1.135	< 0.227	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Indeno (1,2,3-cd) pyrene	ug/L	0.0088					< 0.578	< 0.062	< 0.289	< 1.445	< 0.578	< 0.289	< 1.445	< 0.289	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Organics	Isophorone	ug/L	730				100	< 0.996	< 10	< 0.498	< 2.49	< 0.996	< 0.498	< 2.49	< 0.498	<0.022	<0.022	<0.022	1.4	<0.022	2.8
Organics	Methylene Chloride	ug/L						< 0.15	0.36	1.50	0.29	< 0.15	4.0	< 0.15	1.6	<0.043	<0.043	<0.043	<0.043	<0.043	<0.043
Organics	Methyl-t-butyl Ether (MTBE)	ug/L						NS	< 0.068	5.4	< 0.068	< 0.068	< 0.068	NS	1.1	<0.058	<0.058	<0.058	<0.058	<0.058	<0.058
Organics	Naphthalene	ug/L					20	< 0.824	< 0.10	< 0.412	< 2.06	< 0.824	< 0.412	< 2.06	< 0.412	<0.022	<0.022	2.1	<0.022	<0.022	<0.022
Organics	Pentachlorophenol	ug/L	1				0.5	< 0.011	< 0.011	< 0.011	< 0.011	< 0.011	< 0.011	< 0.011	< 0.011	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Organics	Phenanthrene	ug/L	0.0088					< 0.552	< 0.075	< 0.276	< 1.38	< 0.552	< 0.276	< 1.38	< 0.276	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Phenol	ug/L	300				1	3.9	5.7	3.3	< 2.27	< 0.908	< 0.454	3.8	1.5	4.03	20.75	7.07	<0.026	<0.026	<0.026
Organics	Pyrene	ug/L	0.0088					< 0.802	< 0.080	< 0.401	< 2.005	< 0.802	< 0.401	< 2.005	< 0.401	<0.022	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Toluene	ug/L	85000				60	< 0.078	0.466	7.7	2.3	1.3	0.596	< 0.078	1.4	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047
Organics	Total Trihalomethanes (THM's)	ug/L						NS	2.4	2.3	1.8	3.2	< 0.044	NS	1.1	<0.031	2.26	0.79	2.2	3.6	0.9
Pesticide	2,4-D (2,4-Dichlorophenoxyacetic acid)	ug/L		100.0				< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	<0.00115	<0.00115	<0.00115	<0.00115	<0.00115	<0.00115
Pesticide	Carbofuran	ug/L						< 0.27	< 0.27	< 0.27	< 0.27	< 2.7	< 2.7	< 0.27	< 0.27	NS	NS	<0.0046	<0.0046	<0.0046	<0.0046
Pesticide	Dalapon	ug/L						< 0.58	< 0.58	< 0.58	< 0.58	< 0.58	1.9	< 0.58	< 0.58	0.02	0.13	<0.00125	0.3	0.3	0.1
Pesticide	Endosulfan I	ug/L	9	0.056			0.03	< 0.004	< 0.004	< 0.004	< 0.008	< 0.004	< 0.004	0.02	< 0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Pesticide	Endosulfan II	ug/L	9	0.056			0.03	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009
Pesticide	Endrin aldehyde	ug/L	0.002	0.002				< 0.009	< 0.009	< 0.009	< 0.018	< 0.009	< 0.009	< 0.008	< 0.008	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Pesticide	Glyphosate	ug/L						6.20	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	NS	NS	<0.380	<0.380	<0.380	<0.380
Pesticide	Hexachlorocyclohexane delta {BHC-delta}	ug/L						< 0.006	< 0.006	< 0.006	< 0.012	< 0.006	< 0.006	< 0.006	< 0.006	<0.00007	<0.00007	<0.00007	<0.00007	<0.00007	<0.00007
Pesticide	Styrene	ug/L						< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	<0.046	<0.046	<0.046	<0.046	<0.046	<0.046
Pesticide	Xylene (total)	ug/L		1750				< 0.25	< 0.25	9.50	< 0.25	< 0.25	< 0.25	< 0.25	1.2	<0.14	<0.14	11.97	<0.14	<0.14	<0.14

Parameter	Analyte	UNIT	Reference Standard					Yogurt Canyon-Los Sauces									
								USA					MÉXICO				
			Ocean Plan	TJ River WQOs	TJ Wastewater	NOM-001	CE-CCA	DEC-18	JAN-19	FEB-19	APR-19	MAY-19	DEC-18	JAN-19	FEB-19	APR-19	MAY-19
Conventional	Alkalinity (Total as CaCO3)	mg/L						NS	810	190	650	450	293.2	865.2	195	676.6	491.5
Conventional	Ammonia (as Nitrogen)	mg/L	6.0	0.025	50		0.01	0.6	4.1	ND	1.64	0.842	0.6	2.8	0.6	0.1	0.5
Conventional	Bicarbonate (HCO3)	mg/L								990.0	800	540	293.0	865.2	195.0	620.9	491.5
Conventional	Biochemical Oxygen Demand (5-day) BOD	mg/L		10	379	75		NS	21.0	32.0	21	4	<2	10.3	4.0	<2	3.6
Conventional	Calcium	mg/L						NS	265.0	58.4	288	159	81.4	279.0	50.6	311.4	180.8
Conventional	Carbonaceous Biochemical Oxygen Demand (5-Day) CBOD	mg/L			327			3.7	24.3	14.2	16.7	7	NS	NS	NS	NS	NS
Conventional	Chemical Oxygen Demand (COD)	mg/L		120	710			46.0	160.0	67.0	200	43	48.7	109.3	63.7	118.0	75.0
Conventional	Chloride	mg/L		250				NS	1390.0	248.0	1180	931	503.5	1368.1	243.2	213.3	856.1
Conventional	Chlorine, Total Residual	mg/L	0.06	0.019			0.0075	NS	0.110	0.030	< 0.016	< 0.016	<0.1	0.2	<0.2	0.2	0.4
Conventional	Chlorophyll a	mg/m3						NS	5140.0	423.0	6860	1440	<0.05	8.7	<0.05	85.6	<0.05
Conventional	Chlorophyll b	mg/m3						NS	2600.0	233.0	1210	206	NS	NS	NS	NS	NS
Conventional	Chlorophyll c	mg/m3						NS	3200.0	316.0	2440	263	NS	NS	NS	NS	NS
Conventional	Dissolved Oxygen	mg/L		>5			>5	NS	2.5	8.2	3.7	10.0	5.1	6.3	9.2	9.0	10.3
Conventional	Electrical Conductivity (Specific)	Us/cm						NS	5630.0	1270.0	5060	3910	2280.0	5640.0	1279.0	5620.0	4010.0
Conventional	Fluoride	mg/L		1			0.5	NS	0.7	0.4	0.531	0.52	0.4	0.8	0.4	0.7	0.8
Conventional	Fluorine	mg/L						NS	0.7	0.4	0.531	0.52	NS	NS	NS	NS	NS
Conventional	Magnesium	mg/L						NS	148.0	24.6	131	60.4	48.6	165.7	23.6	109.9	71.4
Conventional	Nitrate, as Nitrogen	mg/L		5			40	NS	0.3	1.7	0.07	0.11	0.7	0.2	0.7	0.3	0.1
Conventional	Nitrite, as Nitrogen	mg/L					2	NS	0.1	< 0.018	< 0.018	< 0.018	0.1	0.3	0.1	0.1	0.1
Conventional	Oil and Grease, Total	mg/L	75		20	15		NS	< 1.554	4.3	2.9	1.6	<5	8.1	7.2	12.5	<5
Conventional	Ortho-Phosphorous as P	mg/L						NS	0.1	0.4	0.4860	0.368	NS	NS	NS	NS	NS
Conventional	Ortho-Phosphorous as PO4	mg/L						NS	NA	1.2	1.4900	1.13	NS	NS	NS	NS	NS
Conventional	pH	pH Units		6.5 to 8.5	7.3	5 to 10		NS	7.5	7.4	7.63	7.79	7.3	7.7	7.8	8.5	7.9
Conventional	Potassium	mg/L						NS	6.4	6.2	15.8	9.2	21.6	18.7	10.3	21.9	13.8
Conventional	Sodium	mg/L						NS	1020.0	180.0	632	455	164.2	1003.0	230.7	7878.0	5496.0
Conventional	Sulfate	mg/L		65				NS	154.0	59.9	363	269	142.4	73.7	56.9	305.4	303.9
Conventional	Sulfide, Total	mg/L					0.002	NS	< 0.1	< 0.1	< 0.1	< 0.1	<0.014	<0.014	<0.014	0.2	<0.014
Conventional	Surfactants (MBAS)	mg/L					0.1	NS	0.4	0.3	0.52	0.24	0.5	0.2	0.3	0.2	0.5
Conventional	Temperature at Time of pH Measurement					40	Nat +/- 1.5	NS	18.7	5.4	8.1	8.3	17.0	16.0	12.0	25.0	24.0
Conventional	Total Dissolved Solids (TDS)	mg/L		300	1589			NS	3140.0	706.0	3320	1940	1444.0	3730.0	696.0	3280.0	2332.0
Conventional	Total Hardness as CaCO3	mg/L						NS	1270.0	NS	1260	646	458.3	1151.3	253.0	1193.5	815.8
Conventional	Total Kjeldahl Nitrogen	mg/L						NS	5.2	1.6	5.3	1.8	3.5	4.8	1.5	6.4	1.5
Conventional	Total Nitrogen	mg/L				40		NS	5.6	3.3	5.37	1.91	6.5	2.0	2.0	6.8	1.6
Conventional	Total Organic Carbon (TOC)	mg/L						NS	23.8	11.5	22.5	20.8	14.6	25.9	13.6	21.7	26.3
Conventional	Total Phosphorous as P	mg/L	0.1	0.1		20	0.0001	0.1	0.7	0.5	0.578	0.385	0.4	0.9	0.6	2.2	0.8
Conventional	Total Phosphorous as PO4	mg/L			8.5		0.002	0.3	2.0	1.5	1.772	1.18	NS	NS	NS	NS	NS
Conventional	Total Solids	mg/L			2428			NS	3350.0	740.0	3970.00	2180.00	1392.0	3730.0	790.0	3796.0	2522.0
Conventional	Total Suspended Solids (TSS)	mg/L		58	385	75		NS	63.5	16.0	606	41.6	246.7	206.7	50.0	380.0	61.4
Conventional	Volatile Suspended Solids (VSS)	mg/L			280			ND	14.0	27.5	122.0	ND	57.5	53.3	<10	94.0	43.6
Pathogens	Camphylobacter	NA						Present	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pathogens	Cholera	NA						Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Pathogens	E. Coli	MPN/100mL		126				20000	1900	36000	>240000	200	>24000	1500	>24000	930.0	430.0
Pathogens	Enteric Virus (Enterovirus)	MPN/L						ND	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pathogens	Enterococcus	MPN/100mL	104	151				11000	1800	55000	>240000	100	NS	NS	NS	886.0	>2400
Pathogens	Fecal Coliform	MPN/L	400	400		1000	200	NS	NS	NS	NS	NS	>24000	11000	>24000	11000.0	4600.0
Pathogens	Norovirus GIA	MPN/L						ND	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pathogens	Norovirus GIB	MPN/L						ND	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pathogens	Norovirus GII	MPN/L						ND	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pathogens	Total Coliform	MPN/100mL	10000	1000				NS	>24000	>240000	65000	44000	NS	NS	>24000	>24000	11000.0
Metals	Aluminum	ug/L					200	4170.0	2690.0	5450.0	11400	996	4814.0	3312.0	1403.0	11570.0	1289.0
Metals	Antimony	ug/L	1200.0	88.00	28			NS	< 1.3	< 1.3	< 1.3	< 26	<1.3	<1.3	<1.3	<1.3	<1.3
Metals	Arsenic	ug/L	80.0	360	5	100	10	3.9	9.3	3.9	8.13	<6.2	<1.5	<1.5	<1.5	10.6	<1.5
Metals	Barium (as Ba)	ug/L					500	85.2	179.0	85.0	217	61.5	118.5	176.1	52.9	195.7	64.6
Metals	Beryllium	ug/L			1.5			< 1.55	< 0.62	< 3.1	< 3.1	< 6.2	<1.1	<1.1	<1.1	<1.1	<1.1
Metals	Boron	ug/L		500			9	187.0	326.0	142.0	619	576	267.1	578.2	141.7	685.1	448.7
Metals	Cadmium	ug/L	10	1.4	0.45	100	0.9	< 0.074	0.1	0.1	0.169	ND	<0.3	<0.3	<0.3	<0.3	<0.3
Metals	Chromium (Total)	ug/L			4.4	500		NS	4.5	8.9	15.1	7.16	16.3	7.8	6.4	14.0	7.0
Metals	Copper	ug/L	30	7.5	29	4000	3	5.7	65.5	13.2	27.5	6.12	9.3	7.6	9.8	15.1	4.8
Metals	Cyanide	ug/L	10	22		1000		< 0.001	0.007	< 0.001	0.0015	0.002	<0.0005	0.0	<0.0005	0.0	0.0
Metals	Cyanide (WAD)	ug/L						NS	0.003	NS	NS	NS	<0.0014	<0.0014	<0.0014	0.0	<0.0014
Metals	Cyanide, Amenable to Chlorination	ug/L						NS	NS	NS	NS	NS	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Metals	Hexavalent chromium	ug/L	20.0	16	0.78		50	< 0.094	< 0.094	< 0.094	< 0.094	0.3	<10.0	<10.0	<10.0	<10.0	<10.0
Metals	Iron	ug/L		1000	3015		50	NS	10000.0	9040.0	11200	2580	8231.0	10110.0	3575.0	15780.0	2285.0
Metals	Lead	ug/L	20	25	17	200	6	2.27 J	7.0	10.6	17.9	<15.2	<0.8	10.1	<0.8	18.7	<0.8

Metals	Manganese	ug/L		0.05				421.0	6840.0	916.0	4800	1220	1095.0	7259.0	23550.0	3849.0	0.8
Metals	Mercury	ug/L	0.0	2.4	0.2	5	0.02	< 0.094	< 0.094	< 0.094	< 0.094	< 0.094	0.0	<0.027	0.1	<0.027	0.0
Metals	Nickel	ug/L	50	653	29	2000	8	5.7	13.6	0.8	14.2	<11.8	7.5	6.2	<0.4	7.8	<0.4
Metals	Selenium	ug/L	150	20	5.4		40	1.7	3.6	1.6	2.27	<7.8	<2.7	<2.7	<2.7	<2.7	<2.7
Metals	Silver	ug/L	0.7	0.84	1		2	< 0.56	< 0.56	< 0.56	< 0.56	< 11.2	<0.6	<0.6	<0.6	<0.6	<0.6
Metals	Thallium	ug/L	14.0		4.25		20	NS	< 0.18	< 0.18	0.188	< 3.6	<1.2	<1.2	<1.2	<1.2	<1.2
Metals	Zinc	ug/L	200.0	54	88.7	10000	90	16.4	70.2	61.5	88.9	<54	77.5	78.1	71.8	103.5	68.5
Organics	2,4,6-Trichlorophenol	ug/L	0.29					< 0.349	< 0.022	< 0.349	< 1.745	< 0.698	<0.026	<0.026	<0.026	<0.026	<0.026
Organics	2,4-Dichlorophenol	ug/L	1					< 0.361	< 0.029	< 0.361	< 1.804	< 0.722	<0.024	<0.024	<0.024	<0.024	<0.024
Organics	2-Butanone (MEK)	ug/L						< 0.3	< 0.3	< 0.3	0.693	< 0.3	NS	NS	NS	NS	NS
Organics	2-Chlorophenol	ug/L	1					< 0.442	< 0.051	< 0.442	< 2.21	< 0.884	<0.024	<0.024	<0.024	<0.024	<0.024
Organics	2-Methylnaphthalene	ug/L						< 0.405	< 0.028	< 0.405	< 2.025	< 0.81	NS	NS	NS	NS	NS
Organics	3 and 4-Methylphenol (m and p-Cresol)	ug/L						< 0.443	< 1.3	< 0.443	< 2.215	< 0.886	<0.043	<0.043	<0.043	<0.043	<0.043
Organics	4-Nitrophenol	ug/L	30				50	< 0.76	< 2.9	< 0.76	< 3.8	< 1.52	<0.02	<0.02	<0.02	<0.02	<0.02
Organics	Acenaphthylene	ug/L	220					< 0.326	< 0.019	< 0.336	< 1.68	< 0.672	<0.024	<0.024	<0.024	<0.024	<0.024
Organics	Acetone	ug/L						< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	NS	NS	NS	NS	NS
Organics	Benzene	ug/L	5.9				5	< 0.071	< 0.071	< 0.071	< 0.071	< 0.071	<0.041	<0.041	0.27	<0.041	<0.041
Organics	Benzo(a)pyrene	ug/L						< 0.295	< 0.020	< 0.295	< 1.475	< 0.59	<0.025	<0.025	<0.025	<0.025	<0.025
Organics	Benzo(b)fluoranthene	ug/L						< 0.34	< 0.014	< 0.374	< 1.87	< 0.748	<0.024	<0.024	<0.024	<0.024	<0.024
Organics	Benzo(g,h,i)perylene	ug/L						< 0.309	< 0.0088	< 0.309	< 1.545	< 0.618	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Bis(2-chloroethyl) ether	ug/L	0.45					< 0.451	< 0.0088	< 0.451	< 2.255	< 0.902	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Bis(2-ethylhexyl) phthalate [Di(2-ethylhexyl) phthalate]	ug/L	3.5	4.0			29.44	0.67	0.58	2.90	2.3	4.7	<0.022	<0.022	0.85	<0.022	<0.022
Organics	Bromodichloromethane (Dichlorobromomethane) (a common THM)	ug/L	130					< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	<0.056	<0.056	<0.056	<0.056	<0.057
Organics	Bromoform (a common THM)	ug/L	130					< 0.053	< 0.053	< 0.053	< 0.053	< 0.053	<0.032	<0.032	<0.032	<0.032	<0.032
Organics	Chlorodibromomethane	ug/L	8.6					< 0.045	< 0.045	< 0.045	< 0.045	< 0.045	<0.039	<0.039	<0.039	<0.039	<0.039
Organics	Chloroform (a common THM)	ug/L	130	100				< 0.044	< 0.044	< 0.044	< 0.044	< 0.044	<0.034	<0.034	<0.034	<0.034	<0.034
Organics	Chloromethane (methyl chloride)	ug/L	130					< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	<0.124	<0.124	<0.124	<0.124	<0.124
Organics	Diethyl phthalate	ug/L	33000				29.44	< 0.262	0.11	< 0.262	< 1.31	< 0.524	<0.022	<0.022	0.22	<0.022	<0.022
Organics	Dimethyl phthalate	ug/L	820000				29.44	< 0.346	< 0.051	< 0.346	< 1.73	< 0.692	<0.024	<0.024	<0.024	<0.024	<0.024
Organics	Di-n-butyl phthalate	ug/L	3500					0.51	0.22	4.9	< 1.48	2.4	0.28	<0.022	2.47	<0.022	<0.022
Organics	Di-n-octyl phthalate	ug/L						< 0.276	< 0.060	< 0.276	< 1.38	< 0.552	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Ethylbenzene	ug/L	4100				500	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	<0.032	<0.032	<0.032	<0.032	<0.032
Organics	Fluoranthene	ug/L	15				0.4	0.35	< 0.019	< 0.227	< 1.135	< 0.454	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Indeno (1,2,3-cd) pyrene	ug/L	0.0088					< 0.289	< 0.015	< 0.289	< 1.445	< 0.578	<0.025	<0.025	<0.025	<0.025	<0.025
Organics	Isophorone	ug/L	730				100	< 0.498	< 2.5	< 0.498	< 2.49	< 0.996	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Methylene Chloride	ug/L						< 0.15	< 0.15	< 0.15	0.291	1.9	<0.043	<0.043	<0.043	<0.043	<0.043
Organics	Methyl-t-butyl Ether (MTBE)	ug/L						NS	1	1	2.1	< 0.068	<0.058	<0.058	<0.058	<0.058	<0.058
Organics	Naphthalene	ug/L					20	< 0.412	< 0.026	< 0.412	< 2.06	< 0.824	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Pentachlorophenol	ug/L	1				0.5	< 0.53	< 0.51	< 0.53	< 2.65	< 1.06	<0.012	<0.012	<0.012	<0.012	<0.012
Organics	Phenanthrene	ug/L	0.0088					< 0.276	< 0.019	< 0.276	< 1.38	< 0.552	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Phenol	ug/L	300				1	< 0.454	< 0.032	< 0.454	< 2.27	< 0.908	<0.026	<0.026	<0.026	<0.026	<0.026
Organics	Pyrene	ug/L	0.0088					< 0.401	< 0.020	< 0.401	< 2.005	< 0.802	<0.022	<0.022	<0.022	<0.022	<0.022
Organics	Toluene	ug/L	85000				60	< 0.078	< 0.078	< 0.078	0.130 J	< 0.078	<0.047	<0.047	<0.047	<0.047	<0.047
Organics	Total Trihalomethanes (THM's)	ug/L						NS	< 0.044	< 0.044	< 0.044	< 0.044	<0.031	<0.031	<0.031	<0.031	<0.031
Pesticide	2,4-D (2,4-Dichlorophenoxyacetic acid)	ug/L		100.0				< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	<0.00115	<0.00115	<0.00115	<0.00115	<0.00115
Pesticide	Carbofuran	ug/L						< 0.27	< 0.27	< 0.27	< 0.27	< 2.7	<0.0046	<0.0046	<0.0046	<0.0046	<0.0046
Pesticide	Dalapon	ug/L						< 0.58	< 0.58	< 0.58	< 0.58	< 0.58	<0.00125	<0.00125	<0.00125	<0.00125	<0.00125
Pesticide	Endosulfan I	ug/L	9	0.056			0.03	0.12	0.02	< 0.004	< 0.008	< 0.004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Pesticide	Endosulfan II	ug/L	9	0.056			0.03	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01	<0.00009	<0.00009	<0.00009	<0.00009	<0.00009
Pesticide	Endrin aldehyde	ug/L	0.002	0.002				< 0.009	< 0.009	< 0.009	< 0.018	< 0.009	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Pesticide	Glyphosate	ug/L						< 2.1	< 2.1	< 2.1	< 2.1	< 2.1	NS	NS	<0.380	<0.380	<0.380
Pesticide	Hexachlorocyclohexane delta {BHC-delta}	ug/L						< 0.006	< 0.006	< 0.006	< 0.012	< 0.006	<0.00007	<0.00007	<0.00007	<0.00007	<0.00007
Pesticide	Styrene	ug/L						< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	<0.046	<0.046	<0.046	<0.046	<0.046
Pesticide	Xylene (total)	ug/L		1750				< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	<0.14	<0.14	<0.14	<0.14	<0.14

Sediment Data from Tijuana River Sampling Locations

Parameter	Analyte	Analytical Method	Units	Tijuana River above Rio Alamar	Rio Alamar	Tijuana River at PB-CILA	Tijuana River at Dairy Mart Bridge	Tijuana River at Hollister ST	Tijuana River at Saturn BLVD	Tijuana River Mouth
				MÉXICO	MÉXICO	MÉXICO	USA	USA	USA	USA
				MAY-19	MAY-19	MAY-19	MAY-19	MAY-19	MAY-19	MAY-19
Conventional	Ammonium-N (as NH4)	SM 4500-NH3-G	mg/Kg	NS	NS	NS	2510	176	145	4.04
Conventional	Nitrate-N	300	mg/Kg	NS	NS	NS	3.62	67	0.884	1.8
Conventional	Organic-N	351.3	mg/Kg	NS	NS	NS	7020	1980	1330	68
Conventional	Percent solids (Total Solids)	SM 2540-G	%	90.9	76.3	76.1	21.4	62.1	70.2	77.9
Conventional	Total Kjeldahl Nitrogen	EPA 351.3	mg/Kg	NS	NS	NS	9410	2150	1470	71.9
Metals	Antimony	200.7	mg/Kg	<3.42	<3.42	<3.42	10.2	3.64	3.6	2.11
Metals	Arsenic	EPA 6010B	mg/Kg	<1	<1	<1	17.6	7.52	3.13	2.32
Metals	Barium	EPA 6010B	mg/Kg	15.36	26.21	45.45	397	308	85.3	5.83
Metals	Cadmium	EPA 6010B	mg/Kg	<1	<1	<1	1.07	1.03	0.38	<0.27
Metals	Chromium	EPA 6010B	mg/Kg	2.24	6.16	6.08	56.6	30.9	12.1	1.89
Metals	Copper	EPA 6010B	mg/Kg	7.86	11.14	12.34	120	87.6	19.5	1.57
Metals	Cyanide	EPA 9012A	mg/Kg	<0.031	<0.031	0.055	0.095	0.235	<0.03	<0.26
Metals	Lead	EPA 6010B	mg/Kg	3.67	5.03	7.7	45.6	52	15.7	1.28
Metals	Mercury	EPA 7471A	mg/Kg	<0.038	<0.038	<0.038	<0.18	0.26	<0.056	<0.05
Metals	Molybdenum	200.7	mg/Kg	<1	<1	<1	<0.61	0.32	2.82	0.62
Metals	Nickel	EPA 6010B	mg/Kg	4.02	5.87	3.17	41.3	22.9	9.91	0.31
Metals	Thallium	200.7	mg/Kg	<2.47	<2.47	<2.47	2.54	2.15	1.82	1.1
Metals	Zinc	EPA 6010B	mg/Kg	34.38	33.27	192.4	468	342	67.8	4.61
Organics	1,2,4-Trimethylbenzene	EPA 8260B	ug/Kg	<1.07	<1.07	<1.07	81	<0.46	<0.4	<0.36
Organics	2,3,7,8-TCCD(dioxin)	EPA 8270C	ug/Kg	NS	NS	NS	<0.753	<0.0313	0.933	<0.0242
Organics	2-Butanone (MEK)	EPA 8260B	ug/Kg	<4.32	<4.32	<4.32	<168	<1.2	14	<0.92
Organics	3 and 4-Methylphenol (m and p-Cresol)	EPA 8270C	ug/Kg	<168	<168	1320	12000	<1575	<27066	<69
Organics	4-Isopropyltoluene	EPA 8260B	ug/Kg	<1.16	<1.16	13.3	190	<0.45	<0.38	<0.35
Organics	Acetone	EPA 8260B	ug/Kg	<11.9	<11.9	74.1	<11682	<83	<71	<64
Organics	Bis(2-Ethylhexyl) Phthalate	EPA 8270C	ug/Kg	NS	NS	NS	11000	<4312	<74074	<56
Organics	Di-N-Butyl Phthalate	EPA 8270C	ug/Kg	NS	NS	NS	<3131	<5556	<95442	85
Organics	Ethylbenzene	EPA 8260B	ug/Kg	<1.09	<1.09	<1.09	67	<0.41	<0.36	<0.32
Organics	m and p-Xylene	EPA 8260B	ug/Kg	<2.16	<2.16	<2.16	220	<0.35	<0.30	<0.27
Organics	Methyl Chloride	EPA 8260B	ug/Kg	NS	NS	NS	400	2.5	1.8	ND
Organics	Methylene Chloride	EPA 8260B	ug/Kg	<5.08	<5.08	<5.08	400	2.5	1.8	4.5
Organics	Methyl-t-butyl Ether (MTBE)	EPA 8260B	ug/Kg	<1.83	<1.83	<1.83	<58	<0.41	<0.36	<0.32
Organics	O-Xylene	EPA 8260B	ug/Kg	<1.06	<1.06	<1.06	110	<0.22	<0.19	<0.17
Organics	Toluene	EPA 8260B	ug/Kg	<0.792	9.83	<0.792	24000	<0.38	410	<0.3
Organics	Xylenes (total)	EPA 8260B	ug/Kg	NS	NS	NS	330	<0.75	<0.64	<0.58
Pathogens	Enterococcus	SM 9230-B	MPN/g	NS	NS	NS	>750000	90000	77000	260
Pathogens	Fecal coliform	SM 9221-E	MPN/g	12	5600	210	>750000	150000	77000	580
Pathogens	Helminth-ova	EPA 625'R92/013	Viable Ova / 4g TS	<0.5	<0.5	<0.5	5	< 1	< 1	< 1
Pathogens	Salmonella	EPA 1682	MPN/4 g TS	<3	<3	<3	2.4	5.6	1.9	0.4

Water Quality Data from Tijuana River Sampling Locations

Parameter	Analyte	Lab Method	Units	Reference				Rio Alamar											
								MÉXICO											
				Ocean Plan	Tijuana River WQO	NOM-001	CE-CAA	DEC-18	JAN-19	FEB-19	MAR-19	APR-19	MAY-19	JUN-19	JUL-19	AUG-19	SEP-19	OCT-19	NOV-19
Conventional	Alkalinity (Total as $CaCO_3$)	SM 2320-B	mg/L					310	532.9	223.6	455.8	521.4	439.8	513.4	580.9	600	277	628.3	573.3
Conventional	Ammonia (as Nitrogen)	SM4500-NH3-G	mg/L	6.0	0.025		0.01	3.0484	6.3808	3.2591	3.3762	7.9845	1.4359	44.9989	9.0655	13.7847	17.0106	22.9476	23.6048
Conventional	Bicarbonate (HCO_3)	SM 2320-B	mg/L					310	438.7	223.6	455.8	394	316.4	513.4	580.9	440	277	628.3	573.3
Conventional	Biochemical Oxygen Demand (5-day) BOD	SM 5210-B	mg/L		10	60		22.9	7.8	24.6	53.8	35.4	8.2	184.1	19.5	18.3	37.6	58.2	59.7
Conventional	Calcium	EPA 200.8	mg/L					NS	NS	NS	NS	131.6	137.2	NS	NS	NS	136.6	179.2	160.4
Conventional	Carbonaceous Biochemical Oxygen Demand (5-Day) CBOD	SM 5210-B	mg/L					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	Carbonate (CO_3)	SM 2320-B	mg/L					0	94.2	0	0	127.4	123.4	0	0	160	0	0	0
Conventional	Chemical Oxygen Demand (COD)	SM 5220-D	mg/L		120			114	47.9	90.8	155.5	142	85	382	65	92	139	171	215
Conventional	Chloride	EPA 300.0	mg/L		250.0			<0.05	<0.05	<0.05	<0.05	0.052	0.051	<0.05	0.104	0.052	<0.05	<0.05	<0.05
Conventional	Chlorine, Total Residual	SM 4500-Cl	mg/L	0.065	0.019		0.0075	<0.2	<0.2	<0.2	<0.2	0.2	0.2	<0.2	0.2	0.2	<0.2	<0.2	<0.2
Conventional	Chlorophyll a	SM 10200-H	mg/m3					<0.05	<0.05	<0.05	13.946	14.959	6.162	18.374	10.963	12.674	21.857	30.186	2.246
Conventional	Chlorophyll b	SM 10200-H	mg/m3					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	Chlorophyll c	SM 10200-H	mg/m3					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	Dissolved Oxygen	4500-O-G	mg/L	≥5			≥5	6.31	18.74	9.47	7.56	8.37	18.37	16.3	5.64	12.34	3.83	8.39	1.55
Conventional	Electrical conductivity (Specific)	SM 2510-B	umhos/cm					1930	3383	1879	2753	3710	3143	2926	2580	3640	3020	3515	3210
Conventional	Fluoride	SM 4500-F-C	mg/L		1		0.5	0.5	0.6773	0.6611	0.8114	1.1194	0.7498	0.5697	0.7005	0.7281	0.8157	0.7985	0.7512
Conventional	Fluorine	Calculation	mg/L					0.4953	0.6773	0.6611	0.8114	NS	0.7498	0.5697	0.7005	0.7281	NS	NS	NS
Conventional	Magnesium	EPA 200.8	ug/L					NS	NS	NS	NS	68750	59850	NS	NS	NS	59700	72680	64750
Conventional	Nitrate	EPA 300.0	mg/L		5		40	3.5966	2.1511	5.9237	2.0279	0.9974	4.2493	<0.0015	0.086	0.4265	<0.0015	1.3146	0.0708
Conventional	Nitrite	EPA 300.0	mg/L				2	0.1531	0.218	0.2332	0.4043	0.323	0.5472	0.0171	0.079	0.1144	0.0167	0.3888	0.0222
Conventional	Oil and Grease	EPA 1664A	mg/L	75		25		<5	6.3	<5	<5	14.8	<5	104.2	<5	<5	<5	19.4	<5
Conventional	Ortho-Phosphorous as P	SM 4500-P-E	mg/L					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	Ortho-Phosphorous as PO4	SM 4500-P-E	mg/L					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	pH	SM 4500-H+B	pH units		6.5 - 8.5			7.9	8.3	7.5	7.8	8.4	8.9	7.8	8.1	8.4	8.3	8.1	7.7
Conventional	Potassium	EPA 200.8	mg/L					NS	NS	NS	NS	22.32	21.97	NS	NS	NS	22.67	25.93	23.8
Conventional	Sodium	EPA 200.8	mg/L					NS	NS	NS	NS	425	439.1	NS	NS	NS	419.2	453.4	444.9
Conventional	Solids percentage (% Solids)	SM 2540-B	%					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	Sulfate	EPA 300.0	mg/L		65			NS	NS	NS	NS	300.301	447.883	NS	NS	NS	386.18	NS	NS
Conventional	Sulfide, Total	SM 4500-S-D	mg/L				0.002	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	0.2237	<0.014	<0.014	<0.014	<0.014	<0.014
Conventional	Surfactants (MBAS)	SM 5540-C	mg/L				0.1	0.813	0.943	0.483	1.168	2.839	0.636	2.914	2.405	1.942	5.005	4.399	4.309
Conventional	Temperature at Time of pH measurement	SM 4500-H+B				40	Nat+/-1.5	19	17	14	19	23	26	24	23	26	22	16	19
Conventional	Total Dissolved Solids (TDS)	SM 2540-C	mg/L		300			1542	2094	1106	1928	1978	1834	1812	2508	2488	2008	2214	2044
Conventional	Total Hardness as $CaCO_3$	SM 2340-B	mg/L					486	713.6	412.2	608.2	721.6	633	550.4	825.5	860	655.2	758.8	683.9
Conventional	Total Kjeldahl nitrogen	EPA 351.2	mg/L					8.09	8.939	5.775	11.967	10.078	3.157	64.43	12.761	19.191	22.978	34.126	30.538
Conventional	Total nitrogen	ALCH 5025	mg/L			25		13.465	11.308	11.932	14.399	11.399	7.953	64.447	12.926	19.731	22.995	35.83	30.631
Conventional	Total Organic Carbon (TOC)	SM 5310B	mg/L					25.53	15.446	22.76	29.295	30.69	29.19	79.03	19.52	10.408	32.62	6.14	25.2
Conventional	Total Phosphorous as P	SM 4500-P-B-5-E	mg/L	0.1	0.1	10.0	0.0001	2.3535	3.3195	1.9779	5.3149	3.7013	1.5277	8.9759	4.2758	3.811	4.9944	5.346	6.1443
Conventional	Total Phosphorus as PO_4	SM 4500-P-B-5-E	mg/L				0.002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	Total Solids	SM 2540-B	mg/L					1764	2192	1272	1912	2350	1904	1854	2556	2520	2022	2284	2058
Conventional	Total Suspended Solids (TSS)	SM 2540-C	mg/L		58	60		585	ND	86	25	18.5	45.6	165	71.7	19	16	33	35.3
Conventional	Volatile Suspended Solids (VSS)	SM2540-E	mg/L					175	<10	<10	12	<10	23.6	117.5	61.7	12	14	31	20
Pathogens	Cholera	BioVir BT/FDA BAM	NA					Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Pathogens	E. coli	SM 9223-B-b	MPN/100ml		126			>24000	>24000	>24000	>24000	>24000	4600	>24000	>24000	>24000	>24000	>24000	>24000
Pathogens	Enterococcus	SM 9260 H	MPN/100ml	104	151			>24196	>24196	>24196	24196	>24196	>8	>24196	>24196	>24196	>24196	>24196	>24196
Pathogens	Fecal coliform	SM 9223-B-b	mg/L	400	400	1000-2000	200	NS	NS	>24000	>24000	>24000	4600	>24000	>24000	>24000	>24000	>24000	>24000
Pathogens	Total coliform	SM 9223-B-b	MPN/100ml	10000	1000			>24000	>24000	>24000	>24000	>24000	11000	>24000	>24000	>24000	>24000	>24000	>24000
Metals	Aluminum	EPA 200.8	ug/L				200						508.3						
Metals	Arsenic	EPA 200.8	ug/L	80	360	200	10						<0.031						
Metals	Barium (Ba)	EPA 200.8	ug/L				500						71.1						
Metals	Boron	EPA 200.7	ug/L		0.5		9.0						321.2						
Metals	Cadmium	EPA 200.8	ug/L	10	1.4	200	0.900						<0.3						
Metals	Chromium (Total)	EPA 200.8	ug/L			1000							28						
Metals	Copper	EPA 200.8	ug/L	30	7.5	6000	3						16.2						
Metals	Cyanide	EPA 200.8	ug/L	10	22	2000							2.5						
Metals	Cyanide (WAD)	EPA 200.8	ug/L										2.5						
Metals	Hexavalent chromium	EPA 218.6	ug/L	20/16	16		50						<10						
Metals	Iron	EPA 200.8	ug/L		1000		50						453.3						
Metals	Lead	EPA 200.8	ug/L	20	25	400	6						<0.8						
Metals	Manganese	EPA 200.8	ug/L		0.05								137.4						
Metals	Nickel	EPA 200.8	ug/L	50	653	4000	8						38.2						
Metals	Selenium	EPA 200.8	ug/L	150	20		40						<2.7						
Metals	Zinc	EPA 200.8	ug/L	200	54	20000	90						100.6						
Organics	Bis(2-ethylhexyl) phthalate	EPA 625	ug/L	3.5	4		29.44						1.79						
Organics	Diethyl phthalate	EPA 625	ug/L	33000			29.44						<0.024						

Organics	Di-n-butyl phthalate	EPA 625	ug/L	3500									1.81						
Organics	Pentachlorophenol	EPA 625	ug/L	10			0.50						<0.012						
Organics	Phenol	EPA 625	ug/L	300			1						<0.026						
Organics	2-butanone (MEK)	EPA 624	ug/L										NS						
Organics	Acetone	EPA 624	ug/L										NS						
Organics	Methylene Chloride	EPA 624	ug/L										<0.043						
Organics	Chloroform (a common THM)	EPA 624	ug/L	130	100								<0.034						
Organics	Toluene	EPA 624	ug/L	85000			60.00						1.04						
Organics	Total Trihalomethanes (THM's)	EPA 624	ug/L	130									<0.032						
Pesticides	Dalapon	EPA 515.4	ug/L										0.0016						

Parameter	Analyte	Lab Method	Units	Reference				Tijuana River above Rio Alamar											
								MÉXICO											
				Ocean Plan	Tijuana River WQOs	NOM-001	CE-CAA	DEC-18	JAN-19	FEB-19	MAR-19	APR-19	MAY-19	JUN-19	JUL-19	AUG-19	SEP-19	OCT-19	NOV-19
Conventional	Alkalinity (Total as $CaCO_3$)	SM 2320-B	mg/L					287.8	445.1	203.9	470.8	390	406	362.2	353.2	380	347	436.6	471.9
Conventional	Ammonia (as Nitrogen)	SM4500-NH3-G	mg/L	6.0	0.025		0.01	25.0405	44.1291	30.3454	46.0333	37.495	36.8526	42.362	37.3072	37.1469	31.9258	37.0025	59.6646
Conventional	Bicarbonate (HCO_3)	SM 2320-B	mg/L					287.8	445.1	203.9	470.8	390	406	362.2	353.2	380	347	436.6	471.9
Conventional	Biochemical Oxygen Demand (5-day) BOD	SM 5210-B	mg/L		10	60		80.5	200.6	93.5	130	68	129.4	198.4	113.8	129.3	86	174.1	193.8
Conventional	Calcium	EPA 200.8	mg/L					NS	NS	NS	NS	105.4	108.9	NS	NS	NS	86.73	106.9	110.3
Conventional	Carbonaceous Biochemical Oxygen Demand (5-Day) CBOD	SM 5210-B	mg/L					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	Carbonate (CO_3)	SM 2320-B	mg/L					0	0	0	0	0	0	0	0	0	0	0	0
Conventional	Chemical Oxygen Demand (COD)	SM 5220-D	mg/L		120			271	445.6	290	377.2	178	306	441	253	346	223	355	463
Conventional	Chloride	EPA 300.0	mg/L		250.0			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.104	<0.05	<0.05	<0.05	<0.05
Conventional	Chlorine, Total Residual	SM 4500-Cl	mg/L	0.065	0.019		0.0075	<0.2	ND	<0.2	<0.2	0.2	<0.2	ND	<0.2	<0.2	0.2	<0.2	<0.2
Conventional	Chlorophyll a	SM 10200-H	mg/m3					<0.05	<0.05	<0.05	5.04	27.543	26.555	11.399	11.998	4.566	4.14	<0.05	3.956
Conventional	Chlorophyll b	SM 10200-H	mg/m3					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	Chlorophyll c	SM 10200-H	mg/m3					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	Dissolved Oxygen	4500-O-G	mg/L	≥5			≥5	5.97	3.25	4.28	3.27	2.84	2.31	2.1	2.31	1.29	2.62	0.25	1.13
Conventional	Electrical conductivity (Specific)	SM 2510-B	umhos/cm					1660	2557	2853	2567	2537	2483	2347	2128	2210	2197	2434	2650
Conventional	Fluoride	SM 4500-F-C	mg/L		1		0.5	0.6232	0.8467	0.8793	0.8235	0.764	0.8417	0.7102	0.8879	0.7462	0.7019	0.7636	1.2593
Conventional	Fluorine	Calculation	mg/L					NS	NS	NS	NS	NS	0.8417	0.7102	0.8879	0.7462	NS	NS	NS
Conventional	Magnesium	EPA 200.8	mg/L					NS	NS	NS	NS	41.43	38.59	NS	NS	NS	35.64	38.66	41.2
Conventional	Nitrate	EPA 300.0	mg/L		5		40	5.2157	<0.0015	4.0894	<0.0015	0.0525	0.0622	<0.0015	0.0389	0.004	<0.0015	0.0307	<0.0015
Conventional	Nitrite	EPA 300.0	mg/L				2	0.1624	0.0272	2.5272	0.0167	0.0868	0.0603	0.0132	0.0527	0.0244	0.0155	0.0746	0.0136
Conventional	Oil and Grease	EPA 1664A	mg/L	75		25		<5	31	11.4	11.6	27.9	22.3	135.7	24.8	<5	<5	15	<5
Conventional	Ortho-Phosphorous as P	SM 4500-P-E	mg/L					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	Ortho-Phosphorous as PO4	SM 4500-P-E	mg/L					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	pH	SM 4500-H+B	pH units		6.5 - 8.5			7.8	8	7.7	7.9	8.2	7.9	7.6	7.9	7.9	8.1	7.8	7.9
Conventional	Potassium	EPA 200.8	mg/L					NS	NS	NS	NS	34.28	24.83	NS	NS	NS	27.21	29.49	31.64
Conventional	Sodium	EPA 200.8	mg/L					NS	NS	NS	NS	241.8	278	NS	NS	NS	242.7	278.4	298.1
Conventional	Solids percentage (% Solids)	SM 2540-B	%					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	Sulfate	EPA 300.0	mg/L		65			NS	NS	NS	NS	357.904	323.742	NS	NS	NS	373.82	NS	NS
Conventional	Sulfide, Total	SM 4500-S-D	mg/L				0.002	<0.014	<0.014	<0.014	<0.014	<0.014	0.389	3.0996	0.7619	0.3678	1.3707	0.3526	4.0733
Conventional	Surfactants (MBAS)	SM 5540-C	mg/L				0.1	2.93	1.844	1.976	2.864	1.892	2.338	3.233	3.655	2.248	3.823	4.91	4.549
Conventional	Temperature at Time of pH measurement	SM 4500-H+B	°C			40	Nat+/-1.5	20	20	16	21	24	21	26	24	27	25	22	22
Conventional	Total Dissolved Solids (TDS)	SM 2540-C	mg/L		300			1232	1430	1622	1502	1426	1500.7	1466	1306	1338	1350	1512	1566
Conventional	Total Hardness as $CaCO_3$	SM 2340-B	mg/L					407	484.5	579.1	504.8	474.1	472.3	421.8	384.5	399.3	400	459.4	471.6
Conventional	Total Kjeldahl nitrogen	EPA 351.2	mg/L					30.975	52.894	37.257	64.393	37.962	37.712	77.697	55.787	77.476	65.403	59.168	84.571
Conventional	Total nitrogen	ALCH 5025	mg/L			25		31.82	52.921	43.873	64.409	38.101	37.835	77.711	55.878	77.504	65.418	59.273	84.585
Conventional	Total Organic Carbon (TOC)	SM 5310B	mg/L					45.1	49.935	49.935	48.75	53.23	53.44	85.46	51.97	36.144	44.54	15.509	79.04
Conventional	Total Phosphorous as P	SM 4500-P-B-5-E	mg/L	0.1	0.1	10.0	0.0001	5.3979	8.0993	6.1406	7.8807	5.287	6.5701	9.9948	6.4433	7.0371	6.3963	8.2436	10.6334
Conventional	Total Phosphorus as PO_4	SM 4500-P-B-5-E	mg/L				0.002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	Total Solids	SM 2540-B	mg/L					1352	1716	1876	1646	1480	1528	1440	1348	1428	1378	1632	1674
Conventional	Total Suspended Solids (TSS)	SM 2540-C	mg/L		58	60		406.7	193.3	132	96	12	178	192.5	25	83.3	55	92.5	112.5
Conventional	Volatile Suspended Solids (VSS)	SM2540-E	mg/L					100	136.7	<10	66	<10	158	142.5	11	63.3	43	82.5	65
Pathogens	Cholera	BioVir BT/FDA BAM	NA					Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Pathogens	E. coli	SM 9223-B-b	MPN/100ml		126			>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000
Pathogens	Enterococcus	SM 9260 H	MPN/100ml	104	151			24196	>24196	>24196	24196	>24196	>1600	>24196	>24196	>24196	>24196	>24196	>24196
Pathogens	Fecal coliform	SM 9223-B-b	mg/L	400	400	1000-2000	200	NS	NS	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000
Pathogens	Total coliform	SM 9223-B-b	MPN/100ml	10000	1000			>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000
Metals	Aluminum	EPA 200.8	ug/L				200						603.2						
Metals	Arsenic	EPA 200.8	ug/L	80	360	200	10						<1.5						
Metals	Barium (Ba)	EPA 200.8	ug/L				500						72.1						
Metals	Boron	EPA 200.7	ug/L		0.5		9.0						276.3						
Metals	Cadmium	EPA 200.8	ug/L	10	1.4	200	0.900						<0.3						
Metals	Chromium (Total)	EPA 200.8	ug/L			1000							6.4						
Metals	Copper	EPA 200.8	ug/L	30	7.5	6000	3						23.8						
Metals	Cyanide	EPA 200.8	ug/L	10	22	2000							6.4						
Metals	Cyanide (WAD)	EPA 200.8	ug/L										<1.4						
Metals	Hexavalent chromium	EPA 218.6	ug/L	20/16	16		50						<10						
Metals	Iron	EPA 200.8	ug/L		1000		50						645.6						
Metals	Lead	EPA 200.8	ug/L	20	25	400	6						<0.8						
Metals	Manganese	EPA 200.8	ug/L		0.05								131.2						
Metals	Nickel	EPA 200.8	ug/L	50	653	4000	8						12.2						
Metals	Selenium	EPA 200.8	ug/L	150	20		40						<2.7						
Metals	Zinc	EPA 200.8	ug/L	200	54	20000	90						208.2						
Organics	Bis(2-ethylhexyl) phthalate	EPA 625	ug/L	3.5	4		29.44						5.01						
Organics	Diethyl phthalate	EPA 625	ug/L	33000			29.44						6.01						

Organics	Di-n-butyl phthalate	EPA 625	ug/L	3500									<0.022						
Organics	Pentachlorophenol	EPA 625	ug/L	10			0.50						<0.012						
Organics	Phenol	EPA 625	ug/L	300			1						11.26						
Organics	2-butanone (MEK)	EPA 624	ug/L										NS						
Organics	Acetone	EPA 624	ug/L										NS						
Organics	Methylene Chloride	EPA 624	ug/L										<0.043						
Organics	Chloroform (a common THM)	EPA 624	ug/L	130	100								<0.034						
Organics	Toluene	EPA 624	ug/L	85000			60.00						<0.047						
Organics	Total Trihalomethanes (THM's)	EPA 624	ug/L	130									<0.032						
Pesticides	Dalapon	EPA 515.4	ug/L										0.1745						

Parameter	Analyte	Lab Method	Units	Reference				Tijuana River at PB-CILA																							
								MÉXICO												USA											
				Ocean Plan	Tijuana River WQOs	NOM-001	CE-CAA	DEC-18	JAN-19	FEB-19	MAR-19	APR-19	MAY-19	JUN-19	JUL-19	AGO-19	SEP-19	OCT-19	NOV-19	DEC-18	JAN-19	FEB-19	MAR-19	APR-19	MAY-19	JUN-19	JUL-19	AUG-19	SEP-19	OCT-19	NOV-19
Conventional	Alkalinity (Total as $CaCO_3$)	SM 2320-B	mg/L					240	423.7	233.4	455.8	394	382.1	370.1	362.8	336	356	408	413.4	NS	420	230	420	370	360	330	360	310	350	350	390
Conventional	Ammonia (as Nitrogen)	SM4500-NH3-G	mg/L	6.0	0.025		0.01	3.2931	18.9934	10.9661	21.4593	19.0129	11.6271	20.2686	23.0731	16.7709	21.0225	17.9357	19.9624	5.3	21.7	9.29	23.4	19.3	11.9	23.3	24.7	21.5	19.2	22.5	19.2
Conventional	Bicarbonate (HCO_3)	SM 2320-B	mg/L					240	423.7	233.4	455.8	338.3	382.1	370.1	362.8	336	356	408	413.4	NS	510	280	510	450	440	400			430	420	480
Conventional	Biochemical Oxygen Demand (5-day) BOD	SM 5210-B	mg/L		10	60		29.9	53.6	42.7	46.4	42.1	15.5	64.7	108.7	31.5	51.2	64.5	69.8	NS	16	54	16	20	17	22	54	23	33	37	37
Conventional	Calcium	EPA 200.8	mg/L					NS	NS	NS	NS	117.6	137.1	NS	NS	NS	109.1	155.4	156	NS	155	121	178	116	135	126	123	185	128	115	132
Conventional	Carbonaceous Biochemical Oxygen Demand (5-Day) CBOD	SM 5210-B	mg/L					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	25.6	24.2	16.2	14.8	20.4	15	21.4	60.9	22.5	29.2	13.7	32.6
Conventional	Carbonate (CO_3)	SM 2320-B	mg/L					0	0	0	0	55.7	0	0	0	0	0	0	0	NS	<25	<12.5	<12.5	<12.5	<25	<12.5					
Conventional	Chemical Oxygen Demand (COD)	SM 5220-D	mg/L		120			146	150.1	153.8	142.6	159	102	129	254	105	147	140	176	210	180	140	170	120	71	170	220	160	35	150	200
Conventional	Chloride	EPA 300.0	mg/L		250.0			<0.05	<0.05	<0.05	<0.05	<0.05	0.101	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NS	536	391	492	459	465	422	380	378	387	518	467
Conventional	Chlorine, Total Residual	SM 4500-Cl	mg/L	0.065	0.019		0.0075	<0.2	<0.2	<0.2	<0.2	0.2	0.2	<0.2	<0.2	0.2	<0.2	<0.2	<0.2	NS	0.04	<0.016	0.3	0.07	0.1	<0.016	<0.1	<0.1	0.08	<0.1	<0.1
Conventional	Chlorophyll a	SM 10200-H	mg/m3					<0.05	2.844	<0.05	6.806	16.316	0.474	10.368	13.082	3.523	6.192	<0.05	20.958	NS	2960	600	1570	3490	2010	1620	4350	7900	4320	2020	3470
Conventional	Chlorophyll b	SM 10200-H	mg/m3					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2770	683	246	421	340	771	248	640	433	261	458
Conventional	Chlorophyll c	SM 10200-H	mg/m3					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	3280	792	393	495	312	740	827	1530	909	482	579
Conventional	Dissolved Oxygen	4500-O-G	mg/L	≥5			≥5	6.21	5.04	8.26	5.27	6.98	7.36	5.9	2.27	3.57	3.47	4.81	3.29	NS	<1	5.9	2.0	6.1	2.5	<1	<1	<1	<1	2.1	1.5
Conventional	Electrical conductivity (Specific)	SM 2510-B	umhos/cm					1500	2910	2333	2740	2870	2420	2686	2490	2480	2510	2785	2880	NS	2880	2350	3030	2780	2780	2650	2500	2380	2570	3230	3000
Conventional	Fluoride	SM 4500-F-C	mg/L		1		0.5	0.42	0.7806	0.8789	0.7835	0.8793	0.7257	0.6641	1.0397	0.8595	0.7405	0.8798	1.019	NS	0.602	1.53	0.577	0.718	0.486	0.636	0.613	0.918	0.620	0.620	0.893
Conventional	Fluorine	Calculation	mg/L					NS	NS	NS	NS	NS	0.7257	0.6641	1.0397	0.8595	NS	NS	1.019	NS	0.602	1.53	0.577	0.718	0.486	0.636	0.613	0.918	0.620	0.620	0.893
Conventional	Magnesium	EPA 200.8	mg/L					NS	NS	NS	NS	52.226	50.28	NS	NS	NS	46.29	52.88	54.3	NS	72.9	47.8	66.5	50.8	62.2	53.8	55.9	74.2	53.7	56	52.9
Conventional	Nitrate	EPA 300.0	mg/L		5		40	3.5065	1.3463	5.7452	0.7676	0.7587	3.1239	0.0339	0.0458	0.1959	0.0512	0.8194	0.0863	NS	1.72	5.33	0.66	0.86	3.12	<.12	<0.012	0.42	<0.012	0.94	0.56
Conventional	Nitrite	EPA 300.0	mg/L				2	0.144	0.525	0.785	0.2654	0.1933	0.6135	0.0499	0.037	0.1044	0.1724	0.127	0.2453	NS	<0.018	<0.018	<0.018	0.08	0.41	<0.18	<0.018	<0.018	<0.018	<0.018	<0.018
Conventional	Oil and Grease	EPA 1664A	mg/L	75		25		<5.0	9.2	<5.0	7.7	12.7	<5.0	65.7	71.2	<5.0	<5.0	79	<5.0	NS	6.9	6.8	3.7	2.6	<1.47	3.3	6.5	<1.554	<1.554	4.7	6.1
Conventional	Ortho-Phosphorous as P	SM 4500-P-E	mg/L					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	3.22	0.2250	2.80	3.06	3.29	3.82	3.95	3.14	4.11	2.81	5.03
Conventional	Ortho-Phosphorous as PO4	SM 4500-P-E	mg/L					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	3.22	0.2250	8.58	9.38	10.1	11.7	12.1	9.63	12.6	8.62	15.4
Conventional	pH	SM 4500-H+B	pH units		6.5 - 8.5			7.9	7.6	7.1	7.7	8.3	8.2	7.8	7.8	7.8	8	7.9	7.3	NS	7.35	6.50	7.81	7.80	7.86	7.39	7.31	7.46	7.3	7.52	7.25
Conventional	Potassium	EPA 200.8	mg/L					NS	NS	NS	NS	30.03	29.63	NS	NS	NS	26.71	28.03	26.55	NS	30.9	29.9	31.2	22.2	29.1	24.4	31.5	22	22.7	24.2	24.9
Conventional	Sodium	EPA 200.8	mg/L					NS	NS	NS	NS	306.1	340.2	NS	NS	NS	291.6	354.7	387.1	NS	494	256	471	295	365	327	318	432	364	349	355
Conventional	Solids percentage (% Solids)	SM 2540-B	%					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.18	0.14	0.204	0.182	0.173	0.17			0.144	0.154	0.164
Conventional	Sulfate	EPA 300.0	mg/L		65			NS	NS	NS	NS	307.005	411.326	NS	NS	NS	363.71	NS	NS	NS	446	277	365	398	362	331	299	322	361	371	380
Conventional	Sulfide, Total	SM 4500-S-D	mg/L				0.002	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	0.1559	0.2237	<0.014	<0.014	<0.014	0.3652	NS	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1	0.5
Conventional	Surfactants (MBAS)	SM 5540-C	mg/L				0.1	0.6	1.401	1.435	2.92	1.778	1.616	1.551	3.94	1.73	3.503	3.6	3.277	NS	1.6	1.5	1.5	1.8	1.6	2.5	3.6	1.6	2.7	2.8	3.4
Conventional	Temperature at Time of pH measurement	SM 4500-H+B				40	Nat+/-1.5	15	15	14	18	20	18	20	22	24	22	12	18	NS	21.1	10.5	7.2	8.5	18.4	7.2	8.5	7.9	14.4	9.3	15.1
Conventional	Total Dissolved Solids (TDS)	SM 2540-C	mg/L		300			1254	1758	1356	1804	1732	1746	1542	1582	1530	1610	1976	1794	NS	1680	1220	1730	1770	1660	1510	1430	1530	1390	1440	1550
Conventional	Total Hardness as $CaCO_3$	SM 2340-B	mg/L					402.7	604	497.1	623.7	594.5	584.8	503.3	489.7	506.9	506.9	601.1	603.6	NS	685	498	718	499	594	535	537	767	539	517	547
Conventional	Total Kjeldahl nitrogen	EPA 351.2	mg/L					10.03	27.513	15.947	26.516	16.222	11.243	31.225	45.118	24.105	26.91	31.11	32.364	NS	35	18	32	24	20	36	45	28	26	35	33
Conventional	Total nitrogen	ALCH 5025	mg/L			25		13.776	29.384	22.477	27.549	17.174	14.98	31.309	45.201	24.406	27.134	32.057	32.696	NS	36.7	23.3	32.7	24.9	23.5	36.0	45.0	28.0	26.0	35.9	33.6
Conventional	Total Organic Carbon (TOC)	SM 5310B	mg/L					15.3	31.46	31.46	23.34	25.73	25.31	22.78	25.98	13.085	31.84	5.645	24.7	NS	27.7	30.0	31.4	28.6	22.7	40.2	60.5	26.2	35.7	38.0	37.4
Conventional	Total Phosphorous as P	SM 4500-P-B-5-E	mg/L	0.1	0.1	10.0	0.0001	1.258	4.8359	3.7273	3.7557	3.626	3.942	5.2947	7.145	3.9784	4.7091	4.5713	6.8047	0.323	4.68	6.41	3.74	3.82	6.18	4.95	5.72	4.22	5.92	3.76	6.88
Conventional	Total Phosphorus as PO_4	SM 4500-P-B-5-E	mg/L				0.002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.990	14.4	19.6	11.5	11.7	18.9	15.2	17.5	12.9	18.2	11.5	21.1
Conventional	Total Solids	SM 2540-B	mg/L					1516	1894	1650	1890	1772	1756	1686	1698	1560	1622	2024	1904	NS	1780	1390	2040	1820	1730	1670	1540	1560	1440	1540	1640
Conventional	Total Suspended Solids (TSS)	SM 2540-C	mg/L		58	60		960	56	153.6	28.3	32.5	50	94	100	25	15.3	37	59	NS	53.8	144	35.3	25.8	37.6	46.0	70.0	31.2	14.9	33.3	58.4
Conventional	Volatile Suspended Solids (VSS)	SM2540-E	mg/L					120	40	ND	24.2	24	14.4	71	68	14.5	14.0	35.0	33	146	38.5	64.0	28.3	18.6	20.4	36.8	54.0	26.0	10.5	25.6	42.0
Pathogens	Cholera	BioVir BT/FDA BAM	NA					Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	NS	Absent	Absent	ABSENT	ABSENT	ABSENT	ABSENT	ABSENT	ABSENT	ABSENT	PRESENT	PRESENT
Pathogens	E. coli	SM 9223-B-b	MPN/100ml		126			>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	NS	>240000	>240000	>240000	>240000	>240000	>240000	>240000	>240000	>240000	>240000	>240000
Pathogens	Enterococcus	SM 9260 H	MPN/100ml	104	151			>24196	>24196	>24196	24196	>24196	>8	>24196	>24196	>24196	>24196	>24196	>24196	NS	>240000	20000	>240000	>240000	200000	>240000	>240000	>240000	240000	>240000	>240000
Pathogens	Fecal coliform	SM 9223-B-b	mg/L	400	400	1000-2000	200	NS	NS	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pathogens	Total coliform	SM 9223-B-b	MPN/100ml	10000	1000			>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	NS	>240000	>240000	>240000	>240000	>240000	>240000	>240000	>240000	>240000	>240000	>240000
Metals	Aluminum	EPA 200.8	ug/L				200						691.7												266						
Metals	Arsenic	EPA 200.8	ug/L	80	360	200	10						<1.5												4.03						
Metals	Barium (Ba)	EPA 200.8	ug/L				500						0.0731												93.7						
Metals	Boron	EPA 200.7	ug/L		0.5		9.0						0.3095												449						
Metals	Cadmium	EPA 200.8	ug/L	10	1.4	200	0.900						<0.3												<0.074						
Metals	Chromium (Total)	EPA 200.8	ug/L			1000							5.8												3.08						
Metals	Copper	EPA 200.8	ug/L	30	7.5	6000	3						15.2												12.6						
Metals	Cyanide	EPA 200.8	ug/L	10	22	2000							2.7												0.0086						
Metals	Cyanide (WAD)	EPA 200.8	ug/L										2.7												NS						
Metals	Hexavalent chromium	EPA 218.6	ug/L	20/16	16		50						<10												<0.094						
Metals	Iron	EPA 200.8	ug/L		1000		50						693.3												694						
Metals	Lead	EPA 200.8	ug/L	20	25	400	6						<0.8												1.21						
Metals	Manganese	EPA 200.8	ug/L		0.05								202.6												203						
Metals	Nickel	EPA 200.8	ug/L	50	653	4000	8						16.7												21.7						
Metals	Selenium	EPA 200.8	ug/L	150	20		40						<2.7												5.19						
Metals	Zinc	EPA 200.8	ug/L	200	54	20000	90						79.3												42.4						
Organics	Bis(2-ethylhexyl) phthalate	EPA 625	ug/L	3.5	4		29.44						1.95												6.5						
Organics	Diethyl phthalate	EPA 625	ug/L	33000			29.44						<0.0220												0.3						
Organics	Di-n-butyl phthalate	EPA 625	ug/L	3500									<0.0220												2.4						
Organics	Pentachlorophenol	EPA 625	ug/L	10			0.50						<0.012												<0.53						
Organics	Phenol	EPA 625	ug/L	300			1						<0.026												<0.454						
Organics	2-butanone (MEK)	EPA 624	ug/L										NS												<0.3						
Organics	Acetone	EPA 624	ug/L										NS												<0.2						
Organics	Methylene Chloride	EPA 624	ug/L										<0.043												<0.15						
Organics	Chloroform (a common THM)	EPA 624	ug/L	130	100								0.51												0.288						
Organics	Toluene	EPA 624	ug/L	85000			60.00						<0.047												0.409						
Organics	Total Trihalomethanes (THM's)	EPA 624	ug/L	130									0.47												0.288						
Pesticides	Dalapon	EPA 515.4	ug/L										0.0294												<0.58						

Parameter	Analyte	Lab Method	Units	Reference				Tijuana River at PB-CILA USA											
				Ocean Plan	Tijuana River WQOs	NOM-001	CE-CAA	DEC-18	JAN-19	FEB-19	MAR-19	APR-19	MAY-19	JUN-19	JUL-19	AUG-19	SEP-19	OCT-19	NOV-19
Conventional	Alkalinity (Total as $CaCO_3$)	SM 2320-B	mg/L					NS	420	230	420	370	360	330	360	310	350	350	390
Conventional	Ammonia (as Nitrogen)	SM4500-NH3-G	mg/L	6.0	0.025		0.01	5.3	21.7	9.29	23.4	19.3	11.9	23.3	24.7	21.5	19.2	22.5	19.2
Conventional	Bicarbonate (HCO_3)	SM 2320-B	mg/L					NS	510	280	510	450	440	400			430	420	480
Conventional	Biochemical Oxygen Demand (5-day) BOD	SM 5210-B	mg/L		10	60		NS	16	54	16	20	17	22	54	23	33	37	37
Conventional	Calcium	EPA 200.8	mg/L					NS	155	121	178	116	135	126	123	185	128	115	132
Conventional	Carbonaceous Biochemical Oxygen Demand (5-Day) CBOD	SM 5210-B	mg/L					25.6	24.2	16.2	14.8	20.4	15	21.4	60.9	22.5	29.2	13.7	32.6
Conventional	Carbonate (CO_3)	SM 2320-B	mg/L					NS	<25	<12.5	<12.5	<12.5	<25	<12.5					
Conventional	Chemical Oxygen Demand (COD)	SM 5220-D	mg/L		120			210	180	140	170	120	71	170	220	160	35	150	200
Conventional	Chloride	EPA 300.0	mg/L		250			NS	536	391	492	459	465	422	380	378	387	518	467
Conventional	Chlorine, Total Residual	SM 4500-Cl	mg/L	0.065	0.019		0.0075	NS	0.04	<0.016	0.3	0.07	0.1	<0.016	<0.1	<0.1	0.08	<0.1	<0.1
Conventional	Chlorophyll a	SM 10200-H	mg/m3					NS	2960	600	1570	3490	2010	1620	4350	7900	4320	2020	3470
Conventional	Chlorophyll b	SM 10200-H	mg/m3					NS	2770	683	246	421	340	771	248	640	433	261	458
Conventional	Chlorophyll c	SM 10200-H	mg/m3					NS	3280	792	393	495	312	740	827	1530	909	482	579
Conventional	Dissolved Oxygen	4500-O-G	mg/L	≥5			≥5	NS	<1	5.9	2.0	6.1	2.5	<1	<1	<1	<1	2.1	1.5
Conventional	Electrical conductivity (Specific)	SM 2510-B	umhos/cm					NS	2880	2350	3030	2780	2780	2650	2500	2380	2570	3230	3000
Conventional	Fluoride	SM 4500-F-C	mg/L		1		0.5	NS	0.602	1.53	0.577	0.718	0.486	0.636	0.613	0.918	0.620	0.620	0.893
Conventional	Fluorine	Calculation	mg/L					NS	0.602	1.53	0.577	0.718	0.486	0.636	0.613	0.918	0.620	0.620	0.893
Conventional	Magnesium	EPA 200.8	mg/L					NS	72.9	47.8	66.5	50.8	62.2	53.8	55.9	74.2	53.7	56	52.9
Conventional	Nitrate	EPA 300.0	mg/L		5		40	NS	1.72	5.33	0.66	0.86	3.12	<.12	<0.012	0.42	<0.012	0.94	0.56
Conventional	Nitrite	EPA 300.0	mg/L				2	NS	<0.018	<0.018	<0.018	0.08	0.41	<0.18	<0.018	<0.018	<0.018	<0.018	<0.018
Conventional	Oil and Grease	EPA 1664A	mg/L	75		25		NS	6.9	6.8	3.7	2.6	<1.47	3.3	6.5	<1.554	<1.554	4.7	6.1
Conventional	Ortho-Phosphorous as P	SM 4500-P-E	mg/L					NS	3.22	0.2250	2.80	3.06	3.29	3.82	3.95	3.14	4.11	2.81	5.03
Conventional	Ortho-Phosphorous as PO4	SM 4500-P-E	mg/L					NS	3.22	0.2250	8.58	9.38	10.1	11.7	12.1	9.63	12.6	8.62	15.4
Conventional	pH	SM 4500-H+B	pH units		6.5 - 8.5			NS	7.35	6.50	7.81	7.80	7.86	7.39	7.31	7.46	7.3	7.52	7.25
Conventional	Potassium	EPA 200.8	mg/L					NS	30.9	29.9	31.2	22.2	29.1	24.4	31.5	22	22.7	24.2	24.9
Conventional	Sodium	EPA 200.8	mg/L					NS	494	256	471	295	365	327	318	432	364	349	355
Conventional	Solids percentage (% Solids)	SM 2540-B	%					NS	0.18	0.14	0.204	0.182	0.173	0.17			0.144	0.154	0.164
Conventional	Sulfate	EPA 300.0	mg/L		65			NS	446	277	365	398	362	331	299	322	361	371	380
Conventional	Sulfide, Total	SM 4500-S-D	mg/L				0.002	NS	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1	0.5
Conventional	Surfactants (MBAS)	SM 5540-C	mg/L				0.1	NS	1.6	1.5	1.5	1.8	1.6	2.5	3.6	1.6	2.7	2.8	3.4
Conventional	Temperature at Time of pH measurement	SM 4500-H+B				40	Nat+/-1.5	NS	21.1	10.5	7.2	8.5	18.4	7.2	8.5	7.9	14.4	9.3	15.1
Conventional	Total Dissolved Solids (TDS)	SM 2540-C	mg/L		300			NS	1680	1220	1730	1770	1660	1510	1430	1530	1390	1440	1550
Conventional	Total Hardness as $CaCO_3$	SM 2340-B	mg/L					NS	685	498	718	499	594	535	537	767	539	517	547
Conventional	Total Kjeldahl nitrogen	EPA 351.2	mg/L					NS	35	18	32	24	20	36	45	28	26	35	33
Conventional	Total nitrogen	ALCH 5025	mg/L			25		NS	36.7	23.3	32.7	24.9	23.5	36.0	45.0	28.0	26.0	35.9	33.6
Conventional	Total Organic Carbon (TOC)	SM 5310B	mg/L					NS	27.7	30.0	31.4	28.6	22.7	40.2	60.5	26.2	35.7	38.0	37.4
Conventional	Total Phosphorous as P	SM 4500-P-B-5-E	mg/L	0.1	0.1	10.0	0.0001	0.323	4.68	6.41	3.74	3.82	6.18	4.95	5.72	4.22	5.92	3.76	6.88
Conventional	Total Phosphorus as PO_4	SM 4500-P-B-5-E	mg/L				0.002	0.990	14.4	19.6	11.5	11.7	18.9	15.2	17.5	12.9	18.2	11.5	21.1
Conventional	Total Solids	SM 2540-B	mg/L					NS	1780	1390	2040	1820	1730	1670	1540	1560	1440	1540	1640
Conventional	Total Suspended Solids (TSS)	SM 2540-C	mg/L		58	60		NS	53.8	144	35.3	25.8	37.6	46.0	70.0	31.2	14.9	33.3	58.4
Conventional	Volatile Suspended Solids (VSS)	SM2540-E	mg/L					146	38.5	64.0	28.3	18.6	20.4	36.8	54.0	26.0	10.5	25.6	42.0
Pathogens	Cholera	BioVir BT/FDA BAM	NA					NS	Absent	Absent	ABSENT	ABSENT	ABSENT	ABSENT	ABSENT	ABSENT	ABSENT	PRESENT	PRESENT
Pathogens	E. coli	SM 9223-B-b	MPN/100ml		126			NS	>240000	>240000	>240000	>240000	>240000	>240000	>240000	>240000	>240000	>240000	>240000
Pathogens	Enterococcus	SM 9260 H	MPN/100ml	104	151			NS	>240000	20000	>240000	>240000	200000	>240000	>240000	>240000	240000	>240000	>240000
Pathogens	Fecal coliform	SM 9223-B-b	mg/L	400	400	1000-2000	200	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pathogens	Total coliform	SM 9223-B-b	MPN/100ml	10000	1000			NS	>240000	>240000	>240000	>240000	>240000	>240000	>240000	>240000	>240000	>240000	>240000
Metals	Aluminum	EPA 200.8	ug/L				200						266						
Metals	Arsenic	EPA 200.8	ug/L	80	360	200	10						4.03						
Metals	Barium (Ba)	EPA 200.8	ug/L				500						93.7						
Metals	Boron	EPA 200.7	ug/L		0.5		9.0						449						
Metals	Cadmium	EPA 200.8	ug/L	10	1.4	200	0.900						<0.074						
Metals	Chromium (Total)	EPA 200.8	ug/L			1000							3.08						
Metals	Copper	EPA 200.8	ug/L	30	7.5	6000	3						12.6						
Metals	Cyanide	EPA 200.8	ug/L	10	22	2000							0.0086						
Metals	Cyanide (WAD)	EPA 200.8	ug/L										NS						
Metals	Hexavalent chromium	EPA 218.6	ug/L	20/16	16		50						<0.094						
Metals	Iron	EPA 200.8	ug/L		1000		50						694						
Metals	Lead	EPA 200.8	ug/L	20	25	400	6						1.21						
Metals	Manganese	EPA 200.8	ug/L		0.05								203						
Metals	Nickel	EPA 200.8	ug/L	50	653	4000	8						21.7						
Metals	Selenium	EPA 200.8	ug/L	150	20		40						5.19						
Metals	Zinc	EPA 200.8	ug/L	200	54	20000	90						42.4						
Organics	Bis(2-ethylhexyl) phthalate	EPA 625	ug/L	3.5	4		29.44						6.5						
Organics	Diethyl phthalate	EPA 625	ug/L	33000			29.44						0.3						
Organics	Di-n-butyl phthalate	EPA 625	ug/L	3500									2.4						
Organics	Pentachlorophenol	EPA 625	ug/L	10			0.50						<0.53						
Organics	Phenol	EPA 625	ug/L	300			1						<0.454						
Organics	2-butanone (MEK)	EPA 624	ug/L										<0.3						
Organics	Acetone	EPA 624	ug/L										<0.2						
Organics	Methylene Chloride	EPA 624	ug/L										<0.15						
Organics	Chloroform (a common THM)	EPA 624	ug/L	130	100								0.288						
Organics	Toluene	EPA 624	ug/L	85000			60.00						0.409						
Organics	Total Trihalomethanes (THM's)	EPA 624	ug/L	130									0.288						
Pesticides	Dalapon	EPA 515.4	ug/L										<0.58						

Parameter	Analyte	Lab Method	Units	Reference				Tijuana River at PB-CILA MÉXICO											
				Ocean Plan	Tijuana River WQOs	NOM-001	CE-CAA	DEC-18	JAN-19	FEB-19	MAR-19	APR-19	MAY-19	JUN-19	JUL-19	AGO-19	SEP-19	OCT-19	NOV-19
Conventional	Alkalinity (Total as $CaCO_3$)	SM 2320-B	mg/L					240	423.7	233.4	455.8	394	382.1	370.1	362.8	336	356	408	413.4
Conventional	Ammonia (as Nitrogen)	SM4500-NH3-G	mg/L	6.0	0.025		0.01	3.2931	18.9934	10.9661	21.4593	19.0129	11.6271	20.2686	23.0731	16.7709	21.0225	17.9357	19.9624
Conventional	Bicarbonate (HCO_3)	SM 2320-B	mg/L					240	423.7	233.4	455.8	338.3	382.1	370.1	362.8	336	356	408	413.4
Conventional	Biochemical Oxygen Demand (5-day) BOD	SM 5210-B	mg/L		10	60		29.9	53.6	42.7	46.4	42.1	15.5	64.7	108.7	31.5	51.2	64.5	69.8
Conventional	Calcium	EPA 200.8	mg/L					NS	NS	NS	NS	117.6	137.1	NS	NS	NS	109.1	155.4	156
Conventional	Carbonaceous Biochemical Oxygen Demand (5-Day) CBOD	SM 5210-B	mg/L					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	Carbonate (CO_3)	SM 2320-B	mg/L					0	0	0	0	55.7	0	0	0	0	0	0	0
Conventional	Chemical Oxygen Demand (COD)	SM 5220-D	mg/L		120			146	150.1	153.8	142.6	159	102	129	254	105	147	140	176
Conventional	Chloride	EPA 300.0	mg/L		250			<0.05	<0.05	<0.05	<0.05	<0.05	0.101	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Conventional	Chlorine, Total Residual	SM 4500-Cl	mg/L	0.065	0.019		0.0075	<0.2	<0.2	<0.2	<0.2	0.2	0.2	<0.2	<0.2	0.2	<0.2	<0.2	<0.2
Conventional	Chlorophyll a	SM 10200-H	mg/m3					<0.05	2.844	<0.05	6.806	16.316	0.474	10.368	13.082	3.523	6.192	<0.05	20.958
Conventional	Chlorophyll b	SM 10200-H	mg/m3					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	Chlorophyll c	SM 10200-H	mg/m3					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	Dissolved Oxygen	4500-O-G	mg/L	≥5			≥5	6.21	5.04	8.26	5.27	6.98	7.36	5.9	2.27	3.57	3.47	4.81	3.29
Conventional	Electrical conductivity (Specific)	SM 2510-B	umhos/cm					1500	2910	2333	2740	2870	2420	2686	2490	2480	2510	2785	2880
Conventional	Fluoride	SM 4500-F-C	mg/L		1		0.5	0.42	0.7806	0.8789	0.7835	0.8793	0.7257	0.6641	1.0397	0.8595	0.7405	0.8798	1.019
Conventional	Fluorine	Calculation	mg/L					NS	NS	NS	NS	NS	0.7257	0.6641	1.0397	0.8595	NS	NS	1.019
Conventional	Magnesium	EPA 200.8	mg/L					NS	NS	NS	NS	52.226	50.28	NS	NS	NS	46.29	52.88	54.3
Conventional	Nitrate	EPA 300.0	mg/L		5		40	3.5065	1.3463	5.7452	0.7676	0.7587	3.1239	0.0339	0.0458	0.1959	0.0512	0.8194	0.0863
Conventional	Nitrite	EPA 300.0	mg/L				2	0.144	0.525	0.785	0.2654	0.1933	0.6135	0.0499	0.037	0.1044	0.1724	0.127	0.2453
Conventional	Oil and Grease	EPA 1664A	mg/L	75		25		<5.0	9.2	<5.0	7.7	12.7	<5.0	65.7	71.2	<5.0	<5.0	79	<5.0
Conventional	Ortho-Phosphorous as P	SM 4500-P-E	mg/L					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	Ortho-Phosphorous as PO4	SM 4500-P-E	mg/L					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	pH	SM 4500-H+B	pH units		6.5 - 8.5			7.9	7.6	7.1	7.7	8.3	8.2	7.8	7.8	7.8	8	7.9	7.3
Conventional	Potassium	EPA 200.8	mg/L					NS	NS	NS	NS	30.03	29.63	NS	NS	NS	26.71	28.03	26.55
Conventional	Sodium	EPA 200.8	mg/L					NS	NS	NS	NS	306.1	340.2	NS	NS	NS	291.6	354.7	387.1
Conventional	Solids percentage (% Solids)	SM 2540-B	%					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	Sulfate	EPA 300.0	mg/L		65			NS	NS	NS	NS	307.005	411.326	NS	NS	NS	363.71	NS	NS
Conventional	Sulfide, Total	SM 4500-S-D	mg/L				0.002	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	0.1559	0.2237	<0.014	<0.014	<0.014	0.3652
Conventional	Surfactants (MBAS)	SM 5540-C	mg/L				0.1	0.6	1.401	1.435	2.92	1.778	1.616	1.551	3.94	1.73	3.503	3.6	3.277
Conventional	Temperature at Time of pH measurement	SM 4500-H+B				40	Nat+/-1.5	15	15	14	18	20	18	20	22	24	22	12	18
Conventional	Total Dissolved Solids (TDS)	SM 2540-C	mg/L		300			1254	1758	1356	1804	1732	1746	1542	1582	1530	1610	1976	1794
Conventional	Total Hardness as $CaCO_3$	SM 2340-B	mg/L					402.7	604	497.1	623.7	594.5	584.8	503.3	489.7	506.9	506.9	601.1	603.6
Conventional	Total Kjeldahl nitrogen	EPA 351.2	mg/L					10.03	27.513	15.947	26.516	16.222	11.243	31.225	45.118	24.105	26.91	31.11	32.364
Conventional	Total nitrogen	ALCH 5025	mg/L			25		13.776	29.384	22.477	27.549	17.174	14.98	31.309	45.201	24.406	27.134	32.057	32.696
Conventional	Total Organic Carbon (TOC)	SM 5310B	mg/L					15.3	31.46	31.46	23.34	25.73	25.31	22.78	25.98	13.085	31.84	5.645	24.7
Conventional	Total Phosphorous as P	SM 4500-P-B-5-E	mg/L	0.1	0.1	10.0	0.0001	1.258	4.8359	3.7273	3.7557	3.626	3.942	5.2947	7.145	3.9784	4.7091	4.5713	6.8047
Conventional	Total Phosphorus as PO_4	SM 4500-P-B-5-E	mg/L				0.002	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Conventional	Total Solids	SM 2540-B	mg/L					1516	1894	1650	1890	1772	1756	1686	1698	1560	1622	2024	1904
Conventional	Total Suspended Solids (TSS)	SM 2540-C	mg/L		58	60		960	56	153.6	28.3	32.5	50	94	100	25	15.3	37	59
Conventional	Volatile Suspended Solids (VSS)	SM2540-E	mg/L					120	40	ND	24.2	24	14.4	71	68	14.5	14.0	35.0	33
Pathogens	Cholera	BioVir BT/FDA BAM	NA					Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Pathogens	E. coli	SM 9223-B-b	MPN/100ml		126			>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000
Pathogens	Enterococcus	SM 9260 H	MPN/100ml	104	151			>24196	>24196	>24196	24196	>24196	>8	>24196	>24196	>24196	>24196	>24196	>24196
Pathogens	Fecal coliform	SM 9223-B-b	mg/L	400	400	1000-2000	200	NS	NS	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000
Pathogens	Total coliform	SM 9223-B-b	MPN/100ml	10000	1000			>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000	>24000
Metals	Aluminum	EPA 200.8	ug/L				200						691.7						
Metals	Arsenic	EPA 200.8	ug/L	80	360	200	10						<1.5						
Metals	Barium (Ba)	EPA 200.8	ug/L				500						0.0731						
Metals	Boron	EPA 200.7	ug/L		0.5		9.0						0.3095						
Metals	Cadmium	EPA 200.8	ug/L	10	1.4	200	0.900						<0.3						
Metals	Chromium (Total)	EPA 200.8	ug/L			1000							5.8						
Metals	Copper	EPA 200.8	ug/L	30	7.5	6000	3						15.2						
Metals	Cyanide	EPA 200.8	ug/L	10	22	2000							2.7						
Metals	Cyanide (WAD)	EPA 200.8	ug/L										2.7						
Metals	Hexavalent chromium	EPA 218.6	ug/L	20/16	16		50						<10						
Metals	Iron	EPA 200.8	ug/L		1000		50						693.3						
Metals	Lead	EPA 200.8	ug/L	20	25	400	6						<0.8						
Metals	Manganese	EPA 200.8	ug/L		0.05								202.6						
Metals	Nickel	EPA 200.8	ug/L	50	653	4000	8						16.7						
Metals	Selenium	EPA 200.8	ug/L	150	20		40						<2.7						
Metals	Zinc	EPA 200.8	ug/L	200	54	20000	90						79.3						
Organics	Bis(2-ethylhexyl) phthalate	EPA 625	ug/L	3.5	4		29.44						1.95						
Organics	Diethyl phthalate	EPA 625	ug/L	33000			29.44						<0.0220						
Organics	Di-n-butyl phthalate	EPA 625	ug/L	3500									<0.0220						
Organics	Pentachlorophenol	EPA 625	ug/L	10			0.50						<0.012						
Organics	Phenol	EPA 625	ug/L	300			1						<0.026						
Organics	2-butanone (MEK)	EPA 624	ug/L										NS						
Organics	Acetone	EPA 624	ug/L										NS						
Organics	Methylene Chloride	EPA 624	ug/L										<0.043						
Organics	Chloroform (a common THM)	EPA 624	ug/L	130	100								0.51						
Organics	Toluene	EPA 624	ug/L	85000			60.00						<0.047						
Organics	Total Trihalomethanes (THM's)	EPA 624	ug/L	130									0.47						
Pesticides	Dalapon	EPA 515.4	ug/L										0.0294						

Parameter	Analyte	Lab Method	Units	Reference		Tijuana River at Dairy Mart Bridge			
						USA			
				Ocean Plan	Tijuana River WQOs	DEC-18	JAN-19	FEB-19	MAY-19
Conventional	Alkalinity (Total as $CaCO_3$)	SM 2320-B	mg/L			NS	410	230	340
Conventional	Ammonia (as Nitrogen)	SM4500-NH3-G	mg/L	6.0	0.025	6.97	19.5	5.52	11.8
Conventional	Bicarbonate (HCO_3)	SM 2320-B	mg/L			NS	500	280	410
Conventional	Biochemical Oxygen Demand (5-day) BOD	SM 5210-B	mg/L		10	NS	14	14	12
Conventional	Calcium	EPA 200.8	mg/L			NS	157	99.6	145
Conventional	Carbonaceous Biochemical Oxygen Demand (5-Day) CBOD	SM 5210-B	mg/L			33.2	10.3	15.3	5.9
Conventional	Carbonate (CO_3)	SM 2320-B	mg/L			NS	<12.5	<25	<12.5
Conventional	Chemical Oxygen Demand (COD)	SM 5220-D	mg/L		120	97	160	80	90
Conventional	Chloride	EPA 300.0	mg/L		250	NS	440	248	467
Conventional	Chlorine, Total Residual	SM 4500-Cl	mg/L	0.06	0.019	NS	0.04	<0.016	0.11
Conventional	Chlorophyll a	SM 10200-H	mg/m3			NS	1910	730	1900
Conventional	Chlorophyll b	SM 10200-H	mg/m3			NS	1860	629	349
Conventional	Chlorophyll c	SM 10200-H	mg/m3			NS	2200	725	369
Conventional	Dissolved Oxygen	4500-O-G	mg/L	≥5		NS	<1	7.9	4.3
Conventional	Electrical conductivity (Specific)	SM 2510-B	umhos/cm			NS	2810	1720	2850
Conventional	Fluoride	SM 4500-F-C	mg/L		1	NS	0.64	0.347	0.478
Conventional	Fluorine	Calculation	mg/L			NS	0.64	0.347	0.478
Conventional	Magnesium	EPA 200.8	ug/L			NS	73100	36200	60600
Conventional	Nitrate	EPA 300.0	mg/L		5	NS	1.34	6.56	3.32
Conventional	Nitrite	EPA 300.0	mg/L			NS	<0.018	<0.018	0.43
Conventional	Oil and Grease	EPA 1664A	mg/L	75		NS	2.8	<1.554	<1.47
Conventional	Ortho-Phosphorous as P	SM 4500-P-E	mg/L			NS	3.17	1.7	3.46
Conventional	Ortho-Phosphorous as PO4	SM 4500-P-E	mg/L			NS	3.17	1.7	10.6
Conventional	pH	SM 4500-H+B	pH units		6.5 - 8.5	NS	7.29	7.7	7.83
Conventional	Potassium	EPA 200.8	ug/L			NS	33400	26200	29300
Conventional	Sodium	EPA 200.8	ug/L			NS	514000	213000	387000
Conventional	Solids percentage (% Solids)	SM 2540-B	%			NS	0.17	0.11	0.173
Conventional	Sulfate	EPA 300.0	mg/L		65	NS	375	211	392
Conventional	Sulfide, Total	SM 4500-S-D	mg/L			NS	<0.1	<0.1	<0.1
Conventional	Surfactants (MBAS)	SM 5540-C	mg/L			NS	2.5	0.9	1.6
Conventional	Temperature at Time of pH measurement	SM 4500-H+B				NS	20.9	8.3	21.4
Conventional	Total Dissolved Solids (TDS)	SM 2540-C	mg/L		300	NS	1680	1000	1640
Conventional	Total Hardness as $CaCO_3$	SM 2340-B	mg/L			NS	693	398	611
Conventional	Total Kjeldahl nitrogen	EPA 351.2	mg/L			NS	29	8.7	19
Conventional	Total nitrogen	ALCH 5025	mg/L			NS	30.3	15.3	21.8
Conventional	Total Organic Carbon (TOC)	SM 5310B	mg/L			NS	25.3	18.5	24.6
Conventional	Total Phosphorous as P	SM 4500-P-B-5-E	mg/L	0.1	0.1	0.905	3.66	3.70	5.20
Conventional	Total Phosphorus as PO_4	SM 4500-P-B-5-E	mg/L			2.770	11.2	11.3	15.9
Conventional	Total Solids	SM 2540-B	mg/L			NS	1730	1120	1730
Conventional	Total Suspended Solids (TSS)	SM 2540-C	mg/L		58	NS	32.2	89.3	30.2
Conventional	Volatile Suspended Solids (VSS)	SM2540-E	mg/L			ND	22.6	23.0	14.2
Pathogens	Cholera	BioVir BT/FDA BAM	NA			NS	Absent	Absent	Absent
Pathogens	E. coli	SM 9223-B-b	MPN/100ml		126	NS	>240000	>240000	>240000
Pathogens	Enterococcus	SM 9260 H	MPN/100ml	104	151	NS	>240000	160000	39000
Pathogens	Total coliform	SM 9223-B-b	MPN/100ml	10000	1000	NS	>240000	>240000	>240000
Metals	Aluminum	EPA 200.8	ug/L						626
Metals	Arsenic	EPA 200.8	ug/L	80	360				4.57
Metals	Barium (Ba)	EPA 200.8	ug/L						90.1
Metals	Boron	EPA 200.7	ug/L		0.5				434
Metals	Cadmium	EPA 200.8	ug/L	10	1.4				0.105
Metals	Chromium (Total)	EPA 200.8	ug/L						3.19
Metals	Copper	EPA 200.8	ug/L	30	7.5				23.1
Metals	Cyanide	EPA 200.8	ug/L	10	22				0.0125
Metals	Hexavalent chromium	EPA 218.6	ug/L	20	16				0.3
Metals	Iron	EPA 200.8	ug/L		1000				1210
Metals	Lead	EPA 200.8	ug/L	20	25				2.29
Metals	Manganese	EPA 200.8	ug/L		0.05				219
Metals	Nickel	EPA 200.8	ug/L	50	653				23.2
Metals	Selenium	EPA 200.8	ug/L	150	20				5.34
Metals	Zinc	EPA 200.8	ug/L	200	54				57.3
Organics	Bis(2-ethylhexyl) phthalate	EPA 625	ug/L	3.5	4				6.3
Organics	Diethyl phthalate	EPA 625	ug/L	33000					<0.262
Organics	Di-n-butyl phthalate	EPA 625	ug/L	3500					2.4
Organics	Pentachlorophenol	EPA 625	ug/L	10					<0.533
Organics	Phenol	EPA 625	ug/L	300					<0.454
Organics	2-butanone (MEK)	EPA 624	ug/L						<0.3
Organics	Acetone	EPA 624	ug/L						<0.2
Organics	Methylene Chloride	EPA 624	ug/L						1.9
Organics	Chloroform (a common THM)	EPA 624	ug/L	130	100				0.242
Organics	Toluene	EPA 624	ug/L	85000					0.421
Organics	Total Trihalomethanes (THM's)	EPA 624	ug/L	130					0.242

Parameter	Analyte	Lab Method	Units	Reference		Tijuana River at Hollister St USA			
				Ocean Plan	Tijuana River WQOs	DEC-18	JAN-19	FEB-19	MAY-19
Conventional	Alkalinity (Total as $CaCO_3$)	SM 2320-B	mg/L			NS	410	240	390
Conventional	Ammonia (as Nitrogen)	SM4500-NH3-G	mg/L	6.0	0.025	2.36	21.6	7.1	17.9
Conventional	Bicarbonate (HCO_3)	SM 2320-B	mg/L			NS	510	290	480
Conventional	Biochemical Oxygen Demand (5-day) BOD	SM 5210-B	mg/L		10	NS	28	7	32
Conventional	Calcium	EPA 200.8	mg/L			NS	156	91.2	134
Conventional	Carbonaceous Biochemical Oxygen Demand (5-Day) CBOD	SM 5210-B	mg/L			18.3	30.3	14.5	32.9
Conventional	Carbonate (CO_3)	SM 2320-B	mg/L			NS	<25	<12.5	<25
Conventional	Chemical Oxygen Demand (COD)	SM 5220-D	mg/L		120	130	170	91	120
Conventional	Chloride	EPA 300.0	mg/L		250	NS	420	252	394
Conventional	Chlorine, Total Residual	SM 4500-Cl	mg/L	0.06	0.019	NS	0.04	<0.016	<0.016
Conventional	Chlorophyll a	SM 10200-H	mg/m3			NS	1190	564	2650
Conventional	Chlorophyll b	SM 10200-H	mg/m3			NS	593	460	454
Conventional	Chlorophyll c	SM 10200-H	mg/m3			NS	663	490	606
Conventional	Dissolved Oxygen	4500-O-G	mg/L	≥5		NS	<1	6.2	<1
Conventional	Electrical conductivity (Specific)	SM 2510-B	umhos/cm			NS	2740	1680	2760
Conventional	Fluoride	SM 4500-F-C	mg/L		1	NS	0.635	0.344	0.49
Conventional	Fluorine	Calculation	mg/L			NS	0.635	0.344	0.49
Conventional	Magnesium	EPA 200.8	mg/L			NS	69.9	34.6	55.4
Conventional	Nitrate	EPA 300.0	mg/L		5	NS	<0.012	4.15	<0.012
Conventional	Nitrite	EPA 300.0	mg/L			NS	<0.018	<0.018	<0.018
Conventional	Oil and Grease	EPA 1664A	mg/L	75		NS	1.6	<1.554	<1.554
Conventional	Ortho-Phosphorous as P	SM 4500-P-E	mg/L			NS	3.38	1.96	4.71
Conventional	Ortho-Phosphorous as PO4	SM 4500-P-E	mg/L			NS	3.38	1.96	14.4
Conventional	pH	SM 4500-H+B	pH units		6.5 - 8.5	NS	7.23	7.41	7.35
Conventional	Potassium	EPA 200.8	mg/L			NS	35.8	27.7	27.7
Conventional	Sodium	EPA 200.8	mg/L			NS	499	190	338
Conventional	Solids percentage (% Solids)	SM 2540-B	%			NS	0.17	0.10	0.16
Conventional	Sulfate	EPA 300.0	mg/L		65	NS	369	198	328
Conventional	Sulfide, Total	SM 4500-S-D	mg/L			NS	3.0	<0.1	2
Conventional	Surfactants (MBAS)	SM 5540-C	mg/L			NS	3.5	1.2	2.1
Conventional	Temperature at Time of pH measurement	SM 4500-H+B				NS	20.9	7.8	4.7
Conventional	Total Dissolved Solids (TDS)	SM 2540-C	mg/L		300	NS	1610	970	1570
Conventional	Total Hardness as $CaCO_3$	SM 2340-B	mg/L			NS	677	370	563
Conventional	Total Kjeldahl nitrogen	EPA 351.2	mg/L			NS	31	10	30
Conventional	Total nitrogen	ALCH 5025	mg/L			NS	31.0	14.2	30
Conventional	Total Organic Carbon (TOC)	SM 5310B	mg/L			NS	31.6	21.1	43.7
Conventional	Total Phosphorous as P	SM 4500-P-B-5-E	mg/L	0.1	0.1	0.178	3.80	3.00	5.66
Conventional	Total Phosphorus as PO_4	SM 4500-P-B-5-E	mg/L			0.546	11.7	9.18	17.4
Conventional	Total Solids	SM 2540-B	mg/L			NS	1680	1040	1620
Conventional	Total Suspended Solids (TSS)	SM 2540-C	mg/L		58	NS	10.9	57.3	15.6
Conventional	Volatile Suspended Solids (VSS)	SM2540-E	mg/L			216	8.00	14.8	<10
Pathogens	Cholera	BioVir BT/FDA BAM	NA			NS	Absent	Absent	Absent
Pathogens	E. coli	SM 9223-B-b	MPN/100ml		126	NS	>240000	120000	>240000
Pathogens	Enterococcus	SM 9260 H	MPN/100ml	104	151	NS	>240000	44000	>240000
Pathogens	Total coliform	SM 9223-B-b	MPN/100ml	10000	1000	NS	>240000	>240000	>240000
Metals	Aluminum	EPA 200.8	ug/L						146
Metals	Arsenic	EPA 200.8	ug/L	80	360				5.22
Metals	Barium (Ba)	EPA 200.8	ug/L						86
Metals	Boron	EPA 200.7	ug/L		0.5				239
Metals	Cadmium	EPA 200.8	ug/L	10	1.4				<0.074
Metals	Chromium (Total)	EPA 200.8	ug/L						1.56
Metals	Copper	EPA 200.8	ug/L	30	7.5				11.9
Metals	Cyanide	EPA 200.8	ug/L	10	22				<0.1
Metals	Hexavalent chromium	EPA 218.6	ug/L	20	16				0.4
Metals	Iron	EPA 200.8	ug/L		1000				890
Metals	Lead	EPA 200.8	ug/L	20	25				0.813
Metals	Manganese	EPA 200.8	ug/L		0.05				445
Metals	Nickel	EPA 200.8	ug/L	50	653				22.5
Metals	Selenium	EPA 200.8	ug/L	150	20				4.92
Metals	Zinc	EPA 200.8	ug/L	200	54				20.9
Organics	Bis(2-ethylhexyl) phthalate	EPA 625	ug/L	3.5	4				3.8
Organics	Diethyl phthalate	EPA 625	ug/L	33000					0.45
Organics	Di-n-butyl phthalate	EPA 625	ug/L	3500					2.3
Organics	Pentachlorophenol	EPA 625	ug/L	10					1.4
Organics	Phenol	EPA 625	ug/L	300					0.86
Organics	2-butanone (MEK)	EPA 624	ug/L						2.2
Organics	Acetone	EPA 624	ug/L						45
Organics	Methylene Chloride	EPA 624	ug/L						1.2
Organics	Chloroform (a common THM)	EPA 624	ug/L	130	100				<0.044
Organics	Toluene	EPA 624	ug/L	85000					7.7
Organics	Total Trihalomethanes (THM's)	EPA 624	ug/L	130					<0.044

Parameter	Analyte	Lab Method	Units	Reference		Tijuana River at Saturn BLVD			
						USA			
				Ocean Plan	Tijuana River WQOs	DEC-18	JAN-19	FEB-19	MAY-19
Conventional	Alkalinity (Total as $CaCO_3$)	SM 2320-B	mg/L			NS	450	230	390
Conventional	Ammonia (as Nitrogen)	SM4500-NH3-G	mg/L	6.0	0.025	2.54	26.7	7.88	14.6
Conventional	Bicarbonate (HCO_3)	SM 2320-B	mg/L			NS	550	280	470
Conventional	Biochemical Oxygen Demand (5-day) BOD	SM 5210-B	mg/L		10	NS	32	7	11
Conventional	Calcium	EPA 200.8	mg/L			NS	142	90.7	135
Conventional	Carbonaceous Biochemical Oxygen Demand (5-Day) CBOD	SM 5210-B	mg/L			15.4	56.6	13.8	11.5
Conventional	Carbonate (CO_3)	SM 2320-B	mg/L			NS	<25	<12.5	<25
Conventional	Chemical Oxygen Demand (COD)	SM 5220-D	mg/L		120	110	420	74	79
Conventional	Chloride	EPA 300.0	mg/L		250	NS	431	229	388
Conventional	Chlorine, Total Residual	SM 4500-Cl	mg/L	0.06	0.019	NS	<0.016	<0.016	0.05
Conventional	Chlorophyll a	SM 10200-H	mg/m3			NS	1160	550	2980
Conventional	Chlorophyll b	SM 10200-H	mg/m3			NS	1420	481	936
Conventional	Chlorophyll c	SM 10200-H	mg/m3			NS	1620	533	670
Conventional	Dissolved Oxygen	4500-O-G	mg/L	≥5		NS	ND	6.4	1.5
Conventional	Electrical conductivity (Specific)	SM 2510-B	umhos/cm			NS	2760	1660	2680
Conventional	Fluoride	SM 4500-F-C	mg/L		1	NS	0.525	0.341	0.502
Conventional	Fluorine	Calculation	mg/L			NS	0.525	0.341	0.502
Conventional	Magnesium	EPA 200.8	ug/L			NS	70500	32800	52300
Conventional	Nitrate	EPA 300.0	mg/L		5	NS	0.07	3.35	0.07
Conventional	Nitrite	EPA 300.0	mg/L			NS	<0.018	<0.018	<0.018
Conventional	Oil and Grease	EPA 1664A	mg/L	75		NS	<1.554	<1.554	2.2
Conventional	Ortho-Phosphorous as P	SM 4500-P-E	mg/L			NS	4.28	2.00	3.90
Conventional	Ortho-Phosphorous as PO4	SM 4500-P-E	mg/L			NS	4.28	2.00	12.00
Conventional	pH	SM 4500-H+B	pH units		6.5 - 8.5	NS	7.16	7.35	7.55
Conventional	Potassium	EPA 200.8	ug/L			NS	30800	26800	28100
Conventional	Sodium	EPA 200.8	ug/L			NS	469000	185000	331000
Conventional	Solids percentage (% Solids)	SM 2540-B	%			NS	0.18	0.10	0.16
Conventional	Sulfate	EPA 300.0	mg/L		65	NS	366	278	327
Conventional	Sulfide, Total	SM 4500-S-D	mg/L			NS	2.0	<0.1	<0.01
Conventional	Surfactants (MBAS)	SM 5540-C	mg/L			NS	1.8	1.1	1.5
Conventional	Temperature at Time of pH measurement	SM 4500-H+B	°C			NS	20.8	7.8	4.2
Conventional	Total Dissolved Solids (TDS)	SM 2540-C	mg/L		300	NS	1700	890	1550
Conventional	Total Hardness as $CaCO_3$	SM 2340-B	mg/L			NS	643	361	551
Conventional	Total Kjeldahl nitrogen	EPA 351.2	mg/L			NS	49	10	22
Conventional	Total nitrogen	ALCH 5025	mg/L			NS	49.1	13.4	22.1
Conventional	Total Organic Carbon (TOC)	SM 5310B	mg/L			NS	41.4	21.0	29.5
Conventional	Total Phosphorous as P	SM 4500-P-B-5-E	mg/L	0.1	0.1	0.194	5.67	2.91	4.66
Conventional	Total Phosphorus as PO_4	SM 4500-P-B-5-E	mg/L			0.595	17.4	8.92	14.3
Conventional	Total Solids	SM 2540-B	mg/L			NS	1770	990	1600
Conventional	Total Suspended Solids (TSS)	SM 2540-C	mg/L		58	NS	40.4	78.6	36.6
Conventional	Volatile Suspended Solids (VSS)	SM2540-E	mg/L			138	32.0	17.1	12.2
Pathogens	Cholera	BioVir BT/FDA BAM	NA			NS	Absent	Absent	Absent
Pathogens	E. coli	SM 9223-B-b	MPN/100ml		126	NS	>240000	52000	52000
Pathogens	Enterococcus	SM 9260 H	MPN/100ml	104	151	NS	>240000	36000	36000
Pathogens	Total coliform	SM 9223-B-b	MPN/100ml	10000	1000	NS	>240000	240000	240000
Metals	Aluminum	EPA 200.8	ug/L						693
Metals	Arsenic	EPA 200.8	ug/L	80	360				5.54
Metals	Barium (Ba)	EPA 200.8	ug/L						93.2
Metals	Boron	EPA 200.7	ug/L		0.5				318
Metals	Cadmium	EPA 200.8	ug/L	10	1.4				<0.074
Metals	Chromium (Total)	EPA 200.8	ug/L						2.16
Metals	Copper	EPA 200.8	ug/L	30	7.5				11.4
Metals	Cyanide	EPA 200.8	ug/L	10	22				<0.001
Metals	Hexavalent chromium	EPA 218.6	ug/L	20	16				0.4
Metals	Iron	EPA 200.8	ug/L		1000				1700
Metals	Lead	EPA 200.8	ug/L	20	25				1.46
Metals	Manganese	EPA 200.8	ug/L		0.05				434
Metals	Nickel	EPA 200.8	ug/L	50	653				22.6
Metals	Selenium	EPA 200.8	ug/L	150	20				4.12
Metals	Zinc	EPA 200.8	ug/L	200	54				28.1
Organics	Bis(2-ethylhexyl) phthalate	EPA 625	ug/L	3.5	4				2
Organics	Diethyl phthalate	EPA 625	ug/L	33000					<0.262
Organics	Di-n-butyl phthalate	EPA 625	ug/L	3500					0.43
Organics	Pentachlorophenol	EPA 625	ug/L	10					<0.53
Organics	Phenol	EPA 625	ug/L	300					<0.454
Organics	2-butanone (MEK)	EPA 624	ug/L						<0.3
Organics	Acetone	EPA 624	ug/L						<0.2
Organics	Methylene Chloride	EPA 624	ug/L						1.1
Organics	Chloroform (a common THM)	EPA 624	ug/L	130	100				<0.044
Organics	Toluene	EPA 624	ug/L	85000					<0.079
Organics	Total Trihalomethanes (THM's)	EPA 624	ug/L	130					<0.044

Parameter	Analyte	Lab Method	Units	Reference		Mouth of the river			
						USA			
				Ocean Plan	Tijuana River WQOs	DEC-19	JAN-19	FEB-19	MAY-19
Conventional	Alkalinity (Total as $CaCO_3$)	SM 2320-B	mg/L			NS	250	150	320
Conventional	Ammonia (as Nitrogen)	SM4500-NH3-G	mg/L	6.0	0.025	1.72	9.12	2.54	10.4
Conventional	Bicarbonate (HCO_3)	SM 2320-B	mg/L			NS	310	190	390
Conventional	Biochemical Oxygen Demand (5-day) BOD	SM 5210-B	mg/L		10	NS	9	<1.5	11
Conventional	Calcium	EPA 200.8	mg/L			NS	333	342	215
Conventional	Carbonaceous Biochemical Oxygen Demand (5-Day) CBOD	SM 5210-B	mg/L			11.4	10.8	17.9	10.6
Conventional	Carbonate (CO_3)	SM 2320-B	mg/L			NS	<25	<12.5	<25
Conventional	Chemical Oxygen Demand (COD)	SM 5220-D	mg/L		120	290	1200	1400	340
Conventional	Chloride	EPA 300.0	mg/L		250	NS	12400	14900	6460
Conventional	Chlorine, Total Residual	SM 4500-Cl	mg/L	0.06	0.019	NS	0.03	<0.016	0.04
Conventional	Chlorophyll a	SM 10200-H	mg/m3			NS	946	399	847
Conventional	Chlorophyll b	SM 10200-H	mg/m3			NS	1260	123	91
Conventional	Chlorophyll c	SM 10200-H	mg/m3			NS	1540	178	143
Conventional	Dissolved Oxygen	4500-O-G	mg/L	≥5		NS	<1	10	7.3
Conventional	Electrical conductivity (Specific)	SM 2510-B	umhos/cm			NS	34400	39600	19400
Conventional	Fluoride	SM 4500-F-C	mg/L		1	NS	0.672	0.671	0.629
Conventional	Fluorine	Calculation	mg/L			NS	0.672	0.671	0.629
Conventional	Magnesium	EPA 200.8	mg/L			NS	984	854	459
Conventional	Nitrate	EPA 300.0	mg/L		5	NS	<0.012	0.33	0.35
Conventional	Nitrite	EPA 300.0	mg/L			NS	<0.018	<0.018	<0.018
Conventional	Oil and Grease	EPA 1664A	mg/L	75		NS	26.4	2	<1.47
Conventional	Ortho-Phosphorous as P	SM 4500-P-E	mg/L			NS	1.34	0.4770	2.5000
Conventional	Ortho-Phosphorous as PO4	SM 4500-P-E	mg/L			NS	1.34	0.4770	7.6600
Conventional	pH	SM 4500-H+B	pH units		6.5 - 8.5	NS	6.94	7.72	7.58
Conventional	Potassium	EPA 200.8	mg/L			NS	309	315	141
Conventional	Sodium	EPA 200.8	mg/L			NS	8390	9160	3810
Conventional	Solids percentage (% Solids)	SM 2540-B	%			NS	2.34	2.21	1.16
Conventional	Sulfate	EPA 300.0	mg/L		65	NS	1780	2030	1050
Conventional	Sulfide, Total	SM 4500-S-D	mg/L			NS	0.3	<0.1	<0.01
Conventional	Surfactants (MBAS)	SM 5540-C	mg/L			NS	1.8	0.42	0.98
Conventional	Temperature at Time of pH measurement	SM 4500-H+B				NS	20.8	8.4	19.5
Conventional	Total Dissolved Solids (TDS)	SM 2540-C	mg/L		300	NS	22800	21300	10700
Conventional	Total Hardness as $CaCO_3$	SM 2340-B	mg/L			NS	4870	4360	2420
Conventional	Total Kjeldahl nitrogen	EPA 351.2	mg/L			NS	11	2.9	15
Conventional	Total nitrogen	ALCH 5025	mg/L			NS	11.0	3.23	15.4
Conventional	Total Organic Carbon (TOC)	SM 5310B	mg/L			NS	14.4	7.2	18.5
Conventional	Total Phosphorous as P	SM 4500-P-B-5-E	mg/L	0.1	0.1	0.188	1.565	0.636	3.470
Conventional	Total Phosphorus as PO_4	SM 4500-P-B-5-E	mg/L			0.576	4.80	1.95	10.6
Conventional	Total Solids	SM 2540-B	mg/L			NS	23400	22100	11600
Conventional	Total Suspended Solids (TSS)	SM 2540-C	mg/L		58	NS	8.1	55.8	7.6
Conventional	Volatile Suspended Solids (VSS)	SM2540-E	mg/L			105	<5.55	<12.5	<5.55
Pathogens	Cholera	BioVir BT/FDA BAM	NA			NS	Absent	Absent	Absent
Pathogens	E. coli	SM 9223-B-b	MPN/100ml		126	NS	>240000	16000	24000
Pathogens	Enterococcus	SM 9260 H	MPN/100ml	104	151	NS	>240000	8400	7000
Pathogens	Total coliform	SM 9223-B-b	MPN/100ml	10000	1000	NS	>240000	69000	>240000
Metals	Aluminum	EPA 200.8	ug/L						125
Metals	Arsenic	EPA 200.8	ug/L	80	360				23.6
Metals	Barium (Ba)	EPA 200.8	ug/L						61.1
Metals	Boron	EPA 200.7	ug/L		0.5				1760
Metals	Cadmium	EPA 200.8	ug/L	10	1.4				<1.85
Metals	Chromium (Total)	EPA 200.8	ug/L						2.48
Metals	Copper	EPA 200.8	ug/L	30	7.5				35.5
Metals	Cyanide	EPA 200.8	ug/L	10	22				0.0018
Metals	Hexavalent chromium	EPA 218.6	ug/L	20	16				<0.094
Metals	Iron	EPA 200.8	ug/L		1000				1190
Metals	Lead	EPA 200.8	ug/L	20	25				<19
Metals	Manganese	EPA 200.8	ug/L		0.05				274
Metals	Nickel	EPA 200.8	ug/L	50	653				21.3
Metals	Selenium	EPA 200.8	ug/L	150	20				71.8
Metals	Zinc	EPA 200.8	ug/L	200	54				<67.5
Organics	Bis(2-ethylhexyl) phthalate	EPA 625	ug/L	3.5	4				5.7
Organics	Diethyl phthalate	EPA 625	ug/L	33000					<0.262
Organics	Di-n-butyl phthalate	EPA 625	ug/L	3500					2.3
Organics	Pentachlorophenol	EPA 625	ug/L	10					<0.53
Organics	Phenol	EPA 625	ug/L	300					<0.454
Organics	2-butanone (MEK)	EPA 624	ug/L						<0.3
Organics	Acetone	EPA 624	ug/L						<0.2
Organics	Methylene Chloride	EPA 624	ug/L						<0.15
Organics	Chloroform (a common THM)	EPA 624	ug/L	130	100				<0.044
Organics	Toluene	EPA 624	ug/L	85000					<0.078
Organics	Total Trihalomethanes (THM's)	EPA 624	ug/L	130					<0.044