# DECISION DOCUMENT

# ANALYSIS OF THE CLEAN WATER ACT SECTION 301(h) SECONDARY TREATMENT WAIVER RENEWAL APPLICATION FOR THE ARECIBO REGIONAL WASTEWATER TREATMENT PLANT NPDES PERMIT NO. PR0023710 PUERTO RICO

**U.S. ENVIRONMENTAL PROTECTION AGENCY REGION 2**

**NEW YORK, NEW YORK**

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**TABLE OF CONTENTS**

## LIST OF TABLES



## LIST OF FIGURES

## INTRODUCTION

The Puerto Rico Aqueduct and Sewer Authority (PRASA or the applicant) has requested a renewal of its waiver, under Section 301(h) of the Clean Water Act (CWA or the Act), 33 U.S.C. § 1311(h), from the secondary treatment requirements contained in Section 301(b)(1)(B) of the Act, 33 U.S.C. § 1311(b)(1)(B), for the Arecibo Regional Wastewater Treatment Plant (RWWTP). The Arecibo RWWTP is a publicly owned treatment works (POTW) located on the island of Puerto Rico. [National Pollutant Discharge Elimination System (NPDES) Permit No. PR0023710]

The applicant is seeking a 301(h) waiver to discharge wastewater receiving less-than-secondary treatment from the Arecibo RWWTP to the Atlantic Ocean. The original application for a 301(h) modification of secondary treatment requirements at the Arecibo RWWTP was submitted to the U.S. Environmental Protection Agency Region 2 (EPA) in 1979 and was tentatively approved by EPA in 1988. In 2000, after a thorough review of updated information, EPA approved PRASA's first application for a 301(h) modified permit ("modified permit") for the Arecibo RWWTP, and subsequently issued a modified permit that became effective in 2002 and expired in 2007. Prior to the conclusion of the 5-year permit term, PRASA applied for a renewal of the modified permit and pursuant to 40 CFR § 122.21, the terms and conditions of the modified permit were administratively extended. In 2012, PRASA submitted an updated application that modified dilution estimates and the mixing zone size based on more recent receiving water data and modeling. EPA issued a modified permit to PRASA in 2015. On June 26, 2020, PRASA once again applied for a renewal of its modified permit. PRASA again updated the mixing zone size and dilution estimates based on a new model and additional data.

This Decision Document presents EPA Region 2's findings, conclusions, and recommendations as to whether the applicant's modified discharge will comply with the criteria set forth in Section 301(h) of the Act, as implemented by regulations contained in 40 CFR Part 125, Subpart G and the Puerto Rico Water Quality Standards Regulation (PRWQSR), as amended (Regulation Number 7837).

## DECISION CRITERIA

Under Section 301(b)(1)(B) of the Act, 33 U.S.C. § 1311(b)(l)(B), POTWs in existence on July 1, 1977 were required to meet effluent limitations based upon secondary treatment as defined by the Administrator of the EPA (the Administrator). Secondary treatment is defined in federal regulations at Title 40 of the Code of Federal Regulations (CFR) Part 133 in terms of effluent quality for total suspended solids (TSS), five-day measure of biochemical oxygen demand ($BOD_5$) and pH. Uniform national effluent limitations for these pollutants were promulgated (see 40 CFR Part 133) and included in NPDES permits for POTWs issued under Section 402 of the Act. POTWs were required to comply with these limitations, in most circumstances, by July l, l977.

Congress subsequently amended the Act, adding Section 301(h), which authorized the Administrator, with State[1] concurrence, to issue NPDES permits which modify the secondary treatment requirements of the Act [P.L. 95-217, 91 Stat. 1566, as amended by P.L. 97-117, 95 Stat. 1623; and Section 303 of the Water Quality Act (WQA) of 1987]. Section 301(h) provides that the Administrator, with the concurrence of the State, may issue a permit under Section 402 of the Act which modifies the requirements of subsection (b)(1)(B) with respect to the discharge of any pollutant from a POTW into marine waters, if the applicant demonstrates to the satisfaction of the Administrator that:

1. there is an applicable water quality standard specific to the pollutant for which the modification is requested, which has been identified under Section 304(a)(6) of the CWA;

2. the discharge of pollutants in accordance with such modified requirements will not interfere, alone or in combination with pollutants from other sources, with the attainment or maintenance of that water quality which assures protection of public water supplies and the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife, and allows recreational activities, in and on the water;

3. the applicant has established a system for monitoring the impact of such discharge on a representative sample of aquatic biota, to the extent practicable, and the scope of such monitoring is limited to include only those scientific investigations which are necessary to study the effects of the proposed discharge;

4. such modified requirements will not result in any additional requirements on any other point or nonpoint source;

5. all applicable pretreatment requirements for sources introducing waste into such treatment works will be enforced;

6. in the case of any treatment works serving a population of 50,000 or more, with respect to any toxic pollutant introduced into such works by an industrial discharger for which pollutant there is no applicable pretreatment requirement in effect, sources introducing waste into such works are in compliance with all applicable pretreatment requirements, the applicant will enforce such requirements, and the applicant has in effect a pretreatment program which, in combination with the treatment of discharges from such works, removes the same amount of such pollutant as would be removed if such works were to apply secondary treatment to discharges and if such works had no pretreatment program with respect to such pollutant;

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

[1] Section 502(3) of the Act defines "State" to include the Commonwealth of Puerto Rico. 33 U.S.C. § 1362(3).

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

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

For this subsection, the phrase “the discharge of any pollutant into marine waters” refers to a discharge into deep waters of the territorial sea or the waters of the contiguous zone, or into saline estuarine waters where there is strong tidal movement and other hydrological and geological characteristics which the Administrator determines necessary to comply with the requirements of Sections 301(h)(2) and 101(a)(2) of the Act. For the purposes of Section 301(h)(9), “primary or equivalent treatment” means treatment by screening, sedimentation and skimming adequate to remove at least 30 percent of the $BOD_5$ and TSS in the treatment works influent, and disinfection where appropriate. A municipality which applies for a modification from secondary treatment requirements shall be eligible to receive a permit pursuant to this subsection which modifies the requirements of subsection (b)(1)(B) of this section with respect to the discharge of any pollutant from any treatment works owned by such municipality into marine waters. No permit issued shall authorize the discharge of sewage sludge into marine waters. For a permit to be issued for the discharge of a pollutant into marine waters, such marine waters must exhibit characteristics assuring that water providing dilution does not contain significant amounts of previously discharged effluent from such treatment works. No permit issued shall authorize the discharge of any pollutant into marine or estuarine waters which at the time of application does not support a balanced, indigenous population of shellfish, fish and wildlife, or allow recreation in and on the waters or which exhibit ambient water quality below applicable water quality standards adopted for the protection of public water supplies, shellfish and wildlife, or recreational activities or such other standards necessary to assure support and protection of such uses. The prohibition contained in the preceding sentence shall apply without regard to the presence or absence of a causal relationship between such characteristics and the applicant’s current or proposed discharge.

On August 9, 1994, EPA promulgated final regulations implementing these statutory criteria in 40 CFR Part 125, Subpart G. These regulations provide that a modified permit may not be issued in violation of 40 CFR § 125.59(b), which requires, among other things, compliance with provisions of the Coastal Zone Management Act (16 U.S.C. 1451 et seq.), the Endangered Species Act (16 U.S.C. 1531 et seq.), Title III of the Marine Protection, Research and Sanctuaries Act (16 U.S.C. 1431 et seq.), and other applicable provisions of State or Federal laws or Executive Orders. Other provisions or Executive Orders currently include Essential Fish Habitat requirements of the Magnuson-Stevens Fishery Conservation and Management Act and the President’s Executive Order on Coral Reef Protection dated June 11, 1998. Furthermore, the decision to grant or deny a 301(h) modification shall be made by the Administrator and shall be

based on the applicant's demonstration that it has met all the requirements of 40 CFR §§ 125.59 through 125.68.

EPA has reviewed data submitted by the applicant in the context of applicable statutory and regulatory criteria and presents its findings and conclusions in this Decision Document. This document summarizes EPA's review of effluent and receiving water monitoring data collected since issuance of the September 2015 modified permit in addition to other relevant information to evaluate the potential impact of the modified discharge on water quality and the marine environment and to support its determination regarding re-issuance of the existing modified permit.

## SUMMARY OF FINDINGS

Based upon review of information provided by the applicant and other supporting documents, EPA makes the following findings regarding the modified discharge's compliance with statutory and regulatory criteria:

1. The modified discharge will not cause violations of Puerto Rico water quality standards (PRWQS) for the constituents (dissolved oxygen and turbidity) that inform conditions of the pollutants for which the modification is requested, $BOD_5$ and TSS. [Section 301(h)(1), 40 CFR § 125.61]

2. The applicant has demonstrated that it can consistently achieve PRWQS at and beyond the zone of initial dilution, with some exceptions. The applicant's modified discharge, alone or in combination with pollutants from other sources, will not impact public water supplies. The modified discharge will not interfere with the protection and propagation of a balanced indigenous population of fish, shellfish, and wildlife, and will not affect recreational activities. [Section 301(h)(2), 40 CFR § l25.62]

3. The applicant has proposed an adequate monitoring program to assess the impact of the modified discharge; however, the Quality Assurance Project Plan (QAPP) must be updated for the next permit term as described in the Monitoring Program section of this document. The terms of this program will become enforceable conditions of the modified permit to be issued to the applicant. [Section 30l(h)(3), 40 CFR § l25.63]

4. The applicant's modified discharge will not result in additional treatment requirements on any other point or nonpoint sources. [Section 30l(h)(4), 40 CFR § l25.64]

5. The applicant has an industrial pretreatment program, and the program continues to be implemented on an island-wide basis. [Section 301(h)(5), 40 CFR §§ 125.66 and 125.68]

6. The applicant has demonstrated that it has met the urban area pretreatment requirements. [Section 301(h)(6), 40 CFR § 125.65]

7. The applicant has proposed a toxics control program to limit the entrance of toxic pollutants from nonindustrial sources into the treatment works. [Section 30l(h)(7), 40 CFR § l25.66]

8. There will be no new or substantially increased discharges from point sources of pollutants to which the waiver applies above those specified in the modified permit. [Section 30l(h)(8), 40 CFR § 125.67]

9. The applicant has demonstrated the modified discharge will receive at least primary or equivalent treatment and meet the requirements established under Section 304(a)(1) of the Act after initial mixing. [Section 301(h)(9), 40 CFR § 125.60]

## CONCLUSION

EPA has concluded that, absent any significant change to plant operations, the modified discharge from the Arecibo RWWTP will not adversely impact the marine environment and beneficial uses of the receiving water, and will comply with the requirements of Section 301(h) of the Act and 40 CFR Part 125, Subpart G.

## RECOMMENDATIONS

It is recommended that the applicant be granted a 301(h)-modified permit in accordance with the above findings, and that a public notice of intent to issue the modified permits be prepared in accordance with all applicable provisions of 40 CFR Parts 122 and l24. In accordance with 40 CFR § 125.68, the Arecibo RWWTP 301(h) modified permit (NPDES Permit No. PR0023710) shall contain, in addition to all applicable terms and conditions required by 40 CFR Part 122, the following special conditions:

1. All requirements determined necessary by the Puerto Rico Department of Natural and Environmental Resources (DNER) as part of its final Water Quality Certificate to ensure that the modified discharge will comply with all applicable provisions of Commonwealth law, including water quality standards. [Section 401, 40 CFR § 124.54]

2. Proposed 301(h) modified effluent limitations and mass loadings shown in Table 1, in accordance with 40 CFR Parts 122 and 125;

Table 1. Proposed 301(h) modified effluent limitations and mass loadings. No changes to the limitations and mass loadings presented in the previous permit are proposed.

| Parameter | Monthly Average | Average Weekly | Daily Maximum | Percent Removal |
|---|---|---|---|---|
| Flow, MGD | -- | -- | 20 | -- |
| $BOD_5$, mg/l | 120 | -- | -- | 30 |
| $BOD_5$, kg/day | 9,085 | -- | -- | -- |

| | | | | |
|---|---|---|---|---|
| TSS, mg/l | 110 | -- | -- | 50 |
| TSS, kg/day | 8,326 | -- | -- | -- |

3. Requirements for the use of chemical addition (e.g., polymer) to increase solids removal to achieve a 50 percent removal rate, on a monthly average basis, for TSS;

4. Monitoring requirements for establishing and implementing the Arecibo RWWTP 301(h) Waiver Demonstration Studies that include, but are not limited to, biological, effluent, and water quality monitoring (including a revised QAPP and the requirement to resample and reanalyze for constituents with insufficient data quality) that are consistent with 40 CFR §§ 125.60, 125.62, 125.63, and 125.68(c);

5. Reporting requirements for the Arecibo RWWTP 301(h) Waiver Demonstration Studies, in accordance with 40 CFR § 125.68(d);

6. Requirements to modify, as necessary, and implement a toxics control program upon the effective date of each modified permit to limit the entrance of toxic pollutants from nonindustrial sources into the treatment works; and

7. Requirements for implementing a pretreatment program and nonindustrial control program in accordance with 40 CFR §§ 125.65, 125.66, and 125.68(b).

EPA has found that the applicant's receiving water monitoring data does not fully demonstrate compliance with the Puerto Rico Water Quality Standards as required by 40 CFR § 125.62(a). However, EPA is providing recommendation for the renewal of the 301(h) modification because the applicant has sufficiently demonstrated that the discharge does not impact public water supplies, the protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife, and recreational activities in and on the water. To assure that monitoring data are representative of the site-specific areas, EPA will require improvements to the monitoring program during the next permit term. Furthermore, EPA recommends that the applicant begin to consider and assess the feasibility of secondary treatment for the wastewater treatment plant and if feasible, begin a study and planning for the upgrade.

## DESCRIPTION OF THE TREATMENT FACILITY

The Arecibo RWWTP is located on the north coast of the island of Puerto Rico in the municipality of Arecibo and provides wastewater treatment services to the municipality of Arecibo. The Arecibo RWWTP first began operations in 1986 and is designed to provide advanced primary treatment of wastewater through screening, grit removal, polymer-enhanced sedimentation, disinfection (chlorination), and sludge dewatering. The facility is designed for a maximum daily flow of 20 MGD and a monthly average flow of 10 MGD. Based on flow monitoring data for the period of April 2015 through March 2020 (shown on Figure 1), the

facility typically operates below these flows, with some exceptions. Daily maximum flows were influenced by hurricanes in September and October 2017 (18 and 21 MGD, respectively). The remaining actual daily maximum flows ranged between 5 MGD (June 2015) and 12.2 MGD (March 2020), and actual average monthly flows ranged between 3.53 MGD (October 2017) and 10.1 MGD (April 2018).

The Arecibo RWWTP discharges advanced primary-treated wastewater into the Atlantic Ocean through an ocean outfall, the distal end of which is configured as a high-rate diffuser to maximize mixing and dispersion. The effluent is discharged approximately 3,769 ft offshore at a depth of 69 to 82 ft. The 48-inch-diameter outfall terminates in a 660-ft-long, multiple-port diffuser manifold. The outfall pipe is buried approximately 6.6 ft below the ocean bottom at a slope of 0.0282 meters per meter (m/m). The diffuser section of the outfall has risers that extend above the sea floor, with a total of 112 ports (2 per riser). Port diameters range from 2.5 inches (for 110 ports) to 3.5 inches (for two ports) to accommodate maximum daily flows of up to 60 MGD. Currently, 41 of the 112 diffuser ports are open on alternating sides of the diffuser barrel. PRASA proposes to close some of the ports and reconfigure the diffuser using 41 ports, one on each of the seaward-most 41 risers, to optimize diffuser performance for the current range of effluent flows.

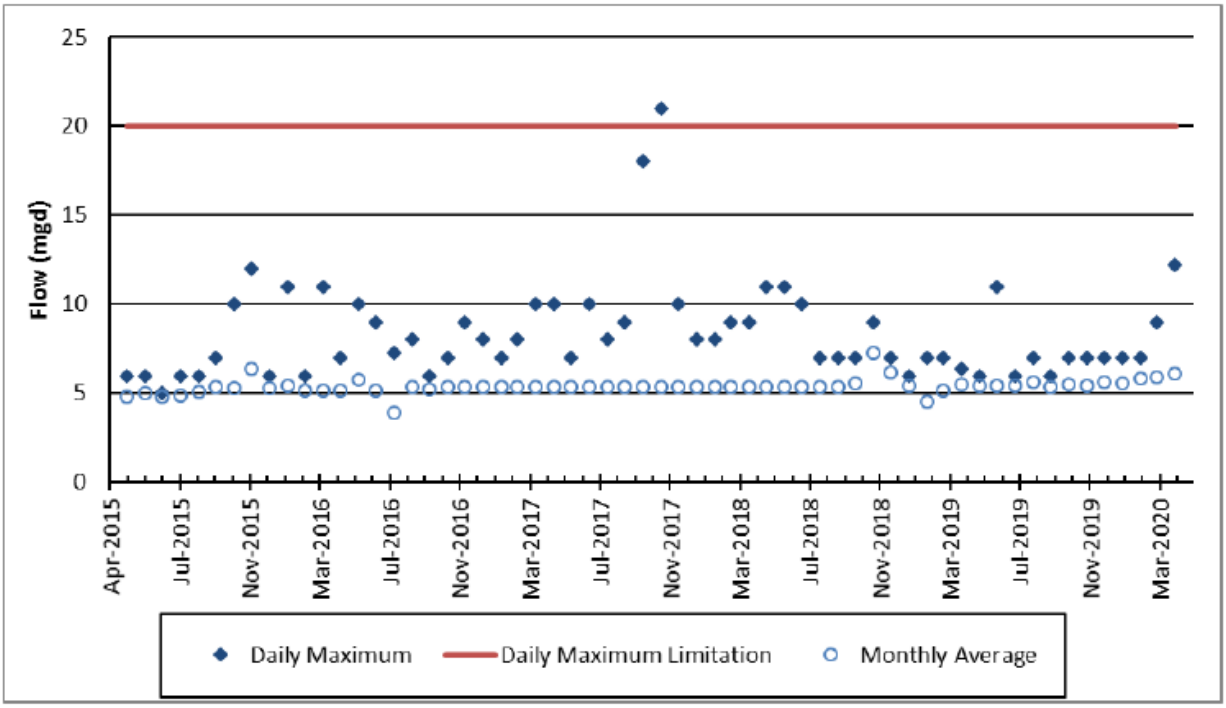


Figure 1. Arecibo RWWTP flow data for April 2015 through March 2020, taken from PRASA's 2020 301(h) renewal application (Jacobs 2020).

## DESCRIPTION OF THE RECEIVING WATERS

The receiving water in the vicinity of the Arecibo RWWTP discharge is classified as a Class SB water. Class SB waters are defined in Rule 1302.1(B) of the PRWQSR as coastal waters subject to the ebb and flow of tides (mean sea level) out to a maximum of 10.35 miles (16,656.71 meters) offshore.

The Commonwealth of Puerto Rico adopted water quality standards for Class SB waters to protect the designated uses of these waters: primary and secondary contact recreation; and the propagation and maintenance of desirable species, including threatened and endangered species. For the 301(h) evaluation, EPA has assessed attainment of water quality standards for Class SB waters to ensure that the modified discharge from the Arecibo RWWTP does not impact designated uses in the area.

PRASA has conducted monitoring in accordance with 301(h) requirements since 1999. Based on this monitoring, PRASA has determined that there is little seasonal variation in the water column with respect to temperature and salinity. Density profiles taken near the outfall during wet and dry seasons indicate that pycnoclines do not form, which supports constant mixing of the water column throughout the year. Annual temperature and salinity data indicate that surface-to-bottom differences of these parameters are small, and spatial differences are insignificant. Local winds do not significantly affect the general hydrological flow patterns near the outfall, although they may influence surface currents. Currents in the vicinity of the outfall are generally influenced by the North Equatorial Current. Currents generally flow east to west, parallel to the coastline. Current speeds vary with depth and average between 9.61 and 13.04 cm/sec. Tides in the vicinity of the Arecibo RWWTP outfall are semi-diurnal, with an overall mean amplitude of 0.8 feet (0.24 meters) and a maximum spring tide range of 2.0 feet (0.61 meters).

At the time a 301(h) modification becomes effective, 40 CFR § 125.62 requires that the Arecibo RWWTP's outfall and diffuser be located and designed to provide adequate initial dilution, dispersion, and transport of wastewater such that the discharge does not exceed any water quality standard , at and beyond the Zone of Initial Dilution (ZID). Dilution is defined as the ratio of the total volume of the sample (ambient water plus effluent) to the volume of effluent in the sample. The ZID is defined as a region of mixing surrounding, or adjacent to, the end of the outfall or diffuser, provided that the ZID is not larger than allowed by mixing zone restrictions in applicable water quality standards. 40 CFR § 125.58(dd). Rule 1305 of the PRWQSR authorizes the use of mixing zones through a mixing zone approval process. Upon approval by DNER, an interim authorization for a mixing zone is granted based on the applicant's demonstration that water quality standards are met at the boundary of the proposed mixing zone, after consideration of the lowest (i.e., critical) initial dilution determined for open coastal waters.

In general, the mixing zone is considered a ZID that is geometrically sized to include the seafloor and the water column above it. PRASA originally submitted a request to the Environmental Quality Board (EQB; now the DNER) for a Water Quality Certificate (WQC) and mixing zone in 2007. In 2012, PRASA submitted a revised request based on new information from dilution modeling. In 2014, the EQB issued a WQC for the Arecibo RWWTP that included an

authorization of a mixing zone. The mixing zone was a rectangular-shaped area approximately 279.6 m long and 79.5 m wide surrounding the diffuser, providing a critical initial dilution (CID) of 224:1 based on a maximum daily design flow of 20 MGD through the outfall and a diffuser configuration with 41 of the total 112 ports open to prevent seawater intrusion.

DNER has approved PRASA's proposed new mixing zone for the next permit term. Based on the current diffuser configuration, the DNER-defined CID is 376:1 and will result in a rectangular-shaped mixing zone that is approximately 56 meters long by 110 meters wide (Jacobs 2020a).

## RECEIVING WATER, EFFLUENT, AND BIOLOGICAL MONITORING

Since 1999, PRASA has implemented a 301(h) monitoring program for the Arecibo RWWTP that consists of effluent and receiving water monitoring, assessment of benthic invertebrates and coral communities, and analysis of toxic pollutants in sediment and fish tissue. A complete description of the 301(h) monitoring program is provided in PRASA's 2012 Quality Assurance Project Plan and Sampling and Analysis Protocols for the Arecibo RWWTP 301(h) Waiver Demonstration Studies (CH2M HILL 2012).

During the 2015-2019 period, receiving waters were sampled five times (annually) at six receiving water monitoring stations and three different depths (10%, 50% and 90%). The following six receiving water stations were monitored in the vicinity of the Arecibo RWWTP (shown on Figure 2) during the 2015-2019 period: Zone of Initial Dilution (ZID) - Station A6, Edge of Internal Mixing Zone (IMZ) - Stations A1 and A2, Far-field Locations - Stations A4 and A5, and Background Reference Location -Station A3.

During the 2015-2019 period, sediment and benthic organisms were collected annually at all six stations. A single sediment sample was taken from the upper 2-centimeter layer at each station for analysis. Three replicate grab sediment samples were taken at each station and washed through a sieve to collect the benthic biota in those sediments.

In October 2016, fish sampling for bioaccumulation analysis was conducted at all six stations.

In March 2021, two coral community monitoring stations were surveyed at locations approximately 0.8 km east, Station Alternate A1 (AA1), and approximately 1.0 km west, Station Alternate A2 (AA2), of the Arecibo outfall. These coral monitoring stations are located on hard-bottom habitat characterized by relatively low, though somewhat variable, topographic relief. Station AA1 is located at a depth of 53 feet and Station AA2 at a depth of approximately 70 feet. Coral community monitoring station locations are shown in Figure 2.

EPA evaluated receiving water data from PRASA's 301(h) Waiver Demonstration Studies documents (2015-2019), effluent monitoring data from PRASA's Discharge Monitoring Reports (2017-2021), and other information to assess the impact of the modified discharge on the attainment of water quality standards.

The Arecibo RWWTP compliance with Puerto Rico's Water Quality Standards, as related to the receiving waters, was evaluated by EPA based on the PRWQSR adopted by DNER on August 8, 2022 (approved by EPA on November 23, 2022) and the following documents:

- Quality Assurance Project Plan and Sampling and Analysis Protocols for the Arecibo RWWTP 301(h) Waiver Demonstration Studies (CH2MHILL, September 17, 2012)
- 2015 Dry Season Report for the Arecibo RWWTP 301(h) Waiver Demonstration Studies, March 2015 (CH2M HILL 2015),
- 2016 Wet Season Report for the Arecibo RWWTP 301(h) Waiver Demonstration Studies, October 2016 (CH2M HILL. 2017a),
- 2017 Dry Season Report for the Arecibo RWWTP 301(h) Waiver Demonstration Studies, February/March 2017 (CH2M HILL. 2017b),
- 2018 Wet Season Report for the Arecibo RWWTP 301(h) Waiver Demonstration Studies, October 2018 (Jacobs 2019a),
- 2019 Dry Season Report for the Arecibo RWWTP 301(h) Waiver Demonstration Studies, March 2019 (Jacobs 2019b)

Detailed information is provided in: EPA's Arecibo 301(h) Regional Wastewater Treatment Plant NPDES Permit PR0023710 (EPA 2015), PRASA's 2020 Renewal Application for 301(h) Waiver for the Arecibo RWWTP (Jacobs 2020c), PRASA's Application for a Water Quality Certificate and Definition of a Mixing Zone for the Arecibo RWWTP Outfall System (Jacobs 2020a) and PRASA's Quality Assurance Project Plan and Sampling and Analysis Protocols for the Arecibo RWWTP 301(h) Waiver Demonstration Studies (CH2MHILL 2012).

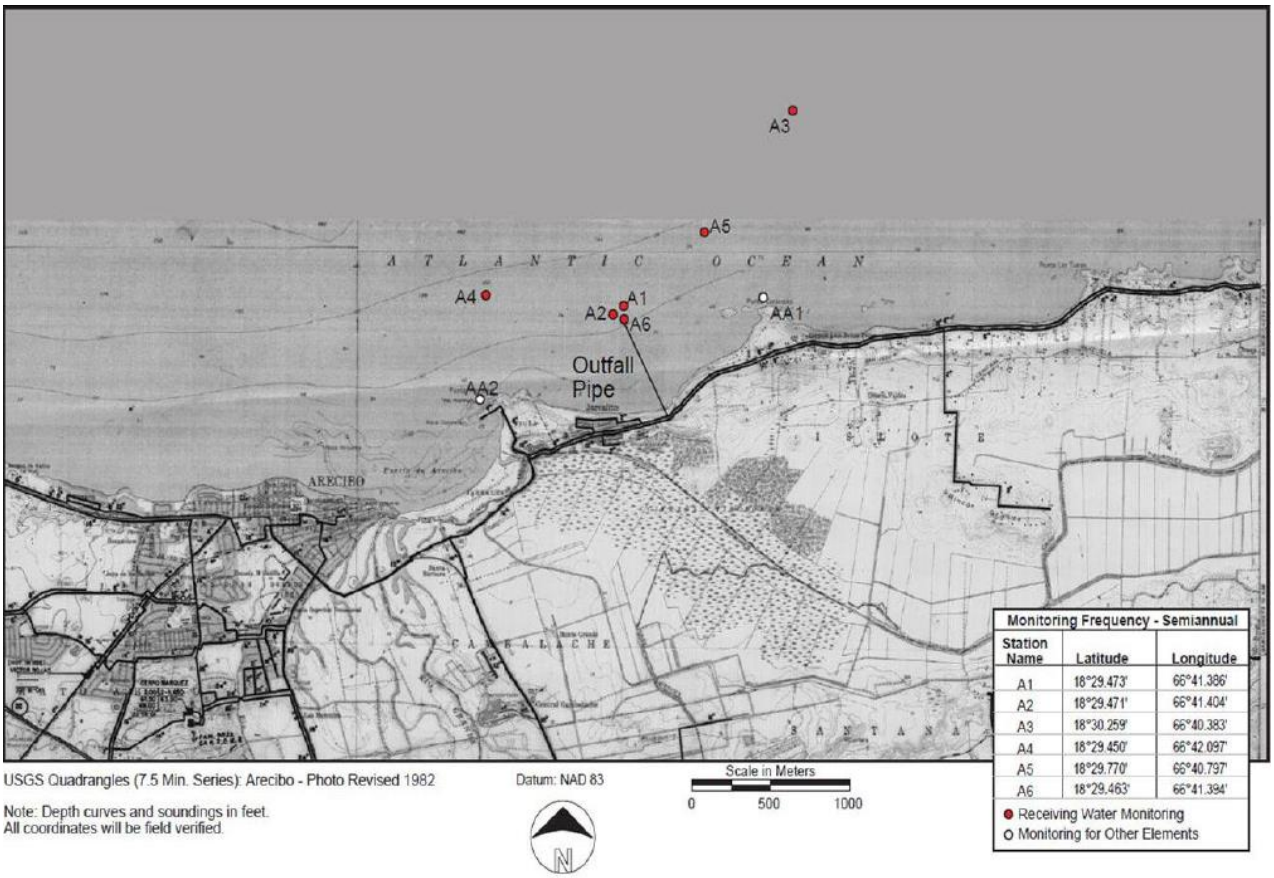


Figure 2. Station locations, taken from PRASA's 2020 301(h) renewal application (Jacobs 2020).

## APPLICATION OF STATUTORY AND REGULATORY CRITERIA

### 1. Existence of and compliance with applicable water quality standards [Section 301(h)(1), 40 CFR § 125.61]

Under 40 CFR § 125.61, which implements Section 301(h)(1), water quality standards applicable to the pollutants for which the modification is requested must exist. Specifically, water quality standards must exist for biochemical oxygen demand ($BOD_5$) or dissolved oxygen (DO); suspended solids, turbidity, light transmission, light scattering, or maintenance of the euphotic zone; and pH, as applicable to the requested modification. The applicant must demonstrate that the modified discharge will comply with these standards and the State must provide a determination that the proposed modified discharge will comply with applicable provisions of State law including water quality standards.

On June 25, 2020, PRASA requested a renewal of modified secondary treatment requirements for $BOD_5$ and TSS. PRASA included a table in the renewal application summarizing results for DO and turbidity data taken from the five 301(h) monitoring events and four mixing zone validation studies that were conducted during the 2015-2019 period (Table 2). The PRWQSR include water quality standards for DO and turbidity. EPA compared receiving water DO and turbidity monitoring data to the PRWQS to evaluate and determine compliance with the PRWQSR.

Table 2. Receiving water results for DO and turbidity around the Arecibo RWWTP discharge site, taken from PRASA's 2020 301(h) renewal application (Jacobs 2020).

| Parameter and Data Source | Samples | Minimum | Average | 90th Percentile | Maximum |
|---|---|---|---|---|---|
| DO (mg/L) MZVS Stations BG-1 and BG-2[a] | 198 | 6.13 | 6.60 | 6.94 | 6.97 |
| DO (mg/L) 301(h) Stations[b] | 746 | 5.71 | 6.40 | 6.64 | 6.69 |
| Turbidity (NTU) MZVS Stations BG-2 and BG-4[a] | 24 | 0.031 | 0.05 | 0.068 | 0.073 |
| Turbidity (NTU) 301(h) Stations[b] | 90 | 0.05 | 0.28 | 0.48 | 1.35 |

[a] Data from November 14 and 18, 2016, and April 7 and 11, 2019 MZVS field events background water quality stations

[b] Data from March 2015, October 2016, February 2017, October 2018, and March 2019 301(h) field events

Rule 1303.2 of the PRWQSR provides that dissolved oxygen in Class SB waters "shall not contain less than 5 mg/L, except when this value is depressed due to natural phenomena." Table 2 shows that all 947 total samples collected during the 2015-2019 period met the applicable standard for DO.

Rule 1303.1 of PRWQSR provides that "the waters of Puerto Rico shall be free…from turbidity attributable to discharges in such a degree as to create a nuisance to the enjoyment of the existing or designated uses of the waterbody." Specifically, Rule 1303.2 provides that turbidity in Class SB waters shall not exceed 10 nephelometric turbidity units (NTUs), except by natural causes.

Table 2 shows that all 114 samples collected during the 2015-2019 period met the applicable standard for turbidity.

In summary, the data submitted by the applicant for the 2015-2019 monitoring period demonstrates that the modified discharge complied with applicable water quality standards that exist for DO and turbidity. Because these parameters inform the condition of $BOD_5$ and TSS, EPA concludes that the applicant has demonstrated that the modified discharge will comply with the water quality standards for $BOD_5$ and TSS. On October 28, 2023, the DNER issued a WQC indicating that the modified discharge will comply with applicable provisions of State law including water quality standards for these pollutants. EPA concludes that, absent any significant change to plant operations, the Arecibo RWWTP modified discharge will continue to comply with 40 CFR § 125.61 for these pollutants in the following permit term.

**2. Attainment or maintenance of water quality which assures protection of public water supplies; assures the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife; and allows recreational activities [Section 301(h)(2), 40 CFR § 125.62]**

Section 301(h)(2) of the Act provides that the Administrator may issue a permit which modifies the requirements of secondary treatment provided that the modified discharge protect human health and the environment. Specifically, Section 301(h)(2) requires that the applicant's discharge must not interfere with the attainment and maintenance of water quality which assures protection of public water supplies; assures protection and propagation of a balanced, indigenous population (BIP) of shellfish, fish and wildlife; and allows recreational activities.

**a. Physical characteristics of the discharge [40 CFR § 125.62(a)]**

Pursuant to 40 CFR § 125.62(a), the applicant's outfall and diffuser must be located and designed to provide adequate initial dilution, dispersion, and transport of wastewater such that the discharge does not exceed, at and beyond the ZID, any applicable water quality standards.

EPA reviewed all receiving water data provided by the applicant in the annual Arecibo RWWTP 301(h) Waiver Demonstration Studies for the period from 2015 through 2019 and evaluated them based on the PRWQSR adopted in 2022. Table 3-Table 5 show the full list of parameters reviewed. The constituents were either not detected above the Program Detection Limits (PDLs) or were reported at concentrations below the applicable water quality standard at all depths and at all receiving water monitoring stations except for the highlighted constituents. The highlighted constituents are discussed in further detail in this section. Estimated concentrations were treated as measured concentrations in EPA's review.

Table 3. Oceanographic parameters.

| |
|---|
| Temperature |
| Dissolved Oxygen |

| |
|---|
| pH |
| Conductivity |

Table 4. Annual 301(h) parameters.

| ***General*** | ***Total Metals*** | ***Pesticides*** | |
|---|---|---|---|
| Oil and grease | Antimony | Aldrin | Methoxychlor |
| Total suspended solids | Arsenic | Alpha-BHC | Toxaphene |
| Settleable solids | Beryllium | Beta-BHC | Mirex |
| Ammonia, N | Barium | Gamma-BHC (Lindane) | Perthane |
| Total Kjeldahl nitrogen, N | Boron | Delta-BHC | Azinphos methyl (Guthion) |
| Nitrate/nitrite, N | Cadmium | Chlordane | Chlorpyrifos |
| Color | Chromium | 4,4'-DDT | Coumaphos |
| Turbidity | Copper | 4,4'-DDE | Demeton |
| Surfactants (MBAS) | Hexavalent chromium | 4,4'-DDD | Fenthion |
| Fecal coliform bacteria | Lead | Dieldrin | Malathion |
| *Enterococcus* bacteria | Manganese | Alpha-endosulfan | Naled |
| Sulfide | Mercury | Beta-endosulfan | Ethyl parathion |
| Sulfate | Nickel | Endosulfan sulfate | Methyl parathion |
| Chlorophyll *a* | Selenium | Endrin | |
| Fluoride | Silver | Endrin aldehyde | |
| Cyanide (free) | Thallium | Heptachlor | |
| | Zinc | Heptachlor epoxide | |

Table 5. Supplemental 301(h) parameters, measured once every 5 years.

| ***General*** | 1,1,2-Trichloroethane | 4-Chlorophenyl-phenyl-ether |
|---|---|---|
| Asbestos | Trichloroethene | Chrysene |
| Dioxin | Vinyl chloride | Dibenzo(a,h)anthracene |
| | 2-Chlorophenol | 1,2-Dichlorobenzene |
| ***Organics*** | 2,4-Dichlorophenol | 1,3-Dichlorobenzene |
| Acrolein | 2,4-Dimethyphenol | 1,4-Dichlorobenzene |
| Acrylonitrile | 4,6-Dinitro-2-methylphenol | 3,3-Dichlorobenzidene |
| Benzene | 2,4-Dinitrophenol | Diethylphthalate |
| Bromoform | 2-Nitrophenol | Dimethylphthalate |
| Carbon tetrachloride | 4-Nitrophenol | Di-n-butylphthalate |
| Chlorobenzene | 4-chloro-3-methylphenol | 2,4-Dinitrotoluene |
| Dibromochlormethane | Pentachlorophenol | 2,6-Dinitrotoluene |
| Chloroethane | Phenol | Di-n-octylphthalate |
| 2-Chloroethylvinyl ether | 2,4,6-Trichlorophenol | 1,2-Diphenylhydrazine |

| | | |
|---|---|---|
| Chloroform | Acenaphthene | Fluoranthene |
| Dichlorobromomethane | Acenaphthylene | Fluorene |
| 1,1-Dichloroethane | Anthracene | Hexachlorobenzene |
| 1,2-Dichloroethane | Benzidine | Hexachlorobutadiene |
| 1,1-Dichloroethene | Benzo(a)anthracene | Hexachlorocyclopentadiene |
| 1,2-Dichloropropane | Benzo(a)pyrene | Hexachloroethane |
| 1,3-Dichloropropylene | Benzo(b)fluoranthene | Indeno(1,2,3-cd)pyrene |
| Ethylbenzene | Benzo(g,h,i)perylene | Isophorone naphthalene |
| Methyl bromide (Bromomethane) | Benzo(k)fluoranthene | Nitrobenzene |
| Methyl chloride (Chloromethane) | Bis(2-chloroethoxy)methane | N-Nitrosodimethylamine |
| Methylene chloride | Bis(2-chloroethyl)ether | N-Nitrosodi-N-propylamine |
| 1,1,2,2-Tetrachloroethane | Bis(2-chloroisopropyl)ether | N-Nitrosodiphenylamine/diphenylamine |
| Tetrachloroethene | Bis(2-ethylhexyl)phthalate | Phenanthrene |
| Toluene | 4-Bromophenyl-phenyl-ether | Pyrene |
| Trans-1,2-dichloroethene | Butylbenzylphthalate | 1,2,4-Trichlorobenzene |
| 1,1,1-Trichloroethane | 2-Chloronaphthalene | |

### i. Oceanographic parameters

Field measurements (water column profiles) of temperature, pH, dissolved oxygen (DO), and conductivity were taken at each monitoring station. Measurements were made using a Sea-Bird conductivity/temperature/depth recorder with additional sensors to measure DO and pH. The applicable water quality standards for temperature, pH, and DO were met in all receiving waters around the Arecibo RWWTP outfall during the 2015-2019 monitoring events (Table 6).

Table 6. Oceanographic parameters in Arecibo RWWTP receiving waters (by monitoring year)

| | Maximum Temperature (°C) | pH Range (SU) | Minimum Dissolved Oxygen (DO; mg/L) |
|---|---|---|---|
| **PRWQS** | **30 °C** | **7.3 - 8.5** | **5.0** |
| | | | |
| 2015 | 26.7 | 8.2 – 8.22 | 6.35 |
| 2016 | 29.7 | 8.10 – 8.16 | 5.71 |
| 2017 | 26.3 | 8.15 – 8.17 | 6.58 |
| 2018 | 29 | 8.18 – 8.21 | 6.19 |
| 2019 | 26.4 | 8.23 – 8.29 | 6.35 |

## ii. General annual parameters

During the 2015-2019 period of interest, the general annual parameters that have numeric water standards (turbidity, methylene blue active substances [MBAS], undissociated sulfide [$H_2S$], sulfate, total nitrogen (sum of nitrate, nitrite and total Kjeldahl nitrogen [TKN]), cyanide [free], color and *Enterococcus* bacteria) were either not detected above the PDLs or were reported at concentrations below the applicable water quality standard at all depths and at all receiving water monitoring stations except for total nitrogen and free cyanide.

Total Nitrogen

The applicable water quality standard for total nitrogen (sum of nitrate, nitrite and total Kjeldahl nitrogen [TKN]) is 5 mg/L (PDL 0.125 mg/L)

During the 2015, 2016 and 2019 monitoring events, total nitrogen concentrations at all receiving water stations and depths were below the standard. Effluent total nitrogen concentrations in 2015, 2016 and 2019 (19.4 mg/L, 14.2 mg/L and 21.2 mg/L, respectively) exceeded the standard.

In 2017, the total nitrogen concentration at the edge of the mixing zone station (A2) at 10% depth (9.4 mg/L, reported as estimated) exceeded the standard. Total nitrogen concentrations at all other receiving water stations and sampling depths were either undetected (at reporting limits below the standard) or estimated to be below the standard. The effluent total nitrogen concentration (24.2 mg/L, reported as estimated) exceeded the standard.

In 2018, the total nitrogen concentration at the ZID station (A6) at 90 % depth (8.64 mg/L, reported as estimated) exceeded the standard. Total nitrogen concentrations at all other receiving water stations and sampling depths were undetected (at reporting limits below the standard). The effluent total nitrogen concentration (16.8 mg/L) exceeded the standard.

In summary, estimated concentrations of total nitrogen exceeded the applicable standard for total nitrogen two times in the receiving water during the 2016-2019 monitoring period (once in 2017 at the edge of the mixing zone station and once in 2018 at the ZID station). During the four monitoring events, effluent total nitrogen concentrations were nearly three to five times the applicable standard. Total nitrogen has been included in the mixing zone definition for the next permit term.

Free Cyanide

The applicable water quality standard for free cyanide, which must be met at the edge of the mixing zone, is 1 μg/L. (PDL 0.25 μg/L)

All free cyanide concentrations in receiving waters during the 2015 to 2017 monitoring events were reported either as undetected (at reporting limits below the standard) or as estimated values below the standard. Effluent free cyanide in 2015, 2016, and 2017 was estimated at concentrations of 10.4 μg/L, 4.77 μg/L, and 03939 μg/L, respectively.

During the 2018 monitoring event, free cyanide was undetected at all receiving water monitoring stations and depths. However, reporting limits (5 µg/L) were above the standard. The effluent free cyanide concentration was 7.5 µg/L, reported as estimated.

During the 2019 monitoring event, free cyanide concentrations at all depths at the far-field and reference locations (Stations A3, A4 and A5) and at 10% depth at the ZID (Station A6) were reported as undetected. However, reporting limits (5 µg/L) were above the standard, and results were flagged for matrix interference and dilution. Free cyanide concentrations at all other receiving water stations and depths were estimated to be above the standard and flagged for matrix interference. The effluent concentration was 9.4 µg/L.

In summary, all free cyanide concentrations in receiving waters during the 2015 to 2017 monitoring events were below the standard. Although all receiving water samples in 2018 and many samples in 2019 were reported as undetected, reporting limits were above the standard. Therefore, EPA cannot confidently determine that no exceedances occurred during this period. All samples at the edge of the mixing zone in 2019) had concentrations that were estimated at levels that exceeded the standard. During the next permit term, EPA will require PRASA to employ analytical methods that are sufficiently sensitive to achieve lower detection and quantitation limits.

### iii. Additional annual parameters

Copper

The applicable water quality standard for copper, which must be met at the edge of the mixing zone, is 3.73 µg/L. (PDL 0.025 µg/L)

During the 2016 monitoring event, copper was estimated to be present in receiving water at the reference location (Station A3) at 50% depth at a concentration (4.33 µg/L) exceeding the standard. Copper concentrations at all other receiving water stations and depths did not exceed the standard. The effluent copper concentration was 0.55 µg/L.

Copper concentrations in all receiving water samples during the remaining four monitoring events were estimated to be below the standard. Effluent copper concentrations during the four monitoring events ranged from 1.42 to 2.26 µg/L).

EPA concludes that the single observation of the copper concentration exceeding the standard at the reference location in 2016, particularly while the effluent copper concentration was well below the standard, is not an indication that the discharge of effluent from the Arecibo RWWTP outfall causes exceedances of copper in receiving water.

Zinc

The applicable water quality standard for zinc is 85.62 µg/L. (PDL 5 µg/L)

During the 2019 monitoring event, a zinc concentration at a far-field location (Station A5) at 50% depth (249 μg/L) exceeded the standard. The effluent zinc concentration (6.41 ug/L) was below the standard.

All zinc concentrations in receiving water during the remaining four monitoring events were below the standard. Effluent zinc concentrations for all five monitoring events from 2015 through 2019 were also below the standard.

EPA concludes that the single observation of the zinc concentration exceeding the standard at the far-field station in 2019, particularly while the effluent zinc concentration was well below the standard, is not an indication that the discharge of effluent from the Arecibo RWWTP outfall causes exceedances of zinc in receiving water.

4,4-DDE

The applicable water quality standard for 4,4-DDE is 0.00018 μg/L. (PDL 0.0002 μg/L)

In 2018, concentrations for 4,4-DDE were estimated to be above the standard at the edge of the mixing zone (Station A1) at 10% depth (0.0007) μg/L, at the edge of the mixing zone (Station A2) at 10% and 50% depth (0.00076 and 0.00092 μg/L, respectively), and at the ZID (Station A6) at 50% depth (0.00074 μg/L).

At all other stations and depths in 2018 and during the remaining four monitoring events, 4,4-DDE was reported as undetected in receiving water. However, reporting limits (0.0005 μg/L) were above the standard. For all five monitoring events from 2015 through 2019, 4,4-DDE in effluent was also reported as undetected with reporting limits above the standard.

In summary, there were four estimated exceedances of the applicable standard for 4,4-DDE at the edge of mixing zone and ZID stations in 2018. Although all remaining receiving water samples during the 2015-2019 period were reported as undetected, reporting limits were above the standard. Therefore, EPA cannot determine that no additional exceedances occurred during this period.

### iv. Constituents for which compliance cannot be demonstrated

Table 8 identifies all water quality parameters for which the concentrations defined as the applicable standard (per 2022 PRWQSR) are lower than the concentrations defined to be their PDL (per 2012 QAPP). Therefore, EPA recognizes that data adhering to the limits of detection specified in the approved QAPP cannot demonstrate compliance of the discharge with the applicable standards. For all parameters in Table 6 except 4,4-DDE, all results were reported as undetected during the 2015-2019 events.
Table 7 identifies constituents in Arecibo RWWTP outfall receiving waters and effluent which were undetected, but for which the laboratory reporting limits exceeded PDLs in the QAPP and

exceeded the applicable standards. EPA cannot determine that no exceedances occurred for these parameters.

Table 8 identifies all water quality parameters for which the concentrations defined as the applicable standard (per 2022 PRWQSR) are lower than the concentrations defined to be their PDL (per 2012 QAPP). Therefore, EPA recognizes that data adhering to the limits of detection specified in the approved QAPP cannot demonstrate compliance of the discharge with the applicable standards. For all parameters in Table 6 except 4,4-DDE, all results were reported as undetected during the 2015-2019 events.

Table 7. Undetected parameters for which the laboratory reporting limits exceeded the applicable standards.

| Parameter | PRWQS (µg/L) | PDL (µg/L) | Receiving Water Reporting Limits (µg/L) | Effluent Reporting Limits (µg/L) |
|---|---|---|---|---|
| Chlordane | 0.0032 | 0.0002 | 0.005 - 0.013 | 0.034 - 1.1 |
| 4,4-DDT | 0.0003 | 0.0002 | 0.0005 - 0.0027 | 0.00051 - 0.028 |
| heptachlor epoxide | 0.00032 | 0.0002 | 0.0005 - 0.00052 | 0.0015 to 0.01 |
| Chlorpyrifos | 0.0056 | 0.0026 | 0.025 - 0.026 | 0.025 - 0.026 |

Table 8. Organic constituents with program detection limits above the applicable standards.

| Parameter | 2020 PRWQS (µg/L) | Program Detection Limit (2012 QAPP) |
|---|---|---|
| Aldrin | 0.0000077 (HH) | 0.0002 |
| Dioxin | 5.1 x 10 (-8) (HH) | 5 |
| 4,4’-DDE | 0.00018 (HH) | 0.0002 |
| Dieldrin | 0.000012 (HH) | 0.0002 |
| Heptachlor | 0.000059 (HH) | 0.0002 |
| Pentachlorophenol | 0.4 (HH) | 5 |
| Toxaphene | 0.0002 (AL) | 0.05 |
| Azinphos – methyl (Guthion) | 0.01 (AL) | 0.05 |
| Chlorpyrifos | 0.0056 (AL) | 0.025 |
| 1,2-Diphenylhydrazine | 2 (HH) | 5 |
| Benzidine | 0.11 (HH) | 10 |
| Benzo(a)anthracene | 0.013 (HH) | 0.1 |

| | | |
|---|---|---|
| Benzo(a)pyrene | 0.0013 (HH) | 0.1 |
| 3,3-Dichlorobenzidine | 1.5 (HH) | 5 |
| Benzo(b)fluoranthene | 0.013 (HH) | 0.1 |
| Bis(2-ethylhexyl) phthalate | 3.7 (HH) | 5 |
| Butylbenzyl phthalate[w] | 1.0 (HH) | 3 |
| Dibenzo(a,h)anthracene | 0.0013 (HH) | 0.1 |
| Hexachlorobutadiene | 0.1 (HH) | 5 |
| Hexachlorocyclopentadiene | 4.0 (HH) | 5 |
| Hexachloroethane | 1.0 (HH) | 5 |
| Indeno(1,2,3–cd)pyrene | 0.013 (HH) | 0.1 |

**Conclusion:** Physical characteristics of the discharge (40 CFR § 125.62(a))

The applicable standard for total nitrogen was exceeded in two receiving water samples during the 2015-2019 monitoring period (once in 2017 at the edge of the mixing zone station and once in 2018 at the ZID station). The applicable standard for free cyanide was exceeded in six receiving water samples during the 2015-2019 monitoring period (in 2019 at all depths at both edge of mixing zone stations). The applicable standard for 4,4-DDE was exceeded in four receiving water samples during the 2015-2019 monitoring period (in 2018 at the edge of the mixing zone station (A1) at 10% depth, at the edge of the mixing zone station (A2) at 10% and 50% depths, and at the ZID station at 50% depth). All exceedances were associated with data that was reported as estimated concentrations.

Data for chlordane, 4, 4-DDT, 4,4-DDE, heptachlor epoxide, chlorpyrifos and several free cyanide samples could not be used to demonstrate that the Arecibo RWWTP effluent discharge did not result in exceedance of applicable water quality standards because laboratory reporting limits for these contaminants did not adhere to the QAPP and exceeded both the specified PDLs and the applicable standards. Furthermore, many parameters (listed in Table 8) could not be used to demonstrate compliance.

The 2015-2019 monitoring results show that exceedances of water quality standards occurred during the monitoring period. Furthermore, many results could not be used to demonstrate compliance due to high reporting limits. EPA cannot conclude, therefore, that adequate initial dilution, dispersion, and transport of wastewater is provided such that the discharge does not exceed, at and beyond the ZID, all applicable water quality standards [40 CFR § 125.62(a)]. However, these exceedances did not result in adverse impacts to public water supplies, balanced indigenous populations, or recreation. The data supporting this conclusion are presented and discussed in Sections 2 b-d, below.

### b. Impact of discharge on public water supplies [40 CFR § 125.62(b)]

Pursuant to 40 CFR § 125.62(b), which implements Section 301(h)(2) of the Act, the applicant's modified discharge must allow for the attainment or maintenance of water quality that assures the protection of public water supplies. The applicant's modified discharge also must not interfere with the use of planned or existing public water supplies or have the effect of requiring treatment over and above that which would be necessary in the absence of such discharge.

As specified in Rule 1303.2 of the PRWQSR, drinking water (for human consumption) has not been established as a designated use for the Class SB waters of Puerto Rico. Drinking water supplies in Puerto Rico are derived from inland surface and groundwater sources. The outfall is located approximately 3,769 feet offshore in marine waters more than 70 feet deep. The effluent is discharged to coastal ocean waters and, therefore, poses no risk to any current or proposed public water supply systems. Accordingly, EPA concludes that the modified discharge will not affect public water supplies. EPA concludes that the applicant has met the requirements of 40 CFR § 125.62(b).

### c. Biological impact of discharge [40 CFR § 125.62(c)(1) and (2)]

Pursuant to 40 CFR § 125.62(c)(1) and (2), the applicant must demonstrate that its modified discharge will allow for the attainment or maintenance of water quality which assures protection and propagation of a balanced indigenous population (BIP) of shellfish, fish, and wildlife, and that a BIP of shellfish, fish, and wildlife will exist immediately beyond and in all other areas beyond the ZID where marine life is actually or potentially affected by the applicant's modified discharge. Conditions within the ZID must not contribute to extreme adverse biological impacts, including, but not limited to, the destruction of distinctive habitats of limited distribution, the presence of disease epicenter, or the stimulation of phytoplankton blooms which have adverse effects beyond the ZID. Furthermore, benthic populations within the ZID must not differ substantially from the BIPs which exist immediately beyond the boundary of the ZID and the discharge must not result in the accumulation of toxic pollutants or pesticides at levels which exert adverse effects on the biota within the zone of initial dilution.

PRASA has been conducting surveys to obtain biological data as part of the 301(h)-waiver monitoring program since 1999. The biological surveys address the biological integrity of key communities: 1) phytoplankton, 2) infaunal benthic invertebrates (those living within soft-bottomed sediments), and 3) coral. These community-level evaluations, along with sediment quality and fish tissue bioaccumulation evaluations, are described in detail in each of PRASA's 301(h) monitoring reports. The results for the 301(h)-waiver monitoring and reporting conducted at the Arecibo RWWTP for the reporting period (2015–2019) are summarized below.

#### i. Whole Effluent Toxicity

EPA defines Whole Effluent Toxicity (WET) as "the aggregate toxic effect of an effluent measured directly by a toxicity test" (54 FR 23868, June 2, 1989). Rule 1303.1 (J) of the PRWQSR provides that all waters of Puerto Rico shall not contain any substance at such concentration which, either alone or as result of synergistic effects with other substances is toxic

or produces undesirable physiological responses in human, fish or other fauna or flora. Under section 101(a)(3) of the Clean Water Act, this is referred to as the general narrative standard of "no toxics in toxic amounts." The numeric interpretation of this narrative standard for toxicity as defined by the PRWQSR is 0.3 Acute Toxic Units (TUa) and 1.0 Chronic Toxic Units (TUc). As part of the NPDES permitting program, whole effluent toxicity (WET) testing is routinely used to evaluate both the toxicity of wastewater discharges and compliance with narrative water quality standards that prohibit the discharge of toxic pollutants in toxic amounts, or otherwise provide for the maintenance and propagation of a balanced population of aquatic life.

Since effluent toxicity is inversely related to the effect concentration (the lower the effect concentration, the higher the toxicity in the effluent), concentration-based toxicity measurements are typically expressed as toxic units (TUs) to better illustrate the magnitude of potential toxicity. In EPA's Technical Support Document (TSD) for Water Quality-based Toxics Control, EPA recommends that in the absence of a numeric criterion for the parameter toxicity, a criterion maximum concentration (CMC) of 0.3 Toxic Units Acute (TUa) and criterion continuous concentration (CCC) of 1.0 Toxic Units Chronic (TUc) be used to ensure aquatic life protection against acute and chronic toxicity in the receiving water (EPA 1991). Rule 1301 of the PRWQSR provides that TUa and TUc be defined by the Lethal Concentration (LC50) of the tested effluent at which 50 percent of the test organisms die, where TUa = 100 ÷ LC50; and the No Observed Effect Concentration (NOEC), where TUc = 100 ÷ NOEC. The NOEC is the highest tested effluent concentration (in percent effluent) that does not cause an adverse effect on the test organism (i.e., the highest effluent concentration at which the values for the observed responses are not statistically different from the control).

For the 301(h) evaluation, EPA evaluated receiving water toxicity with consideration of a CID of 376:1. EPA applied the CID to acute and chronic water quality criteria of 0.3 TUa and 1.0 TUc to determine the maximum allowable level of effluent toxicity or wasteload allocation (WLA) that would still ensure attainment of water quality criteria for toxicity at the edge of the mixing zone. EPA calculated acute and chronic WLAs of 112.8 TUa and 376 TUc, respectively, and then compared the WLAs to effluent WET data.

Pursuant to the current modified permit, PRASA is required to conduct acute and chronic WET testing on flow-weighted 24-hour composite effluent samples using the mysid shrimp (*Americamysis bahia*, formerly *Mysidopsis bahia*), sea urchin (*Arbacia punctulata*); and sheepshead minnow (*Cyprinidon variegatus*). These aquatic tests are laboratory tests and are designed to measure the biological effect (e.g., an acute effect such as mortality and chronic effects such as impairment of growth and reproduction) of the effluent on the aquatic organism.

The applicant provided the *Application for a Water Quality Certificate and Definition of a Mixing Zone for the Arecibo RWWTP Outfall System* document (May 28, 2020) as part of the 301(h) waiver application. This document includes Chapter 4: Whole Effluent Toxicity Testing and tabulated WET results from January 2017 through January 2020. Based on available WET data included in the application, all TUa values were below the acute WLA and all TUc values were below the chronic WLA.

While the values reported were below the WLAs for acute and chronic toxicity, there toxicity was observed in both acute and chronic tests, just not at levels that are expected to cause or contribute to an excursion of water quality standards at the edge of the mixing zone. EPA also evaluated whether these levels demonstrated the reasonable potential to cause or contribute to an excursion of the water quality standard for toxicity. Chronic toxicity is the more sensitive toxic effect observed. Using Table 3-1 of the Technical Support Document for Water Quality Based Toxics Control (EPA, March 1991), at a coefficient of variation of 0.6 and greater than 20 samples, EPA used a multiplier of 2.3 on the most critical chronic NOEC level of 1.41% which occurred in both Mysidopsis Bahia and Arbacia Punctulata chronic tests in the data submitted with the NPDES permit application from 2016 through 2020. This percentage effect translates to 70.92 TUc at the discharge point based on the following calculation:

$$1/0.0141 = 70.92 \text{ TUc}$$

After dilution this equates 0.189 TUc:

$$70.92 \text{ TUc} / 376 = 0.189 \text{ TUc}$$

Using the multiplier of 2.3 from Table 3-1 of the TSD at the 99th Percentile this exhibits a critical condition of 0.43 TUc:

$$0.189 \times 2.3 = 0.43 \text{ TUc}$$

This is less than the 1.0 TUc recommended criterion. PRASA also provided updated testing from January 2023, which included a NOEC result of 0.85% for the *A. punctulata* fertilization test. This translates to 0.72 TUc:

1/0.0085 = 117.65 TUc / 376 dilution = 0.313 x 2.3 TSD multiplier = 0.72 TUc

This result, 0.72 TUc, is less than the 1.0 TUc recommended criterion. Therefore, EPA has determined this discharge does not cause or contribute or have the reasonable potential to cause or contribute to an excursion of the narrative or recommended water quality standards for toxicity at the edge of the mixing zone.

**ii. Phytoplankton assessment**

PRASA has conducted water quality monitoring for chlorophyll *a* (Chl-*a*), an indicator of phytoplankton abundance, to assess the potential nutrient impacts from the modified discharge. There are no PRWQS or EPA-recommended water quality criteria for Chl-*a*. Instead, EPA's Strategic Target for Chl-*a* (i.e., 0.35 mg/m$^3$) for nearshore and coastal waters within the Florida Keys National Marine Sanctuary was used in assessing phytoplankton productivity in Puerto Rico waters, which are similar to the tropic and sub-tropic Florida Keys marine system (Boyer and Briceño 2009).

Chl-*a* concentrations were measured at three depths (10%, 50% and 90% of water column depth) at each receiving water monitoring station during the 2015-2019 monitoring period. Chl-*a* concentrations varied with no consistent pattern between sampling stations across sampling periods. Chl-*a* concentrations were comparable across all stations during all monitoring events.

There were no exceedances of the 0.35 mg/m$^3$ target for Chl-*a*. Figure 3 shows the average Chl-*a* concentrations for each sampling site over the 5-year period.

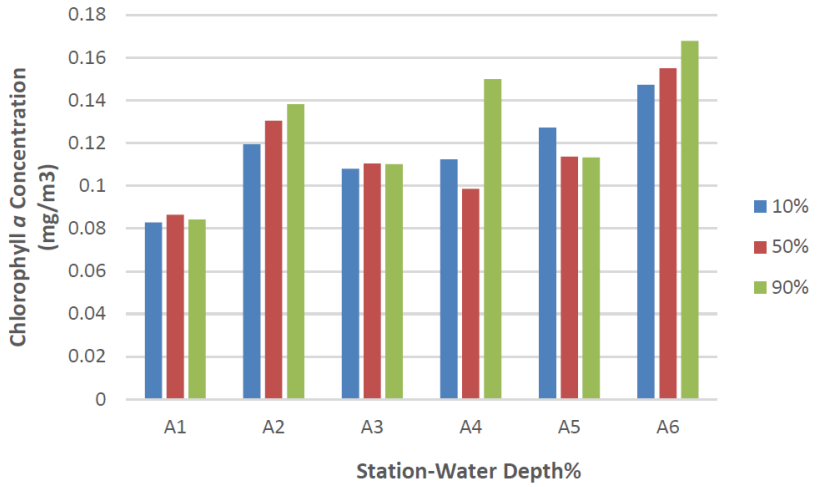


Figure 3. Average Chl-*a* at Arecibo outfall monitoring stations, 2015 to 2019, taken from PRASA's 2020 301(h) renewal application (Jacobs 2020).

The lack of consistent spatial or depth-based patterns or differences in Chl-*a* concentrations related to the Arecibo RWWTP outfall suggests a lack of significant biotic response to effluent discharges. The data does not suggest that nutrient discharges created conditions associated with nuisance phytoplankton blooms in the vicinity of the outfall at the times of monitoring. EPA has not received any reports of blooms during the five-year monitoring period. Because concentrations of nitrogen and Chl-*a* at stations nearest to the outfall are comparable to those levels observed at the far field and reference stations, Arecibo RWWTP's discharge of nutrients is not likely to result in excessive phytoplankton growth at or beyond the edge of the mixing zone during the next permit term.

### iii. Benthic invertebrate communities

During each 301(h)-monitoring event, sediment and benthic organisms were collected at all six monitoring stations. A single sediment sample was taken at each station and analyzed for physical (grain size) and chemical parameters. Three replicate grab sediment samples were taken at each station and washed through a sieve to collect the benthic biota in those sediments. Organisms collected from each replicate were taxonomically identified, counted, and weighed. Number of individuals (estimated density), number of taxa, Shannon-Wiener diversity index (H'), species evenness (J), and species richness (D), and presence or absence of pollution-tolerant species were reported for each benthic sample.

Number of Taxa

The number of benthic invertebrate taxa at each station for the 2015–2019 period and the average number of benthic taxa for each station for this period are shown in Figure 4Figure 4. Number of benthic taxa near the Arecibo outfall (March 2015 to March 2019), taken from PRASA's 301(h) renewal application (Jacobs 2020).. The average number of taxa was highest at

the reference station (A3), followed by the ZID station (A6). Although some variability from year to year is apparent, the number of taxa remained stable overall.

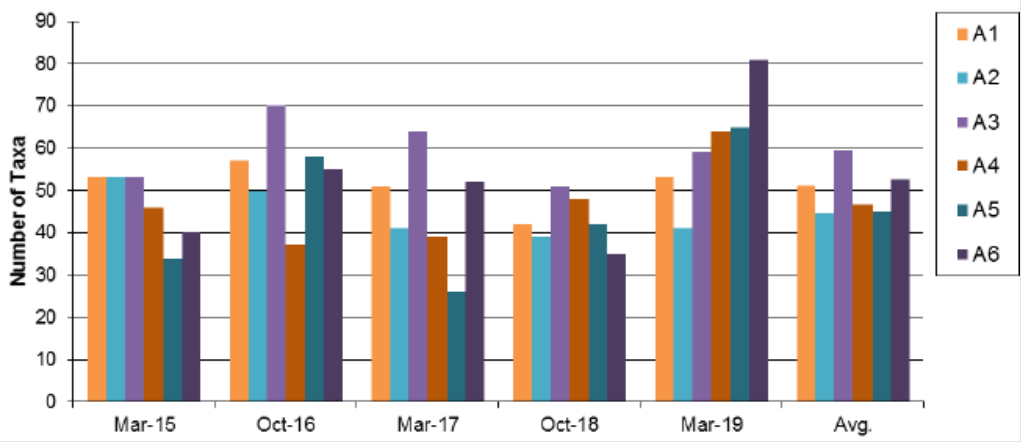


Figure 4. Number of benthic taxa near the Arecibo outfall (March 2015 to March 2019), taken from PRASA's 301(h) renewal application (Jacobs 2020).

Shannon-Wiener Species Diversity Index (H)

The H index values at each station for the 2015–2019 period and an average for each station for this period are shown in Figure 5. Diversity indices are similar at all stations and indicate a diverse benthic community.

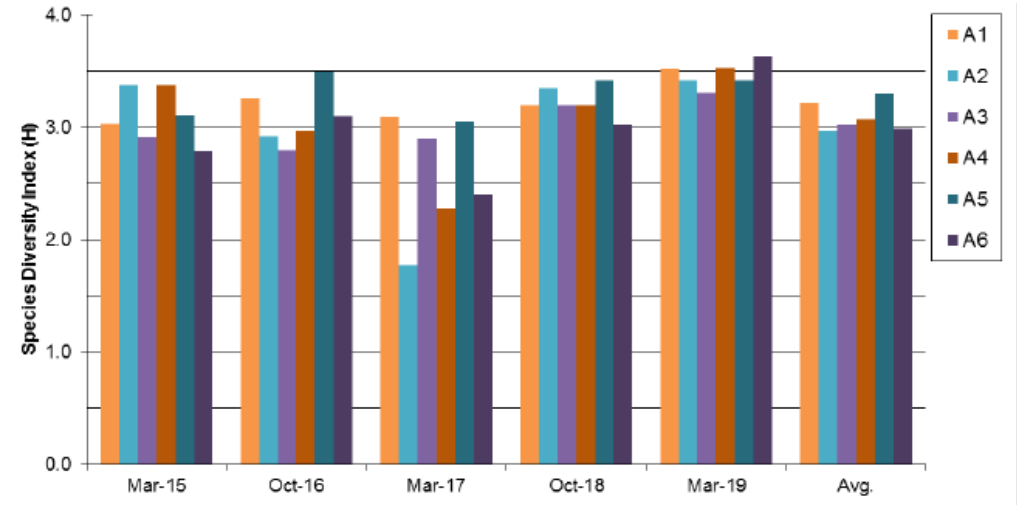


Figure 5. Shannon-Wiener Species Diversity Index (H) near the Arecibo outfall (March 2015 to March 2019), taken from PRASA's 301(h) renewal application (Jacobs 2020).

Species Evenness (J)

The J index values at each station for the 2015–2019 period and an average for each station for this period are shown in Figure 6. Species evenness was similar at all stations during the

monitoring period except in 2017. In 2017, species evenness was higher at the stations east of the outfall (edge of mixing zone [Al], far-field [A5], and reference [A3]).

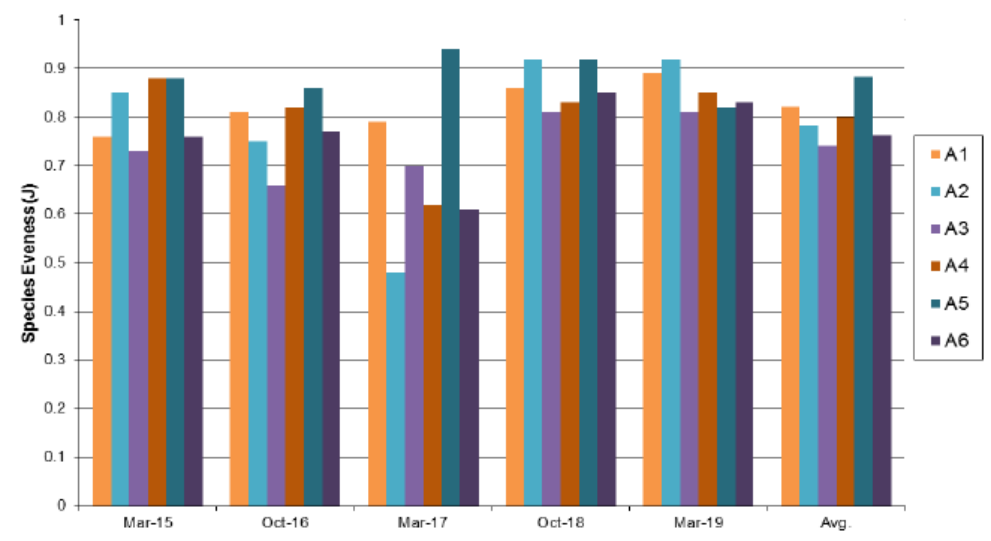


Figure 6. Species evenness (J) near the Arecibo outfall (March 2015 to March 2019), taken from PRASA's 301(h) renewal application (Jacobs 2020).

Species Richness (Margalef's Diversity [D])

The D index values at each station for the 2015–2019 period and an average for each station for this period are shown in Figure 7. No clear trends in species richness are evident among stations. An overall increasing trend in species richness is apparent from 2015 to 2019.

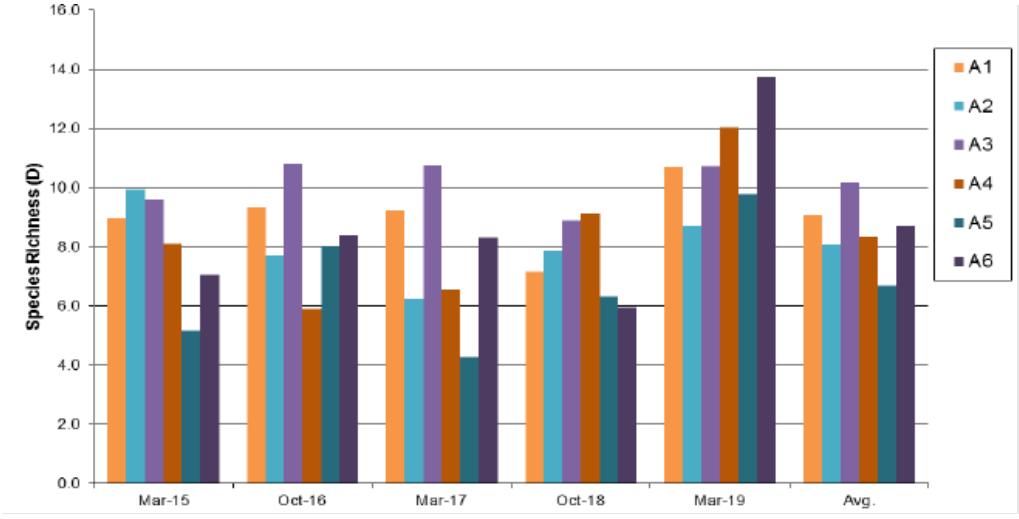


Figure 7. Species richness (D) near the Arecibo outfall (March 2015 to March 2019), taken from PRASA's 301(h) renewal application (Jacobs 2020).

Number of Individuals/Density

The number of individuals at each station for the 2015–2019 period and an average for each station for this period are shown in Figure 8. Estimated density, which is calculated from number of individuals, at each station for the 2015–2019 period and an average for each station for this period are shown in Figure 9. The number of individuals and density is typically highest in the eastern far-field (Station A5). The number of individuals and density nearly doubled at most stations in 2016, but otherwise remained generally consistent in 2015, 2017, 2018, and 2019.

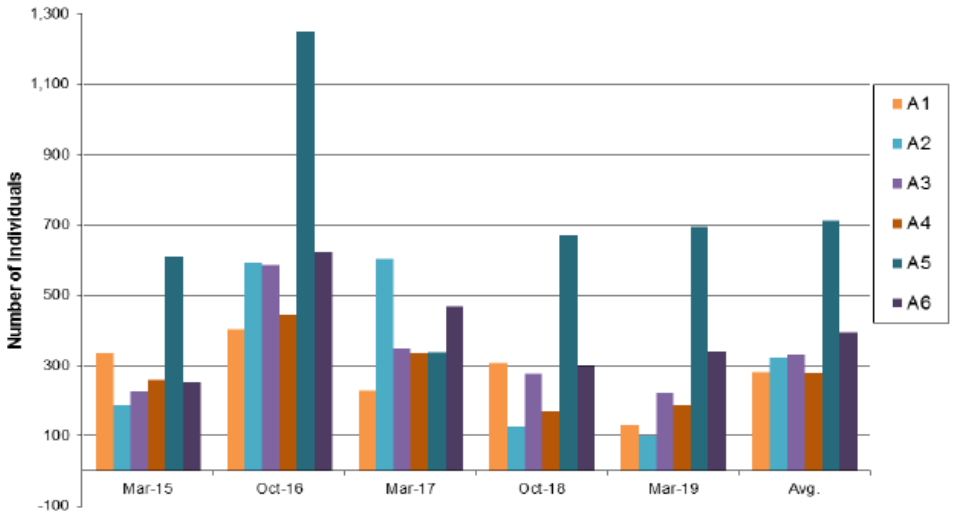


Figure 8. Number of individuals near the Arecibo outfall (March 2015 to March 2019), taken from PRASA's 301(h) renewal application (Jacobs 2020).

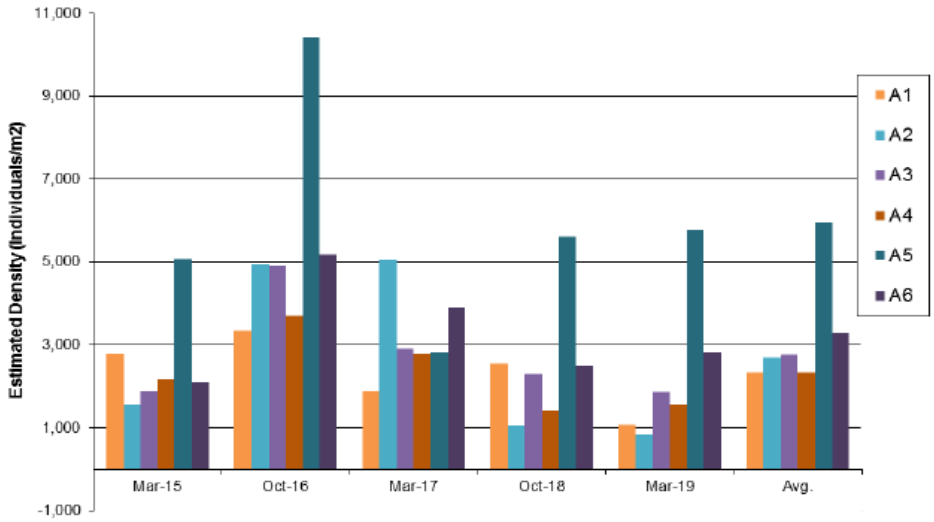


Figure 9. Estimated density near the Arecibo outfall (March 2015 to March 2019), taken from PRASA's 301(h) renewal application (Jacobs 2020).

Presence or Absence of Pollution-Tolerant Benthic Species

Thirteen polychaete genera (*Capitella* sp., *Cirriformia* sp., *Glycinde* sp., *Goniada* sp., *Lumbrineris* sp., *Marphysa* sp., *Mediomastus* sp., *Nephtys* sp., *Nereis* sp., *Notomastus* sp., *Polydora* sp., *Prionospio* sp., and *Scoloplos* sp.) and three families (Capitellidae, Lumbrineridae, and Spionidae) have been identified in the scientific literature as having species that may be indicators of organically enriched or disturbed areas. There are variations within the species habitat preferences in these genera, and there is no indication that all species in a particular genus are tolerant of pollution or other environmental stresses.

PRASA did not identify any pollution-tolerant species in the renewal application, noting that identification to species level was not possible with the specimens collected and that most genera were reported at low relative densities at the ZID station.

Benthic Invertebrate Summary

The 2015-2019 monitoring demonstrated that benthic communities around the Arecibo RWWTP outfall are diverse and stable. Benthic communities at stations within and at the edge of the mixing zone are similar to benthic communities outside the mixing zone. No pollution-tolerant polychaetes were confirmed to be present.

EPA concludes that the 2015-2019 benthic community sampling demonstrates that the discharge of modified effluent from the Arecibo RWWTP has not adversely impacted balanced indigenous benthic populations in areas around the outfall.

Sediment Quality

Sediment samples were collected at all six monitoring stations and analyzed for EPA priority pollutant organic compounds, pesticides, metals, and several other inorganic constituents. Results were compared to NOAA Effects Range-Low (ER-L) and Effects Range-Median (ER-M) benchmarks.

Organic Constituents (EPA Priority Pollutants and Pesticides)

During the 2015-2019 period, two organic constituents (methylene chloride and toluene) were estimated in sediments at the ZID (Station A6) in October 2016. Estimated methylene chloride concentrations (6.5 µg/kg at the ZID and 2.1 at the edge of mixing zone [Station A1l) were well below the applicable NOAA ER-L benchmark (370 µg/kg). Estimated toluene concentrations (4 µg/kg at the ZID, 1.9 µg/kg at the edge of mixing zone [Station A1] and 1.3 µg/kg at the reference [Station A3]) were also well below the applicable NOAA ER-L benchmark (670 µg/kg). Methylene chloride and toluene were not analyzed in 2015, 2017, 2018, or 2019. No other organic constituents were detected or estimated at the ZID (Station A6) during the 2015-2019 period.

Metals and Inorganic Constituents

Sixteen (16) inorganic constituents (Ag, As, Ba, Be, B, Cd, Cr, Cu, Hg, Mn, Ni, Pb, Sb, Th, Zn, Cyanide) were detected in sediment collected from at least one 2015-2019 monitoring sample

location or event. Concentrations of all inorganic constituents in the sediments at the ZID (Station A6) were less than or within the range of concentrations found at the other stations (see Table 9).

Table 9. Concentrations (in mg/kg) of inorganics in sediment during the 2015-2019 period.

| | **ZID (A6)** | **Edge of MZ (A1 & A2)** | **Far-field (A4 & A5)** | **Reference (A3)** |
|---|---|---|---|---|
| Antimony | 0.06-0.09 | 0.06-0.1 | 0.062-0.126 | 0.064-0.12 |
| Arsenic | 18.2-26.3 | 23.4-28.5 | 17.7-25.7 | 27.4-34.2 |
| Beryllium | ND | ND-0.3 | ND-0.3 | ND-0.3 |
| Barium | 5.1-7.71 | 6.1-8.8 | 5.37-7.1 | 6.1-8.9 |
| Boron | 15-24 | 19-22 | 13.7-31 | 17-22 |
| Cadmium | 0.02-0.04 | 0.029-0.05 | 0.028-0.05 | 0.028-0.04 |
| Chromium | 14.5-22.4 | 17.7-32.3 | 20.2-64.4 | 21.1-40.9 |
| Copper | 7.1-10.2 | 7.59-13.8 | 4.4-18.9 | 9.3-17.3 |
| Lead | 1.38-1.84 | 1.58-3.25 | 2.02-4.39 | 1.95-3.32 |
| Manganese | 302-491 | 397-529 | 301-580 | 484-622 |
| Mercury | 0.0032-0.0037 | 0.0027-0.0042 | 0.0028-0.0089 | 0.0036-0.005 |
| Nickel | 6.54-9.68 | 7.2-13.5 | 2.92-13.9 | 8.48-14.9 |
| Selenium | ND | ND | ND | ND |
| Silver | ND | ND | ND-0.17 | ND |
| Thallium | 0.01-0.02 | 0.02-0.05 | 0.015-0.04 | 0.024-0.03 |
| Zinc | 12.1-19.2 | 14.5-25.3 | 6-35.5 | 17.1-31.2 |
| Cyanide | ND-0.29 | ND-0.26 | ND-0.25 | ND |

Based on 2015-2019 monitoring data, EPA concludes that the discharge of modified effluent from the Arecibo RWWTP has not resulted in accumulation of organic and inorganic contaminants in sediments around the outfall. Sediment contaminant levels within the mixing zone were comparable to far field and reference sediment concentrations. The presence of apparently healthy benthic communities in the area around the Arecibo outfall further support EPA's conclusion that sediment concentrations of organic and inorganic constituents around the Arecibo RWWTP outfall are not causing toxicity or other deleterious effects that preclude maintenance of a BIP of benthic organisms in its vicinity.

### iv. Fish bioaccumulation assessment

Tissues of fish collected from four monitoring stations around the Arecibo RWWTP outfall were analyzed for metals. Metal concentrations in fish were compared to available tissue screening concentration (TSC) benchmarks published by Dyer et al. (2000).

Fish were collected using fish traps and hook-and-line methods. Four species, coney (*Cephalopholis fulva*), lane snapper (*Lutjanus synagris*), French grunt (*Haemulon flavolineatum*), and vermilion snapper (*Rhomboplites aurorubens*) were analyzed. Five fish samples were obtained from the ZID station (A6), five samples were obtained from the far-field station (A4), six samples were obtained from the far-field station (A5), and 5 samples were obtained from the reference station (A3).

Most metal concentrations were below available tissue screening concentration (TSC) benchmarks for bioaccumulation (Dyer et al. 2000). Four of the 16 constituents (arsenic, chromium, mercury, and selenium) were detected above TSC benchmarks in one or more fish tissue samples from every station. Concentrations of nickel were detected above the TSC benchmark in a single fish tissue sample from the ZID and a single fish tissue sample from the reference station. A single fish tissue sample from the far-field station (A5) had a concentration of silver that exceeded the TSC benchmark.

In general, concentrations of metals in fish tissues collected from the ZID were comparable to concentrations in fish tissue collected from the reference and far-field locations. There was no clear pattern of increasing concentration or incidence of exceeding the TSC within the ZID. EPA concludes that due to the inconsistent pattern of observed concentrations in fish sampled around the outfall, estimated/detected concentrations for the seven constituents in fish sampled from within the ZID cannot be confidently attributed to exposure to the Arecibo RWWTP effluent.

### v. Coral reef communities as distinctive habitats of limited distribution

According to EPA's Amended Section 301(h) Technical Support Document (ATSD), distinctive habitats of limited distribution are defined as habitats in which protection is of special concern because of their ecological significance, such as coral reefs, or their value to humans, such as for subsistence fishing (EPA 1994). Because of the unique faunal components of these marine communities, distinctive habitats of limited distribution may be highly susceptible to the potential effects of discharged suspended solids, nutrients, and other pollutants.

Monitoring was conducted in March 2021 at two stations (see the stations shown in white on Figure 2) to assess coral habitat near the Arecibo RWWTP outfall. The monitoring stations were located approximately 0.8 km east (Station Alternate A1 [AA1]) and approximately 1.0 km west (Station Alternate A2 [AA2]) of the Arecibo RWWTP outfall. These coral habitat monitoring stations are characterized as relatively low, though somewhat variable, topographic relief hard-bottom habitat. Station AA1 is located at a depth of 53 feet and Station AA2 at a depth of approximately 70 feet.

At Station AA1, an algal complex was the most dominant sessile-benthic component, dominated by biotic turf. *Dictyota* sp. and *Sargassum* sp. were the most abundant macroalgal species, while

*Halimeda* sp. was also commonly observed. Sponges were common among the sessile invertebrate community. Dominant sponge species included *Ircinia* sp., *Xestospongia muta*, and various encrusting sponges. Station AA2 was also dominated by an algal complex . The algal complex consisted of dense biotic turf with a mixed assemblage of small epibenthic biota, including interspersed sponges, hydrozoans, and macroalgae. Dominant macroalgal taxa were *Dictyota* sp. and the calcareous green algae *Halimeda* spp. Crustose coralline algae were also present. Sponges were a common part of the sessile invertebrate community and included *Ircinia* sp., X. *muta*, and other encrusting sponges.

Figure 10 and Figure 11 show cover type from 2008-2021 at Station AA1 and AA2, respectively. During the 2010 to 2021 period, coral coverage declined at both locations. Coral coverage was low during the October 2010 survey at Station AA1 (2.2%) and AA2 (0.3%). During the next survey in March 2011, coral cover slightly decreased at Station AA1 (2.0%) and AA2 (0.2%) No stony corals were observed at either station in March 2021.

During the 2010 to 2021 period, sponge coverage declined at both locations. Station AA1 had 17.3%, 13.3%, and 2.0% sponge cover in 2010, 2011, and 2021, respectively and Station AA2 had 11.9%, 5.7%, and 3.0% sponge cover in 2010, 2011, and 2021, respectively. Sponges remained the dominant invertebrate cover at both stations.

Total algal coverage remained dominant at both locations. Average algal complex cover was 83.4% at Station AA1, higher than previously reported during the March 2011 (76.5%) and October 2010 (69.2%) surveys. At Station AA2, average algal complex cover was 69.3%, lower than previously reported in March 2011 (91.5%) but higher than in the October 2010 survey (58.3%).

Abiotic substrate, consisted of sediment over hard substrate, shell hash, and exposed hard substrate. Abiotic/reef rock coverage increased at both locations. Coverage was 13.4% at Station AA1 and 26.6% at Station AA2 in 2021. Coverage in 2011 was 7% at Stations AA1 and 2.1% at Station AA2.

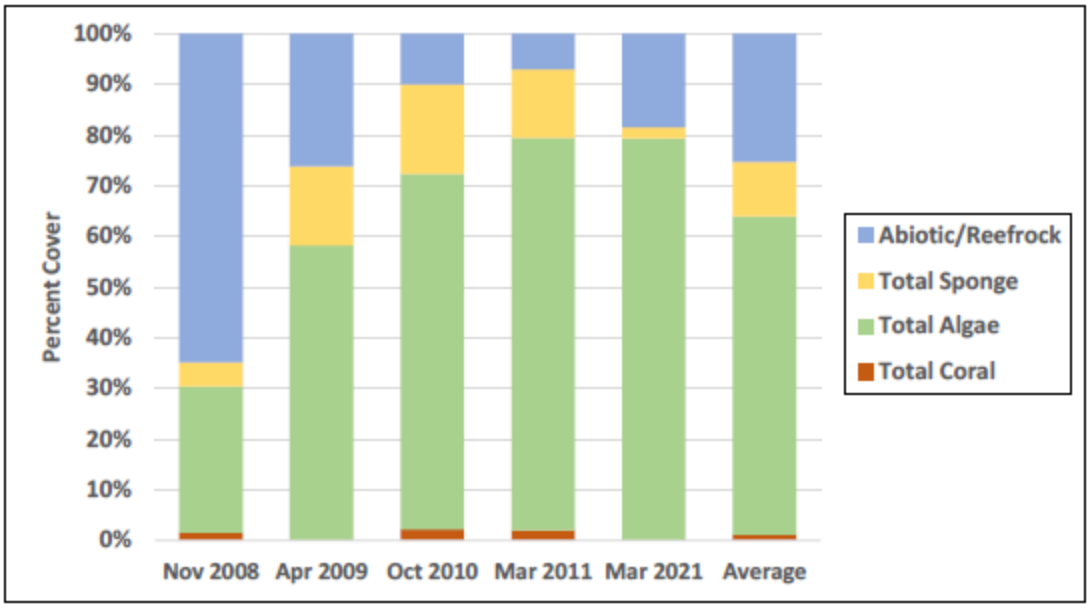


Figure 10. Station AA1 cover type (2008–2021).

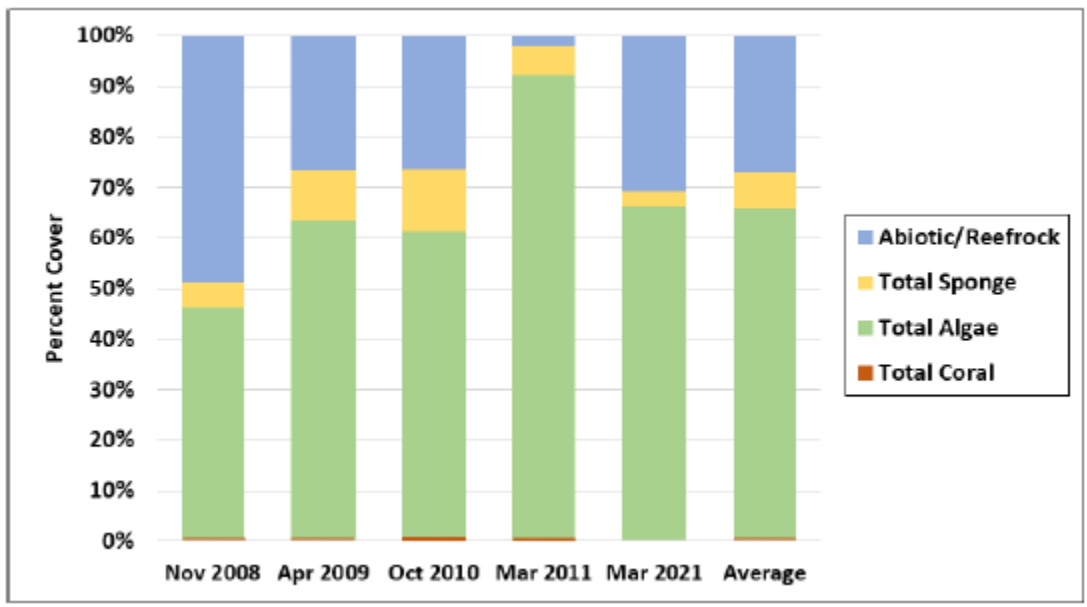


Figure 11. Station AA2 cover type (2008–2021).

Based on this monitoring, PRASA determined that listed coral reef communities are not likely to be adversely impacted by the modified discharge from the Arecibo RWWTP. On June 1, 2020, the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) formally concurred with this determination in consultation under Section 7 of the Endangered Species Act (NOAA 2020). Accordingly, EPA concludes that changes in the coral community at the monitoring stations are not attributable to the modified discharge of Arecibo RWWTP effluent.

### d. Absence of extreme adverse impacts within the ZID [40 CFR § 125.62(c)(3)]

Pursuant to 40 CFR § 125.62(c)(3), conditions within the ZID must not contribute to extreme adverse biological impacts, including, but not limited to, the destruction of distinctive habitats of limited distribution, the presence of disease epicenters, or the stimulation of phytoplankton blooms that have severe adverse effects beyond the ZID. Effluent and receiving water monitoring data reported in *Renewal Application for 301(h) Waiver for the Arecibo RWWTP* (Jacobs 2020) indicate that the modified discharge from the Arecibo RWWTP will provide for the attainment of water quality criteria for DO, turbidity, and toxicity, and maintenance of a BIP. Section 2a of this document (Compliance with applicable water quality standards) details the toxic pollutants for which laboratory detection limits and/or measured concentrations exceed corresponding water quality criteria. EPA is not aware of any phytoplankton blooms, fish kills, or other adverse impacts in the vicinity of the outfall. The modified outfall discharges to open coastal waters that provide a dynamic mixing zone, are unstratified in nature, and are influenced by large-scale, wind-driven ocean currents and are not prone to conditions within the ZID that would contribute to extreme adverse effects. EPA concludes that conditions within the ZID do not contribute to extreme adverse biological impacts, including, but not limited to, the destruction of distinctive habitats of limited distribution, the presence of disease epicenter, or the stimulation of phytoplankton blooms which have adverse effects beyond the zone of initial dilution and that the requirements of 40 CFR § 125.62(c)(3) have been met.

**Conclusion**: Biological impact of discharge (40 CFR § 125.62 (c))

Monitoring data demonstrates that the modified discharge of Arecibo RWWTP effluent does not sufficiently impair water or sediment quality to cause toxicity to marine organisms or accumulation of metals in fish; does not result in nutrient conditions that are associated with eutrophication or phytoplankton blooms; or adversely impact benthic communities or distinct habitats of limited distribution (coral communities) in receiving waters around the outfall. Therefore, EPA concludes that the modified discharge will allow for the maintenance of water quality which assures protection and propagation of a BIP of shellfish, fish, and wildlife, that a BIP of shellfish, fish, and wildlife will exist immediately beyond the ZID and in all other areas beyond the ZID where marine life is actually or potentially affected by the modified discharge and the discharge is not expected to cause extreme adverse impacts within the ZID. The applicant has met the requirements of 40 CFR § 125.62(c).

### e. Impact of discharge on recreational activities [40 CFR § 125.62(d)]

Under 40 CFR § 125.62(d), the Arecibo RWWTP's discharge must allow for the attainment or maintenance of water quality which allows for recreational activities beyond the ZID, including, without limitation, swimming, diving, boating, fishing, picnicking, and sports activities along shorelines and beaches. There must also be no federal, territorial, or local restrictions on recreational activities within the vicinity of the outfall unless such restrictions are routinely imposed around sewage outfalls, as long as the routine restrictions would not be lifted or modified if the applicant were discharging a secondary treatment effluent.

The Arecibo RWWTP outfall is more than 0.6 miles from any existing or potential recreational beach. EPA is not aware of any restrictions on recreational activities within the vicinity of the outfall, and the applicable water quality criterion for *Enterococci* bacteria was not exceeded during any of the 2015-2019 monitoring events. EPA concludes that the Arecibo RWWTP's discharge allows for the maintenance of water quality which allows for unrestricted recreational activities beyond the ZID.

On August 23, 2023, the Puerto Rico Planning Board granted a Coastal Zone Management Act (CZMA) consistency certification for the modified discharge from the Arecibo RWWTP (Puerto Rico Planning Board 2023).

Therefore, EPA concludes that the applicant has met the requirements of 40 CFR § 125.62(d).

### f. Stressed waters [40 CFR § 125.62(f)]

Under 40 CFR § 125.62(f), the applicant must demonstrate that the modified discharge will not contribute to, increase, or perpetuate stressed conditions, contribute to further degradation if pollution from other sources increases, or retard the recovery of the biota and water quality if the level of human perturbation from other sources decreases. As defined in 40 CFR § 125.58(z), stressed waters are those ocean waters for which an applicant can demonstrate that the absence of a balanced indigenous population is caused solely by human perturbations other than the applicant's modified discharge.

The Arecibo RWWTP does not discharge into stressed waters, as defined in 40 CFR § 125.58(z). Based on available data, EPA has determined that a BIP exists in the vicinity of the Arecibo RWWTP outfall and that the modified discharge will provide for the attainment of water quality standards and criteria at and beyond the ZID. Therefore, EPA concludes that the applicant has met the requirements of 40 CFR § 125.62(f).

**Conclusion:** Attainment or maintenance of water quality which assures protection of public water supplies; assures the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife; and allows recreational activities (40 CFR § 125.62)

In conclusion, although exceedances of the PRWQS may have occurred in the receiving waters for several parameters as described in section 2a of this document, the remainder of section 2 of this document demonstrates that the Arecibo RWWTP's discharge does not interfere with the maintenance of water quality which assures protection of public water supplies, assures protection and propagation of a BIP of shellfish, fish and wildlife; and allows for recreational activities. Therefore, EPA concludes that the Arecibo RWWTP discharge does not demonstrate compliance with 40 CFR § 125.62(a) with respect to all pollutants, but does comply with § 125.62(b) through (e).

## 3. Establishment of a monitoring program [Section 301(h)(3), 40 CFR § 125.63]

Under 40 CFR § 125.63, which implements Section 301(h)(3) of the Act, the applicant must have a monitoring program designed to evaluate the impact of the modified discharge on the

receiving environment, demonstrate compliance with applicable water quality standards, and measure toxic substances in the discharge. In addition, the applicant must also demonstrate that it has the resources necessary to implement the monitoring program upon issuance of a 301(h) modified permit and to carry it out for the life of the permit (40 CFR § 125.63(a)(1)(iii)). The frequency and extent of the monitoring program are to be determined by taking into consideration the Arecibo RWWTP's rate of discharge, quantities of toxic pollutants discharged, and the potential for significant impacts in the receiving water (40 CFR § 125.63(a)(1)(iv)).

### a. Biological monitoring program [40 CFR § 125.63(b)]

Pursuant to 40 CFR § 125.63(b), the applicant must have a biological monitoring program that provides adequate data to evaluate the impact of the discharge on the marine biota. Under 40 CFR § 125.63(b)(1), the applicant's biological monitoring program must include periodic surveys of control sites and biological communities most likely to be affected by the discharge; periodic bioaccumulation studies and examination of possible adverse effects of effluent-related toxic substances; periodic sampling of sediments for toxic pollutants and pesticides; and periodic assessment of fisheries.

Table 8 lists several water quality parameters for which compliance with applicable water quality standards cannot be demonstrated due to applicable standards being lower than program detection limits. EPA will require that these parameters be included in the fish tissue analyte list for the bioaccumulation analysis.

Recent coral community monitoring data shows no coral cover at the current coral community monitoring stations. EPA will require that monitoring at these stations continue. However, EPA also requires that alternate coral community monitoring sites/strategies be selected in consultation with EPA, NMFS and DNER.

EPA is also requiring that the applicant develop a plan for a toxicity reduction evaluation (TRE) within the first three months of the permit term. This plan may be an update of the plan developed for the previous NPDES permit cycle. EPA has included action levels based on the recommended criteria of 0.3 TUa and 1.0 TUc, which would be 112.8 TUa after dilution (376 TUc before dilution). Should the toxicity levels be observed at levels above either action level, accelerated monitoring would be required for twelve weeks. During the accelerated testing period, an additional exceedance of the action level would require activation of the TRE workplan and implementation of the applicant's strategy to identify and abate the source of toxicity.

### b. Water quality monitoring program [40 CFR § 125.63(c)]

Pursuant to 40 CFR § 125.63(c), the applicant must have a receiving water monitoring program that provides adequate data for evaluating compliance with water quality standards or criteria and measures the presence of toxic pollutants which have been identified or are expected to be in the Arecibo RWWTP effluent discharged to the receiving water.

EPA remains concerned with the overall ongoing data quality provided by the applicant for receiving water. Although the applicant typically monitored for the required water quality parameters, the concentrations provided for various parameters were reported as undetected or estimated concentrations at reporting limits well above the PDLs specified in the QAPP. These undetected or estimated values often also significantly exceeded the applicable water quality standards. EPA cannot consider 'undetected' values above the standard for making compliance determinations. In addition, analytical results for some parameters were rejected due to the matrix interferences, resulting in the entire sets of data for a given year to be unusable (e.g., free cyanide in 2019).

These data quality issues and the unavailability of analytical methods to detect and quantify pesticides and other organic contaminants at the low concentrations necessary to demonstrate compliance with the PRWQSR limits EPA's ability to make a confident determination whether the applicable standards for these parameters will be met in Arecibo RWWTP receiving waters during the next permit term. To address this situation, the applicant must update its QAPP document to revise (and subsequently implement) appropriate EPA-approved testing methods to achieve lower quantification limits wherever possible and address matrix interferences during the next permit term. The applicant will be required to resample and reanalyze samples for which data quality is insufficient to support a compliance determination.

EPA relies solely on one dataset per year (and in the case of organic parameters, one dataset for the entire 5-year period), therefore the limited data submitted to EPA must be of sufficient quality to allow for appropriate decision-making in the future.

To rectify EPA's concerns with the overall ongoing quality of receiving water data provided by the applicant, EPA will now require that the applicant implement the following changes to the water quality monitoring:

- Update the QAPP document to address the adequate assessment of the most recent water quality criteria as adopted by DNER and revise (and implement during the next permit term) appropriate EPA-approved testing methods with adequate detection and quantification limits. The applicant must follow the procedures described in the QAPP document to minimize the need for reporting data as estimated values and the rejection of data due to matrix interferences.
- Submit each individual annual 301(h) Waiver Demonstration Study Report for the Arecibo RWWTP to EPA as soon as data is available. If any QA/QC issues are identified by EPA, the applicant will be required to address these issues before the next annual monitoring event is initiated.
- Complete the supplemental monitoring event for organic compounds during one of the first three years of the permit cycle. If receiving water data for any parameter is rejected during the validation process due to matrix interference or a concentration flagged as "estimated" due to a concentration above the program detection limit, as identified in the QAPP, the applicant will be required to resample this parameter before the next annual monitoring event is initiated.

### c. Effluent monitoring program [40 CFR § 125.63(d)]

Pursuant to 40 CFR § 125.63(d), the applicant must have an effluent monitoring program that provides quantitative and qualitative data that measures toxic substances and pesticides in the effluent, and data for evaluating compliance with the percent removal efficiency requirements under 40 CFR § 125.60. As described in EPA's ATSD, the major objectives of effluent monitoring are to provide data for determining compliance with permit effluent limitations and section 304(a) water quality criteria, measure the effectiveness of the toxic substances control programs, and relate effluent characteristics to the receiving water biological and water quality conditions (EPA 1994). In addition, influent and effluent monitoring provides data for assessment of treatment plant performance with primary treatment requirements for $BOD_5$ and TSS.

### d. Monitoring program

PRASA is required to design a monitoring program to evaluate the impact of the Arecibo discharge on the marine environment and must also demonstrate the capability to implement this program after the issuance of the 301(h) modified permit. PRASA has designed and implemented a comprehensive marine monitoring program that was approved by EPA, and at the time of submitting the renewal application, has submitted 36 individual monitoring reports to EPA.

The 2012 Quality Assurance Project Plan (QAPP) and Sampling and Analysis Protocols (SAP) outlines the marine monitoring plan. Sampling frequencies for the 301(h) Monitoring Program requirements at the Arecibo RWWTI are listed in Table 10.

Table 10. 301(h) monitoring program requirements for the Arecibo RWWTP.

| Component | Frequency |
|---|---|
| Annual Effluent | Once a year per permit period (alternating wet and dry seasons) |
| Supplemental Effluent | Once every 5 years (year before permit is due for renewal) |
| Annual Receiving Water | Once a year per permit period (alternating wet and dry seasons) |
| Supplemental Receiving Water | Once every 5 years (year before permit is due for renewal) |
| Benthic Invertebrates | Once a year per permit period (alternating wet and dry seasons) |
| Annual Sediment | Once a year per permit period (alternating wet and dry seasons) |
| Supplemental Sediment | Once every 5 years (year before permit is due for renewal) |
| Fish Tissue | Once every 5 years (year before permit is due for renewal) |

| Component | Frequency |
|---|---|
| Coral Communities | Once every 5 years (year before permit is due for renewal) |

Since its approval, there have been several EPA-approved revisions to the QAPP, and the monitoring continues per the required procedures and schedules outlined in the 2012 QAPP. Therefore, EPA has concluded that the applicant has met the requirements of 40 CFR §§ 125.63(a) through (d) for the permit term.

**4. Effect of the discharge on other point and nonpoint sources [Section 301(h)(4), 40 CFR § 125.64]**

In accordance with Section 301(h)(4) of the Act, EPA may not issue a modified permit unless such modified discharge will not result in any additional pollution control requirements on any other point or nonpoint source. In May 2020, PRASA requested a determination from the DNER indicating whether the modified discharge from the Arecibo RWWTP will result in an additional treatment, pollution control, or other requirement on any other point or nonpoint sources, as required by 40 CFR§ 125.64(b). On October 28, 2023, the DNER issued a WQC indicating that the modified discharge will not cause violations to the applicable water quality standards in the receiving water. Based on this determination, EPA concludes that the discharge from the Arecibo RWWTP will not result in any additional requirements on any other point or nonpoint sources; therefore, the applicant has met the requirements of Section 301(h)(4), 40 CFR § 125.64.

**5. Urban area pretreatment program [Section 301(h)(5) and (6), 40 CFR § 125.65]**

In accordance with Section 301(h)(5) and (6) of the Act, EPA may not issue a 301(h) modified permit unless the applicant demonstrates that all applicable pretreatment requirements for sources introducing waste into such treatment works will be enforced. As part of an Industrial Pretreatment Program, POTWs that seek a 301(h) modified permit must assess the need for local limits and set local limits in accordance with 40 CFR Part 403 based on an analysis of toxic pollutants known or suspected of being introduced by industrial sources. Local limits are developed for pollutants that may cause interference, pass through, sludge contamination, and/or worker health and safety problems, if discharged in excess of the receiving POTW's capabilities and/or receiving water quality standards.

In evaluating the need for local limit development, a POTW must identify industries that might be subject to the pretreatment program and determine the character and volume of pollutants that the industries contribute to the POTW. The POTW must then determine which pollutants have a reasonable potential for pass through, interference, or sludge contamination. To calculate the maximum allowable POTW influent loading for a pollutant of concern, treatment plant data and estimates of pollutant removal rates are used to calculate the total allowable pollutant load that would meet sludge requirements, permit limits, and water quality standards. After accounting for

domestic sources, the remaining load is then evenly distributed among industries that contribute to the POTW.

PRASA has an Industrial Pretreatment Program that was approved by EPA on September 28, 1985, and an Enforcement Response Plan that was approved by EPA on May 30, 1995. EPA's approval of PRASA's pretreatment program in 1985 only contained general island-wide local limits for all of its wastewater treatment facilities. Since then, PRASA has assessed the need for facility-specific local limits for all facilities. For the Arecibo RWWTP, PRASA has established facility-specific local limits, which are summarized in Table 11. PRASA has incorporated these limits into all applicable industrial pretreatment permits for industries that discharge to the Arecibo RWWTP in accordance with 40 CFR Part 403.

Table 11. Local limits for the Arecibo RWWTP.

| **Parameter** | **Arecibo RWWTP Local Limit (mg/l)** |
|---|---|
| Arsenic | 0.190 |
| Beryllium | NL |
| Biochemical Oxygen Demand | 250 mg/l surcharge level |
| Cadmium | 0.160 |
| Chromium | 1.000 |
| Color | 250 Pt/Co Units |
| Copper | 1.000 |
| Cyanide | 0.005 |
| Flammability | No two consecutive readings at ≥5% LEL, and no reading of ≥10% LEL allowed |
| Flow | NL |
| Fluoride | NL |
| Lead | 0.760 |
| Manganese | NL |
| Mercury | 0.044 |
| Molybdenum | 0.710 |
| Nickel | 1.700 |
| Nitrogen ($NO_3$, $NO_2$, $NH_3$) | Monitor Only |
| Oil & Grease (O&G) | 50 mg/l Total O&G |
| Phenols (phenolics substances) * | 1.0 |
| pH | 6.5-9.0 SU |
| Selenium | 0.550 |
| Silver | 0.679 |
| Surfactants (as MBAS) | 1.260 |

| | |
|---|---|
| Thallium | 0.018 |
| Temperature | 40°C (104°F) at POTW<br>60°C (140°F) from SIU |
| Total Suspended Solids (TSS) | 250 mg/l surcharge level |
| Total Toxic Organics (TTO) | 2.13 |
| Zinc | 0.500 |

As explained in the preamble to the 1994 revision of the Section 301(h) Regulations (59 FR 40656, August 9, 1994), for urban area pretreatment programs with significant numbers of industrial users, at any given time, it is reasonable to expect that at least one or more of those users might be out of compliance (59 FR 40656, August 9, 1994). EPA determines a POTW's continuing eligibility for a 301(h) modified permit under Section 301(h)(6) by measuring industrial user compliance and POTW enforcement activities against existing criteria in EPA's National Pretreatment Program. A POTW's enforcement program is considered adequate if no more than fifteen percent of its industrial users meet the significant noncompliance (SNC) criteria in a single year. In situations where the POTW followed its procedures but the level of SNC among significant industrial users (SIUs) is fifteen percent or greater, the adequacy of the enforcement procedures should be reviewed. A total of six SIUs are monitored under the Pretreatment Program for the Arecibo RWWTP, and all currently have discharge permits. According to PRASA's 2022 Industrial Pretreatment Program Annual Report covering the period from September 1, 2021 through August 31, 2022, the Arecibo RWWTP service areas reported a SNC rate of fifty percent (three of six SIUs) for its SIUs. The SNC rate is greater than the SNC criteria of fifteen percent for determining the adequacy of the pretreatment program. PRASA issued Notices of Noncompliance to the facilities and the facilities returned to compliance. These enforcement actions indicate that PRASA's enforcement program has met the criteria for adequate enforcement of its pretreatment program for the Arecibo RWWTP.

Since PRASA has established local limits to control toxic pollutants that may be introduced by industrial dischargers, and has demonstrated that it is able to enforce these limits, EPA concludes that the applicant has met the requirements of 40 CFR § 125.65 for an urban area pretreatment program.

### 6. Toxics control program [Section 301(h)(5), 40 CFR §§ 125.66(a) through (c)]

#### a. Chemical analysis

Pursuant to 40 CFR § 125.66(a), at the time of application, the applicant must submit a chemical analysis of its current discharge for all toxic pollutants and pesticides defined in 40 CFR§§ 125.58(p) and (aa). As specified in EPA's ATSD, the applicant must submit results of wet and dry season analyses of the effluent if known or suspected industrial sources of toxic pollutants or pesticides exist. The analysis shall be performed on a minimum of two 24-hour composite samples (one dry season and one wet season). Applicants may supplement or substitute chemical

analyses if the composition of the supplemental or substitute samples typifies that which occurs during wet and dry weather conditions.

### b. Toxic pollutant source identification

Under 40 CFR § 125.66(b), the applicant must submit an analysis of the known or suspected sources of toxic pollutants or pesticides identified in response to 40 CFR§ 125.66(a). To the extent practicable, the applicant must also categorize the sources according to industrial and nonindustrial types.

PRASA identified six industries permitted as SIUs that discharge to the Arecibo RWWTP (Jacobs 2020b). The Arecibo RWWTP generally provides service to the metal finishing point source industry.

Based on PRASA's 2022 Industrial Pretreatment Program Annual Report, EPA has concluded that the applicant has met the requirements of 40 CFR § 125.66(b).

### c. Industrial pretreatment program

Under 40 CFR § 125.66(c), an application for a 301(h) modification from secondary treatment requirements that has known or suspected industrial sources of toxic pollutants must have an approved pretreatment program as described in 40 CFR Part 403. The Arecibo RWWTP currently has an EPA-approved industrial pretreatment program and has implemented the program throughout the island. EPA originally approved the applicant's industrial pretreatment program on September 28, 1985, and Enforcement Response Plan on May 30, 1995. The Puerto Rico Rules and Regulations for the Supply of Water and Sewer Supply (Rules and Regulations) were approved as part of the original program in 1985 and met the existing pretreatment requirements for legal authority at 40 CFR §403.8. Effective October 3, 2003, PRASA revised its Rules and Regulations in accordance with changes made to the federal pretreatment regulations (e.g., additional federal prohibitions, revised definitions, and notification requirements). Since PRASA has an EPA-approved industrial pretreatment program for the Arecibo RWWTP, EPA has concluded that the applicant has demonstrated that it has met the requirements of 40 CFR § 125.66(c).

PRASA is adequately enforcing its Industrial User Pretreatment Program. All SIUs are monitored once a year, and unannounced compliance inspections are performed at least twice a year. Non-compliance issues are addressed with escalated enforcement actions. A detailed report concerning the compliance status of the Arecibo RWWTP SIUs is included in PRASA's Annual Pretreatment Report submitted to EPA. The report includes all non-compliance issues detected during the reporting period and the enforcement actions performed by PRASA.

Since PRASA has an approved pretreatment program and has demonstrated that it can enforce the program, EPA concludes that the applicant has met the requirements of 40 CFR § 125.66(c).

### 7. Nonindustrial source control program [Section 301(h)(7), 40 CFR § 125.66(d)]

Pursuant to 40 CFR § 125.66(d), which implements Section 301(h)(7) of the Act, the applicant must propose a public education program designed to minimize the entrance of nonindustrial toxic pollutants into the treatment system. The program must be implemented no later than 18 months after issuance of a modified permit. PRASA proposes to continue to implement its two nonindustrial source control educational programs during the next permit term: the "Aquamóvil" Education Program and the Fat, Oil and Grease (FOG) and Petroleum, Oils, and Grease (POGS) Program.

The "Aquamóvil" Education Program was created by PRASA's Communications Office in 1988 and implemented in 1993. The island-wide program is designed to minimize toxic substances from nonindustrial sources through a mobile learning center that travels throughout the island providing literature, illustrations, and models of the wastewater treatment processes. The materials provide information to PRASA's clients and the general public.

The program covers all municipalities, with particular emphasis on universities, public and private schools, housing developments, industrial and governmental agencies, community groups, health and service fairs, and religious groups. PRASA's website provides information to the public about the availability of the educational program. PRASA also distributes information concerning the wastewater treatment process as well as household toxic substances disposal at major shopping centers throughout the island. During 2018 and 2019, a total of 19 and 17 general educational activities were held in the Arecibo area, respectively.

PRASA's FOG and POGS Program focuses on educating food service establishments that discharge to the Arecibo RWWTP, including fast food providers, restaurants, and bakeries, as well as maintenance and repair service establishments, including gas stations, commercial garages, and car washes. PRASA began providing a "Best Manufacturing Program Manual" to food service establishments and courtesy inspections in 2006 to evaluate FOG management and disposal. PRASA will continue providing these inspections. PRASA also launched a public educational campaign in June 2019 called "Tuberías Limpias" to educate the citizens, establishments, and industries about the proper management and disposal of fats, oil, petroleum and grease. As part of the campaign, PRASA updated the FOG and POGS section of its website.

If requested, personnel of the pretreatment program provide educational lectures on FOG management to food service establishment personnel and other interested groups. During 2019, six educational lectures were given throughout the island with excellent participation of representatives of the Asociación de Restaurantes de Puerto Rico. During 2018 and 2019, a total of 208 and 183 food service establishments, respectively, were inspected in the Arecibo area, which is served by the Arecibo RWWTP.

The development and implementation of the "Aquamóvil" Education Program and the FOG and POGS Program demonstrate that PRASA has a nonindustrial source control program that is designed to minimize the entrance of nonindustrial toxic pollutants into the Arecibo RWWTP. Therefore, EPA concludes that the applicant has met the requirements of 40 CFR § 125.66(d).

**8. Increase in effluent volume or amount of pollutants discharged [Section 301(h)(8), 40 CFR § 125.67]**

Under 40 CFR § 125.67, which implements Section 301(h)(8) of the Act, EPA may not issue a modified permit unless the applicant demonstrates that there will be no new or substantially increased discharges from the point source of the pollutant to which the modification applies above the volume of discharge specified in the permit. Pursuant to 40 CFR§ 125.67(b), where pollutant discharges are attributable to combined sewer overflows, the applicant shall minimize existing overflows and prevent increases in the amount of pollutants discharged. Since the Arecibo RWWTP is not a combined sewer system, the applicant is exempt from the requirements of 40 CFR § 125.67(b). However, 40 CFR § 125.67(c) requires that the applicant provide projections of annual average effluent volume in $m^3$/sec and mass loadings in metric tons/year for any pollutants to which the modification applies in five-year increments for the design life of its facility. The Arecibo RWWTP first began operations in the late 1980s and the design life of the facility is considered to be 40 years.

PRASA has not requested an increase in the permitted effluent flow limitations for the Arecibo RWWTP or a change in concentration-based $BOD_5$ and TSS effluent limitations that would affect permitted loadings. PRASA does not anticipate any changes in the service area or population which would result in increased flow over the term of the next permit. PRASA provided the following projected daily effluent volume and mass emissions in the Renewal Application, based on maximum daily flow and concentration limitations. Since no increase in permitted discharge is anticipated, the projections shown in Table 12 are anticipated for the foreseeable future.

Table 12. Service area population and flow projections for the Arecibo RWWTP, taken from PRASA's 2020 301(h) renewal application (Jacobs 2020).

| Year | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|
| Population | 52,128 | 52,798 | 53,192 | 53,319 | 53,176 |
| Residential Average Contribution (mgd) | 4.09 | 4.13 | 4.15 | 4.15 | 4.13 |
| Non-Residential Average Contribution (mgd) | 1.34 | 1.35 | 1.36 | 1.37 | 1.36 |
| Total Average Contribution (mgd) | 5.43 | 5.49 | 5.52 | 5.52 | 5.49 |
| Total Average Contribution/Capita (gpd) | 104 | 104 | 104 | 103 | 103 |

Since the modified discharge will not result in any new or substantially increased discharges of $BOD_5$ and TSS above the discharge specified in the 301(h) modified permit, and since the applicant provided projections of effluent volume and mass loadings for $BOD_{55}$ and TSS, EPA concludes that the applicant has met the requirements of 40 CFR§ 125.67.

**9. Primary or equivalent treatment requirements [Section 301(h)(9), 40 CFR § 125.60]**

Section 301(h)(9) of the Act was amended by Section 303(d)(1) and (2) of the WQA. Under Section 303(d)(1), the applicant's effluent must be receiving at least primary or equivalent

treatment at the time its 301(h) modified permit becomes effective. Section 303(d)(2) defines primary or equivalent treatment as a means of treatment by screening, sedimentation, and skimming adequate to remove at least 30 percent of the $BOD_5$ and TSS in the POTW's influent and disinfection, where appropriate. To ensure that the effluent discharge has received primary or equivalent treatment, 40 CFR § 125.60 requires that the applicant perform monitoring of influent and effluent and assess $BOD_5$ and TSS removal rates based on a monthly average.

Current permit limitations require at least 30 percent removal for $BOD_5$ and at least 50 percent removal for TSS. Figures 12 and 13 demonstrate that the Arecibo RWWTP has met $BOD_5$ and TSS removal requirements for the 2015-2019 permit term, except for four excursions of TSS percent removal between December 2017 and April 2018. According to the renewal application, the excursions were the result of a plant upset caused by damage incurred during Hurricane Maria in September 2017. The plant resumed compliance by May 2018.

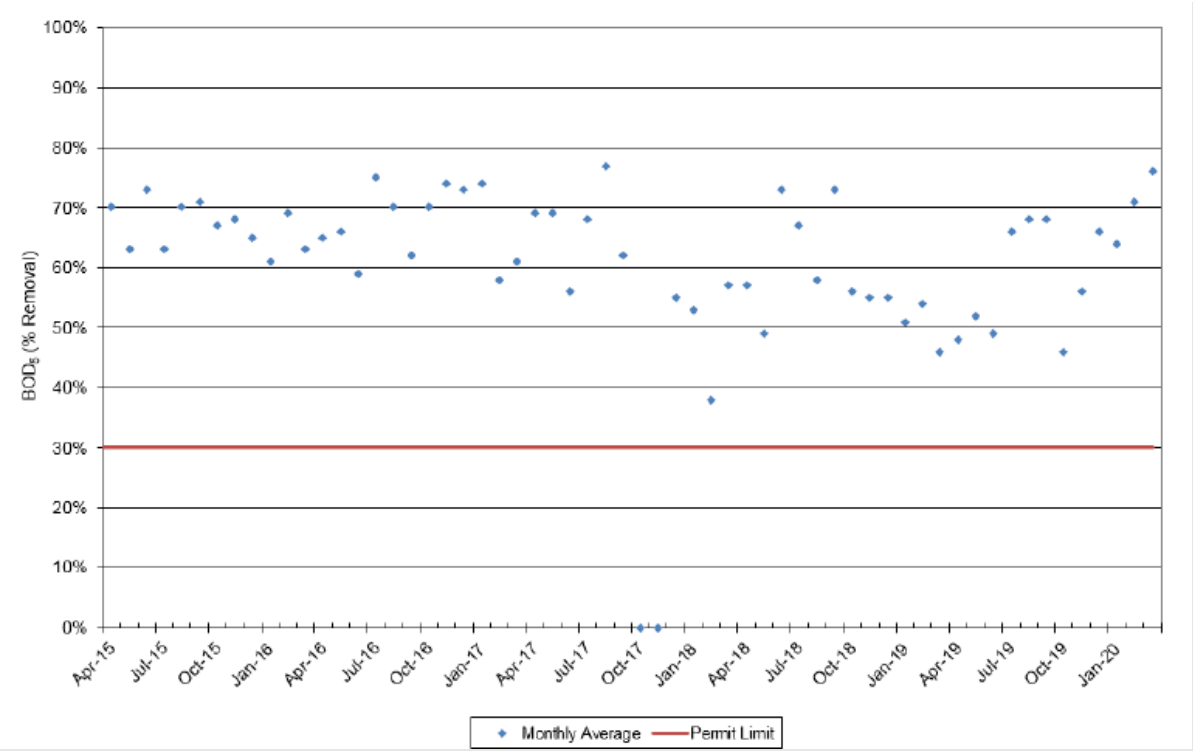


Figure 12. $BOD_5$ percent removal, taken from PRASA's 2020 301(h) renewal application (Jacobs 2020).

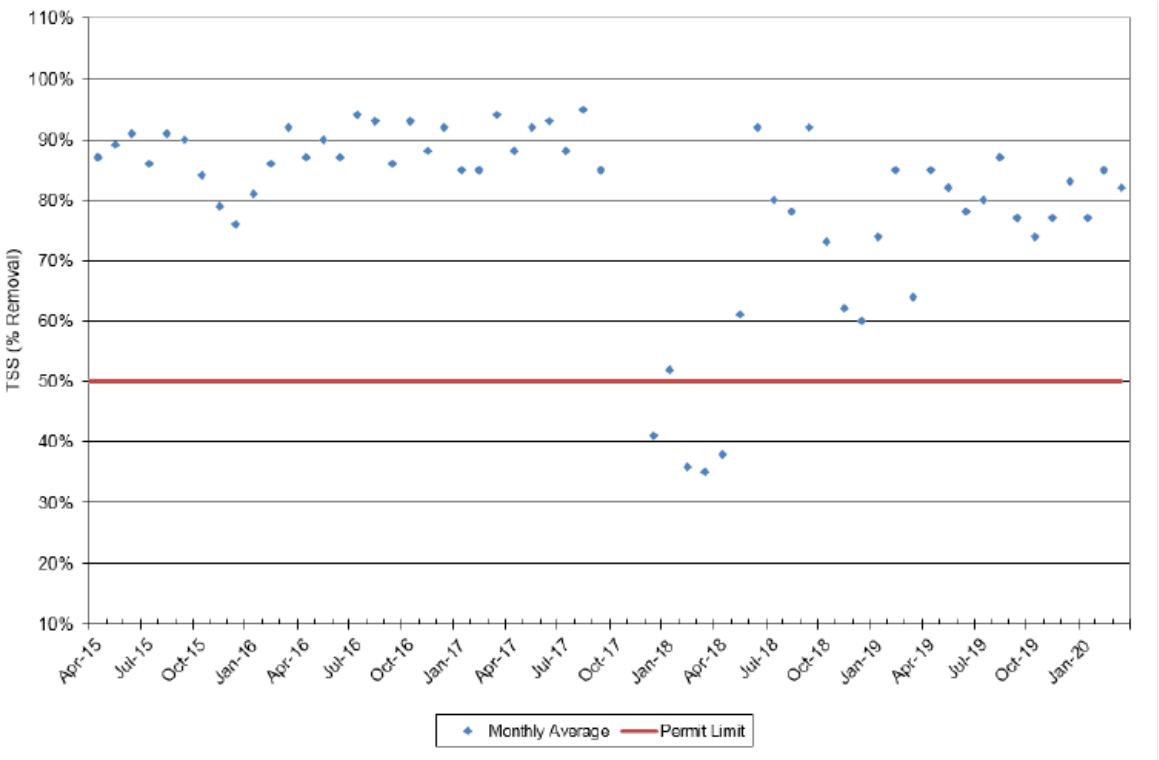


Figure 13. TSS percent removal, taken from PRASA's 2020 301(h) renewal application (Jacobs 2020).

Since 2002, the Arecibo RWWTP has consistently shown that it can achieve at least primary or equivalent treatment with at least 30 percent removal of $BOD_5$ and TSS. Between 2002 and 2019, monthly average removal rates for $BOD_5$ ranged from 35 percent (August 2003) to 86 percent (December 2004) and removal rates for TSS ranged from 35 percent (March 2018) to 97 percent (December 2004).

The proposed limitations reflect those established in the current modified permit for the Arecibo RWWTP and are consistent with the requirements of Section 301(h) of the Act for primary treatment of influent based on a minimum of 30 percent removal of $BOD_5$ and TSS. Because the applicant has performed monitoring and ensured, based on the monthly average results of the monitoring, that the effluent it discharges has received primary or equivalent treatment, EPA concludes that the applicant has met the requirements of Section 301(h)(9), 40 CFR § 125.60.

## COMPLIANCE WITH APPLICABLE PROVISIONS OF COMMONWEALTH, LOCAL, OR OTHER FEDERAL LAW OR EXECUTIVE ORDERS

Under 40 CFR § 125.59(b)(3), a modified permit may not be issued if such issuance would conflict with applicable provisions of Commonwealth, local, or other federal laws or Executive Orders. As part of the renewal application, the applicant must demonstrate compliance with all applicable Commonwealth and federal laws, regulations and Executive Orders which include the Coastal Zone Management Act, the Marine Protection Research and Sanctuaries Act, and the Endangered Species Act.

### 1. Coastal Zone Management Act

Under 40 CFR § 125.59(b)(3), a modified permit must comply with the Coastal Zone Management Act (CZMA) of 1972, as amended, 16 U.S.C. § 1451 et seq. In accordance with 16 U.S.C. § 1456(c)(3)(A), and its implementing regulations, a 301(h) modified permit may not be issued unless the proposed discharge is certified by the Commonwealth of Puerto Rico to be consistent with the Commonwealth's Coastal Zone Management Program. The Arecibo RWWTP's outfall and diffuser are located in a coastal area managed by the Commonwealth's Coastal Zone Management Program. On August 23, 2023, the Puerto Rico Planning Board granted a CZMA consistency certification for the modified discharge from the Arecibo RWWTP (Puerto Rico Planning Board 2023).

### 2. Marine Protection, Research and Sanctuaries Act

40 CFR §l25.59(b)(3) provides that issuance of a section 30l(h) modified permit must comply with Title III of the Marine Protection, Research and Sanctuaries Act (MPRSA), l6 U.S.C. § l43l et seq. In accordance with 16 U.S.C. § 1434(d), a 30l(h) modified permit may not be issued for a discharge located in a marine sanctuary designated pursuant to Title III of the MPRSA if the regulations applicable to the sanctuary prohibit issuance of such a permit.

The Arecibo RWWTP's outfall is not located in a marine or estuarine sanctuary designated under Title III of the MPRSA. This was confirmed in a June 4, 1987 letter from NOAA. Because the location of the outfall has not changed and a marine or estuarine sanctuary has not been designated under Title III of the MPRSA near the Arecibo RWWTP outfall, NOAA's 1987 determination is sufficient to meet the requirements of 40 § CFR 125.59(b)(3).

### 3. Endangered Species Act

Under 40 CFR § l25.59(b)(3), a section 30l(h) modified permit may not be issued if the proposed discharge will adversely impact threatened or endangered species or critical habitat listed pursuant to the Endangered Species Act (ESA), 16 U.S.C. § 1531 et seq. Because threatened or endangered species might occur in the vicinity of the Arecibo RWWTP outfall, PRASA prepared a Biological Evaluation (BE) to evaluate the potential effects of the Arecibo RWWTP discharge on threatened and endangered species and critical habitat (Jacobs 2020b). In a letter dated June 1, 2020, NMFS concluded that the effects of the 301(h) waiver are not likely to adversely affect the subject ESA-listed species (NOAA NMFS 2020). In a letter dated August 15, 2023, the US Fish and Wildlife Service (USFWS) concluded that the discharge may affect, but is not likely to adversely affect, the Antillean manatee, and no adverse impacts to designated critical habitat are anticipated (USFWS 2023).

### 4. Magnuson-Stevens Fishery Conservation and Management Act

Under 40 CFR § 125.59(b)(3), a modified permit must comply with applicable provisions of Federal laws including the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) of 1976, 16 U.S.C. § 1801 et seq., which protects against adverse impacts to

Essential Fish Habitat (EFH). As required by MSFCMA, EPA must demonstrate that an approval of a 301(h) waiver for the Arecibo RWWTP will not result in adverse impact to any EFH. In a letter dated June 6, 2024, NOAA NMFS concluded that no EFH Conservation Recommendations are required (NOAA NMFS 2024).

### 5. Executive Order on Coral Reef Protection

On June 11, 1998, the President issued an Executive Order on Coral Reef Protection directing federal agencies to expand research, preservation, and restoration activities for the protection of coral reef ecosystems. As described previously, there are no significant coral reefs in the vicinity of the outfall. In the letter dated June 1, 2020, NMFS noted that the previous August 13, 2013 concurrence considered all currently listed coral species (NOAA NMFS 2020). In the letter, NMFS concurred with PRASA' s determination that the Arecibo RWWTP discharge may affect, but is not likely to adversely affect, coral critical habitat and that the Arecibo RWWTP discharge will have no effect on ESA-listed corals. Therefore, EPA has determined that the modified discharge is consistent with the Executive Order on Coral Reef Protection.

At this time, EPA is not of aware any additional Commonwealth or local laws that need to be addressed prior to issuance of a final modified permit for the Arecibo RWWTP.

## COMMONWEALTH CONCURRENCE OF SECTION 301(h) MODIFICATION

Under 40 CFR §§ 125.61(b)(2) and 125.64(b), the applicant must provide a determination signed by the state or interstate agency authorized to provide certification under 40 CFR §§ 124.53 and 124.54 that the modified discharge will comply with applicable provisions of Commonwealth law including water quality standards. The state determination shall include a discussion of the basis for its conclusion. Furthermore, pursuant to 40 CFR §§ 124.53 and 124.54, the Commonwealth of Puerto Rico must either grant a certification pursuant to Section 401 of the Act or waive this certification before EPA may issue a modified permit.

In May 2020, PRASA requested a determination from the DNER that the modified discharge from the Arecibo RWWTP will comply with all applicable provisions of Commonwealth law. On October 28, 2023, the DNER issued a WQC that certified that the modified discharge will comply with all applicable provisions of Commonwealth law including applicable water quality standards and will not result in any additional treatment requirements on any point or nonpoint sources (DNER 2023).

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