2018
Commonwealth of the Northern Mariana Islands
305(b) and 303(d),
Water Quality Assessment Integrated Report

Photo: Scott Eck – Grotto Cave

Bureau of Environmental and Coastal Quality
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EXECUTIVE SUMMARY

The 2018 Commonwealth of the Northern Mariana Islands' (CNMI) 305(b) and 303(d) Water Quality Assessment Integrated Report is based on pertinent research data provided by various government and non-government agencies, and water quality data collected during fiscal years 2016 through 2017 (September 1, 2015 through October 31, 2017).

Commonwealth of the Northern Mariana Islands Coastal Waters

There are 240.5 ocean shoreline miles in the CNMI as listed in Table I-a, in Appendix I. During this reporting cycle, 140.4 ocean miles (58%) were found to be fully supporting all the designated uses set forth in the Clean Water Act (CWA), which make them "fishable and swimmable". This includes the *Support and Propagation of Aquatic Life, Fish and Shellfish Consumption, Recreational Use, and Aesthetic Enjoyment* Designated Uses (DU).

The remaining 100.1 coastal shoreline miles were unsupportive of at least one DU, or lacked sufficient information to assess their attainment. Coastal water impairments were either caused by pollutant concentrations exceeding the CNMI Water Quality Standards (WQS), and/or by a non-pollutant. Examples of non-pollutants include: diminished Aquatic Life Support Function (ALUS), alteration of hydrology, invasive species, etc. There were 30.1 ocean shoreline miles impaired due to a "Poor" ALUS ranking, This resulted in non-support of the *Propagation of Aquatic Life* DU, which included 6.7 coastal miles surrounding Saipan, 2.6 miles surrounding Rota, 20.8 miles surrounding Tinian.

Of the CNMI's coastal shoreline miles that were impaired by a pollutant, exceedances of the WQS for dissolved oxygen, phosphate and *Enterococci*, were the most frequent causes for 303(d) listing a waterbody as impaired. However, past erroneous orthophosphate data reported in the 2004 Integrated Report, and a lack of new data for Tinian and Rota is the only reason this cause is still listed this reporting cycle.

Of the 50.5 coastal miles impaired due to *Enterococci* (21% of CNMI coastal miles), of these 17.8 miles surround Rota, and 32.7 miles surround Saipan. As in previous years the most common sources of *Enterococci* contamination are from point sources, such as failing sewer lines and other municipal wastewater collection, or individual on-site wastewater collection systems, and non-point sources (NPS). NPSs include: 1) sediment-laden storm water runoff with naturally occurring *Enterococci* from urban runoff, secondary coral roads, erosion from construction sites and new developments, etc.; 2) Illicit wastewater discharges from animal pens and outhouses; 3) waste from free range feral and domestic livestock; and 4) in the case of remote tourist locations, an increase in visitor numbers in conjunction with a lack of available public restroom facilities at these sites.

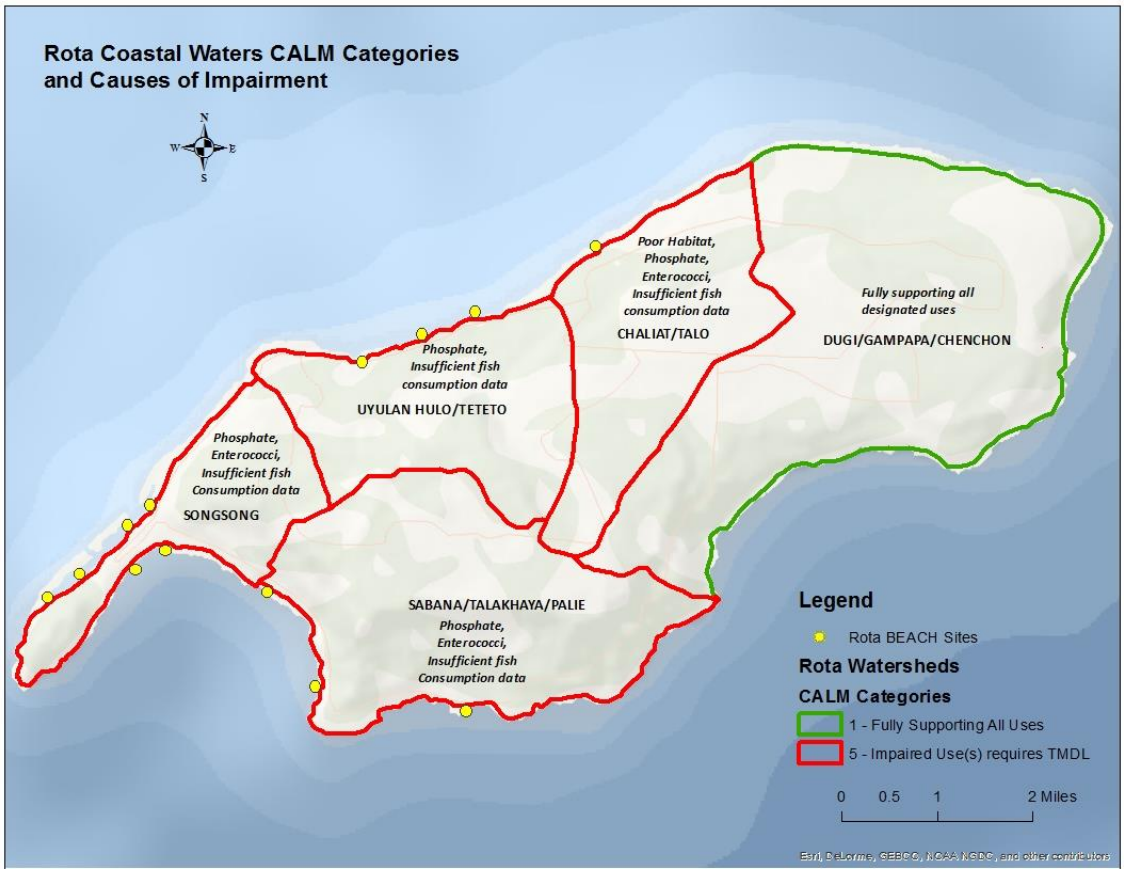
Of note, "*The Total Maximum Daily Loads for Coastal Waters Impaired by Bacteria on Saipan*", hereafter cited as the 2017 TMDL, was approved by EPA and is being implemented. (2017, Paradigm Environmental).

Figures I – III., on the following pages depict the various causes of coastal water impairment, as well as the watershed's Consolidated Assessment and Listing Methodology (CALM) category.

FIGURE I. Saipan Coastal CALM Categories and Causes of Impairment

The Tables containing all CNMI waterbodies' CALM Category assignments are contained in Appendices IV-VII, at the end of this report.

FIGURE II. Rota Coastal CALM Categories and Causes of Impairment



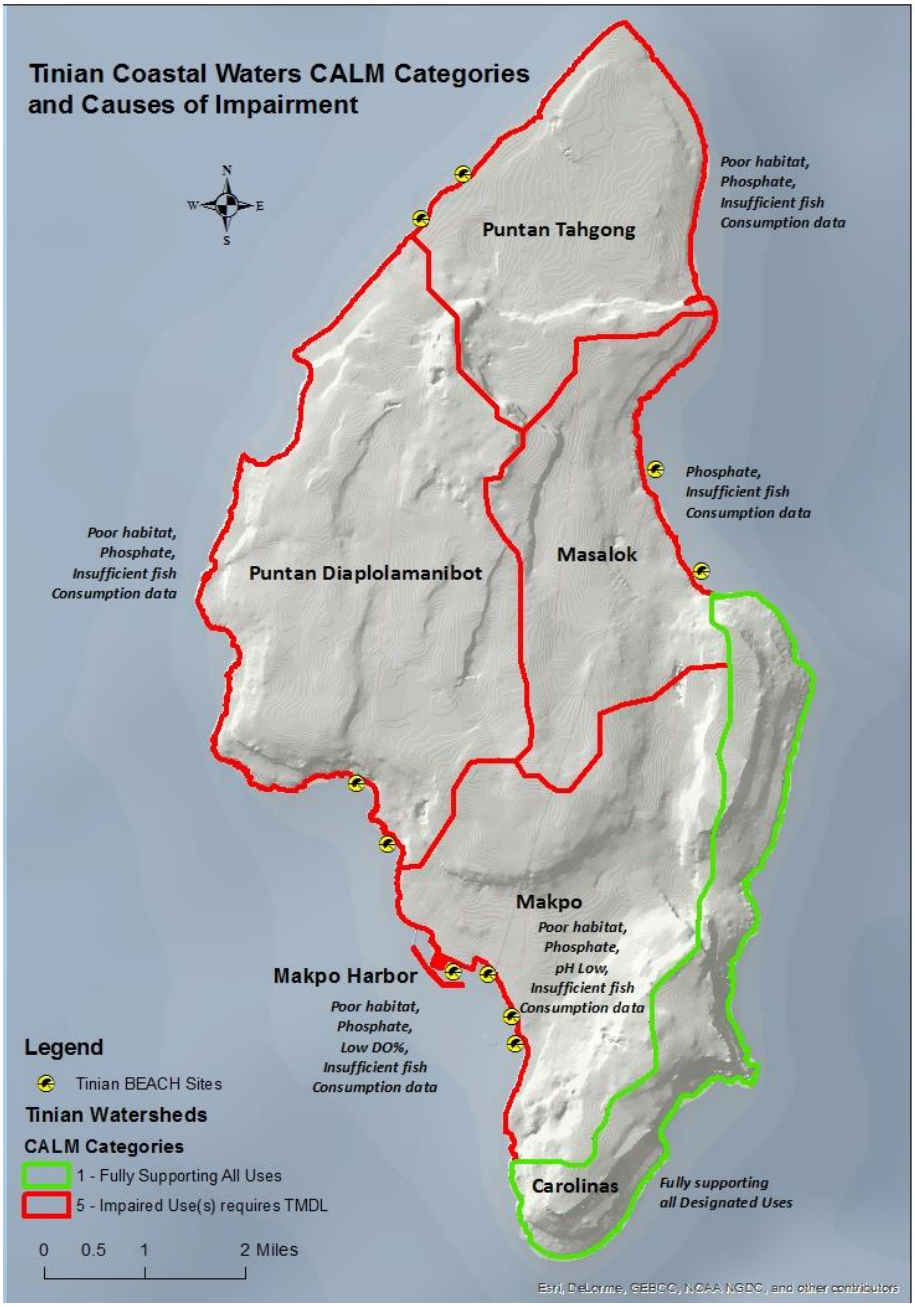
Of note, many of CNMI coastal waters showed a marked decrease in the percent of *Enterococci* violations since last reporting cycle. Saipan's decrease is associated with upgrades to the municipal sewer system, completion of Phase I through III of the Cross Island Road Reconstruction project, construction of roadway storm water Best Management Practices (BMPs), as well as a reduction in rainfall.

The abundant rains experienced at the beginning of the strong El Nino events in 2015 through 2016, were followed by a very dry post-Peak phase starting in June 2017 to present (NOAA website: https://www.climate.gov/news-features/blogs/beyond-data/hawaii-and-pacific-islands-2017-has-been-anything-normal).

Rota and Tinian's reduction in percent of violations of the WQS for the Fecal Indicator Bacteria (FIB) *Enterococci* are also associated with reduced rainfall in 2017, as well as a substantive decrease in the islands' populations and wastewater production during last, and this reporting

cycle. The reduction is associated with a downturn in the economy and a decrease in number of foreign workers allowed to remain in the CNMI by the Federal government. This is part of the federal administration's limitation on the number of foreign workers allowed in the CNMI.

FIGURE III. Tinian Coastal Categories and Causes of Impaired Designated Uses



As to the other DUs, only *Aesthetic Enjoyment* is fully supported by all CNMI coastal waters.

CNMI Stream Systems

There has been significant amount of ground-truthing of streams systems assessments on Saipan and Rota, but not all have been fully evaluated to date. Tinian, Aguigan, and Mañagaha islands do not have existing stream systems. This reporting cycle, the 2017 National Hydrography Dataset (NHD) was finalized by the US Geological Survey (at a resolution of 1:24,000 scale), and the Wetland and Streams Geographical Information System (GIS) data layer was updated by BECQ. This data layer provides more accurate delineation of existing intermittent (flowing in response to rainfall), and ephemeral (normally dry most of the year) streams than in previous reports, as well as wetlands and lakes on Saipan. It is now estimated that 100.5 stream miles are in existence within the CNMI, of which 44.2 stream miles were found impaired for at least one cause, with exceedances of the WQS for *Enteroccocci* being the most frequently 303(d) listed impairment.

CNMI Wetlands

To date, not all wetlands have been delineated or fully assessed. This is due to logistical issues and accessibility, especially to the Northern Islands. The total acreage for all wetlands was reported to be 681 acres in previous IRs. However, using the most recent delineations, the 2017 NHD and Wetland and Streams GIS data layers, and a 2015 survey of Tinian conducted for the Pacific Naval Facilities Engineering Command as part of the CNMI Joint Military Training (CJMT) Environmental Impact Statement (EIS), 717.8 wetland acres of have been measured on the islands of Saipan, Tinian, Rota and Pagan.

CNMI Lakes

There are only four lakes in the CNMI archipelago. Susupe Lake on Saipan is considered the most impaired. The remaining three lakes in the Northern Islands, one on Anatahan, and two on Pagan, have limited anthropogenic stressors. There are reportedly, less than 15 people living on these islands at any one time, and they circulate between Anatahan, Alamagan, and Pagan. Some individuals do not live there permanently, but return to the inhabited islands for supplies, or to attend to medical conditions, (2018 communication, Carlos Ketebengang, BECQ Env. Specialist).

In regards to the *Potable Water Supply* DU, no surface waters within the CNMI are used as a potable source, only ground water. In general, the quality of ground water used for Public Water Systems (PWS) meets EPA Primary Drinking Water Standards. Although there are isolated incidents of ground water contamination from underground or aboveground storage tanks, the CNMI Commonwealth Utility Corporation (CUC) minimizes the threat of these pollutants from entering the general PWS by employing a large number of production wells. These wells are spread extensively over the islands' entire land surface. CUC pumps wells at relatively low flow rates to diminish infiltration. With that said, salt water intrusion, although not an EPA Primary Drinking Water concern, remains a significant issue on Saipan due to general unpalatability.

In conclusion, it is unsurprising that most microbial violations are in areas in close proximity to sewer lines, manholes, or large heavily populated storm water drainages. True microbial violations are usually adjacent to failing sewers, overflows, or poorly constructed or aging homes,

businesses, or apartments with failing on-site wastewater collection systems. Some sites are near subsistence farms that lack BMPs to capture waste from free roaming domestic livestock, or near beaches with large bird populations, feral dogs and cats, or near drainages and wetlands that are home to feral pigs.

However, it should be noted that some public beach advisories happen at sites unlikely to have true fecal contamination. These sites are often at remote coastlines with high surf, or drainages carrying soil-laden storm water with naturally occurring *Enterococci* that is known to grow in tropical environments. In these instances, the exceedances would trigger a public beach advisory even though there is little chance of actual fecal contamination that could cause a potential human health risk.

Key recommendations for addressing identified point, and NPS water quality impairments in the CNMI, is for Bureau of Environmental and Coastal Quality (BECQ) to continue collaborating with local and federal agencies and watershed communities to implement restoration activities contained within community vetted Conservation Action Plans (CAP) and in the 2017 TMDL.

In addition, BECQ has expedited the manner in which potential point sources of sewage discharges and storm water contaminants are brought to the attention of the CUC field crew using tablets, Global Positioning Systems (GPS), and GIS mapping. CUC is now alerted immediately whenever "spikes" in *Enterococci* levels occur, or whenever overflows, sewage odors, or failing lift stations are observed during routine sampling. In this way, corrective measures are put into place as quickly as possible resulting in more timely resolution of pollution events.

BECQ also provides training to the Department of Public Works (DPW) and the Mayors' Offices on proper road grading and maintenance techniques to minimize NPS of contamination. BECQ assists with planning roadway improvements, such as sedimentation basins, swales, rain gardens, storm water catchments, and other BMPs.

The BECQ Water Quality Surveillance and NPS (WQS/NPS) Program continues to conduct sanitary field surveys in impaired watersheds to identify other possible NPSs of contamination and collaborates with watershed stakeholders and farmers to avail information and funding to improve watershed health. A primary partner is the United States Department of Agriculture (USDA) Natural Conservation Service (NRCS) through their Environmental Quality Incentive Program (EQIP). This program continues to provide essential financial assistance for farmers to build dry litter piggeries, erect solar voltaic fencing to prevent cattle from free-range grazing, and construct animal wastewater treatment systems to prevent contamination of CNMI waterbodies.

Aside from the efforts listed above, convincing the public, business community, and political leadership of the value of earmarking water pollution prevention funding to expand sewer infrastructure, provide regular maintenance of these facilities and storm water drainages, *and* to dedicate public land for BMPs, has been the primary obstacle in making major improvements to CNMI water quality.

A summary of CNMI waterbody assessment methodology, and assessment results (causes and sources of impairment) are discussed in Section C.2., and C.3., of this report respectively.

Subsequently, further detail is provided about each waterbody segment (watershed) in the three inhabited islands, and in the Northern Islands in Section C.4 that follows. Readers wishing to learn more about the health of watershed in which they live or work are directed to the table of contents to navigate directly to the page of interest.

PART A. INTRODUCTION

The Late Governor of the CNMI, Eloy Inos, merged the Division of Environmental Quality (DEQ) and the Coastal Resources Management office (CRM) into BECQ in 2014. BECQ is responsible for monitoring, assessing, and protecting water quality within the CNMI, as well as managing land, air, water, and coastal quality. Both Commonwealth and U.S. Federal and laws and regulations mandate this responsibility.

The WQS/NPS was formed in 2012, prior to the merger of BECQ. This Branch is principally responsible for the BEACH monitoring Program, which includes collecting water quality samples, analyzing physical and chemical water quality criteria in the field, and assisting the BECQ Marine Monitoring Team (MMT) in collecting biological criteria data. In addition, the WQS/NPS branch uses visual field assessments and remote GPS sensing to: conduct watershed surveys; identify causes of contamination; and map the potential sources of contamination. WQS/NPS then collaborates with other BECQ branches and CUC to prevent further contamination and subsequently, remediate or restore waterbodies as much as possible to their natural state.

The CNMI waterbody DU are defined in detail within the CNMI Water Quality Standards (WQS), and Section C.2.2., of this 305(b) and 303(d) Water Quality Assessment Integrated Report (henceforth referred to as the "IR"). In short DUs include: *Support of Aquatic Life and Coral Reef Conservation; Fishing and the Consumption of Fish and Shellfish; Recreation in and on the Water; and Aesthetic Enjoyment*. Surface waters have one additional DU, availability as a *Potable Water Supply*.

These findings are compiled into an EPA ATTAINs database to calculate the miles of shoreline and streams, and acres of wetlands and lakes impaired. This reporting cycle, the ATTAINS database will be used for the first time with substantial changes to the size of waterbody segments' boundaries as the result of using the new 2017 NHD and Wetland and Stream GIS data layers, more recently ground-truthed visual field assessment data, and newly delineated Saipan watershed catchment basins. The identified impaired waters are then included in the 303(d) list in Section C.3.2., of this report, thus satisfying the requirements of Sections 303(d), 305(b), 314, and 319 of the CWA.

In this IR, monitoring data collected from October 1, 2015 through September 30, 2017 were analyzed and compared to previous fiscal years to assess each waterbody's health. A waterbody is "healthy" when it fully supports all of its DUs.

In addition, observed trends are also assessed and assigned one of the five (5) US EPA recommended CALM Categories. These range from CALM Category 1 where all DUs are supported, to Category 5 where at least one DU is not being supported. Category 5 requires that a TMDL be established for each pollutant in the waterbody. The TMDL is used to focus natural resource management and restoration efforts to minimize the source(s) of impairment.

This IR is the principal means by which the CNMI BECQ, Congress, and the public evaluate whether CNMI waters are meeting WQS, thus ensuring that all DUs are supported, and CNMI waters are "fishable and swimmable".

PART B. BACKGROUND INFORMATION

B.1. ALL CNMI SURFACE WATERS

The CNMI consists of two geologically distinct island chains located at 145° E latitude, and between 14° – 21° N longitude (Figure B-1., On the following page). The four *southern* Mariana Islands are around 41 million years old and were initially formed by volcanic activity, which permanently ceased around 10 million years ago. The present composition and terraced appearance of the southern Marianas is the result of limestone reef deposition, geologic uplifting, and shifting sea levels. The Northern Islands lie to the northwest, residing on the still volcanically active Mariana Ridge.

Archaeological findings by Carson in 2016, validate the earliest human cultural presence on the islands as being "slightly older than 1500 B.C. (2017, Carson, M.T., and Hung, H).

This IR contains information primarily about the three southernmost islands of Saipan (including "Mañagaha", a small sand cay in Saipan's lagoon), Tinian, and Rota, where the vast majority (89 %) of the CNMI population lives and recreates (2010, CNMI census data). Information is also provided on the Northern Islands, as Pagan has been targeted for homestead development, and most recently, militaristic training exercises by the US Department of Defense (DoD). In addition, the marine waters surrounding the three northern most Islands of the archipelago, Uracas ("Farallon de Pajaros"), Maug, and Asuncion, were selected for further protection by US presidential proclamation through the establishment of the Marianas Trench Marine National Monument in 2009.

FIGURE B-1. The Commonwealth of the Northern Marianas Islands

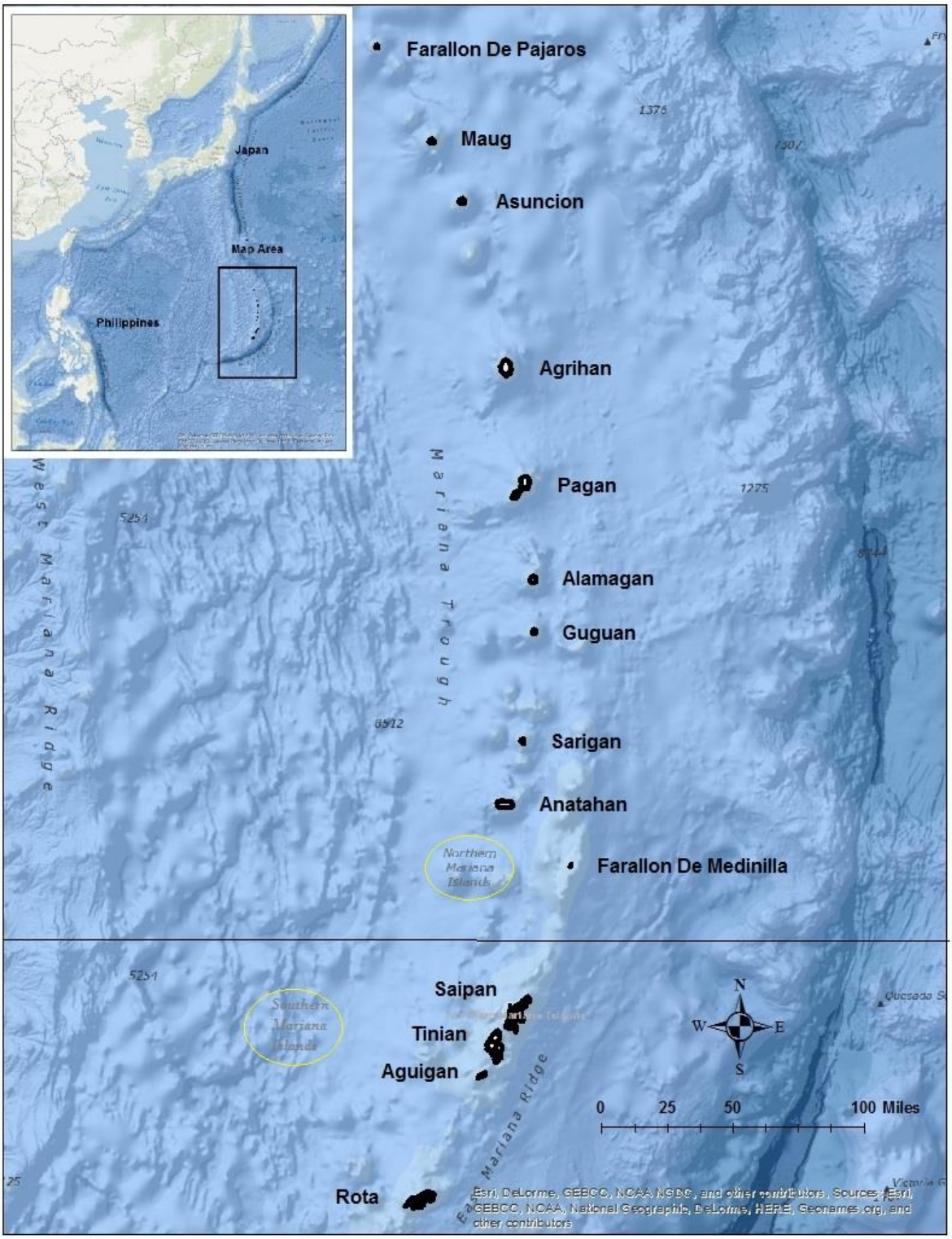


TABLE B-1. Size of CNMI Surface Waters Assigned to Reporting Categories

Topic	Value	Source
CNMI Population	53,883	2010 US Census (April 2015)
Total Miles of Streams	100.5	2017 NHD Wetland and Stream GIS data Layer
- Non-perennial Streams	96.41	
- Miles of ditches or canals	4.1	
Number of Publically Owned Lakes	4	2016 Imagery, 2017 NHD
Acres of Publicly Owned Lakes	267.4	2016 Imagery, 2017 NHD
Square Miles of harbors and bays	6.6	2016 Imagery, 2017 NHD
Miles of Ocean Coast	240.5	2016 Imagery
Acres of Wetlands	717.8	2017 NHD GIS data Layer
Acres of Tidal Mangrove Wetlands	61.4	2017 NHD GIS data Layer

[1] Stream length does not include Northern Islands' streams
[2] Lake Acres includes Susupe on Saipan, two lakes on Pagan, and one on Anatahan.

B.1.1. Monitoring Water Quality of Saipan and Mañagaha

Saipan is the capital of CNMI and the largest and most populated of the islands, with 48,220 inhabitants (CNMI Census, 2010). Saipan has five Marine Protected Areas including: Mañagaha Marine Conservation Area (Waterbody Segment #23); Bird Island Marine Sanctuary (Kalabera, Segment #12); Forbidden Island Marine Sanctuary (Kagman, Segment #14); Lau Lau Bay Sea Cucumber Sanctuary (Dan Dan Segment #16); and the Lighthouse Reef Trochus Sanctuary (Susupe North, Segment #18A).

Due to the size of Saipan's population, annual visitor numbers, and ongoing rapid development since 2015, anthropogenic threats to Saipan's MPAs water quality are greater than that to Rota, Tinian, or the Northern Islands.

This and the fact that BECQ has only a few staff dedicated to marine and surface water quality monitoring has resulted in more resources being dedicated to analyzing waterbodies on Saipan, and primarily on Saipan's west coast which has the largest number of visitors daily. Saipan's east beaches and Mañagaha are monitored less often. They are monitored on a rotational eight (8) week schedule to ensure that contaminants and other data are collected on at least a quarterly basis to capture seasonal changes.

B.1.2. Monitoring Water Quality of Rota and Tinian

Like Saipan's east beaches and Mañagaha, the less densely populated islands of Rota and Tinian, are monitored on a rotational eight (8) week sampling schedule. Rota has one designated MPA,

the Sasanhaya Bay Fish Reserve (Sabana/Talakhaya/Palie Watershed, Segment #2). Tinian also has one MPA, the Tinian Marine Reserve (Makpo, Segment #9).

B.1.3. Monitoring Water Quality of Northern Islands

The 10 other northernmost islands (see Figure B-1., on page 9), commonly referred to as the "Northern Islands", are not routinely monitored, and rarely visited.

Only the islands of Agrihan, Pagan, and Alamagan are occasionally inhabited by a few families. As was mentioned above, the marine waters surrounding the three most Northern Islands, Uracas (Segment #33), Maug (Segment #32) and Ascuncion (Segment #31), were designated as the *Marianas Trench National Marine Monument* in January 2009, by then President George W. Bush. "The Monument consists of three units: the Islands, Trench, and Volcanic Units covering 96,714 square miles of submerged lands cooperatively managed by the US Secretary of Commerce (NOAA), and Secretary of the Interior (US Fish and Wildlife Service) in coordination with the Department of Defense and the CNMI government." (www.fpir.noaalgov/MNM/mnm_marians-trench.html).

The 2014 CNMI IR reevaluated the Northern Islands based on marine water quality, and biological criteria data collected by the multi-agency "Bottomfish Research Cruise"; but based on considerably less data than is available for the southern islands. That cruise was conducted in June through July aboard the NOAA R/V Oscar Elton Sette. Data analysis deemed that all of the Northern Islands were fully supportive of all DUs. This is reinforced by the fact that the islands are remote and lack major developments, making anthropogenic sources of pollutants highly unlikely. Subsequent visits by NOAA vessels in 2015 (NOAA R/V Oscar Elton Sette), and 2016 (NOAA R/V Okeanos Explorer) also found these to be high quality islands with outstanding and valuable resources for the CNMI. Like waters of other National Parks, marine sanctuaries, and wildlife refuges, they have exceptional recreational and ecological significance.

B.1.4. CNMI Classification of Marine Coastal Water Uses

The CNMI also has two Classes of marine waters designated in the WQS, Class AA (highest quality) and Class A.

B.1.4.1. Class AA Coastal Waterbodies

The majority of CNMI waters are Class AA meaning that they shall remain in their natural pristine state as much as possible with an absolute minimum of pollution or alteration of water quality from any human-related source or actions. Waterbodies in industrial or harbor areas are Class A.

The DUs protected in both classes of waters are: *the support and propagation of marine life; conservation of coral reefs and wilderness areas; oceanographic research; aesthetic enjoyment and compatible recreation inclusive of whole body contact (e.g. swimming and snorkeling); and other related activities* in keeping with the intent of the CWA to maintain these waters as "fishable and Swimmable".

In addition, the 2017 revision of the CNMI WQS adopted an anti-degradation policy that provides for three tiers of protection for waterbodies, based on their attributes as specified in the 2012 EPA Recreational Water Quality Criteria. Tier 3 are high quality waters, which constitute an outstanding CNMI resource, where lowered water quality is prohibited. This is followed by Tier 2 where the waters' quality exceeds the levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, but whose quality may be lowered if necessary to accommodate important economic or social development. Finally, Tier 1 are all waterbodies where the existing level of quality routinely falls below or just above the applicable water quality criteria for DUs, which requires a minimum level of water quality necessary to protect its existing uses.

As seen in Table B-2., on the following page, all of the Northern Islands' coastal waters have been designated as Tier 3. This is important to note as the present frequency of inhabitants on the Islands and their population density could change in the future should homesteads be built, the US expand military training exercises there, or the CNMI tourism industry increase visitor travel to these islands. This poses a new threat, which requires further study to establish baselines and to regularly monitor and maintain these waterbodies as required by the CNMI WQS and the CWA.

Mañagaha, Aguigan, Tinian and Rota beaches (outside of their harbor areas), are also designated as Tier 3. They have exceptional resource value due to their relatively pristine state, and the small population having limited potential for causing anthropogenic stresses therein.

In comparison, Saipan's recreational beaches on the western shore are more densely used by residents and tourists. This underscores their value, making them an extremely important economic and environmental resource for the CNMI, upon which the tourism economy greatly depends.

The more remote beaches in the far north and on the eastern shore of Saipan have exceptional resource value. For this reason Saipan's Kalabera, Talofofo, LaoLao, DanDan and Banaderu watersheds are also designated as Tier 3. However, the remaining beaches on Saipan's west coast are more easily accessed and have had more impairments from WWII, and anthropogenic stressors from development and poor land use practices, and for this reason they are designated as Tier 2.

Tier 1 waters are those remaining beaches located adjacent to the industrial port areas and harbors of Saipan, Tinian and Rota; or near Saipan's treated municipal wastewater outfalls. These waterbodies are also designated for use as Class A marine waters in the CNMI WQS.

B.1.4.2. Class A Coastal Waterbodies

Class A waters in the CNMI are limited to Saipan's Puerto Rico "Industrial" area, which is 3000 feet from the shore and contains the seaport, marinas, and Sadog Tasi municipal Wastewater Treatment Plant (WWTP) outfall located in Lower Base (Figure B-2 on the following pages). Class A waters also include a 1,000 foot radius surrounding the Agingan Point municipal WWTP outfall on the southern tip of Saipan in the Isley Watershed.

TABLE B-2. Classification of Coastal Water Uses and Waterbody Tier Designations

Island	Water Body	Segment	Class	Tier	Reason for Designation
Saipan	Puerto Rico Industrial Area	19A	A	1	Commercial port / Municipal wastewater outfall
	Agingan Point	17A, 18B	A	1	Municipal wastewater outfall
	Kalabera	12	AA	3	High quality / Outstanding resource
	Talofofo	13	AA	3	High quality / Outstanding resource
	Kagman	14	AA	2	Support propagation of fish, recreation
	LaoLao	15	AA	3	High quality / Outstanding resource
	DanDan	16	AA	3	High quality / Outstanding resource
	Isley	17A&B	AA	2	Support propagation of fish, recreation
	Susupe	18A&B	AA	2	Support propagation of fish, recreation
	W.Takpochao	19A,B&C	AA	2	Support propagation of fish, recreation
	Achugao	20A&B	AA	2	Support propagation of fish, recreation
	As Matuis	21	AA	2	Support propagation of fish, recreation
	Banaderu	22	AA	3	High quality / Outstanding resource
Managaha	All beaches	23	AA	3	High quality / Outstanding resource
Rota	East Harbor	3	A	1	Commercial port
	West Harbor	3	A	1	Commercial port
	All others	1-2, 4-5	AA	3	High quality / Outstanding resource
Tinian	San Jose Harbor	9	A	1	Commercial port
	Aguigan "Goat Island"	6	AA	3	High quality / Outstanding resource
	All others	7-8, 10-11	AA	3	High quality / Outstanding resource
Northern Islands	Farallon de Pajaros "Uracas"	33	AA	3	Marine National Monument
	Maug	32	AA	3	Marine National Monument
	Asuncion	31	AA	3	Marine National Monument
	Agrihan	30	AA	3	High quality / Outstanding resource
	Pagan	29	AA	3	High quality / Outstanding resource
	Alamagan	28	AA	3	High quality / Outstanding resource
	Guguan	27	AA	3	High quality / Outstanding resource
	Sarigan	26	AA	3	High quality / Outstanding resource
	Anatahan	25	AA	3	High quality / Outstanding resource
	Farallon de Medinilla	24	AA	3	High quality / Outstanding resource

FIGURE B-2. Class A Waters within 3000 ft of Puerto Rico Industrial Area, Saipan

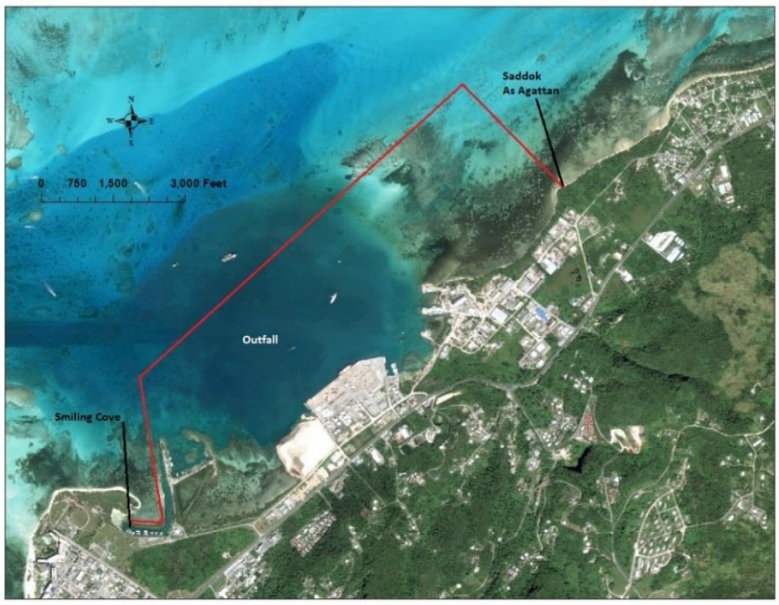
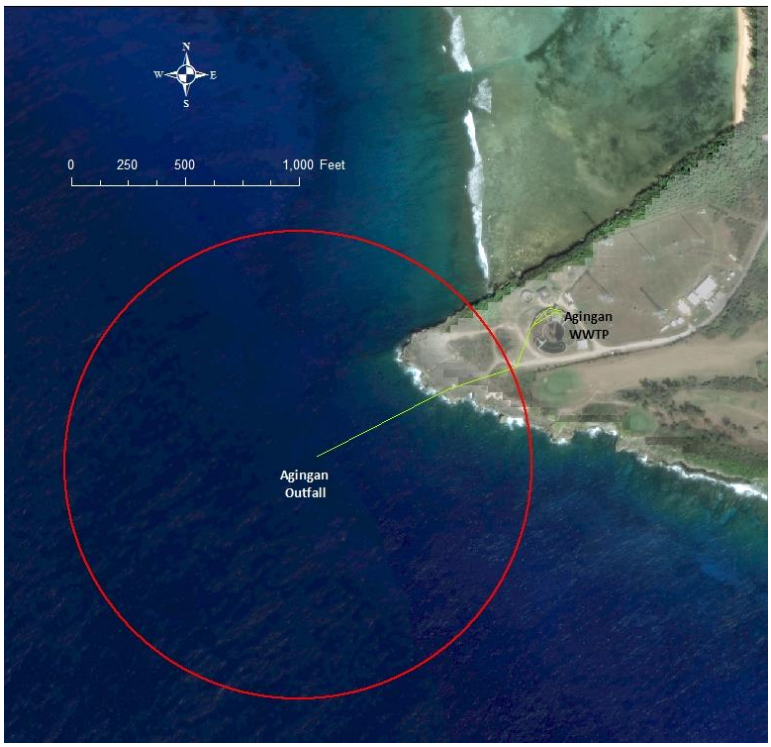


FIGURE B-3. Class A Waters within 1000 ft of Agingan Outfall (15°7’ 7.9 N, 145°41’18.3 E), Saipan



The other Class A waters are limited to the existing harbors on Tinian and Rota.

FIGURE B-4. Class A Waters of San Jose Harbor, Tinian

FIGURE B-5. Class A Waters of East and West Harbor, Rota

Class A waters are protected for their *Recreational* and *Aesthetic Enjoyment* DUs. The WQS allows for other uses as long as those uses support the *protection and propagation of fish and shellfish*, and wildlife, and *recreation in and on the water with limited body contact.* In other words, the DUs recommended in the CWA.

B.1.5. CNMI Classification of Fresh Surface Waterbodies (Streams, Wetlands and Lakes) Uses

The CNMI WQS also define two classes of fresh surface water uses, Class 1 and 2. However, there are no Class 2 surface waters in the CNMI. All surface waterbodies including, intermittent and ephemeral watercourses (streams) whether wet or dry, and lakes and wetlands are Class 1. Therefore, all these surface waters are to remain in a pristine state with an absolute minimum of pollution or alteration of water quality from any human-related source or actions in order to meet their Class 1 DUs.

In addition, a Tier 3 status has been designated for those surface waters of high water quality where lowered quality is prohibited. They constitute an outstanding resource and are listed in Table B-3., on the following page.

Streams occur mostly in limited areas where less permeable volcanic materials have been exposed. The raised limestone bedrock of the southern Mariana Islands is extremely permeable and highly erodible. Therefore, most rainfall that does not directly run off into the ocean percolates readily into the ground. The majority of CNMI streams are not tested for water quality on a regular basis due to lack of flow. A few streams sections are wet most of the year, but none of which have measurable flow volumes through their entire length. Most of the islands' seasonally dry streambeds are used for hiking, and training by recreational and professional athletes, which demonstrates their aesthetic value. Freshwater shrimp and eels have been found in some of the more frequently flowing streams with surface pools on Saipan and Rota. BECQ has solicited DLNR DFW to take part in future stream assessments to better capture this data for more informed valuations of streams, and to prioritize restoration activities therein.

To date, only limited water quality data and visual field assessments have been completed on streams beginning with those in high priority watersheds of Saipan and Rota. As more water quality data becomes available and assessments and valuations are completed, streams of high value will be designated as Tier 3 waters due to their important hydrological function, and as sites providing essential native aquatic and wildlife habitat.

There are a low abundance of wetlands, streams, and lakes in the CNMI. Wetlands occur primarily at low elevations where the water table intersects with the land's surface. Wetlands and streams together comprise less than 5% of the land (based on the 2017 NHD and Wetland and Streams GIS data layers). Wetlands alone cover less than 2% of the CNMI, the majority of which are patchily distributed around the islands of Saipan, Tinian, and Pagan. The importance of wetlands as the primary treatment for polluted surface water runoff, and for their hydrological function, wildlife habitat, and marine nurseries, establishes them as high quality waters, which constitute

exceptional CNMI resources. Therefore, all wetlands are designated as Class 1 and Tier 3 waters, as shown in Table B-3., below.

TABLE B-3. Classification of Surface Water Uses and Waterbody Tier Designation

Island	Watershed Name	Segment	Type	Class	Tier	Reason for Designation
Saipan	Talofofo	13WET	Wetland	1	3	Hydrological Function/Aquatic and Wildlife Habitat/Outstanding Resource
	Kagman	14WET		1	3	Hydrological Function/Aquatic and Wildlife Habitat/Outstanding Resource
	DanDan	16WET		1	3	Hydrological Function/Aquatic and Wildlife Habitat/Outstanding Resource
	Isley	17WET		1	3	Hydrological Function/Aquatic and Wildlife Habitat/Outstanding Resource
	Susupe	18WETB		1	3	Hydrological Function/Aquatic and Wildlife Habitat/Outstanding Resource
	West Takpochau	19WET		1	3	Hydrological Function/Aquatic and Wildlife Habitat/Outstanding Resource
	Achugao	20WET		1	3	Hydrological Function/Aquatic and Wildlife Habitat/Outstanding Resource
	Kalabera	12STR	Stream	1	TBD	
	Talofofo	13STR		1	TBD	
	Kagman	14STR		1	TBD	
	Lao Lao	15STR		1	TBD	
	Isley (West)	17STRA		1	TBD	
	Isley (East)	17STRB		1	TBD	
	Susupe (North)	18STRA		1	TBD	
	Susupe (South)	18STRB		1	TBD	
	West Takpochau (North)	19STRA		1	TBD	
	West Takpochau (Central)	19STRB		1	TBD	
	West Takpochau (South)	19STRC		1	TBD	
	Achugao (Achugao)	20STRA		1	2	Hydrological Function/Aquatic and Wildlife Habitat/Outstanding Resource
	Achugao (Dogas)	20STRB		1	2	Hydrological Function/Aquatic and Wildlife Habitat/Outstanding Resource
	Achugao (Agatan)	20STRC		1	TBD	
	As Matuis	21STR		1	TBD	
	Susupe (South)	18LAKB	Lake	1	TBD	
Rota	Sabana/Talakhaya/Palie	2STR	Stream	1	3	High Quality/Hydrological Function /Outstanding Resource
Tinian	Masalok	7WET	Wetland	1	3	Hydrological Function/Aquatic and Wildlife Habitat/Outstanding Resource
	Makpo	9WET		1	3	Hydrological Function/Aquatic and Wildlife Habitat/Outstanding Resource
	Puntan Diaplolamanibot	10WET		1	3	Hydrological Function/Aquatic and Wildlife Habitat/Outstanding Resource
	Puntan Tahgong	11WET		1	3	High Quality/Aquatic and Wildlife Habitat/Hydrological Function /Outstanding Resource
Northern Islands	Pagan	29WET	Wetland	1	3	High Quality/Aquatic and Wildlife Habitat/Hydrological Function /Outstanding Resource
	Anatahan	25LAK	Lake	1	TBD	
	Pagan (West side)	29LAKA		1	3	/Outstanding Resource
	Pagan (Middle)	29LAKB		1	3	High Quality/High Hydrological Function / Outstanding Resource

TBD – To be determined

There are only four lakes within the CNMI, one on Saipan and the rest in the Northern Islands, one is on Anatahan and two are on Pagan. They will be discussed in more detail in Section C.3.4. Section 314 (Clean Lakes Program) of this report.

The ground water resources on the southern islands require careful management. Some ground water resources on Tinian and Rota are under the influence of surface waters but are still used as sources for potable water. However, none of Saipan's surface waters are used in such a manner.

B.2. WATER POLLUTION CONTROL PROGRAM

BECQ's Water Pollution Control Program is comprised of several branches working in coordination, but with different mandates and responsibilities.

B.2.1. Water Quality Surveillance/Nonpoint Source Program

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The WQS/NPS program's primary responsibilities are to enforce the CNMI WQS, monitor marine and surface waters (lakes, wetlands and streams) quality, and notify the public when waters exceed the WQS. The program is also responsible for administering the Section 401 Water Quality Certification Program. These duties ensure that CNMI waters remain fishable and swimmable.

Each year the WQS/NPS Program receives approximately $1.2 million in funding from the Beaches Environmental Assessment and Coastal Health (BEACH) Act, CWA Sections 106 and 319, and from the US Coral Reef Initiative Program. These funds also support the BECQ's Environmental Surveillance Laboratory, NPS demonstration projects, and other education and outreach activities.

B.2.1.1. CNMI Water Quality Standards

The 2014 revision of the CNMI WQS incorporated EPA's 2012 Recreational Water Quality Criteria. This included adding an anti-degradation review for wetlands and Lagoon Areas of Particular Concern (APC), as well as prohibiting any human or animal wastewater discharge within 50ft of a waterbody or water course (whether wet or dry), or 25ft if on an embankment.

The WQS also refers to the *WQS Implementation Guidance Manual*, which provides direction in how resource managers should analyze water quality data in a statistically defensible manner. The manual also contains biological monitoring criteria, which is an integral tool for evaluating coral reefs, seagrasses, and benthic habitats' health. This data augments water quality monitoring data.

The frequency with which water samples exceed the WQS in conjunction with biological marine monitoring data, and information gathered from visual field assessments, are used to identify impaired waterbodies (those not supportive of at least one DU). The WQS/NPS branch compiles this information into this biennial CNMI IR, which contains the list of 303(d) impaired waters.

The 303(d) list steers policy decisions, prioritizes waterbodies, and determines where TMDLs are required, and Conservation Action Plans (CAP) are most needed for remediation and restoration

efforts. CAPs are developed locally through a collaborative process, utilizing the best available science and stakeholder input. This makes the best use of limited financial and available human resources.

B.2.1.2. Water Quality Monitoring and Notification

The WQS/NPS staff collect weekly marine water samples from long-term BEACH monitoring sites discussed in detail in Section C.1.1. In addition, they collaborate with the MMT to conduct biological assessments of benthic, coral reefs, and seagrass habitats. Coastal marine waters, lakes, and streams are analyzed in situ for several physical and chemical parameters. In addition, water samples are brought back to the BECQ Environmental Surveillance Laboratory to test for total suspended solids, nutrients, and FIBs (*Enterococci and E. coli*). The lab provides water quality results to WQS/NPS for identifying exceedances of the CNMI WQS. *Enterococci* exceedances in coastal waters are reported to the general public and visitors in a publicized beach advisory, posted signboards, and on social media.

Spikes or trends in WQS exceedances are further investigated by the WQS/NPS in collaboration with the Wastewater, Earthmoving and Erosion Control (WEEC) branch and the Division of Coastal Resources Management (DCRM) office through visual field assessments of watersheds and lake and stream sampling. Potential point sources and NPS of pollution in upland areas are geo-referenced using GPS. This information is further analyzed with GIS software.

Since the WQS/NPS program began five (5) years ago, there has been a marked improvement in how rapidly point sources of pollution are addressed. As soon as water quality results indicate there has been a point source pollution event, The WQS/NPS and WEEC programs narrow down the potential sources within the watershed. These findings are communicated directly to CUC engineers and field staff so they can examine the suspected sewer lines, lift stations, manholes, etc., for failures in the system, to immediately address the source(s) of contamination.

Should NPSs be identified in the field, WQS/NPS collaborates with DCRM and other watershed stakeholders to implement restoration actions contained in the community vetted CAPs and TMDL recommendations. In addition, BECQ often collaborates with the local NRCS agents to encourage farmers to adopt sanitary agricultural practices and avail assistance from their EQIP program.

B.2.1.3. Section 401 Water Quality Certification Program

The CWA Section 401 Water Quality Certification Program is administered through provisions contained within the CNMI WQS. A 401 Certification is required for every federal permit, which may result in a pollutant discharge or fill into CNMI waters.

This includes National Pollutant Discharge Elimination System (NPDES) permits for Saipan's municipal separate storm sewer system; the two municipal CUC WWTP on Saipan; the package Membrane Bioreactor treatment plant on Mañagaha Island; and for EPA General NPDES Permits, such as that for discharges from construction sites larger than one acre.

A Section 401 Certification is also required for any activity requiring an Army Corps of Engineer's Section 404 permit for discharge of fill, and for some activities regulated by the District Attorney under Section 10 of the Rivers and Harbors Act.

B.2.2. Marine Biological Monitoring Program

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The MMT was established in 1996 to better understand current conditions and health trends of jurisdictional coral reef and seagrass assemblages. In recent years, the MMT has consisted primarily of BECQ staff whom have improved: staff training; data collection techniques; data accuracy; methods for analyzing coral health and resiliency; and GIS mapping (Houk and Van Woesik, 2006, Houk and Starmer, 2008, www.cnmicoralreef.net/monitoring.htm).

In the case of the CNMI, as with all island nations, discussions about water quality must include information regarding the status of nearshore marine communities. Marine communities can shift in response to nutrient enrichment, and other water quality impairment (Littler and Littler, 1985, Lapointe, 1997, Fabricius and De'ath, 2001). Similarly, changes in temperature, salinity, pH, Dissolved Oxygen (DO%), and other water quality criteria will also affect coral reef environments (Valiela, 1995). At any particular time, water quality concentrations are affected by rainfall or storm events, tidal fluctuations, and other atmospheric, climatic, and oceanographic conditions. This dynamic nature makes all water quality data very difficult to use for assessing a region, a project's impact on a waterbody, or a pollutant source if there is not a sufficient sample size with which to make inferences. It is much more efficient for island territories to use biological monitoring criteria coupled with water quality data to assess waterbody "health".

It is the goal of the MMT to better understand human population impacts and development as population growth and development continue, by assessing the CNMI reefs and seagrass beds within the lagoon, and around the islands long-term. The MMT collects regular benthic habitat data on selected and probabilistic sites on the islands' reef flats and slopes, seagrass beds, and lagoons. Their findings help to elicit appropriate natural resources management decisions, government policy, and to develop site-specific permit requirements for the protection of marine resources during, and after developments are complete.

B.2.3. Wastewater, Earthmoving, and Erosion Control Program

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The CWA Section 319 and US Coral Reef Initiative grants fund BECQ's WEEC Program. These funds produced the "*CNMI and Guam Storm water Management Manuals", Volume I and II*, which provides a framework for designers, engineers, and contractors to implement effective storm water BMPs to protect vital water resources. Funds are also used to update field manuals for contractors and site inspectors, and to inventory and inspect in ground Individual Wastewater Disposal Systems (IWDS) throughout the CNMI.

B.2.3.1. Wastewater Treatment Disposal Regulations

Large numbers of CNMI residents rely, and will probably continue to rely, on in-ground IWDS for treatment of the wastewater they generate. The CNMI Wastewater Treatment Disposal (WTD) Regulations stipulates how these systems are to be constructed when no available municipal sewer collection system is available. The WTD Regulations require permits for all new on-site septic systems and "other" small IWDS. The WTD regulations also cover certain types of animal feed operations and sets limitations on, and prohibitions to, livestock grazing near streams and other CNMI waters. The WTD regulations were amended in 2009 to include a certification program for percolation testers, and requirements for wastewater treatment and collection system operators. This enabled the CNMI to administer standard nationalized exams and issue operator certifications that are fully transferrable to other states.

BECQ administers a prescriptive septic system construction, inspection, and operation permitting program which specifies septic system sizes based on measured percolation rates and surrounding land uses.

Another WTD covered by this program is small package plants, which *do not discharge to waters of the CNMI,* such as the treatment systems operated by the Rota Resort on the island of Rota, and LaoLao Bay Golf Resort on Saipan. These small plants reuse treated effluent for golf course irrigation. Another small plant is the leachate treatment system operated at the Marpi Solid Waste Landfill Facility on Saipan.

WTDs that discharge directly to *waters of the CNMI*, or which are directly hydrologically connected to surface waters (such as the Mañagaha Island treatment system), are regulated by the US EPA through their National Pollution Disposal Elimination Systems (NPDES) program.

In Addition to these protections, the WQS were revised in 2014 to address loop holes identified in the WTD regulations. The first being illicit discharges from outhouses, subsistence farm lots, and other small animal feedlots to storm water drainages and intermittent stream beds. The WQS now define a waterbody to include water courses, whether "wet or dry", to prevent these sites from being used for conveying wastewater off-site. In addition, the WQS also established a permitting program for other types of wastewater generation not mentioned in the WTD regulations. This includes the discharge of brine from reverse-osmosis desalination equipment, discharges from oil/water separators, and any other mechanism that may generate a liquid waste stream not covered by the WTD regulations.

B.2.3.2. Earthmoving and Erosion Control Regulations

The Earthmoving and Erosion Control Permitting Program provides an overarching "One-Start" structure for the CNMI. Nearly all forms of development or construction within the CNMI are required to obtain a permit prior to commencing the activity.

One-Start Permits include approvals and conditions from three CNMI regulatory agencies, including BECQ, Department of Lands and Natural Resources (DLNR) - Division of Fish and Wildlife (DFW), and Historic Preservation Office.

The permit review process assures compliance with the Earthmoving and Erosion Control (EEC) Regulations, which is the primary mechanism by which erosion and sedimentation from new construction sites are regulated within the CNMI, as well as post-construction storm water quantity and quality. The EEC Regulations dates back to 1993. In 2006, BECQ (nee DEQ) substantially revised the regulations by adoption of new site design and construction standards contained in the "*CNMI and Guam Storm water Management Manuals", Volume I and II*. This manual added up-to-date standards for both construction and post-construction storm water treatment and BMP designs. Additional material was added in 2009, with a field manual and training program for construction field staff and erosion control inspectors. These improvements have proven successful, so much so that in 2010, both American Samoa and the Republic of Palau have incorporated the CNMI Manuals into their own regulations.

The One Start Permitting Program continues to evolve with the latest research in new methods and technology for managing erosion and storm water, and promoting rainwater reuse and recharge, and low impact development to improve water quality treatment and protect CNMI waters.

B.2.4. Safe Drinking Water and Ground water Management Program

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BECQ's Safe Drinking Water Branch's primary responsibilities are to administer and enforce the CNMI Safe Drinking Water (SDW) Regulations to ensure that the CNMI has a dependable and safe potable water supply. Semi-annual ground water monitoring has been required for years, especially for nitrate and salinity levels. Well owners are also required to test for organics, inorganics and radionuclides from entry points. In addition, a SDW Information System database is used to store and retrieve ground water quality information. However, methods for analyzing the collected data, and actions to be taken based upon the data are still lacking, including a comprehensive ground water management plan.

B.2.4.1. Safe Drinking Water Regulations

The SDW Regulations require that PWSs conduct regular monitoring for potential contaminants based on a schedule set by BECQ. PWSs that use ground water are required to monitor for contaminants that may be present in their raw ground water, as well as within the system if the system does not provide treatment for that specific contaminant at the entry point.

B.2.4.2. Well Drilling and Well Operation Regulations

The SDW also administers the CNMI Well Drilling and Well Operation Regulations. These regulations require that wells be drilled by a licensed well driller and specify where wells may be sited including set back distances from potential sources of contamination. Semi-annual water quality analysis are required from all owners of active wells in the CNMI. The regulations also designate geographic ground water management zones on Saipan.

B.2.4.3. Underground Injection Control Regulations

SDW also administers the CNMI Underground Injection (UIC) Control Regulations. These regulations allow only Class V UIC wells for use in the CNMI. Examples of this type of well include in-ground WTDS (e.g., septic system leaching fields, that serve 20 or more people), and drilled injection wells for the disposal of reverse-osmosis brine wastewater.

B.3. COST/BENEFIT ASSESSMENT

The following is an approximation of the economic and social costs and benefits of actions taken to achieve the objectives of the CWA.

B.3.1. Costs

Information about the costs associated with capital investments in municipal facilities, and investments in NPS pollution control measures are provided in Table B-4 below. This data was provided by the CNMI Department of Finance.

TABLE B-4. CNMI Capital, Investments, Operation and Maintenance Costs

Expenditures	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017*
Capital investments in Municipality (Capital Improvement Projects)	$635,396	$366,996	$1,554,170	$772,009	$491,518
Investments in NPS Pollution Prevention (DPW)	$2,863,870	$4,396,047	$3,769,180	$3,064,001	$4,600,903

* FY2017 is an estimation at the time of this writing

The average annual FY 16 and 17 DPW operation and maintenance costs of municipal facilities for Saipan, Rota, and Tinian for were $3,411,228, as calculated from date provided in Table B-5.

TABLE B-5. CNMI Annual Operation and Maintenance Costs of Municipal Facilities

Expenditures	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017*
Saipan	$2,069,423	$3,361,718	$2,756,776	$1,822,793	$3,192,001
Rota	$513,587	$624,646	$589,133	$655,322	$702,355
Tinian	$133,671	$171,622	$171,328	$202,394	$247,590
TOTAL	***$2,716,681***	***$4,157,986***	***$3,517,237***	***$2,680,509***	***$4,141,946***

The average annual costs for BECQ to administer CWA requirements, and BEACH Monitoring Program, and water pollution control activities for FY 16 and 17 was $1.4 million.

B.3.2. Benefits

The benefits to the CNMI as a result of the stated cost expenditures include protection and improvement of marine water quality with a total of 140.4 CNMI coastal miles (out of 240.5 miles) supporting all DUs. Since last reporting cycle a total of 69.5 CNMI coastal miles were removed from the 303(d) list as impaired for various water quality exceedances of the WQS. This is in part due to the continued operation and maintenance of public utilities and storm water BMPs.

In addition, the WQS/NPS branch enforces CNMI WQS to prevent point source and NPS contamination of waterbodies. As an indirect result, the CNMI continues to enjoy a steady increase in tourist arrivals each year, who report visiting the CNMI to enjoy area beaches and the surrounding waters.

MVA's Visitor Arrivals survey shows a 30% increase in arrivals in FY2017 compared to the previous year, "this is the fourth highest fiscal year arrivals in Marianas history" ranking the CNMI as "the third fastest growing tourist destination in the world", according to the United Nations World Travel Organization (MVA New Release, October 2017) .

The benefits to the CNMI as a result of ground water protection expenditures includes an increase in well production and reduced costs for drinking water treatment due to cleaner intake water.

Enforcement of the CNMI WQS safeguards the Saipan lagoon, CNMI harbors, and reefs so they can continue to provide: protection to developments and people from storm surge; habitat for fish and shellfish, which is the primary source of fresh fish and seafood for local consumption; and the CNMI as a tourist destination, the backbone of the CNMI economy.

B.4. SPECIAL STATE CONCERNS AND RECOMMENDATIONS

As in previous years, the most common sources of water quality degradation include: 1) storm water runoff from existing roads and development causing sediment and other pollutant loading; 2) sewage discharge from failing wastewater infrastructure; 3) waste discharge from free roaming feral and domesticated animal, and from animal containments; and 4) heavy metal contamination from WWII debris and dumpsites.

B.4.1. Erosion and Sedimentation

Erosion of, and sedimentation from, improperly designed secondary coral roads remains of special concern as these are the primary source of coastal water turbidity and NPS pollution. During rainy season, fill material from coral roads washes into the ocean. During the dry season,

more fill material is added to repair roads, which in turn erodes away the following rainy season, creating a cycle of repair and impairment. This activity has hindered water quality improvement for decades, and requires continued attention, which BECQ provides through road crew trainings and infrastructure improvement planning. Aside from identifying funding for major improvements, dedicating land for constructing roadway BMPs has been a primary obstacle to improved water quality.

Environmentally sound construction of even one roadway is extremely costly, but well worth the investment. Phase IIa and IIb of the Cross Island Roadway Reconstruction Project was completed from DanDan through Kagman watersheds last reporting cycle, and continued through Capitol Hill in the Talofofo watershed this reporting cycle. This significantly improved bacteriological water quality in these watersheds resulting in Kagman watershed being delisted for *Enterococci*. Phase III began this reporting cycle and continues through the rest of the Talofofo watershed. The remainder of Phase III, will terminate in the North West Takpochau watershed. It is slated for completion in 2018, next reporting cycle.

In addition, to these roadway improvements, DPW has plans for constructing Route 36 to connect the paved road from Kingfisher golf course through the Talofofo watershed to Bird Island Look Out in the Kalabera watershed. A request for bids to construct Route 36 was publicized near the end of FY 2017. When completed, Route 36 should significantly improve water quality at Hidden beach, Jeffry's and Old Man by the Sea in Talofofo. DPW will also begin reconstruction of Beach Road from Garapan to Quarter Master Road in Central and South West Takpochau through the North Susupe watersheds on Saipan's west coast. These latter two projects are targeted for completion by next reporting cycle (2017, communication with Henry Bautista, DPW, Engineer)

However, there are many more roadways requiring the same attention, most notably, Mt. Takpochau road, which reaches the highest elevation on Saipan at 1,554 feet. The runoff from this coral roadway adversely impacts several watersheds. It is currently graded with fill at least twice a year to maintain access. CNMI's budgetary constraints makes paving the road cost prohibitive, and is the primary deterrent to resolving this source of pollution loading,

B.4.2. Failing Septic Systems, and Illicit, and Permitted Wastewater Discharges

BECQ has made significant strides in addressing the second source of water quality degradation, 'failing wastewater infrastructure', through the regulation of new developments using the "One-Start" Earth Moving permitting program. However, the problem of how to address older developments remains a challenge given limited funding sources.

The rehabilitation of Saipan's wastewater infrastructure is progressing under the auspices of the court's stipulated orders entered into by the CNMI and EPA in 2009. In addition, BECQ continues to alert CUC engineers where there are "spikes" in coastal water *Enterococci* levels, and uses the 303(d) list of impaired waters to guide where fiduciary expenditures on wastewater infrastructure would be most beneficial.

Traveling from south to north, the first sewer improvements this reporting cycle were at the San Antonio Lift Station A-16 in the South Susupe watershed (Segment 18B). The upgrade to meet peak flow demands was completed by CUC in FY2016 (November, 2017 communication, Larry Manacop, CUC, Chief Engineer).

The sewer line between Civic Center Beach and Saipan World Resort (nee Diamond Hotel) in the North Susupe Watershed (Segment 18A) was also rehabilitated in FY2016.

Notable, the S-1 Lift station in the North West Takpochau watershed (Segment 19A) was upgraded last reporting cycle. However, *Enterococci* "spikes" began to occur again at the DPW Channel Bridge BEACH monitoring site adjacent to the lift station in January 2017. A joint sanitary survey by WQS/NPS, WEEC, and CUC revealed a collapsed sewer pipe. CUC immediately obtained the necessary permits to construct a bypass of the pipe to the S-1 lift station, which was completed in March 2017. The bypass is slated to be replaced by an upgrade of the entire sewer line to meet increased wastewater flow from the growing population in the upper watershed.

Further north, Lift station T-3 located near the CUC Power Plant and port facility in the South Achugao Watershed (Segment 20B), was rehabilitated in 2014. In addition, a forgotten leaking sewer line in Dogas stream was capped off in 2016. This resulted in a decrease in *Enterococci* exceedances at Tanapag Meeting hall BEACH monitoring in FY2016 only to increase again this past fiscal year. Therefore, the WQS/NPS branch remains vigilant in monitoring this low-lying area for more sewer line failures in this aging system.

Since last reporting cycle, CUC has also rehabilitated two lift stations in the North Achugao (Segment 20A) watershed. Lift station SR-3 was repaired in 2015 and SR-1 in 2017. Both of these stations are located south of Kensington Hotel (nee Nikko Hotel) and convey sewage south past San Roque School and Aqua Resort. As a result, there has been a drastic decrease in *Enterococci* exceedances in North Achugao watershed this reporting cycle.

The Northern most watershed, Banaderu (Segment 22) remains severely impaired due to *Enterococci* exceedances of the WQS at the Grotto Cave BEACH monitoring site. The restrooms' septic holding tank was found to be sound and in good working order last reporting cycle. However, the restrooms are locked outside of DLNR Parks and Recreation office hours. Therefore, tourists visiting the site outside of office hours, resorted to using the surrounding jungle area out of necessity. Human waste was identified as the primary source of *Enterococci* using a quantitative polymerase chain reaction (qPCR) human-marker microbial source tracking test.

To prevent further misuse by visitors, BECQ created a joint Tourism Management Working Group with DLNR Parks and Recreation, and Marianas Visitor Authority (MVA). DLNR, which has jurisdiction over the Park, has increased Ranger surveillance this reporting cycle. Next reporting cycle DLNR plans to install a gate to prevent visitor access afterhours, and will implement user fees to support maintenance and enforcement of environmental laws in the park. In addition, MVA established a Tour Operators' Certification Program to educate tour guides about environmental laws, and to promote their enforcement of proper sanitary practices by their customers.

This illustrates the importance of continued water quality monitoring, and visual field assessments to identify sources of fecal contamination, so they may be addressed accordingly.

B.4.3. Feral and Domesticated Animal Waste Discharge

The third source of water quality degradation, is wastewater and sewage discharge from free roaming feral and domesticated animals and livestock. Last reporting cycle BECQ revised the 2014 CNMI WQS to provide the WQS/NPS branch with the authority to give a "Notice of Violation" (NOV) to any farmer or other individual who discharges animal or human wastewater to any waterbody by imposing mandatory setbacks. This amendment addresses a previous gap within the DEQ Wastewater regulations for small farm operations and outhouses. Individuals that wish to continue farm operations must come into compliance with the CNMI WQS to avoid fines or penalties. Should violators be unable to pay, they are directed to meet with local NRCS agents to obtain sanitary animal pen designs through their EQIP program. EQIP also offers financial assistance to eligible farmers for construction to prevent further adverse impacts from improper agricultural operations.

In addition to availing NRCS expertise, WQS/NPS staff act as a liaison between farmers and the Department of Public Lands (DPL) for obtaining agricultural land exchanges. This has resulted in the relocation of farms to more appropriate areas within the watershed to prevent further contamination of waterbodies downstream.

Implementation of CAPs and TMDL recommendations by WQS/NPS, WEEC, DCRM, and NRCS is the primary means by which domesticated animal waste pollution is controlled. However, more action is needed to address fecal contamination from feral pigs, and stray dogs and cats that can be found in large numbers at various beach sites, wetland areas, and in stream beds throughout the islands.

B.4.4. Toxins and Heavy Metal Contamination of Fish and Other Biota

More current research has been conducted by Dr. Denton, et.al, of the University of Guam's (UoG) Water and Environmental Research Institute (WERI) this reporting cycle (2016, Environ Sci Pollut Res. DOI 10.007/s11356-016-6603-7). The 2016 WERI study measured toxins and heavy metal levels in sediment, fish tissue, and other biota surrounding the island of Saipan. However, it has been limited to just a few watersheds.

A previous study by Denton in 2011, reported in previous IRs found elevated levels of mercury (Hg) in biota in the West Takpochau watershed, which was sourced to the hospital incinerator (2011. *Impact of a Medical Waste Incinerator on Mercury Levels in Lagoon Fish from a Small Tropical Island in the Western Pacific*. Denton, et.al). Mercury was also found in coastal sediment surrounding the island of Mañagaha. The 2016 study found high levels of heavy metal contamination in sediment and biota associated with WWII wreckage, dumpsites, and unexploded ordinance. This included Agingan Point wastewater outfall, West Takpochau, Achugao, and the Banaderu watersheds.

This highlights the need for additional funding to carry out further fish tissue and biota studies for all the islands, given the myriad of military waste and dumpsites left on the islands after WWII. More information is needed to understand if these sites are adversely affecting the *Support and Propagation of Aquatic Life,* and the safety of *Fish and Shellfish Consumption* by the general public.

PART C. SURFACE WATER MONITORING ASSESSMENT

C.1. MONITORING PROGRAMS

BECQ maintains several monitoring programs; the Safe Drinking Water Quality, Marine and Surface Water Quality, and Marine Biological Criteria Monitoring Programs, which together are used to evaluate waterbody health.

The Safe Drinking Water Monitoring Program that was briefly discussed in Section B.2.4., will be described in detail in Part D of this report.

C.1.1. Coastal Marine Water Quality Monitoring and Notification

BEACH Act funding supports the WQS/NPS Water Quality Monitoring and Notification Program. Maps of the CNMI long-term BEACH water quality and MMT biological criteria monitoring sites for the islands of Saipan, Rota and Tinian are contained at the beginning of each island's "Five-Part Categorization Subsection" of this report; C.3.5., C.3.6., and C.3.7., respectively.

On a weekly basis, 38 marine water monitoring, or "West Beach" sites are sampled along Saipan's most heavily used west coast. The less used northeast and southeast coasts of Saipan have only six (6) BEACH sites each, which are monitored using an 8-week rotational schedule coupled with the island of Rota (n = 12). When these sites are being monitored weekly, Tinian and Mañagaha sites are only monitored once a month for the entire 8-week cycle. After the 8-weeks, the islands are swapped and Tinian (10 sites) and Mañagaha (11 sites) are sampled weekly, while Saipan's east beach sites and Rota sites are sampled just once per month. In so doing all beach sites are sampled across the various seasons, while meeting boat transport availability, staffing, and other budgetary constraints.

Samples are collected and given to the BECQ Environmental Surveillance Laboratory for analyses within allowable holding times as specified in the BECQ Laboratory Quality Assurance Program Plan (QAPP). The Laboratory maintains, and rigorously follows the QAPP, which includes Standard Operating Procedures (SOP) for sampling, testing, and reporting results.

The QAPP has two primary functions: 1) to assure that proper quality control practices are implemented in day-to-day laboratory operations; and 2) to assure that the reported data are valid, of known precision and accuracy, and therefore, scientifically defensible.

The microbiological, chemical and physical parameters include: *Enterococci* and *E.coli* bacteria (MPN/100ml); salinity (‰), Dissolved Oxygen (DO%); Temperature (°C), pH, Turbidity (NTU), and Total Suspended Solids.

Orthophosphate (PO_4) and Nitrate (NO_3) levels have been tested in drinking water by BECQ laboratory using a Flow Injection Analyzer (FIA) method since 2007. Refinement of the FIA method for marine water began in 2013, but interference from salinity continued to be an issue, as well as a lack of trained personnel to perform the analyses. This reporting cycle BECQ Laboratory hired and trained new staff to perform EPA Method 353.2, which provides accurate and scientifically defensible nutrient levels in marine water. At present, data is limited to BEACH monitoring site on Saipan, and a few reef flat sites surrounding the islands of Rota and Tinian. However, there are no new nutrient data for the rest of the islands.

Although the data is limited in number, results confirm that the 2004 reported orthophosphate levels were inaccurate and should no longer be considered when making an assessment of a waterbody's support of the *Propagation of Aquatic Life* DU.

BECQ Laboratory is also in the process of adapting two qPCR methods. The first, EPA Method 1609, was adapted for use on the Pall™ GeneDisc system to obtain rapid, same-day *Enterococci* results. The second is a microbial source tracking method based on the HF183 human gene marker, which has also been adapted for use on the Pall™ system. The latter method is used for investigative purposes to determine whether fecal contamination originated from humans or animals. The Pall™ Corporation is now considering the manufacture of additional Pall™ MST GeneDisc assays for birds, dogs, cows, and other ungulates in the future.

Data collected from this program is used to assess CNMI waterbodies to ensure that they support the *Propagation of Aquatic Life*, *Fish and Shellfish Consumption, Recreational Use, and Aesthetic Enjoyment* DUs, and to track the source(s) of contamination during investigations.

C.1.2. Marine Biological Criteria Monitoring Program

Water Monitoring Programs that only rely on water quality data to assess ecological health may not be statistically rigorous enough to detect change over time due to low sample numbers compared with the high rates of change in pertinent water quality criteria. One obvious way to enhance the collection of water quality data is through the use of continuous recording instruments. Currently, this approach is very expensive when considering the vast number of waterbodies that exist in the CNMI. In contrast, a more cost and time efficient method is to gather data on the distribution and abundances of benthic dwelling organisms that live within CNMI's coastal waters, in conjunction with marine water quality data. Therefore, the CNMI MMT was established in 1996 to collect such data.

In 2010, the CNMI collaborated with US EPA Region 9, Guam EPA, and American Samoa EPA to carry out the first National Reef Flat Probabilistic Monitoring project as part of the Environmental Monitoring and Assessment Program for the Pacific Territories. Each island territory was provided with 50 randomly selected reef flat sites generated by EPA Office of Research and Development

using a compatible probabilistic design and common set of survey indicators. Of the 50 randomly selected sampling sites assigned to the CNMI, 19 were assigned to Rota, 16 to Tinian, and 16 to Saipan. Each site was tested for pH, temperature, DO%, salinity, turbidity, Photosynthetically Active Radiation, Chlorophyll-a, dissolved nutrients (orthophosphates, nitrites, nitrates, ammonia, total phosphorus, total nitrogen), total suspended solids, and *Enterococci.* The MMT assessed the floral and faunal composition of the reef flat habitats, using the Aquatic Life Use Support (ALUS) method as described in detail in the Assessment Methodology Section, C.2.3.1.

This same Probabilistic Monitoring was repeated last reporting cycle as part of the 2015 National Coastal Condition Assessment (NCCA). This time logistics were made much more challenging due to CNMI's fiber optic cable being severed, preventing communication with the outside world for two weeks prior to sampling. Transportation of staff and samples to and from the three inhabited islands was also exacerbated due to frequent and intense storms and typhoons during this period causing high surf hazards, wind shear, and power outages. Yet, all 50 samples were successfully frozen, shipped out, and received by the Corvallis laboratory in Oregon before Super Typhoon Soudelor hit the islands on August 3rd, 2015.

The MMT has collected probabilistic biological monitoring data from the islands' reef flats, reef slopes, seagrass beds, lagoon, and harbors for over 20 years. This data is used in conjunction with water quality data to assess a waterbodies ability to *Support Propagation of Aquatic Life* DU, and to make other resource management and policy decisions.

C.1.3. Surface Water Quality Monitoring Program

In the past water quality monitoring was limited to coastal waters and one lake on Saipan. However, since the *CNMI Surface Water Quality Monitoring Plan* was completed in 2013, Saipan streams and those in the Talakhaya watershed on Rota are now also monitored. However, data is extremely limited due to the lack of flow outside of rainy season (July through October), as CNMI streams are intermittent or ephemeral by nature. Therefore, BECQ began researching alternative means for evaluating stream system health this reporting cycle by adapting biological and physical parameters extrapolated from a rapid assessment method used in Hawaii.

C.1.4. Other Information and Data Used

In addition to using the regular monitoring data provided by the WQS/NPS, MMT, WEEC, and Safe Drinking Water Quality Programs, data from other sources have also been used in the assessments. These include data collected: on fish tissue and biota contaminants by WERI; coral reef health and resiliency by Dr. Peter Houk of UoG's Marine Lab; and biological monitoring by the National Oceanic and Atmospheric Administration Coral Reef Ecosystem Division (NOAA-CRED) in the remote Northern Islands. In addition, monitoring data are used from six (6) additional monitoring sites in the LaoLao Bay watershed, several reef flat sites, and results from an aquatic survey of Saipan streams conducted by the CNMI DLNR Division of Fish and Wildlife (DFW) in 2008.

C.1.4.1. WERI Fish Tissue and Biota Contaminant Studies

Since 2000, UoG WERI has collaborated with CNMI agencies to investigate heavy metal contaminant levels in sediments and marine life found in sites within the Saipan Lagoon and the waters surrounding the island. Data summarized in a 2008 report by Denton (WERI Technical Report No. 123: 50 pp.), indicated that most species sampled throughout the Saipan lagoon *were free of contaminants at any levels of concern*, although some species of bivalves in the Puerto Rico Dump area (North West Takpochau, Segment 19A) had lead (Pb) levels that exceeded US Food and Drug Administration (FDA) standards. However, the use of these bivalves as an edible species, "… is unlikely".

Fish tissue contaminant data was used in assessing support of the *Fish and Shellfish Consumption* DU. A 2013 study by Denton, et.al, found elevated levels of mercury (Hg) in more commonly consumed fish species that exceeded US EPA limits for unrestricted fish consumption. These included fish collected from Hafa Adai Beach and Micro Beach areas (Central W. Takpochau, Segment 19B). These are located some distance from known sources of Hg contamination. A follow up investigation identified the former Commonwealth Health Center's medical waste incinerator as the primary source of Hg enrichment to a storm water drainage. The incinerator was used for the destruction of medical waste from the hospital and other medical clinics on island for about 20 years. Storm water runoff from the facility entered a drainage network that discharged into the Lagoon at the southern end of Hafa Adai Beach. More recently published data from fish species analyzed in 2007 revealed that Hg concentrations from Hafa Adai Beach area are significantly lower than those determined in 2004-2005, since the old incinerator was shut down in 2006, and corrective action was implemented by the hospital. All storm water from the facility is now collected, treated, and prevented from discharging to the surrounding drainage.

More recent studies by Denton et.al, of WERI in 2016 and 2014 on the environmental impacts of formerly used defense sites and brownfield sites on aquatic resources found that "Agingan Point (Set 17A - Isley West Segment 17A) was a 'hot spot' (2016. *Impact of WWII dumpsites on Saipan (CNMI):,* and 2014. *Influence of Urban Runoff, Inappropriate Waste Disposal Practices and World War II on the Heavy Metal Status of Sediments in the Southern Half of Saipan Lagoon)*. This site and other WWII dumpsites around the islands require additional study on metal uptake in resident biota. Local people frequently "harvest seaweeds and mollusks for food from the adjacent back reef. The submerged metallic debris and demolition material littering the fore reef also serves as a fish aggregation site and is a favored fishing spot by many." The impact of heavy metals and other toxins from such WWII dumpsites on *the safe Consumption of Fish and Shellfish* is of major importance from a public health standpoint. Denton will be completing future fish tissue studies as funding is secured.

C.1.4.2. UOG and NOAA-CRED Studies

Ecological surveys and limited water quality data was collected on several occasions in the remote Northern Islands during the past decade. Research is conducted using federal research vessels from the NOAA-CRED program. NOAA CRED researchers include both local government, UOG, and federal scientists and resource managers. The scientific cruises have taken place

approximately every two years, since they began in 2003. Each cruise lasts approximately 30 days. Generally, the data summaries show that fish abundances surrounding the remote islands are much larger compared with the populated southern islands (2008. State of the Reef Report, Starmer et.al). The recent establishment of the Marianas Trench Marine Monument is expected to further these general findings. More specifically, Houk and Starmer (2009), provided a detailed analysis of the coral reef assemblages. Their publication shows that benthic assemblages were extremely heterogeneous, and the significant drivers of multi-year trends were natural occurring environmental regimes. The primary driver of coral abundance and size structure was volcanic activity, island size, and connectivity with the islands aquifer. All of these natural, uncontrollable regimes explained the vast majority of the variance in coral species richness, differing relative abundances of coral reef taxa, and the nature of reef development. Human influences such as herbivorous fish abundances, percentage of canopy cover in adjacent waterbodies, and the presence of feral animals did not explain any additional amount of the ecological variance. Other studies from tropical islands show that these human influences can alter modern coral assemblages. However, in the remote Northern Islands, the study concluded that natural environmental regimes are strong enough to mask any further human influence, if indeed they would otherwise be evident. The limited water quality sampling provided high spatial but extremely low temporal resolution. Thus, only large-scale trends were emergent, such as the salinity patterns due to connectivity with the island aquifers.

Based upon these reports, there is a firm basis for finding both marine and fresh waterbodies of the Northern Islands to be considered fully supportive of the *Support and Propagation of Aquatic Life* DU.

C.1.4.3. LaoLao Bay Watershed Restoration Project

The LaoLao Bay Watershed American Recovery and Revitalization Act (ARRA) Restoration Project began in 2010 with the objective of reducing sedimentation in the near shore marine environment. Efforts to meet this objective included upland reforestation of bare badland soil and grasslands, paving the coral road to the Bay, and constructing culverts, sediment catchment basins, and concrete stream crossings BMPs. Road and BMP construction was completed in late 2014. These structures continue to be maintained to date by DPW and BECQ staff, and by other volunteers and the non-profit, Micronesian Islands Nature Alliance (MINA).

Since the onset of this project, monthly monitoring continues at six LaoLao reef flat sites. Water quality data from this reporting cycle are compared to baseline water quality to evaluate the efficacy of these activities overtime. Results are discussed in Section C.3.5.4.

C.1.4.4. CNMI Division of Fish & Wildlife Fresh Aquatic Survey

The CNMI DFW conducted a fresh water aquatic survey in August of 2008. Specimens from various stream systems in eight watersheds on Saipan were collected using dip net, trap and electrofishing. This survey was “the first freshwater native and introduced species study of its kind”. Data from the subsequent report included full species lists, descriptions of each site location, water chemistry information and other findings. This information was used to assess the *Support and Propagation of Aquatic Life* DU for the sampled waterbodies. Details may be

found for the streams sampled under each watershed sub-heading in Section C.3.5., beginning with the Talofofo watershed in Section C.3.5.2.

C.2. ASSESSMENT METHODOLOGY

Since 2010 CNMI water quality has been assessed in terms of waterbody segments based on watershed units.

C.2.1. Waterbody Segmentation - Watershed Approach

Some watershed units on Saipan have been split into two or more sub-watersheds in order to take advantage of the greater amount of available data in specific watersheds, and to better differentiate between areas with known sources of pollutants, especially in densely populated areas on Saipan.

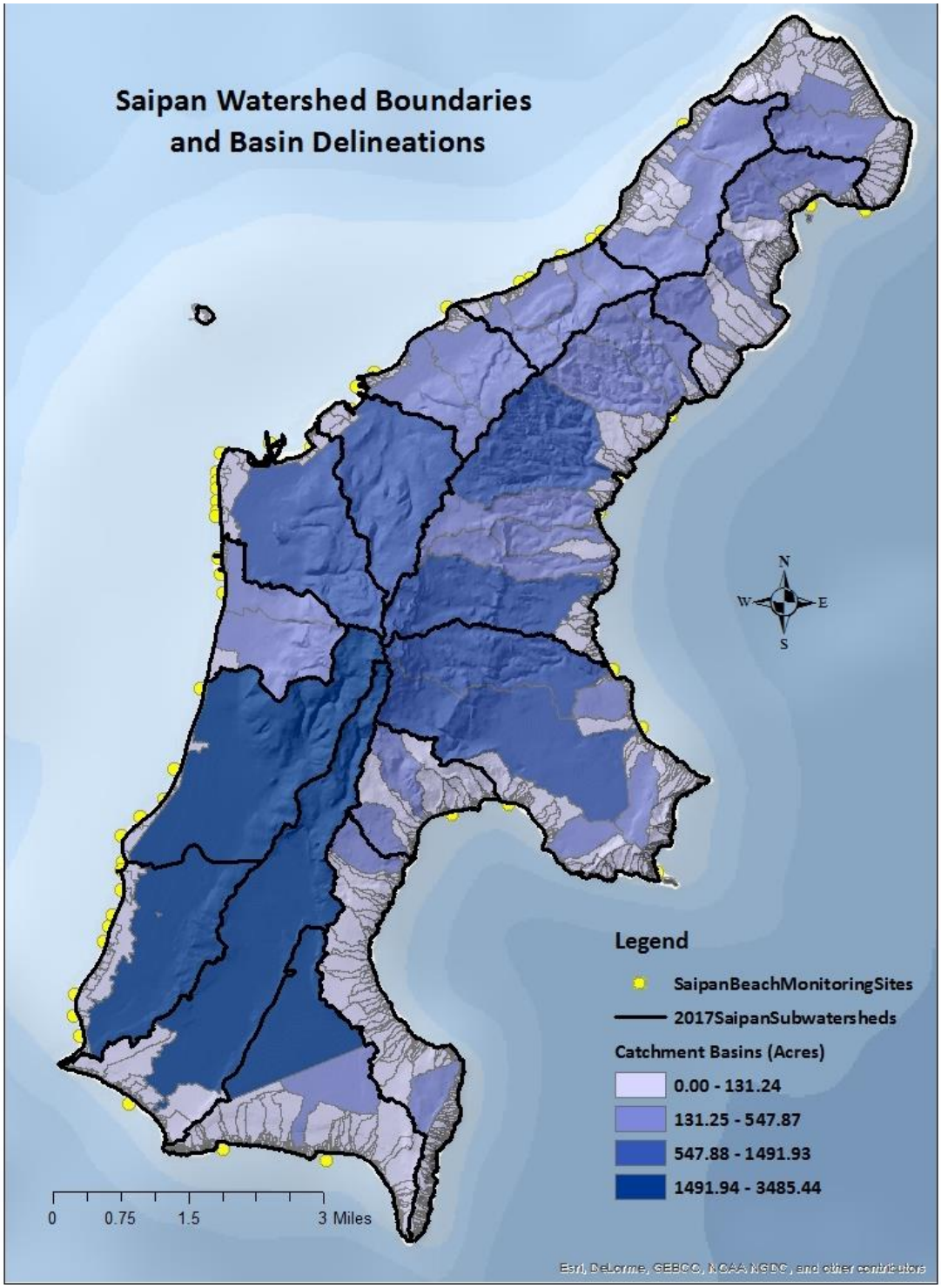
However, those waterbodies with less available information continue to be assigned to only one watershed unit. This is the case for Mañagaha, Aguigan ("Goat Island"), and the Northern Islands, and most CNMI streams systems, lakes, and wetlands.

In previous reports until present, BECQ used watershed segments that were digitized using historic USGS topographic maps. These have been superseded by the higher resolution data presently available. Figure C-1., on the following page shows the new watershed boundaries.

The new watershed segments (black outlines) were established using Light detection and ranging (LiDAR) topographic data (2.67 m. resolution) collected by the U.S. Army Corps of Engineers in 2007. This data was processed as a digital elevation model and raster surface at two-meter resolution. The BECQ GIS Specialist used the model to calculate slope, aspect, flow direction, and flow accumulation for the entire island of Saipan. These data were then used in ArcGIS Desktop to delineate watershed catchment basins. Catchment basins were then grouped together based on the historic watershed boundaries in which they were previously designated. This information was used to merge and form new watershed boundaries.

The basins, historic watershed units, and new watershed boundaries were examined by BECQ WQS/NPS staff to assess the re-alignment before finalizing. Once finalized, ocean shoreline miles were recalculated by the GIS Specialist by converting the watershed polygons to polylines and smoothing the polylines "zig zags"

FIGURE C-1. New Saipan Watershed Delineation and BEACH sites



The new delineation revealed that some long-term BEACH monitoring sites actually lie within a different watershed than previously reported, as listed in Table C-1., below.

TABLE C-1. New Long-term Monitoring Site Locations Based on 2017 Catchment Basins

Sample Station ID	Sampling Station Name	Segment IDs Before and Present FY10-15	FY16-17	Segment Class
		N/A	**Talofofo**	
CNMI-104	Jeffry's Beach Reef flat	*	13	AA
		Lao Lao	**Kagman**	
CNMI-29	Tank Beach Reef flat	*	14	AA
SEB 02	North LaoLao Beach	15	14	AA
ARRA B2	North LaoLao Reef Flat	*	14	AA
ARRA B5	North LaoLao Reef Flat	*	14	AA
ARRA B8	North LaoLao Reef Flat	*	14	AA
		N/A	**Lao Lao**	
CNMI-21	Central LaoLao Beach reef flat	*	15	AA
ARRA C2	South LaoLao Reef Flat	*	15	AA
ARRA C5	South LaoLao Reef Flat	*	15	AA
ARRA C3	South LaoLao Reef Flat	*	15	AA
		N/A	**Dan Dan**	
CNMI 72	DanDan Reef Flat	*	16	A
		N/A	**Isley (East)**	
CNMI-30	Ladder Beach Reef Flat	*	17B	A
		W. Takpochao (South)	**Susupe (North)**	
WB 24	Chalan Laulau	19C	18A	AA
		W. Takpochao (North)	**W. Takpochao (Central)**	
WB 11.2	South Puerto Rico Dump	19A	19B	A
WB 12	Smiling Cove Marina	19A	19B	A
WB 12.1	American Memorial Park Drain	19A	19B	A
WB 13	Outer Cove Marina	19A	19B	A
		W. Takpochao (Central)	**W. Takpochao (South)**	
WB 21	Garapan Fishing Dock	19B	19C	A
WB 23	Garapan Drainage #3	19B	19C	A
		W. Takpochao (North)	**Achugao (South)**	
WB 09	Sea Plane Ramp	19A	20A	AA

* Water quality data collected from these sites were not used in previous IR assessments.

The new catchment basins better reflect actual water flow and coastline discharge locations. In Addition to these changes, there are five (5) near shore reef flat monitoring sites, some of which were established during the 2010 National Coastal Condition Assessment, and six (6) LaoLao bay

beach reef flat sites established for monitoring the efficacy of ARRA funded roadway improvements, that are now included for DU assessments.

Detailed watershed maps showing the long-term BEACH monitoring sites are contained at the beginning of each watershed's sub-section, in Section C-3., of this report.

C.2.2. CNMI Designated Uses

Although the language of the CNMI WQS differs somewhat from the terminology used in the CWA, the basic guaranteed DUs that ensures that waters are fishable and swimmable are the same, as shown in Table C-2., below.

TABLE C-2. CWA vs. CNMI Designated Use Terminology

DU Categories Used in this Report	DUs Defined in CNMI Water Quality Standards	
COASTAL WATERS	**Class AA**	**Class A**
Propagation of Aquatic Life	"The support and propagation of shellfish and other marine life", and "conservation of coral reefs and wilderness areas"	"The protection and propagation of fish, shellfish, and wildlife"
Fish Consumption	No specific CNMI language, see above	No specific CNMI language, see above
Recreation	"Compatible recreation with risk of water ingestion by either children or adults."	"Compatible recreation with risk of water ingestion by either children or adults"
Aesthetic Enjoyment/Others	"Aesthetic enjoyment, , and oceanographic research"	"Aesthetic enjoyment"
FRESH WATERS	**Class 1**	**Class 2**
Propagation of Aquatic Life	"The support and propagation of aquatic life"	(not applicable – no class 2 waters in CNMI)
Fish Consumption	No specific CNMI language, but Section 65-130-450 of CNMI WQS lists toxic pollutants in concentrations recommended by EPA	(not applicable – no class 2 waters in CNMI)
Recreation	"Compatible recreation including water contact recreation with risk of water ingestion by either children or adults."	(not applicable – no class 2 waters in CNMI)
Potable Water Supply	"Domestic water supplies, food processing, ground water recharge"	(not applicable – no class 2 waters in CNMI)
Aesthetic Enjoyment/Others	"Aesthetic enjoyment"	(not applicable – no class 2 waters in CNMI)
WETLANDS	**Class 1**	**Class 2**
Propagation of Aquatic and Terrestrial Life	"shall be protected to support the propagation of aquatic and terrestrial life"	(not applicable – no class 2 waters in CNMI)

The 2012 CNMI IR stated that the "fish consumption" designation was not clearly stipulated in the CNMI WQS. This was addressed during the 2013 WQS Triennial review.

EPA Region 9 reviewed the WQS language and determined that the present wording incorporated "fish consumption" by the fact that fish consumption criteria are captured in the list of Priority Toxic Pollutants' Maximum Contaminant Level (MCL) concentrations contained in § 65-130-450 of the CNMI WQS.

However, in the interest of maintaining consistency with other states, the *Fish and Shellfish Consumption* DU is also used in this report, along with criteria for assessing its attainment.

The CNMI WQS criteria used to assess attainment of each of the DUs for each Class of waters are contained in Table C-3., below.

TABLE C-3. CNMI Water Quality Criteria for Assessing Coastal and Fresh Surface Waters

PARAMETER	COASTAL WATERS		FRESH SURFACE WATERS	
	CLASS AA Marine Waters	CLASS A Marine Waters	CLASS 1 Fresh Waters	CLASS 2 Fresh Waters
Enterococci (CFU/ 100 ml)	GM[1] < 35 <130 Single Sample	GM[1] < 35 <130 Single Sample	GM[1] < 35 <130 Single Sample	GM[1] < 35 <130 Single Sample
E. coli (CFU/100 ml)			GM[1] < 126 <410 Single Sample	GM[1] < 126 <410 Single sample
pH	7.5 – 8.6 <0.5 from ambient	7.5 – 8.6 <0.5 from ambient	6.5-8.5 <0.5 from ambient	6.5 - 8.5 <0.5 from ambient
NO_3 - N (mg/L)	< 0.20	< 0.50		
Total Nitrogen (mg/L)	< 0.4	< 0.75	< 0.75	< 1.50
Orthophosphate (mg/L)	< 0.025	< 0.05	< 0.10	< 0.10
Total Phosphorus (mg/L)	< 0.025	< 0.05	< 0.10	< 0.10
Ammonia (mg/L) (un-ionized)	< 0.02	< 0.02	< 0.02	< 0.02
Dissolved O_2 (%)	≥75	≥75	≥75	≥75
Total Filterable Suspended Solids (mg/L)[2]	5	40	5	40
Salinity (‰)[2]	10	10	20‰ or above 250 mg/L Chlorides	20‰ or above 250 mg/L Chlorides
Temperature (°C)[2]	±1.0 from ambient	±1.0 from ambient	±1.0 from ambient	±1.0 from ambient
Turbidity (NTU)[2]	±0.5 from ambient	±1.0 from ambient	±0.5 from ambient	±1.0 from ambient
Radioactive Materials	Discharge prohibited	Discharge prohibited	Discharge prohibited	Discharge prohibited
Oil & Petroleum	ND[3]	ND[3]	ND[3]	ND[3]

[1] GM - Geometric mean of samples over a 30-day period.
[2] Shall not exceed ambient by more than the stated value.
[3] ND - Non-detectable.

The manner in which water quality criteria data are used to make DU assessments are discussed in more detail in the sections that follow.

C.2.3. Criteria Used to Assess Coastal Marine Waterbodies' Designated Uses

A coastal waterbody's support of each DU in the CNMI was determined based on water quality data, visual watershed field assessments, biological monitoring data from the MMT program, DPW and CUC field observations and activities, and other available studies as stated previously in Section C.1.3.

At present, Saipan's coastal marine waters receive by far the greatest attention from the monitoring programs and has the most data. Therefore, BECQ has high confidence in these assessments, and is gaining a clearer understanding of the other islands as more data is gathered from the islands of Mañagaha, Rota, Tinian, Aguigan, and the Northern Islands.

Table C-4., summarizes the criteria used to assess attainment of a coastal marine waterbody's DUs.

TABLE C-4. Assessment Criteria for Coastal Marine Waters DUs

Designated Use	Criteria for Attainment Criteria to Assess Support of the DUs
Propagation of Aquatic life	• Habitat suitability: biomonitoring criteria (ALUS) score of "fair" or "good" for all sites within segment and other study results • Dissolved oxygen: less than 10% of samples exceed WQS for all sites within segment • Nutrients (Nitrate and/or Orthophosphate): less than 10% of samples exceeding WQS for all sites within segment. • Ambient water quality criteria met (where data is available) • General provisions met: floating/settleable solids, pH, radioactive substances
Fish consumption	• Fish tissue data shows fish collected within segment to be free of contaminant concentrations exceeding USEPA standards, or very low likelihood of fish tissue contamination due to current or historic land use patterns in adjacent watersheds.
Recreation	• *Enterococci* bacteria: less than 10% of samples result in beach advisory for all sites w/in segment • General provisions met: floating/settleable solids, pH, radioactive substances
Aesthetic Enjoyment/Other	• Empirical evidence • Student findings, published research, studies, tourist surveys, editorials, etc.

A discussion of each DU and the water quality criteria used to assess it follows.

C.2.3.1. Coastal Marine Waters Propagation of Aquatic Life Criteria

Habitat Suitability

The 2014 CNMI WQS incorporated numeric marine biological monitoring criteria that has been tested over 20 years by the MMT and continues to be improved to better assess habitat health and resiliency. The methodology is detailed in the *CNMI WQS Implementation Guidance Manual* that was published in the Commonwealth Register along with revisions to the CNMI WQS, which was promulgated in 2014.

Biological Assessment of Benthic Substrate

Biological assessment data on the distribution and abundances of benthic dwelling organisms that live within CNMI's long-term probabilistic and selected seagrass, back reef, patch reef, reef flat and reef slope sites are collected by the MMT with assistance from the NPW/WQS branch. This data is used in conjunction with water quality data to evaluate waterbody health and the support of the *Propagation of Aquatic Life* DU in accordance with EPA guidance materials.

In addition to benthic organisms, near shore coral reef and seagrass assemblages both show predictable shifts in response to nutrients, sediment loads, turbidity, and other proxies to pollution (Rogers, 1990, Telesnicki and Goldberg, 1995, Houk and van Woesik, 2008). As a result, the CNMI uses several measures of the coral reef and seagrass communities as an additional biological criterion for waterbody assessments.

Regular monitoring surveys have been ongoing by the MMT since 2000. They are conducted by snorkeling for depths less than 2 meter, and by SCUBA for reef slope monitoring at depths at the 7 to 8 meter contours.

The Saipan Lagoon *Halodule uninervis* assemblages were initially evaluated by assessing coverage of seagrass to turf and macroalgae coverage based upon replicated benthic assessment transects during each year (2012 CNMI IR). Only *H. uninervis* seagrass habitats were considered in this evaluation because they show the greatest sensitivity to watershed population and development (Houk and van Woesik 2008) and are widely distributed throughout the lagoon. In 2010, Houk and Camacho statistically quantified different cycles of seagrass and macroalgae growth due to annual seasonal cycles (i.e., temperature and sunlight), high pollutant loading, and high natural disturbance regimes (i.e., large swell events that translate to high surface-current velocities and habitat alteration). The study corroborates that relatively large macroalgae blooms are common throughout Saipan lagoon due to the onset of cold (below 28°C) water temperatures in the fall and winter. Subsequently, where healthy water quality was found, macroalgae stands would typically die off or be carried away during tidal exchanges. Where polluted waters were found, persistent macroalgae stands could emerge and persist through time (up to two years), to successfully out-compete the seagrass for sunlight and nutrients, and eventually space. Where high disturbance regimes and pollutant loading were noted, persistent macroalgae growth would occur until wintertime when large-swell events increased lagoon surface currents beyond the threshold for macroalgae attachment. Thus, seagrass remains as the dominant canopy where disturbance regimes were high, even in the face of tainted water quality.

Biological Assessment of Seagrass Assemblages

In accordance with these findings, Seagrass Assemblages surveyed between October 2015 and September 2017 were evaluated as indicators of Aquatic Life Use Support (ALUS) as follows:

Good Natural seasonal changes are apparent, existing assemblage has statistically more *H. uninervis* than macroalgae based upon average of estimates.

Fair Natural seasonal changes are apparent, existing assemblage has statistically similar abundances of *H. uninervis* and macroalgae based upon average of estimates.

Poor Seasonal cycles are masked by persistent macroalgae growth, or, persistent macroalgae growth dominates unless a disturbance event (i.e., large-swell and high surface currents) occurs.

Biological Assessment of Coral Assemblages

Coral reef assemblages were initially evaluated by calculating a ratio of reef-accreting benthos (coral,crustose coralline algae, and branching coralline algae), which are favorable attributes for sustainable coral assemblages, to non-accreting benthos (turf, macroalgae, and fleshy coralline algae), which are unfavorable attributes (CNMI's 2008 IR; supported by Rogers, 1990, Richmond, 1997, Fabricius and De'ath, 2001, Houk and van Woesik 2010). A second metric of the coral assemblages was simultaneously considered: coral species richness per unit area, which is supported by work by Houk and van Woesik (2010), who showed significant affinities between species richness and watershed population and development in the southern Mariana Islands. In the current IR, CNMI benthic assemblage ratios and coral richness estimates were compared to global mean values to come up with a final ALUS evaluation status.

In accordance with these findings ***Coral Assemblages*** surveyed between October 2015 and September 2017 were evaluated as indicators of aquatic life use support (ALUS) as follows:

Good Minimal or significant impacts reported from disturbance events. If natural disturbances impacted coral assemblage metrics then *statistically significant recovery is currently underway*. If no significant impacts from natural disturbances then metrics were evaluated relative to those expected from 2015 reporting and *found to be higher than the mean average.*

Fair Minimal or significant impacts reported from disturbance events. If natural disturbances impacted coral assemblage metrics then *non-significant recovery trends are currently apparent.* If no significant impacts from natural disturbances then metrics were evaluated relatively to those expected from 2015 reporting and *found to be similar to the mean average.*

Poor Minimal or significant impacts reported from disturbance events. If natural disturbances impacted coral assemblage metrics then *no recovery trends are currently apparent.* If no significant impacts from natural disturbances then metrics were

evaluated relatively to those expected from 2015 reporting and *found to be lower than the mean average.*

For this reporting period, the knowledge base presented above is utilized in conjunction with recent analyses of the long-term monitoring dataset for the southern islands to make ALUS assessments. For all comparisons noted, statistical change over time refers to the results from pairwise T-tests, making post-hoc corrections for multiple comparison years when and if appropriate. The biological data analyzed for this reporting cycle is contained in Appendix III.

In addition to biological monitoring data, the following water quality criteria is used to assess *Propagation of Aquatic Life* DU:

Dissolved Oxygen

Dissolved Oxygen (DO%) results are used along with biological monitoring assessments to determine whether a waterbody supports the *Propagation of Aquatic Life* DU. Dissolved Oxygen levels are not to be less than 75 DO%, more than 10% of the time in order to support this DU.

BECQ measures DO% in-situ with a portable YSI™ meter, Model 556 MPS. The accuracy of the portable meter depends on a number of factors, including proper calibration of the instrument, and following SOPs according to the BECQ Environmental Surveillance Laboratory's QAPP to obtain scientifically defensible results. In the Fiscal year 2008-2009 reporting cycles, it was noted that staff collecting data on the islands of Rota and Tinian had provided inaccurate DO% results due to improper calibration. Therefore, the results were erroneous and not reflective of waterbody health. In response, BECQ successfully conducted staff training in 2011 and all YSI™ measurements of DO% since that time have been accurate and have been used for assessments. All water quality criteria data used for assessment purposes in this reporting cycle is contained in Appendix II.

Nutrients

Orthophosphate (PO_4) and Nitrates (NO^3) were last monitored in 2004 using an inaccurate method for marine water. As a result, waterbodies were reported as unsupportive of the *Propagation of Aquatic Life* DU. However, results from this reporting cycle using the FIA EPA 353.2 Method, confirms that all of monitoring and reef flat sites but two, are well within the CNMI WQS for orthophosphate and nitrate. The BECQ Environmental Surveillance Laboratory now provides accurate nutrient data for marine waters, and previous results from 2004 will no longer be considered for assessing the *Support and Propagation of Aquatic Life* DU.

It is important to note that BECQ has not conducted a study to establish nutrient levels that represent natural healthy conditions in CNMI Waters. CNMI adopted nutrient standards from other states and jurisdictions. Therefore, these levels may not be protective for CNMI waterbodies. CNMI BECQ scientists will continue to study the correlation between water quality nutrient levels and the health of biological seagrass and coral reef assemblages.

General Provisions

The presence of floating or settleable solids, e.g., flotsam, jetsam, marine debris, sediment and the like, is undesirable and unsupportive of the *Recreational* DU. Additionally, their presence is physically harmful to the *Propagation of Aquatic Life* DU due to entanglement, strangulation, affixation, smothering, availability of sunlight, etc. Their presence is also unsupportive due to the potential for pollutants adsorbed on to settleable solids to disassociate and disperse, thus becoming biologically available for uptake and/or bioaccumulation.

Radioactive substances are also unsupportive to most DUs. The CNMI WQS prohibit any level of radioactivity.

The narrow range of pH necessary to maintain the calcium skeleton of a coral reef ecosystem is well documented. The CNMI has been monitoring pH of coastal waters since the early 1990's along with salinity and temperature.

To date, pH levels at most monitoring sites, and site specific monitoring sites for NPDES permit compliance, show little variance from the allowable levels set forth in the CNMI WQS and *Implementation Guidance Manual*. However, a few shallow sites next to heavily urbanized and developed areas have shown exceedances of the WQS for pH. These exceedances are specified and discussed in the subsequent watershed subsections in this report.

All water quality samplers are given regular training in YSI™ Meter operation and calibration methods, to prevent inaccuracies in field measurements.

C.2.3.2. Coastal Marine Water Fish and Shellfish Consumption Criteria

Fish Tissue and Biota Contamination

Mercury contamination of fish tissue in waters surrounding Saipan's Central W. Takpochau watershed and Mañagaha, and other metals in waters surrounding the West Isley watershed has been documented in previous IRs.

According to the more recent heavy metal studies conducted by Denton, et.al, since 2014, other watersheds on Saipan also have elevated levels of heavy metal contamination in sediment and/or biota surrounding WWII debris and dumpsites, a few sites have levels of a public health concern.

However, to date not all watersheds have been studied. Given the amount of military equipment, unexploded ordinance and other WWII debris remaining in the Marianas Archipelago, there is a clear need for further studies, especially in those watersheds that are the most heavily harvested.

WERI continues to research fish tissue and biota contamination. However, this can only be accomplished by earmarking necessary funding and other necessary resources.

C.2.3.3. Coastal Marine Waters Recreational Use Criteria

Fecal Indicator Bacteria - Enterococci

Enterococci concentrations exceeding CNMI WQSs may pose a public health threat for individuals fishing or swimming in waters (should they indicate the presence of actual fecal contamination rather than re-suspended sediment containing naturally occurring *Enterococci* not associated with wastewater). However, as a conservative protective measure, a Beach Advisory is publicized for coastal marine waters ***whenever*** *Enterococci* levels exceed the WQS.

The proposed 2012 US EPA Recreational Water Quality Criteria were adopted by the CNMI in the 2014 WQS revision. These WQS are used to determine when a Public Beach Advisory or "Red Flag" should be issued, at which time the public is advised not to swim or fish within 300 feet of these coastal waters for 48 hours, or until further testing demonstrates that the WQS have been met.

There are two criteria: 1) The single sample result from that day must be less than the Statistical Threshold Value (STV) of 130 MPN/100ml (the 90th percentile or confidence interval that there is a risk of illness for 3.6% of recreational users); and 2) The Geometric Mean (GM) is less than 35 MPN/100 ml over a 30-day period.

Given that, Beach Advisories are publicized and posted for sites whenever:

> A single sample result exceeds the ***Enterococci*** **STV of 130 MPN/100ml** for any Class of ***Marine Waters***; ***OR*** when the **GM exceeds 35 MPN/100ml** based on samples taken within any 30-day interval, **UNLESS** the **Single Sample** Result is **<35 MPN/100ml**.

That is to say that when the STV and GM meets the WQS, the CNMI is 90% confident that not more than 36 users per 1000 (<4%) may become ill from recreating in those waters.

Although a case could be made for using only the GM for assessment, the issuance of an advisory using both the STV and GM is necessary to determine whether or not recreational uses are being attained for those locations that are only monitored on an 8-week rotational schedule. This is true for Tinian, Rota, Mañagaha, and Saipan's eastern beaches that at times are only sampled once per month. Therefore, weekly data does not exist for calculating a GM for a 30-day period. In these circumstances, the STV alone is used to gauge the suitability of water quality for a safe *Recreational* DU even though the *Enterococci* result is 24 hours after the sample was taken. This suggests that using a GM calculated for a longer time period along with the single sample STV would be a better means for deciding when a Public Beach Advisory is needed to protect human health.

It has been shown in many well documented studies that storm surge can re-suspend sediment carrying naturally occurring *Enterococci* causing WQS exceedances; and consequently unnecessary Beach Advisories when no actual fecal contamination exists at a site. Consequently, some "red flags" are merely precautionary, as no known discharges of fecal contamination has actually occurred; only NPS pollution from drainages (as ground-truthed during visual field

assessments). Many scientific studies have established that though "*Enterococci*, shows a significant correlation with illness in marine beaches impacted by *point* source pollution, … a similar correlation has not been identified at beaches impacted by *non-point source* pollution on subtropical marine beaches" (A. Abdelzaher, et al., 2010).

Therefore, the method for determining whether a waterbody supports the *Recreational* DU was based on Public Beach Advisories derived from the 30-day GM and the single sample STV exceedances. An entire waterbody segment is listed as unsupportive when there is more than 10% Public Beach Advisories in a given Fiscal Year, for any single monitoring site within the segment.

Tables containing each Island's assessment of DU support and the cumulative CALM category is provided at the beginning of Island's sub-sections, C.3.5., through C.3.8., of the Assessment Results section of this report.

General Provisions

The same General Provisions used for the assessing the *Support and Propagation of Aquatic Life* DU, are used to assess the *Recreational* DU (see Section C.2.3.1. for details).

C.2.3.4. Coastal Marine Waters Aesthetic Enjoyment and Other Uses Criteria

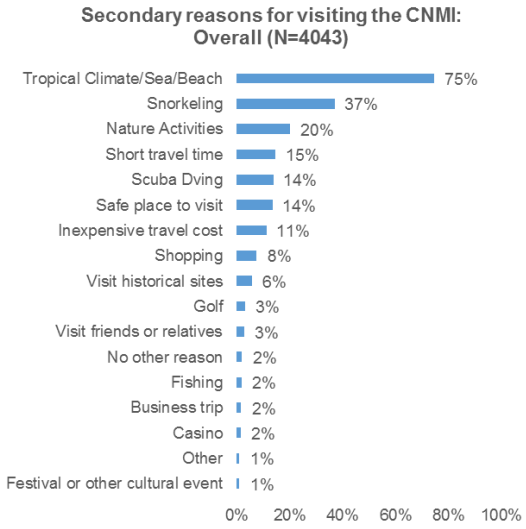
The attainment of the *Aesthetic Enjoyment and Other Uses* DU of a waterbody is not systematically defined in the CWA. However, by anecdotally applying the general definition of *Aesthetic Enjoyment* as "appreciation of beauty", one may assess if this DU is attained based on reported appreciation of a waterbody.

The Marianas Visitor Authority (MVA) with the assistance of Market Research and Development, Inc., began conducting tourist satisfaction exit surveys in 2011, which continues to date. MVA asks visitors to report their satisfaction with their experience based on a 7-point scale ranging from "very dissatisfied/strongly disagree" to "very satisfied/strongly agree". These data, along with other anecdotal information, and professional judgement were used to assess the *Aesthetic Enjoyment* DU.

Last reporting cycle the MVA Tourist Exit Survey responses through Fiscal Year 2015 found that 80% of those surveyed said their primary reason for visiting the CNMI was for pleasure/vacation and their secondary reasons were tropical climate, sea, or beach, followed by snorkeling and nature activities (Figure C-2., on the following page).

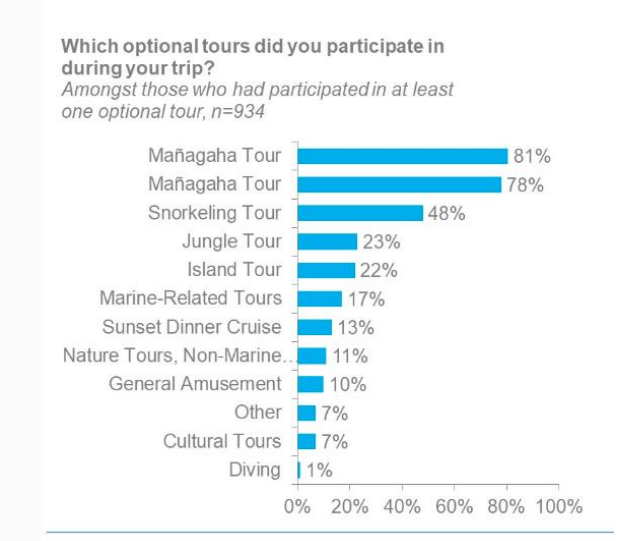
Furthermore, survey results also show that no matter the visitor's home of origin, China, Korea, Japan, or other, their satisfaction with snorkeling, SCUBA, and water sports received a satisfaction score of better than 80 (1 being lowest, and 100 being highest). Scenery / Parks and Beaches similarly received a Satisfaction Score of 83 or over.

FIGURE C-2. 2015 MVA Tourist Exit Survey Results for Reasons to Visit the CNMI



The most recent survey results from 2017 (Figure C-3.) show that most visitors (approximately 80%) chose to visit Mañagaha, followed by snorkeling (48%).

FIGURE C-3. 2017 MVA Tourist Exit Survey Results for Most Popular Tours



Given these results, and the fact that island residents enjoy these same beaches every day, it is assumed that all coastal waters of the CNMI are presently supporting the *Aesthetic Enjoyment* DU.

The CNMI defines "*Other Uses*" of this DU as oceanographic research, of which there has been a pronounced increase since the designation of the Marianas Trench National Marine Monument. Students, scientists and hobbyists continue to study CNMI coastal waters, coral reefs, fishes and other marine life, as they have for decades. This is substantiated by the many published scientific papers and research documents referenced within this IR. Therefore, all waters of the CNMI are presently supporting the "*Other Uses*" DU.

C.2.4 Criteria Used to Assess Fresh Surface Waterbodies' Designated Uses

Table C-5., below summarizes the criteria used to assess a fresh surface waterbody's support of each DU. The criteria used to assess support of a wetlands DU is contained in Section C.4. "Wetlands Program", of this report.

TABLE C-5. Assessment Criteria for Fresh Surface Waters

Designated Use	Criteria to Assess Support of the DUs
Propagation of Aquatic life	• Habitat suitability: Stream visual assessment score of "fair" or "good" for all sites within segment and other study results • DO%: less than 10% of samples exceeding WQS for all sites within segment • General provisions met: floating/settleable solids, pH, radioactive substances
Fish consumption	• Fish tissue data shows fish collected within segment to be free of contaminant concentrations exceeding USEPA standards; or very low likelihood of fish tissue contamination due to current or historic land use patterns in adjacent watersheds; or lack of edible fish species present in water.
Recreation	• *E. coli* or *Enterococci* bacteria: less than 10% of samples result in exceedance of WQS • General provisions met: floating/settleable solids, pH, radioactive substances
Potable Water Supply	• *E. coli* bacteria: less than 10% of samples result in exceedance of WQS • General provisions met: floating/settleable solids, pH, radioactive substances
Aesthetic Enjoyment & Other Uses	• General provisions met: floating/settleable solids, pH, radioactive substances • Self-reporting by users • Research papers, documents, tourist surveys, studies, etc.

C.2.4.1. Fresh Surface Water Propagation of Aquatic Life Criteria

Habitat Suitability

The *CNMI Surface Water Quality Monitoring Plan* for streams was established in late 2013. Implementation of the plan began in earnest in late 2014. Water quality data and information from visual stream assessments are used to map potential sources of pollution, the location of fresh water pools, and to evaluate the type and diversity of aquatic life therein. However, to date there is insufficient water quality data due to lack of regular stream flow in CNMI's intermittent and ephemeral stream systems. Therefore, visual biological assessments have become the foundation for determining whether stream water DUs are being supported in each waterbody segment. Given the CNMI's tropical conditions, gaining access to streams covered by jungle growth is very challenging, and sometimes hazardous given strenuous hiking conditions especially during dry season when temperatures can exceed the reported average of 85°F and 79% humidity. Therefore, only a few priority watersheds with high incidences of "Red Flags" have had visual assessments completed to date. In order to make the current assessment method more efficient, the WQS/NPS branch is collaborating with DCRM Planners to adapt Hawaii's *Stream Visual Assessment Protocol* (SVAP) for biological assessment of CNMI streams and their support of each DU. This Protocol combines the 1989 US EPA rapid bio-assessment protocol, with an NRCS, and Ohio EPA's protocols. This new SVAP measures elements of the physical and biological characteristics of instream and riparian environments with each element assigned a numerical score relative to reference conditions, and an overall score for the stream reach. The CNMI SVAP will be pilot tested and should be finalized before next reporting cycle.

In Addition, to this information, findings from the 2008 study by McKagan, et al, was also used. The DLNR DFW completed a two-week survey in eight different watersheds on Saipan to assess native and introduced freshwater species. Species were collected using a dip net, and where possible, electrofishing for identification and accessing aquatic life. Although, this study provides data on some streams within Saipan there is insufficient data on the remaining stream systems on Saipan, Rota, and the Northern Islands to determine if all are supporting the *Propagation of Aquatic Life* DU.

Dissolved Oxygen, Nutrients, and General Provisions.

The water quality criteria used for fresh surface waters are measured in the same manner as that for coastal waters, with the exception that the in-situ meters and laboratory instruments are calibrated at an appropriate salinity level for fresh waters.

See each of the water quality criteria subsections (Dissolved Oxygen, Nutrients, and General Provisions) above in C.2.3.1 "Coastal Water Propagation of Aquatic Life Criteria", for details.

C.2.4.2. Fresh Surface Water Fish/Shellfish Consumption Criteria

Fish Tissue

At present, testing for contaminants in fish tissue or biota has been very limited in fresh water stream systems for assessing support of the *Fish and Shellfish Consumption* DU. Some heavy metal contaminants have been found in sediments and bivalves in Saipan streams that contain WWII debris dumpsites (2009, 2016, Denton, et.al). However, in the case of the Northern Islands and other remote locations on the inhabited islands where fish tissue or biota data is unavailable, the remoteness of these streams from any potential anthropogenic sources of toxic pollution is taken into consideration for assessment purposes. These remote areas are usually considered supportive of the *Fish and Shellfish Consumption* DU based on visual field assessments and professional judgement.

C.2.4.3. Fresh Surface Water Recreational Use Criteria

Fecal Indicator Bacteria – Enterococci or E. coli

There were few water quality data collected this reporting cycle for assessing the *Recreational* DU of fresh surface waters. This was due to the post-phase of the 2016 El Nino event causing limited rainfall resulting in low or no flow in streambeds. However, when sufficient data was available, exceedances of the WQS for *Enterococci* and *E. coli*, are calculated as follows:

1) A Single Sample Result exceeds the ***Enterococci* STV of 130 MPN/100ml** for any Class of ***Fresh Waters***; ***OR*** when the **GM exceeds 35 MPN/100ml** based on samples taken within any 30-day interval, **UNLESS** the **Single Sample** Result is **<35 MPN/100ml**; or
2) A Single Sample Result exceeds the **E.coli STV of 410 MPN/100ml** for any Class of ***Fresh Waters***; ***OR*** when the **GM exceeds 126 MPN/100ml** based on samples taken within any 30-day interval, **UNLESS** the **Single Sample** Result is **<126 MPN/100ml.**

Due to the lack of available stream water quality data, professional judgment, anecdotal information collected during visual field assessments, and GIS analysis are used this reporting cycle to assess whether or not surface water streams are supportive of the *Recreational DU*.

General Provisions

The same General Provisions used for assessing support of the *Propagation of Aquatic Life* DU for coastal marine waters, are used to assess the *Recreational* DU for fresh surface waters (see the General Provisions subsection under Section C.2.3.1. Coastal Water Propagation of Aquatic Life Criteria, for details).

C.2.4.4. Potable Fresh Water Supply Criteria

CNMI streams are not used as *Potable Water Supplies,* nor is Susupe Lake or the surrounding wetland potholes, or the Lakes on Anatahan or Pagan. However, Lakes could potentially be used with appropriate treatment. However, rainwater catchment and ground water are a more economically feasible source in the CNMI.

All ground water supplies under the influence of surface waters are treated and monitored for quality by CUC before distribution to users, and therefore meet the *Potable Water Supply* DU.

C.2.4.5. Fresh Surface Water Aesthetic Enjoyment and Other Uses Criteria

As stated for the *Recreational* DU, no data are systematically collected concerning visitor or residents *Aesthetic Enjoyment* of fresh surface waters. However, professional judgment, anecdotal information from users, and visual field assessments are used to assess this DU.

C.2.5. Five-Part Consolidated Assessment and Listing Method Categories

The EPA recommended Consolidated Assessment and Listing Methodology (CALM) Categories were utilized in this IR. Table C-6., below summarized the five (5) categories and subcategories.

TABLE C-6. EPA CALM Reporting Categories

EPA CALM CATEGORY:	DESCRIPTION
1	All designated uses (DU) are supported, no DU is threatened
2	Attains some DUs, no DU is threatened, and there is insufficient information to determine if remaining DUs are attained/or impaired
3	There is insufficient available data and/or information to determine if DUs are supported or impaired. Potential presence of stressors that may cause impairment
4a	A TMDL to address a specific segment/pollutant combination has been approved or established by EPA
4b	A DU impairment caused by a pollutant is being addressed by the state through other pollution control requirements
4c[1]	A DU is impaired, but the impairment is not caused by a pollutant[1]
5	Available information indicate that at least one DU is not being supported or is threatened, and a TMDL is needed (a DU is threatened if a waterbody is currently attaining WQS, but is expected to not meet WQS by the next listing cycle).
5-alt	An alternative restoration approach is being pursued to meet WQS, in the interim while a TMDL remains undeveloped.

[1] CWA defines "pollution not caused by a pollutant" as "the man-made or man-induced alteration of the chemical, physical, biological, or radiological integrity of water" (Section 502(19))

The CALM categories are described in full in the "*2006 EPA Guidance for Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the CWA"* and in the recent "*2016 USEPA Memorandum from US EPA containing information concerning 2016 CWA Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions".* Each coastal marine and surface waterbody has been assigned a CALM Category based on this methodology

Each category is discussed in further detail in subsections C.2.5.1., through C.2.5.5., that follow.

C.2.5.1. CALM Category 1

Calm Category 1 is achieved when a waterbody segment is, "*Meeting all Water Quality Standards and is attaining all DUs, and none are threatened".*

Category 1 represents the highest level of attainment. A waterbody classified as Category 1 meets all applicable WQS and criteria throughout the entire waterbody. Assessment is based on combined evaluation of the following information:

1) Current data (collected within 5 years) indicates attainment, with no trend toward expected non-attainment within the listing period. Greater weight is placed on more recent water quality and biological criteria data (< 2 years) if improvement is shown;
2) Old data (> 5 years) indicates attainment and no change in any associated conditions;
3) Qualitative data or information from professional sources indicates attainment of standards and shows no identifiable sources of pollution and low impact land use. Waters of the Northern Islands and Aguigan, for example, are assumed to be Category 1 in part due to the fact that they are mostly uninhabited and undeveloped, in spite of limited available monitoring data.

C.2.5.2. CALM Category 2

Category 2 is deemed when a waterbody segment, "*Attains some of the DUs; no DU is threatened or impaired; and insufficient data or no data and information is available to determine if the remaining DUs are attained, threatened, or impaired* (*with presumption that all DUs are attained*)".

A *Category 2* assessment is based on combined evaluation of the following information:

1) Current data (collected within 5 years) for some standards indicate attainment, with no trend toward expected non-attainment within the listing period, or an inadequate density of data to evaluate a trend;
2) Old data (>5 five years) for some standards indicates attainment, and no change in associated conditions;
3) Insufficient data for some standards, but qualitative data/information from professional sources indicate a low likelihood of impairment from any potential sources (e.g. high dilution, intermittent/seasonal effects, low intensity land use, etc.).

C.2.5.3. CALM Category 3

A Category 3 is deemed when there is, "*Insufficient data and information to determine if DUs are attained*", within a waterbody.

Waterbody segments assigned to *Category 3* have both insufficient, or no data available, and in contrast to Category 2, *there is reasonable potential that one or more uses are not being attained*.

Category 3 waterbody segments are therefore priorities for future monitoring as resources become available. Assessment is based on combined evaluation of the following information:

1) Insufficient or conflicting data that does not confirm either attainment or non-attainment of DUs;
2) **NOTE**: *This category should not be used when data and/or information is available about impairments due to pollution not caused by a pollutant, including for instance, where hydrologic alteration or impacts from habitat alteration impairs a designate use, but no narrative or numeric water quality criteria can be assessed: such water should be placed in* Category 4C*.*
3) Qualitative data or information from professional sources showing the potential presence of stressors that may cause impairment of one or more DUs; however, no quantitative water quality data confirms the presence of impairment-causing stressors. For example, fish tissue data is not available for many waterbody segments of the CNMI, but the contamination that has been found in other biota has occurred only in waterbodies where either current or previous land uses include potential sources of contamination. Therefore, most CNMI waterbodies that have been contaminated from war time ammunitions, dumps, or abandoned equipment, or are adjacent to current or previously developed areas, would be listed as Category 3;
4) Old data, with:
    a. low reliability, no repeat measurements (e.g. one-time synoptic data);
    b. a change of conditions without subsequent re-measurement; or
    c. no evidence of human causes or sources of pollution to account for observed water quality condition.

C.2.5.4. CALM Category 4

Category 4 is reached when a waterbody segment is determined to be*, "Impaired or threatened for one or more DUs, but does not require development of a TMDL."*

A waterbody is listed as *Category 4* when pollution/impairment is not caused by a pollutant (manmade or man-induced alteration); or *if* impairment is caused by a pollutant, a TMDL has already been completed; or other enforceable controls are in place. Assessment is based on combined evaluation of the following information:

1) Current or old data for a WQS indicates either impaired use, or a trend toward expected non-attainment within the listing period, but also where enforceable management changes are expected to correct the condition;
2) Water quality models that predict impaired use under loading for some WQS, also predict attainment when required controls are in place; or,
3) Quantitative or qualitative data/information from professional sources indicate that the cause of impaired use is not from a pollutant(s) (e.g. habitat modification, hydrological changes, or over-harvesting).

Waters are listed in one of the following subcategories of CALM Category 4 when:

Category 4a: *TMDL is completed,* but insufficient new data exists to determine that attainment has been achieved.

Category 4b: *Other pollution control requirements are reasonably expected to result in attainment of WQS in the near future,* but where no new data are available to determine that attainment has been achieved. Enforceable controls may include new wastewater discharge permits issued without preparation of a TMDL, other regulatory orders, CAPs are in place and being implemented, or contracts for hazardous waste remediation projects are in place.

Category 4c: *Pollution is not caused by a pollutant, e.g.,* waters or biological communities impaired by human activity such as habitat modification, hydrologic alteration, which may be climate change related, or over harvesting. Jurisdictions can employ a variety of watershed restoration tools and approaches to address sources of impairment.

C.2.5.5. CALM Category 5

Category 5 is reached when*, "Waters are impaired or threatened for one or more DUs by a pollutant(s) and a TMDL is required*."

Waterbody segments are listed as *Category 5* when:

1) Current data (collected within five years) for a WQS or other criteria either indicates impaired use, or a trend toward expected impairment within the listing period, and where quantitative or qualitative data/information from professional sources indicates that the cause of impaired use is from a pollutant(s);
2) Water quality models predict impaired use under current loading for a WQS, and where quantitative or qualitative data/information from professional sources indicates that the cause of impaired use is from a pollutant(s); or

3) Those waterbodies have been previously listed on the State's 303(d) list of impaired waters, based on current or old data that indicated the involvement of a pollutant(s), and where there has been no change in management or conditions that would indicate attainment of DUs.

C.3 ASSESSMENT RESULTS

This subsection presents the results of all CNMI waterbody assessments for each type of waterbody in and surrounding the southern islands of Saipan, Mañagaha, Rota, Tinian, Aguigan ("Goat Island"), and the Northern Islands.

This includes assessing attainment of each DU for each waterbody segment, and reporting the resulting CALM category, beginning with a general overview of the islands, and then providing further detail on each of the islands' watersheds.

This section also provides summaries of impaired causes and their sources in a 303(d) list, and culminates with an explanation of the criteria used to determine when a waterbody segment may be removed from the 303(d) list of impaired waters.

C.3.1. Five-Part Categorization All CNMI Surface Waters

A total of 14 years (2004 through 2017) of monitoring data were reviewed in the preparation of this 2018 IR (see Appendix II). Based on these data, other studies, and professional judgment CNMI waterbodies were assessed and categorized as shown in the Table C-7.

TABLE C-7. Size of All CNMI Waters Assigned to Each CALM Category

Waterbody Type	Category							total in State	total Assessed
	1	2	3	4a	4b	4c	5		
Stream (Miles)	*	33.6	22.7				44.2	100.5	100.5
Lake (Acres)	210.0						57.4	267.4	267.4
Ocean coast (Miles)	140.4	6.3	6.7	20.2			66.9	240.5	240.5
Wetland (Acres)	85.6	1.6	62.2			568.4		717.8	717.8

* The Northern Islands streams and wetlands have not been delineated recently or measured with GPS

C.3.2. Section 303(d) List and TMDL Development Status

The CWA requires that each state and territory submit a list of impaired (CALM Category 5) waters requiring TMDLs, the pollutants causing the impairment, and the sources responsible for the impairment. These are contained in the 303(d) list contained in Tables C-8., through C-10., on the following pages.

TABLE C-8. Rota Waterbody Segment/Pollutant Combinations on 303(d) Impaired List

Seg ID	Segment Name	Size	Cause Name	Source	Cycle First Listed	Comments
ROTA:						
2	Sabana/Talakaya/ Palie	7.3 miles	enterococci (215)	on-site treatment systems	2008	
				Erosion/Sedimentation	2008	
				Livestock (Grazing or Feeding)	2008	
				Groundwater loading	**2018**	**New source listed**
			phosphate (340)	Source unknown	2004	Erroneous method. no reliable data
3	Songsong	7.9 miles	enterococci (215)	on-site treatment systems	2004	
				Wastes from pets	**2018**	**New source listed**
			phosphate (340)	Source unknown	2004	Erroneous method. no reliable data
4	Uyulanhulo/Teteto	3.5 miles	phosphate (340)	Source unknown	2004	Erroneous method. no reliable data
5	Chaliat/Talo	2.6 miles	enterococci (215)	on-site treatment systems	2004	Last five years cannot remove
			phosphate (340)	Source unknown	2004	Erroneous method. no reliable data

TABLE C-9. Tinian Waterbody Segment/Pollutant Combinations on 303(d) Impaired List

Seg ID	Segment Name	Size	Cause Name	Source	Cycle First Listed	Comments
TINIAN:						
7	Masalok	3.5 miles	phosphate (340)	Source unknown	2004	Erroneous method. no reliable data
9	Makpo	3.0 miles	phosphate (340)	Source unknown	2004	Erroneous method. no reliable data
			pH, Low (490)	**Source unknown**	**2018**	
9H	Makpo (Harbor)	1.5 miles	phosphate (340)	Source unknown	2004	Erroneous method. no reliable data
			DO% (205)	**Marina Boat Maintenance**	**2018**	**New source listed**
				on-site treatment systems	2010	
10	Puntan Diaplolamanibot	9.9 miles	phosphate (340)	Source unknown	2004	Erroneous method. no reliable data
11	Puntan Tahgong	6.4 miles	phosphate (340)	Source unknown	2004	Erroneous method. no reliable data

The items with **bold red fonts** are new causes, or newly listed sources this reporting cycle.

TABLE C-10. Saipan and Mañagaha Waterbody Segment/Pollutant Combinations on 303(d) Impaired List

Seg ID	Segment Name	Size	Cause Name	Source	Cycle First Listed	Comments
SAIPAN:						
13STR	**Talofofo Stream**	**34.5 miles**	**enterococci (215)**	**Livestock (Grazing or Feeding)**	**2018**	
				Off road vehicles	**2018**	
				Erosion/Sedimentation	**2018**	
17A	Isley (West)	1.7 miles	copper (163)	NPS Pollution from Military	2014	
			lead (267)	NPS Pollution from Military	2014	
18 A	Susupe (North)	2.4 miles	DO% (205)	Sanitary Sewer Overflows	2009	
				Urban Runoff/Storm Sewers	2009	
				Groundwater loading	2009	**New source listed**
18 B	Susupe (South)	2.8 miles	DO% (205)	Sanitary Sewer Overflows	2009	
18 B				Urban Runoff/Storm Sewers	2009	
18 B				**Groundwater loading**	2009	**New source listed**
18LAK	Susupe (South) Lake	57.4 acres	DO% (205)	on-site treatment systems	2014	
				Urban Runoff/Storm Sewers	2014	
				Sanitary Sewer Overflows	2014	
			pH, High (491)	naturally occuring/analysis needed	2014	
19 A	W. Takpochau (North)	1.0 miles	**lead (267)**	**NPS Pollution from Military**	**2018**	
19 B	W. Takpochau (Central)	4.4 miles	**pH, Low (490)**	**Roads, Infrastructure Construction**	**2018**	
				Other Marina/Boating Discharges	**2018**	
			DO% (205)	Sanitary Sewer Overflows	2008	
				Groundwater loading	**2018**	**New source listed**
				Urban Runoff/Storm Sewers	2008	
			Hg in fish (467)	Impervious surface/ Lot Runoff	2010	
19STRB	**W. Takpochau (Central) Stream**	**3.2 miles**	**Hg in fish (467)**	Impervious surface/ Lot Runoff	**2010**	
			enterococci (215)	**Livestock (Grazing or Feeding)**	**2018**	**New source listed**
				Urban Runoff/Storm sewers	**2018**	**New source listed**
				Erosion/Sedimentation	**2018**	**New source listed**

TABLE C-10. Saipan and Mañagaha Waterbody Segment/Pollutant Combinations on 303(d) Impaired List, continued

Seg ID	Segment Name	Size	Cause Name	Source	Cycle First Listed	Comments
SAIPAN:						
19 C	W. Takpochau (South)	1.9 miles	DO% (205)	Sanitary Sewer Overflows	2008	
				on-site treatment systems	2008	
				Urban Runoff/Storm Sewers	2008	
			pH, Low (490)	**Roads, Infrastructure Construction**	2015	**New source listed**
				Other Marina/Boating Discharges	2015	**New source listed**
			nitrates (302)	**Urban Runoff/Storm Sewers**	**2018**	**New source listed**
				on-site treatment systems	**2018**	**New source listed**
				Sanitary Sewer Overflows	**2018**	**New source listed**
20 A	Achugao (North)	1.9 miles	DO% (205)	on-site treatment systems	2009	
				Roads, Infrastructure Construction	2009	
20 B	**Achugao (South)**	**2.4 miles**	DO% (205)	Marina Boat Maintenance	2009	
				on-site treatment systems	**2009**	**New source listed**
				Livestock (Grazing or Feeding)	**2009**	**New source listed**
			lead (267)	**NPS Pollution from Military**	**2018**	
20STRB	**Achugao (South) Stream**	**6.5 miles**	**lead (267)**	**NPS Pollution from Military**	**2018**	**New source listed**
			enterococci (215)	**Sanitary Sewer Overflows**	**2018**	**New source listed**
				on-site treatment systems	**2018**	**New source listed**
				Urban Runoff/Storm Sewers	**2018**	**New source listed**
				Livestock (Grazing or Feeding)	**2018**	**New source listed**
21	As Matuis	2.2 miles	DO% (205)	Source unknown	2009	
			pH, Low (490)	**Source unknown**	**2018**	**New source listed**
MANAGAHA:						
23	Managaha	0.6 miles	**pH, Low (490)**	**Other Marina/boating discharge**	**2018**	**New source listed**

There are 10 waterbody segments impaired by a non-pollutant cause (biological integrity), and 23 waterbody segments impaired by a pollutant. The pollutant impairments require that a TMDL be established for each.

The number of water segments impaired is down from 62 last reporting cycle. This is due to many of Saipan's waterbody segments being delisted for *Enterococci* as the result of the completion of the 2017 TMDL for bacteria.

The size of each water segment impaired and the pollutant cause, are listed in order of their frequency of occurrence in Table C-11.

TABLE C-11. Size of Each Waterbody Type Impaired and the Causes

Waterbody Type	Size	Cause In order of most frequent occurances:
Coastal Miles Impaired by Pollutant	66.9	DO%, Phos, Entero, pH (Low), Pb, Hg, Cu, NO3, pH (High)
Stream Miles Impaired by Pollutant	44.2	Enterococci, lead, and Hg in fish
Lake Acres Impaired by Pollutant	57.4	DO% and pH

Diminished DO% concentrations were the most frequently listed cause of impairment for coastal waters and Lakes.

It should be noted that although *Enterococci* is listed less frequently, this is only because of the completion of the 2017 TMDL for bacteria rather than there being an actual decrease in WQS violations throughout Saipan's coastal waters. However, there were five of Saipan's watershed that now meet WQS for *Enterococci* due to decreased rainfall, or various remediation efforts.

This reporting cycle, there has been an increase in waterbodies 303(d) listed as impaired for heavy metals. The recent studies by Denton, et.al, of WERI, indicate that heavy metals are transported into sediment and biota from nearby WWII debris dumpsites. This is of significance given the DoD interest in increasing military training exercises in the CNMI in the future.

There have also been several Saipan waterbodies delisted for phosphate, based on new reliable nutrient data. The following is the criteria used to delist a pollutant.

C.3.2.1. Criteria for Removal of Water Segment/Pollutant Combinations from the 303(d) List

BECQ shall remove a pollutant of a waterbody as impaired based on one or more of the following criteria:

1. USEPA approved a TMDL for the pollutant;
2. The data used for previous listing is superseded by more recent credible and scientifically defensible data showing that the surface water meets the applicable numeric or narrative surface water quality standard. All historical data is considered, with a greater weight placed on more recent (last 3 – 5 years) data, except for Coastal Waters (beaches for swimming), with a greater weight placed on the last 2 years because of the large number of samples collected;
3. The surface water no longer meets the criteria for impairment based on a change in the applicable water quality standard or a DU approved by USEPA;
4. The surface water no longer meets the criteria for impairment for the specific narrative water quality standard based on a change in narrative water quality standard implementation procedures;

5. A re-evaluation of the data indicate that the surface water does not meet the criteria for impairment because of a deficiency in the original analysis; or
6. Pollutant loadings from naturally occurring conditions alone are sufficient to cause a violation of applicable WQS.

BECQ may only upgrade the entire waterbody from CALM Category 5 if all the previous listed pollutants for that waterbody have been removed from the 303(d) list.

C.3.2.2. CNMI Waters Removed from the 303(d) List

Last reporting cycle, several waterbodies remained on the 303(d) list as impaired for *Enterococci*. Many were thought to be the result of naturally occurring bacteria in storm water sediment as the result of severe El Nino storm and rain events. This is supported by the seven (7) waterbodies being delisted for *Enterococci* this reporting cycle, due to improved water qualtiy. This includes three on Saipan and four on Tinian. This is attributed to the post-phase of El Nino causing diminished rain events, and to sewer upgrades and newly constructed roadway BMPs. Table C-12., on the following page, lists all waterbody segment/pollutant combinations, which are being delisted as a result of the 2018 assessment, along with the rationale for each delisting, using USEPA's terminology.

There have been 69.5 coastal miles delisted this reporting cycle, and 57.4 lake acres. This is primarily due to the approval of the 2017 TMDL for bacteria by US EPA. This 2017 TMDL resulted in 14 waterbodies on Saipan being delisted for *Enterococci* or *E. coli* impairment, and subsequently, five (5) waterbodies being upgraded from CALM Category 5 to 4a, as no other DUs were impaired. This includes Kalabera, Talofofo, LaoLao, East Isley, and Banaderu's coastal waters, and Susupe Lake.

The four (4) watersheds delisted on Tinian due to improved *Enterococci* concentrations include Masalok, Makpo Harbor, Puntan Diaplolamanibot, and Puntan Tahgong watersheds. These improvements are associated with decreased rain events, and a drastic decrease in the island's population after the closure of Tinian Dynasty, Typhoon Soudelor, and a decrease in the number of allowed foreign workers by the US federal government. As a direct result of the decreased population, there are also many less cattle now being reared for local consumption, hence a decrease in pollutant loading from animal waste.

TABLE C-12. Segment/Pollutant Combinations Removed from CNMI's FY 2018 303(d) List

Segment/Pollutant Combination on Previous CNMI 303(d) List					Summary Rationale for Delisting Segment/Pollutant Combinations	
					(Identify number of reason)	
Seg ID	**Segment Name**	**Pollutant**	**Segment Size**	**First listed**	1. EPA approved TMDL for pollutant. 2. Previous listing is superseded by more credible data showing WQS being met. 3. No longer impaired based on a change in WQS or designated use approved by EPA. 4. No longer impaired based on change in narrative WQS implementation procedures. 5. Re-evaluation of data because of deficiency in original analysis. WQS now met. 6. Pollutant loading from natural condition alone has caused violation of WQS.	
					Reason	**Comments**
TINIAN:						
7	Masalok	Enterococci (215)	3.5	2005	2	Drastic decrease in population after Soudelor, diminished pollutant loading
9H	Makpo (Harbor)	Enterococci (215)	1.5	2005	2	Drastic decrease in population after Soudelor, diminished pollutant loading
10	Puntan Diaplolamanibot	Enterococci (215)	9.9	2005	2	Drastic decrease in population after Soudelor, diminished pollutant loading
11	Puntan Tahgong	Enterococci (215)	6.4	2005	2	Drastic decrease in population after Soudelor, diminished pollutant loading
SAIPAN:						
12	Kalabera	Enterococci (215)	4.1	2004	1	2017 TMDL approved for Enterococci
		phosphate (340)		2004	2	2004 method erroneous. FIA data meets WQS
13	Talofofo	Enterococci (215)	5.4	2004	1	2017 TMDL approved for Enterococci
		phosphate (340)		2004	2	2004 method erroneous. FIA data meets WQS
		pH, no trend		2015	2	2015 data suspect as no trend in pH and was never repeated
14	Kagman	phosphate (340)	6.7	2004	2	2004 method erroneous. FIA data meets WQS
15	Lao Lao	Enterococci (215)	1.4	2004	1	2017 TMDL approved for Enterococci
		phosphate (340)		2004	2	2004 method erroneous. FIA data meets WQS
17A	Isley (West)	Enterococci (215)	1.7	2004	1, 3	2017 TMDL approved for Enterococci, and now meets WQS
		phosphate (340)		2004	2	2004 method erroneous. FIA data meets WQS
17B	Isley (East)	Enterococci (215)	4.2	2004	1	2017 TMDL approved for Enterococci
		phosphate (340)		2004	2	2004 method erroneous. FIA data meets WQS
18A	Susupe (North)	Enterococci (215)	2.4	2007	1,3	2017 TMDL approved for Enterococci, and now meets WQS
		phosphate (340)		2004	2	2004 method erroneous. FIA data meets WQS
18B	Susupe (South)	Enterococci (215)	2.8	2004	1	2017 TMDL approved for Enterococci
		phosphate (340)		2004	2	2004 method erroneous. FIA data meets WQS
18LAK	Susupe (South) Lake	E. coli (217)	57.4	2010	1	2017 TMDL approved for E. coli

TABLE C-12. Segment/Pollutant Combinations Removed from CNMI's FY 2018 303(d) List continued

Seg ID	Segment Name	Pollutant	Segment Size	First listed	*(Identify number of reason)* 1. EPA approved TMDL for pollutant. 2. Previous listing is superseded by more credible data showing WQS being met. 3. No longer impaired based on a change in WQS or designated use approved by EPA. 4. No longer impaired based on change in narrative WQS implementation procedures. 5. Re-evaluation of data because of deficiency in original analysis. WQS now met. 6. Pollutant loading from natural condition alone has caused violation of WQS.	
					Reason	**Comments**
SAIPAN:						
19A	W. Takpochau (North)	Enterococci (215)	1	1998	1	2017 TMDL approved for Enterococci
		phosphate (340)		2004	2	2004 method erroneous. FIA data meets WQS
		DO% (205)		2009	4	New watershed boundary shows W. Takpochau South impaired, not North.
		pH, no trend		2015	2	2015 data suspect as no trend in pH and was never repeated
19B	W. Takpochau (Central)	Enterococci (215)	4.4	1998	1	2017 TMDL approved for Enterococci
		phosphate (340)		2004	2	2004 method erroneous. FIA data meets WQS
19C	W. Takpochau (South)	Enterococci (215)	1.9	2004	1	2017 TMDL approved for Enterococci
		phosphate (340)		2004	1	2004 method erroneous. FIA data meets WQS
20A	Achugao (North)	Enterococci (215)	1.9	2004	1,3	2017 TMDL approved for Enterococci, and now meets WQS
		phosphate (340)		2004	2	2004 method erroneous. FIA data meets WQS
20B	Achugao (South)	Enterococci (215)	2.4	2004	1	2017 TMDL approved for Enterococci
		phosphate (340)		2004	2	2004 method erroneous. FIA data meets WQS
21	As Matuis	Enterococci (215)	2.2	2004	3	Enterococci now meets WQS
		phosphate (340)		2004	2	2004 method erroneous. FIA data meets WQS
22	Banaderu	Enterococci (215)	5.1	2004	1	2017 TMDL approved for Enterococci
		phosphate (340)		2004	2	2004 method erroneous. FIA data meets WQS
MANAGAHA:						
23	Managaha	phosphate (340)	0.6	2004	2	2004 method erroneous. FIA data meets WQS
		TOTAL Coastal Miles Delisted	**69.5**			
		TOTAL Lake Acres Delisted	**57.4**			

Nutrient testing began in earnest this reporting cycle. Every coastal waterbody surrounding Saipan was tested using the FIA EPA Method 353.2. All watersheds, met the CNMI WQS for orthophosphate and only one did not meet the WQS for nitrate. This was at two BEACH sites in the South West Takpochau watershed. Both Garapan Beach Drainage and Garapan Beach were added to the 303(d) list as impaired for nitrate. Potential sources include urban runoff and sewer construction, and discharges from boat maintenance activities near Garapan Fishing Dock.

Several watersheds were delisted as impaired for pH this reporting cycle, as no downward or upward trends were found, indicating that more study is needed to determine if a TMDL is indeed required, or if this a seasonal occurrence.

In addition to establishing a 303(d) impaired list, the CWQ requires each State and Territory to provide a priority ranking for TMDL development. The 39 waterbody segment/pollutant combinations requiring a TMDL were ranked and scheduled by priority using professional judgment on the basis of the following criteria:

HIGH Priority: 2019

- severe or widespread impairment (multiple sites impaired);
- frequent recreation use;
- high economic (tourism or fishing) value;
- fish tissue contamination in edible species; or
- known sources of pollutants.

MEDIUM Priority: 2020

- limited area of impairment (one or few sites impaired);
- less frequent recreation use; or
- few or unknown sources of pollutants.

LOW Priority: 2021

- isolated location and/or very infrequent recreation use;
- Impaired for only PO4 (suspected data quality issues); or
- few or unknown sources of pollutants.

Given available funding, two High priority TMDLs will be initiated for DO% and pH by next reporting cycle in the Saipan Watersheds. In addition, BECQ will continue to collaborate with UoG WERI to continue heavy metal testing in fish tissue and biota throughout the inhabited islands where there are known WWII dumpsites.

Table C-13., on the next pages lists the status of TMDL development for impaired waterbody segments and the schedule for TMDL submission, or removal from the 303(d) list, based on their priority.

TABLE C-13. TMDL Development Status

Segment Name	Class	Pollutant/ Combination	TMDL ID	*Priority	Project Status	Projected TMDL Submittal or Removal Date
ROTA:						
Sabana/Talakaya/ Palie	AA	Enterococci (215)	CN2-215	Med	Invitation to bid for TMDL 2019	2020
		phosphate (340)	CN2-340	Low	Begin FIA testing 2018	2019
Songsong	A	Enterococci (215)	CN3-215	Med	Invitation to bid for TMDL 2019	2020
		phosphate (340)	CN3-340	Low	Begin FIA testing 2018	2019
Uyulanhulo/Teteto	AA	phosphate (340)	CN4-340	Low	Begin FIA testing 2018	2019
Chailat/Talo	AA	Enterococci (215)	CN5-215	Low	Invitation to bid for TMDL 2019	2020
		phosphate (340)	CN5-340	Low	Begin FIA testing 2018	2019
TINIAN:						
Masalok	AA	phosphate (340)	CN7-340	Low	Begin FIA testing 2018	2019
Makpo	AA	phosphate (340)	CN9-340	Low	Begin FIA testing 2018	2019
		pH, Low (490)	CN9-490	Med	Continue monitoring	2020
Makpo (Harbor)	A	phosphate (340)	CN9H-340	Low	Begin FIA testing 2018	2019
		DO% (205)	CN9H-205	Low	Suspect erroneous, monitor	2020
Puntan Diaplolamanibot	AA	phosphate (340)	CN10-215	Low	Begin FIA testing 2018	2019
Puntan Tahgong	AA	phosphate (340)	CN11-340	Low	Begin FIA testing 2018	2019
SAIPAN:						
Kalabera	AA	Enterococci (215)	CN12-215		Completed 2017	DONE
Talofofo Stream	1	Enterococci (215)	CN13STR-215	Low	Invitation to bid for TMDL 2020	2021
Talofofo	AA	Enterococci (215)	CN13-215		Completed 2017	DONE
Lao Lao	AA	Enterococci (215)	CN15-215		Completed 2017	DONE
Isley (West)	A	Enterococci (215)	CN17A-215		Completed 2017	DONE
		copper (163)	CN17A-163	Med	Invitation to bid for TMDL 2020	2021
		lead (267)	CN17A-267	Med	Invitation to bid for TMDL 2020	2021
Isley (East)	AA	Enterococci (215)	CN17B-215		Completed 2017	DONE
Susupe (North)	AA	Enterococci (215)	CN18A-215		Completed 2017	DONE
		DO% (205)	CN18A-205	High	Invitation to bid for TMDL 2019	2020
Susupe (South)	AA	Enterococci (215)	CN18B-215		Completed 2017	DONE
		DO% (205)	CN18B-205	High	Invitation to bid for TMDL 2019	2020
Susupe (South) Lake	1	E. coli (217)	CN18LAK-217		Completed 2017	DONE
		DO% (205)	CN18LAK-205	Low	Invitation to bid for TMDL 2019	2020
		ph, High (491)	CN18LAK-491	Low	Invitation to bid for TMDL 2019	2020
W. Takpochau (North)	A	Enterococci (215)	CN19A-215		Completed 2017	DONE
		lead (267)	CN19A-267	Med	Invitation to bid for TMDL 2020	2021
W. Takpochau (Central)	AA	Enterococci (215)	CN19B-215		Completed 2017	DONE
		pH, Low (490)	CN19B-490	Low	monitor. Construction related	2020
		DO% (205)	CN19B-205	High	Invitation to bid for TMDL 2019	2020
		Hg in fish (467)	CN19B-467	Med	Invitation to bid for TMDL 2020	2021
W. Takpochau (Central) Stream	1	Hg in fish (467)	CN19STRB-467	Med	Invitation to bid for TMDL 2020	2021
		Enterococci (215)	CN19STRB-467	Low	Invitation to bid for TMDL 2020	2021
W. Takpochau (South)	AA	Enterococci (215)	CN19C-215		Completed 2017	DONE
		DO% (205)	CN19C-205	High	Invitation to bid for TMDL 2019	2020
		pH, Low (490)	CN19C-490	Low	Invitation to bid for TMDL 2019	2020
		Nitrate (302)	CN19C-302	Low	Continue monitoring	2020

TABLE C-13. TMDL Development Status continued

Segment Name	Class	Pollutant/ Combination	TMDL ID	*Priority	Project Status	Projected TMDL Submittal or Removal Date
SAIPAN:						
Achugao (North)	AA	Enterococci (215)	CN20A-215		Completed 2017	DONE
		DO% (205)	CN20A-205	Med	Invitation to bid for TMDL 2019	2020
Achugao (South)	AA	Enterococci (215)	CN20B-215		Completed 2017	DONE
		DO% (205)	CN20B-205	High	Invitation to bid for TMDL 2019	2020
		lead (267)	CN20B-267	Med	Invitation to bid for TMDL 2020	2021
Achugao (South) Stream	1	Enterococci (215)	CN20B-215	Low	Invitation to bid for TMDL 2020	2021
		lead (267)	CN20B-267	Med	Invitation to bid for TMDL 2020	2021
As Matuis	AA	DO% (205)	CN21-205	Low	Invitation to bid for TMDL 2019	2020
		pH, Low (490)	CN21-490	Low	Suspect erroneous, monitor	2020
Banaderu	AA	Enterococci (215)	CN22-215		Completed 2017	DONE
MANAGAHA:						
Managaha	AA	pH, Low (490)	CN23-490	Low	Suspect erroneous, monitor	2020

Medium and Low priority watersheds will have their TMDLs initiated as soon as resources allow, or alternative pollution control requirements can be employed in the interim while a TMDL remains undeveloped, e.g., sewer upgrades, roadway improvements with BMPs, CAP implementation, etc.

C.3.3. CNMI Summaries of Designated Use Support

The CWA requires that each state and territory provide summaries of the DU status for each waterbody segment including: *Propagation of Aquatic Life, Fish/shellfish Consumption, Recreational, and Aesthetic enjoyment/other uses.* Each waterbody's assigned CALM categories are discussed in each island's subsection of this report. In addition, tables for each waterbody type are contained in Appendix IV through VII; including coastal waters, streams, lakes, and wetlands respectively.

ALL CNMI – COASTAL MARINE WATERS

Taking into account all the information discussed in the Sections above, the CNMI's most developed and economically important waterbodies on Saipan are in the West Takpochau watershed. The West Takpochau coastal waters continue to have the most causes of impairment on the 303(d) list of any of the watersheds, followed by the South Achugao watershed. The only DU that continues to be fully supported is the *Aesthetic Enjoyment* DU.

Most coastal waters of the southern inhabited islands are not supporting at least one DU as shown in Table C-14., on the following page. However, the remote Northern Islands, the Carolinas watershed on Tinian, Tinian's neighboring island, Aguigan ("Goat Island"), and the

Dugi/Gampapa/Chenchon watershed on Rota fully support all DUs. These coastal waters are undeveloped and, in many cases, too hazardous for people to regularly visit. Based on this and professional judgement, there are 140.4 coastal miles fully support all their DUs and were assigned a CALM Category 1.

TABLE C-14. Individual DUs Support Summary for CNMI Coastal Marine Waters

Designated Use	Total in State (miles)	Total Assessed (miles)	Supporting /Attaining WQS (miles)	Not Supporting /Attaining WQS	Insufficient Data (miles)
ALL COASTAL WATERS (Class AA and A)					
Propagation of shellfish and other aquatic life	240.5	240.5	168.5	66.6	5.4
Fish/shellfish consumption	240.5	240.5	142.3	9.5	88.7
Recreation with risk of waterborne illness	240.5	240.5	184.8	55.7	0
Aesthetic enjoyment /other uses	240.5	240.5	240.5	0	0

However, the remaining 100.1 miles of Commonwealth coastline were found to be impaired for at least one cause (Table C-15). The most frequently unsupported DU is *Recreational use*, due mostly to *Enterococci* exceedances of the WQS. This resulted in 32.7 coastal miles of Saipan's shoreline, and 17.8 miles of Rota's requiring a TMDL, for which only Saipan has had a TMDL completed for bacteriological impairment. This is reflected in Table C-15., below.

TABLE C-15. Size of CNMI Coastal Marine Waters Impaired by Causes

Cause/Impairment Type	EPA Cause ID	Size of Waters Impaired (miles)	Comments
ALL COASTAL WATERS (Class AA and A)			
Dissolved Oxygen	340	19.5	Tinian and Saipan
Phosphate	205	45.6	Rota and Tinian, no new data to delist
Enterococci	215	17.8	Only Rota, 32.7 miles on Saipan has TMDL
pH, Low	490	12.1	Tinian Harbor, Saipan urban areas, Managah pier
Lead	267	5.1	WWII debris sites on Saipan
Mercury in fish	467	4.4	Saipan's drainage from hospital incinerator
Copper	163	1.7	WWII debris sites on Saipan
Nitrates	302	1.9	W. Takpochao (south)

Although, Banaderu's coastal waters had an increase in beach advisories, many others showed a decrease in *Enterococci* violations, and the percent of posted beach advisories each year. These include: West Isley, North Susupe, and North Achugao watersheds on Saipan; and Masalok, Makpo Harbor, Puntan Diaplolamanibot, and Puntan Tahgong watersheds on Tinian.

There are a myriad of sources of *Enterococci* contamination as listed in Table C-16., below.

Saipan's decrease in *Enterococci* violations are associated with: upgrades to CUC municipal sewer line; completion of Phase I through IIb of the Cross Island Road reconstruction project; a decrease in rain events; and a substantive decrease in Rota's and Tinian's populations.

In coming years, CUC will continue to upgrade the wastewater infrastructure on Saipan.

TABLE C-16. Size of CNMI Coastal Marine Waters Impaired by Sources

Sources of Pollutants	EPA Source ID	Size of Waters Impaired (miles)	Comments
ALL COASTAL WATERS (Class AA and A)			
Source unknown	140	53	Mostly for nutrients
On-site treatment systems	92	21.2	Many unmaintained or aging systems
Urban Runoff/Storm sewers	177	11.5	As the result of wet weather event
NPS from Military	89	6.8	WWII debris dumpsites
Roads, infrastructure construction	49	8.2	
Other Marina/Boating Discharges	94	8.2	
Livestock (Grazing or Feeding)	143	15.2	
Marina boat maintenance	75	3.9	
Sewer overflows	115	8.7	
Sedimentation	21	11.7	Talakhaya badlands, W. Takpochau
Unspecified Urban stormwater	169	1.9	
Commercial Ferries	2018	0.6	Managaha pier

At this time, the source of low pH trends at several of Saipan's coastal BEACH sites is unknown and requires further study.

Overall, biological conditions remained the same this reporting cycle. The southern islands generally receive a "fair" to "good" ranking when situated some distance away from large, populated areas. For instance, all sites on the outer barrier reef of Saipan have consistently high or fair rankings. Similarly, most sites on the less populated islands of Tinian, Aguigan, and Rota also show ecologically resilient assemblages, with notable improvement in coral metrics since the 2003 through 2006 natural disturbance event (i.e., Crown of Thorns starfish predation). However, coral bleaching has been on the rise this reporting cycle coinciding with warmer temperatures associated with El Nino years.

A few sites have consistently received poor ratings by the MMT over time, but the source is not considered a pollutant so it is not included on the 303(d) list. Biological monitoring data, and professional judgement suggests that degradation at these sites is likely due to a reduction in herbivory and/or water quality. This coincides with *Enterococci* water quality violations that are consistently higher in the more populated watersheds and those with piggeries, cattle, and feral dogs and cats near streams and shorelines.

It is the goal of BECQ MMT to continue to utilize benthic substrate, coral reef, and seagrass conditions to provide estimates of the trends that biological assemblages are headed, and rank the associated waterbodies in accordance with those trends. However, some adjustments to the biological ranking protocol may be necessary in the future, especially for the island of Rota.

In general, it is thought that Rota has "naturally" lower coral cover than the islands of Saipan and Tinian. This stems from geological, hydrological, and biological (coral larva transport) differences between the islands, rather than anthropogenic impacts. Rota may have received a low biological rating relative to Saipan and Tinian in this report. However, given that Rota's biological monitoring sites are those with the lowest level of anthropogenic stressors compared to Saipan and Tinian, the present reef and seagrass biological ranking could perhaps reflect the "healthy" or "ambient" state of Rota's waters and reefs, as opposed to "not supporting *propagation of aquatic life*". Thus, the conundrum between the ALUS rankings, and professional judgement when it comes to the current ranking protocol for the island of Rota.

In an effort to restore coral reef resiliency at other sites that have received a consistently poor ranking, BECQ WQS/NPS has begun watershed visual field assessments upland of these sites to identify the type and source of land-based sources of pollutants driving these poor rankings. This information is used to directly address violations, and prioritize impaired watersheds for remediation or restoration efforts.

Sections C.3.5., through C.3.8., of this report provide detailed discussion of each island's coastal waters.

ALL CNMI – FRESH WATER STREAMS

The WQS/NPS staff began implementing the CNMI Surface Water Quality Monitoring Program in earnest in 2014. Water samples are collected from intermittent and perennial streams as rain events permit. The location of potential sources of contamination are identified using GPS during visual field assessments. Streams systems are then mapped using this information along with the 2017 NHD, and wetland and stream GIS data layers, ArcGIS software, and other available information. Table C-17., on the following page provides the total miles of fresh water streams supporting or not supporting DUs, or having insufficient information available to assess a DU.

In some instances, visual field assessments have determined that no surface water pools exist to sustain aquatic life as their flow is too infrequent or is subterraneous to the coast. This is the case for LaoLao watershed on Saipan, and for Aguigan ("Goat Island"), Tinian and Mañagaha islands. Although, visual field assessments have not been completed for the entire Kalabera, DanDan,

and Banaderu watersheds on Saipan; or the Dugi/Gampapa/Chenchon, Songsong, Uyulanhulo/Teteto, Chaliat/Talo watersheds on Rota, they too are expected to lack surface waters pools based on assessments completed thus far.

TABLE C-17. Individual DUs Support Summary for CNMI Fresh Water Streams

Designated Use	*Total in State (miles)	Total Assessed (miles)	Supporting /Attaining (miles)	Not Supporting /Attaining due to non-pollutant	Insufficient Data / Does not exist (miles)
ALL STREAMS (Class 1)					
Propagation of shellfish and other aquatic life	100.5	100.5	62.7	3.2	34.6
Fish/shellfish consumption	100.5	100.5	0	9.7	90.8
Recreation with risk of waterborne illness	100.5	100.5	0	44.2	56.3
Potable Water Supply	100.5	100.5	6.1	0	94.4
Aesthetic enjoyment /other uses	100.5	100.5	97.3	3.2	0

*No stream maps have been established for the Northern Islands to measure stream miles.

Visual field assessments of the streams in Susupe watershed have not recently been conducted. However, a report by the USGS service in 2000 stated that, “Stream channels on the western coastal plain … are not discernible in the field or on topographic maps.” There does appear to be “Some surface runoff from the southwest flank of Mount Tagpochau (sp), which does have discernable stream channels on the topographic maps.” This is supported by the 2017 NHD, and s wetland and stream GIS data layer. The USGS report goes on to state that during “dry years, surface runoff into the lake is probably negligible.” Based on these findings there is most likely not enough volume or frequency in flow to collect a sufficient number of stream samples each year to make an assessment of Susupe’s streams.

In point, there has been insufficient water quality data collected on most streams to make scientifically defensible assessments of the *Recreational* DU. For the stream systems with sufficient data, *Enterococci* was found to be the most frequent cause of impairment. Likewise, where fish tissue or biota data was available, an assessment of the *Fish and Shellfish Consumption* DU could be assessed and heavy metals were identified as the cause for impairment. These findings are listed in Table C-18., including the causes (pollutants) of fresh water stream impairment and the stream miles that are impaired for each.

TABLE C-18. Size of CNMI Fresh Water Streams Impaired by Causes

Cause/Impairment Type	EPA Cause ID	Size of Waters Impaired (miles)	Comments
ALL STREAM WATERS (Class 1)			
Enterococci	215	44.2	many sources
Lead	267	6.5	WWII debris dumpsites
Mercury in fish	467	3.2	Drainage from hospital incinerator

The sources of these impairments are listed in Table C-19., below.

TABLE C-19. Size of CNMI Fresh Water Streams Impaired by Sources

Sources of Pollutants	EPA Source ID	Size of Waters Impaired (miles)
ALL STREAM WATERS (Class 1)		
Livestock (Grazing or Feeding)	143	44.2
Sedimentation	21	37.7
On-site treatment systems	92	6.5
Urban Runoff/Storm sewers	177	6.5
NPS from Military	89	9.7
Sewer overflows	115	6.5

An assessment of the *Support and Propagation of Aquatic Life* DU was possible for a few stream systems where visual field assessments were completed, and by referring to the survey results from the 2008 study conducted by DLNR DFW (2008, McKagan et.al).

However, there is a lack of available fish tissue and biota contaminant data for the majority of streams to assess the *Fish and Shellfish Consumption* DU. Therefore, most stream systems are assigned a CALM Category of 2 or 3, for lack of information.

However, all streams were found to support the *Aesthetic Enjoyment* DU with the exception of Central West Takpochau watershed. The constructed concrete conveyances therein lack natural beauty and cannot be enjoyed for hiking or other athletic training as other streams systems are in the CNMI.

As was the case for the Northern Islands' coastal waters, streams therein are also assigned a CALM Category 1 due to their remoteness and lack of any consistent anthropogenic stressors or pollutants at this writing. However, should military exercises be expanded to these islands, impacts cannot be practicably avoided in total. Therefore, further study of these Tier 3 waters is of utmost importance to establish baseline ambient conditions.

Sections C.3.5., through C.3.8, of this report will provide further detailed discussion of each island's stream systems.

ALL CNMI – WETLANDS

CNMI wetlands are not regularly monitored for water quality unless there are proposed developments within the 50-ft buffer.

For the wetlands that have biological information available, an assessment of the *Propagation of Aquatic Life* DU was made, the only DU assessed for CNMI wetlands. Table C-20., below provides a summary of the acres of wetlands support or not supporting the DU.

TABLE C-20. Individual DUs Support Summary for CNMI Wetlands

Designated Use	*Total in State (Acres)	Total Assessed (Acres)	Supporting /Attaining (Acres)	Not Supporting /Attaining due to non-pollutant	Insufficient Data / Does not exist (Acres)
ALL WETLANDS (Class 1)					
Propagation of shellfish and other aquatic life	717.8	717.8	85.6	568.4	63.8

For the same reasons presented above, Pagan's wetlands are fully supportive of the *Propagation of Aquatic Life* DU, for which they are assigned a CALM category 1. This is again due to their remoteness and lack of any consistent anthropogenic stressors or pollutants at this writing. However, expansion of military training exercises to the Northern Islands could drastically hinder support of this DU in the future.

For those wetlands found unsupportive of the *Propagation of Aquatic Life* DU, their causes of impairment are listed in Table C-21., below.

TABLE C-21. Size of CNMI Wetlands Impaired by Causes

Cause/Impairment Type	EPA Cause ID	Size of Waters Impaired (Acres)	Comments
ALL WETLANDS (Class 1)			
Habitat Alterations	504	568.4	non-pollutant
Non-native Aquatic Plants	312	568.4	non-pollutant
Nonnative Fish, Shellfish, or Zooplankton	313	568.4	non-pollutant
Flow Regime Modification	319	568.4	non-pollutant

The sources of impairment are non-pollutants and listed in Table C-22., below, but not in the 303(d) list (Table C-10., of the previous section).

TABLE C-22. Size of CNMI Wetlands Impaired by Sources

Sources of Impairment	EPA Source ID	Size of Waters Impaired (Acres)	Comments
ALL WETLANDS (Class 1)			
Drainage/Filling/Loss of Wetlands	36	568.4	non-pollutant
Flow Alterations from Water Diversions	42	568.4	non-pollutant
Introduction of Non-native Organisms	180	568.4	non-pollutant

There is further discussion of wetlands contained within each watershed in Sections C.3.5., through C.3.8, of this report. In addition, Section C.4., provides a detailed discussion of BECQ's current Wetland Protection Program and new projects that will be undertaken in coming years.

All lakes in the CNMI are publicly owned. Their trophic condition, and the programs in place to protect these lakes from pollution and improve their water quality follows.

C.3.4. Section 314 (Clean Lakes Program)

There are only four lakes (267.4 acres) within the CNMI archipelago, all of which are brackish. There is one Lake on Saipan, Susupe Lake (57.4 acres), and the other three are in the Northern Islands. There is one Lake on Anatahan (149 acres), and two on Pagan. Lake Sanhalom, "inner lake" (34 acres) lies closer to the volcano on Pagan, and Laguna Sanhiyong (27 acres) is in close proximity to Pagan's west coast (Pacific Planning and Design Consultants (1978). *Physical Development Master Plan for the CNMI.* Volume V, Pagan, Government Printing Office).

Both BECQ's WQS and DCRM's Regulations provide procedures and processes for managing land use to protect lakes from land-based sources of pollution. All lakes fall within DCRM's APC. Any development proposed within an APC requires an APC Permit before it may commence and must comply with stipulated setbacks and buffers from the lake's shoreline. The permitting process requires an anti-degradation review for any actions that have the potential to lower water quality, including temporary, long-term and cumulative impacts. In addition, a section 401 Water Quality Certification and federal consistency review is required for any project requiring an Army Corps of Engineers Section 404 permit, as required by the CWA, and for section 10 permits under the Rivers and Harbor Act of 1899,.

Table C-23., on the following page provides a Summary of the acres of public lakes attaining or not supporting their DUs, and those needing further information to make a DU assessment.

TABLE C-23. Individual DUs Support Summary for CNMI Lakes

Designated Use	*Total in State (Acres)	Total Assessed (Acres)	Supporting /Attaining (Acres)	Not Supporting /Attaining due to non-pollutant	Insufficient Data / Does not exist (Acres)
ALL LAKES (Class 1)					
Propagation of shellfish and other aquatic life	267.4	267.4	210.0	57.4	0.0
Fish/shellfish consumption	267.4	267.4	210.0	0.0	57.4
Recreation with risk of waterborne illness	267.4	267.4	210.0	57.4	0.0
Potable Water Supply	267.4	267.4	267.4	0.0	0.0
Aesthetic enjoyment /other uses	267.4	267.4	267.4	0.0	0.0

The lakes in the Northern Islands of Anatahan and Pagan have not been fully assessed due to their remoteness, and in the case of Anatahan, the hazards to safety caused by the potential for volcanic activity. Therefore, they are only tested when other research is being conducted on the islands. These islands are only sparsely populated, usually on a seasonal basis, which precludes significant anthropogenic stressors to water quality. For now, these lakes support all their DUs. However, this may change should US military exercises be expanded to the island of Pagan.

Susupe Lake covers 57.4 acres in Saipan's South Susupe watershed. It is the only regularly monitored fresh surface waterbody. It is tested bi-weekly for the bacteriological FIB, *E.coli*, as well as for pH, turbidity, conductivity, DO%, and temperature. Susupe lake does not support the *Recreational* or *Propagation of Aquatic Life* DU due to high pH (>8.5), diminished DO% (<75%), and *E. coli* exceedances of the CNMI WQS. The lake also has several introduced species (see Table C-24., causes of impairment on the following page).

TABLE C-24. Size of CNMI Lakes Impaired by Causes

Cause/Impairment Type	EPA Cause ID	Size of Waters Impaired (miles)	Comments
ALL LAKES (Class 1)			
Escherichia coli	217	57.4	
Oxygen, Dissolved	322	57.4	
pH, High	491	57.4	
Nonnative Fish, Shellfish, or Zooplankton	313	57.4	Non-Pollutant

Sources of Susupe Lake's impairment is listed in Table C-25., below. They include on-site treatment systems, urban runoff, and sewer overflows contributing to *E. coli* loading.

TABLE C-25. Size of CNMI Lakes Impaired by Sources

Source of Impairment	EPA Source ID	Size of Waters Impaired (miles)	Comments
ALL LAKES (Class 1)			
on-site treatment systems	92	57.4	
Urban runoff/Storm Sewers	177	57.4	
Sanitary Sewer Overflows	115	57.4	
Source unknown	140	57.4	for High pH

The source for the high pH levels is unproven at this time. However, the diminished oxygen levels are associated with microbial loading, naturally decaying plant life and warm temperatures associated with shallow inland lakes. Lake pH levels can fluctuate daily due to photosynthesis and respiration driving CO_2 levels up, thus raising pH levels. Table C-26., on the following page lists the trophic status of all four of CNMI's publicly owned lakes.

Since there is a lack of available water quality or other data for the lakes in the Northern Islands, only Susupe Lake could be assessed for trends in water quality.

TABLE C-26. Trophic Status of Significant Publicly Owned Lakes

Trophic Status	Description	Number of Lakes	Acres of Lakes
	Total in the CNMI	**4**	**267.4**
Assessed		1	57.4
Oligotrophic	Poor in nutrient and plant life and rich in oxygen	0	0
Mesotrophic	Intermediate productivity, commonly clear water with beds of submerged aquatic plants and medium levels of nutrients.	0	0
Eutrophic	Rich in nutrients, abundant plant life in process of decaying depletes oxygen supply	1	57.4
Hypertrophic	Enriched with nutrients, have a poor ecosystem due to decreased dissolved oxygen	0	0
Dystrophic	Brownish acidic waters, a high humic matter, and a small plant population.	0	0
Unknown		3	210.0

Appendix II contains the annual percent of exceedances of the WQS for *E. coli*, pH, and DO%. These data were used to complete Table C-27., below.

TABLE C-27. Trends in CNMI Lake Water Quality

Description	Number of Lakes	Acres of Lakes
Assessed for Trends	1	45.2
Improving	0	0
Stable	0	0
Degrading	1	45.2
Fluctuating	0	0
Trend Unknown	3	210.0

There does not appear to be a trend in exceedances of the WQS for pH or DO% in Susupe Lake. However, there is a steady increase in the number of *E. coli* exceedances since 2010. Therefore, Susupe Lake's water quality is degrading. This emphasizes the need for BECQ WQS/NPS and WEEC programs to continue coordination and collaboration with CUC to implement the 2017 TMDL recommendations. This includes surveying households to identify those currently using aging on-site systems and requiring them to connect to the available sanitary sewer line in

compliance with CUC regulations. In addition, BECQ will continue to alert CUC of field assessment findings to establish which sewer lines and/or lift stations should be prioritized for upgrades and repair to diminish *E. coli* loading.

There is further detailed discussion of Susupe Lake in Sections C.3.5.7, and the lakes in the Northern Islands in Section C.3.8., of this report.

C.3.5. Five-Part Categorization of Saipan's and Mañagaha's Surface Waters

The following section and sub-sections provide a detailed assessment of each of Saipan's watersheds, and of Mañagaha's water quality status for the benefit of watershed communities, government policy and lawmakers, students, researchers, resource managers and other stakeholders interested in improving the health of the waterbodies in which they fish and swim.

The island of Saipan has 17 designated watersheds (or waterbody segments). There are 58 long-term coastal marine water quality BEACH monitoring and notification sites surrounding Saipan, and 11 surrounding Mañagaha. There are an additional 30 seagrass biological monitoring sites in Saipan Lagoon, and 21 reef flat sites. Figure C-4., and C-5., on the following pages provide a map showing Saipan's and Mañagaha's long-term BEACH monitoring sites.

SAIPAN and MANAGAHA - COASTAL MARINE WATERS

Table C-28., on page 77, lists the assessment results for Saipan's and Mañagaha's coastal waters, and whether or not they attain each of the DUs.

FIGURE C-4. Saipan BEACH Water Quality Monitoring Sites

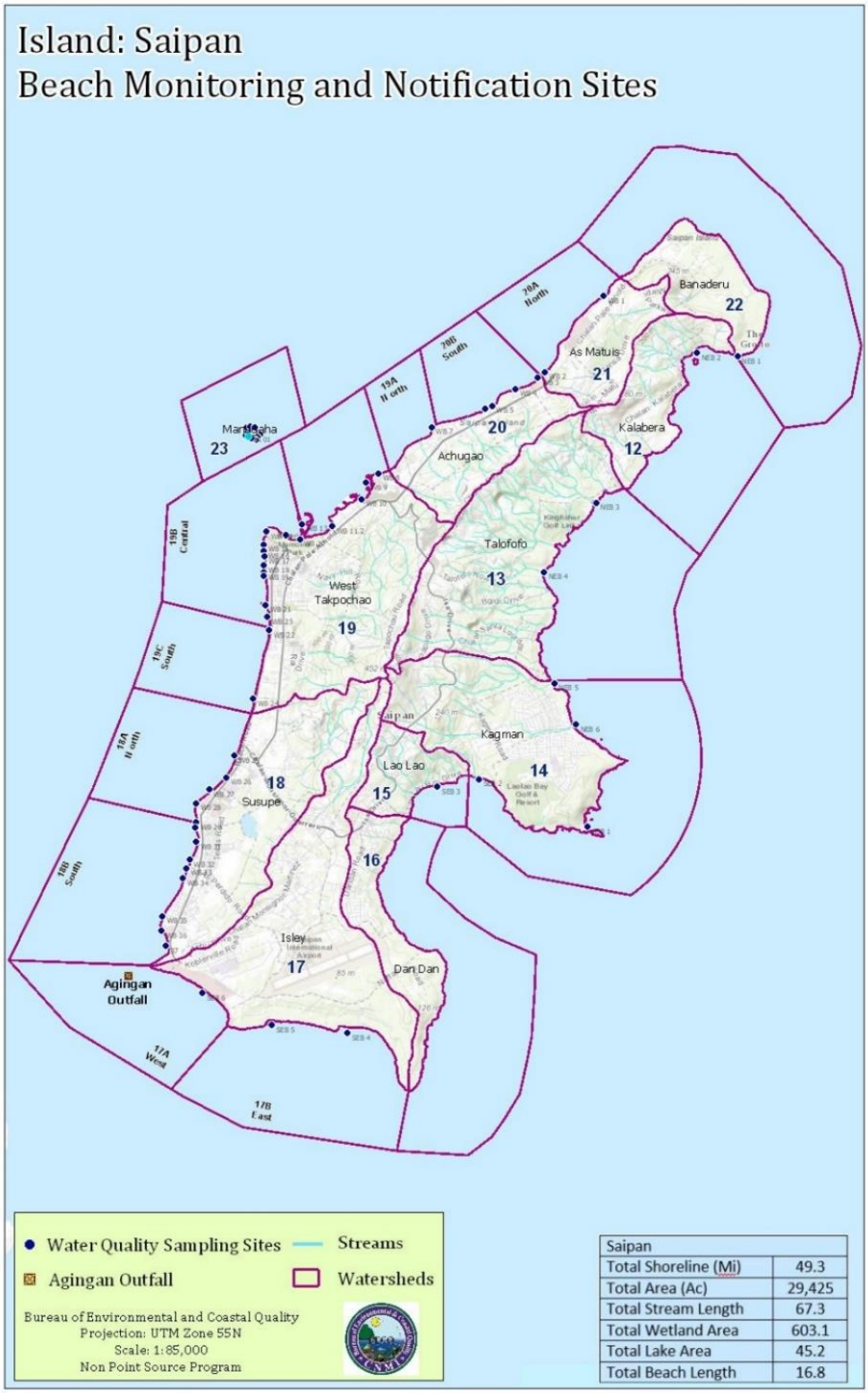


FIGURE C-5. Saipan Selected and Probabilistic Biological Criteria Monitoring Sites

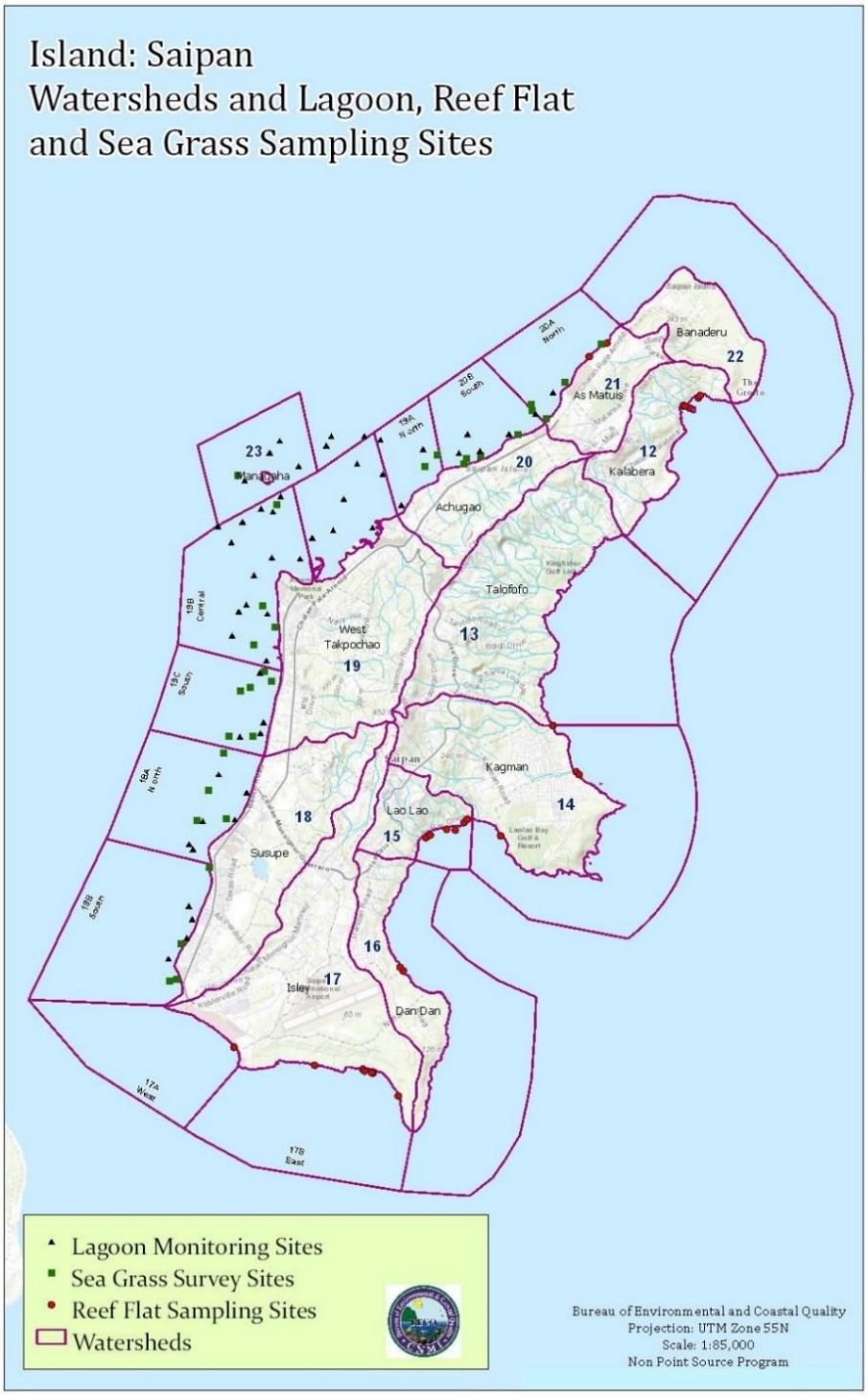


TABLE C-28. Criteria Assessment of Individual DUs Support of Saipan's and Mañagaha's Coastal Waters

		Bird Island Beach	Hidden, Jeffreys, and Old Man by the Sea	Forbidden, Marine, Tank beach, North Lao Lao	South Lao Lao	Private beach off cliff behind airport landing strip	Obyan, Ladder,	Unai Dankulo (Coral Ocean Point)	San Antonio lift station to Sugar Dock	Saipan Community School to Chalan Laulau Beach	Garapan Beach, Drainage #3, Garapan Fishing Dock	Hafa-Adai Drainage#2 to Inos Peace Park	DPW Channel Bridge	Sea Plane Ramp to Tanapag meeting hall	Aqua Resort to Nikko Hotel	Pau Pau beach to Wing Beach	Grotto Cave	Managaha beaches
		NEB02	NEB07, NEB03-04, CNMI-104	SEB01-02, NEB 05-06, CNMI-29, ARRA B2,5,8	SEB03, CNMI-21, ARRA C2,5,8	CNMI 72	SEB04-05, CNMI-30	SEB06	WB37-30	WB23,21-11.2	WB22,23 and WB21	WB20-11.2	WB10	WB9-7	WB6-3	WB2-1, CNMI-19	NEB01	MG01-11
WATER BODY SEGMENT ID		12	13	14	15	16	17 Isley		18 Susupe		19 W. Takpochau			20 Achugao		21	22	23
		Kalabera	Talofofo	Kagman	Lao Lao	Dan Dan	B (East)	A (West)	B (South)	A (North)	C (South)	B (Central)	A (North)	B (South)	A (North)	As Matuis	Banaderu	Managaha
Designated Use																		
Coastal Waters	**Aquatic Life**	***Fair Habitat, Good Nutrient Levels***	***pH Good, Good Nutrient Levels,*** No biological data	Good Habitat, ***Good Nutrient Levels***	Poor Habitat, ***Good Nutrient levels***	F	Fair Habitat, ***Good Nutrient Levels***	Fair Habitat, ***Good Nutrient Levels***	***Fair Habitat,*** DO% low, ***Good Nutrient Levels***	Good Habitat, DO% low, ***Good Nutrient Levels***	***Poor Habitat ,*** DO% & pH low, ***High Nitrate Levels***	Fair Habitat, DO% & ***pH low Good Nutrient Levels***	Poor Habitat, ***Good DO% & pH, Good Nutrient Levels***	Poor Habitat, DO% low ***Good Nutrient Levels***	Fair Habitat, ***DO% low, Good Nutrient Levels***	Fair Habitat, DO% low, ***pH low , Good Nutrient Levels***	F	***Good Habitat, pH low at dock, Good Nutrient Levels***
	Fish Consumption	i	i	i	i	i	i	Cu & Pb in biota	i	i	i	Hg in Fish tissue	***Pb in bivalve***	***Pb in bivalve***	***F***	i	***i***	i
	Recreation	Entero exceed	Entero exceed	F	***Entero exceed***	***F***	Entero exceed	***Entero Good***	Entero exceed	***Entero Good***	Entero exceed, pH low	Entero exceed, ***pH low***	Entero exceed	Entero exceed	***Entero Good***	***Entero Good, pH low***	Entero exceed	F
	Aesthetic enjoyment/others	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	CALM Assessment Category	***4a***	***4a***	3	***4a***	2	***4a***	5	5	5	5	5	5	5	5	5	***4a***	***5***

F - Fully supported | i - Insufficient Information | Not Supporting DU | ***Changes bold italics***

Presently, none of Saipan's or Mañagaha's coastal waters fully support *all* DUs, with the *Propagation of Aquatic Life* and *Recreational* DUs as the uses most commonly unsupported.

Most of Saipan's and Mañagaha's coastal waters' benthic habitat were ranked as "Good" to "Fair", except for Lao Lao, West Takpochau, and South Achugao watersheds (Segments 15, 19C, 19A, and 20B).

These ALUS rankings are based upon benthic habitat, coral reef, and seagrass assemblage assessments over the past five years. The biological monitoring results for each waterbody are listed in tables contained in Appendix III.

The water quality criteria which resulted in other watersheds being listed as unsupportive of the *Propagation of Aquatic Life* DU were low DO%, pH, and high Nitrate-N levels. This was the case for the South and North Susupe (18A and B), Central West Takpochau (19B), North Achugao (20A), and As Matuis (21) watersheds on Saipan, and for Mañagaha island (23).

There is still insufficient fish tissue and biota data to determine whether or not most of Saipan's and Mañagaha's coastal waters support the *Fish and Shellfish Consumption DU*, save for the West Isley (17A), Central (19B) and North West Takpochau (19A), and South Achugao (20B) watersheds' coastal waters which do not supported this DU due to elevated levels of heavy metals (2010, 2014 and 2018 studies by Denton, et.al, of UoG WERI).

Several segments of the western shoreline of Saipan consistently do not support the *Recreational* DU due to greater than 10 % exceedances of the of CNMI WQS for *Enterococci* annually. However, Kagman, Lao Lao, West Isley, North Susupe, North Achugao, and As Matuis coastal waters did show improvement. This is associated with the NRCS Kagman Watershed Project and completion of the Cross Island Road Reconstruction project, which traverses several watershed as shown in Figure C-6., on the following page.

Road improvements included storm water BMPs to prevent sediment from entering coastal waters.

In addition, there were several upgrades to Saipan's municipal sewer system this reporting cycle and limited rainfall events due to the post-peak phase of the strong El Nino years that began in FY2015. This and the completion of the 2017 TMDL for Saipan, resulted in five (5) watersheds being re-assigned to a CALM category of 4a. The TMDL has provided natural resource managers with recommendations for limiting bacterial loading based on the identified sources in each watershed.

FIGURE C-6. Phases of the Cross Island Road Reconstruction Project

The identified causes and sources of impairment will be discussed in detail in the watershed sub-sections of C.3.5.1., through C.3.5.12. that follow.

SAIPAN – FRESH WATER STREAMS

There are no rivers within the CNMI, or streams on Mañagaha. Although there are numerous intermittent and ephemeral streams on Saipan. Table C-29., on the following page lists the assessment results for Saipan's stream systems.

Stream water quality and visual field assessment data collected this reporting cycle, the 2008 fish survey by McKagan, and the 2017 NHD, and Wetland and Stream GIS data layers provided vastly more information to make assessments of the *Support of Propagation of Aquatic Life* DU. These new findings will be discussed in detail in each watersheds' sub-section (C.3.5.1 through C.3.5.12).

New fish tissue and biota data from the 2016 study by Denton, et.al, indicate that heavy metal levels in Central West Takpochau and South Achugao streams systems are unsupportive of the *Fish and Shellfish Consumption* DU. Sources include runoff from the old hospital incinerator in Garapan, and heavy metal transport into sediment at WWII debris dumpsites sites.

TABLE C-29. Assessment of Saipan's Waterbodies DUs – Fresh Water Streams

		Bird Island Beach	Hidden Beach drainage, Talofofo, and Hasngot stream	Marine, and Tank beach drainages, North LaoLao streams	South Lao Lao streams	Private beach off cliff behind airport landing strip	Obyan, Ladder,	Unai Dankulo (Coral Ocean Point)	San Antonio lift station to Sugar Dock	Community School to Chalan Laulau Beach	Garapan Beach	Falipe Stream, Garapan Drainages #1-#3	Tasi Stream, Isa Rd, Chalan Pale Arnold culverts, DPW Channel Bridge Mangroves	Achugao, Dogas and Agatan Streams	Aqua Resort to Nikko Hotel	Pau Pau beach to Wing Beach	Grotto Cave	Managaha beaches
			TAL 01-03	KAG01-02, LAO 01	LAO 02-05							WTC 01-03	WTN01	ACH01-03				
WATER BODY SEGMENT ID		12	13	14	15	16	17 Isley		18 Susupe		19 W. Takpochau			20 Achugao		21	22	23
		Kalabera	Talofofo	Kagman	Lao Lao	Dan Dan	B (East)	A (West)	B (South)	A (North)	C (South)	B (Central)	A (North)	B (South)	A (North)	As Matuis	Banaderu	Managaha
	Designated Use																	
Streams	**Aquatic Life**	***X***	Native Habitat	Native Habitat	***X***	X	i	i	***i***	***i***	i	Non-native species	i	Native Habitat, Visual Field good	Native Habitat Visual Field good	i		
	Fish Consumption	***X***	i	i	***X***	X	i	i	***i***	***i***	i	Hg in biota	i	***Hg, Pb in bivalves***	i	i		
	Recreation	i	***Entero exceed***	i	i	***i***	i	i	***i***	***i***	i	***Entero exceed***	i	***Entero exceed***	i	i		
	Potable Water Supply	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	Aesthetic Enjoyment/others	F	F	F	F	***F***	***F***	***F***	***F***	***F***	F	N	F	F	F	F		
	CALM Assessment Category	2	***5***	***3***	***3***	***2***	3	3	***2***	***2***	2	5	2	***5***	2	2		

F - Fully support DU | I - Insufficient Information | N - Not Attaining DU | ***Changes in bold italics*** | X- Not Assessable | Does not exist

There is insufficient water quality data to assess support of the *Recreational DU* for the majority of Saipan's streams due to limited rainfall this reporting cycle. However, visual field assessments and GIS analysis has provided sufficient information to identify sources of FIB contamination, which are used to target stream restoration efforts.

Likewise, there has been no systematic survey to measure visitor or residents' *Aesthetic Enjoyment* of streams. However, many residents and visiting tri-athletes hike within Saipan's streambeds for training, athletic competitions, or general recreation in the tradition of the "Hash House Harriers". For over 30 years, Saipan residents have set a "Hash" trail every Saturday, for a non-competitive hiking/running event. Trails are made through various pristine forested areas so "hashers" may enjoy the beauty of these remote locations. Tourists and visiting tri-athletes have also been known to take part in the "Hash". Based solely on this anecdotal evidence, the *Aesthetic Enjoyment* DU is supported for all of Saipan's streams except for the concrete conveyances within the Central West Takpochau watershed.

SAIPAN – WETLANDS AND LAKES

Saipan has several isolated wetland regions, and numerous small open water "pot holes" within the wetland area of the Susupe watershed. This is also where Susupe Lake is located. There are no wetlands on Mañagaha. Table C-30., on the following page lists the assessment results for Saipan's wetlands and Susupe Lake.

New wetland delineations and valuations have not been completed for all of Saipan's wetlands. Therefore, many wetlands have been assigned a CALM Category 3 for lack of information. However, the *Propagation of Aquatic Life* DU is considered under threat on Saipan due to wetland loss. Wetlands now cover less than 2% of the land based on current GIS analysis, 1989 National Wetland Inventory, and the 1990 CNMI Wetlands Conservation Plan. Historical (pre-CWA) losses include Garapan - 200 acres; San Roque - 50 acres; Flores Pond - 130 acres; Lake Susupe area - 200 acres; and Kagman and Lower Base - 600 acres. Most wetland losses are believed to have occurred for agricultural purposes during the Japanese administration of the islands, although wetland fills for U.S. military development following the 1944 invasion probably accounts for some losses, as well as some more recent permitted fills.

The wetlands of Susupe, West Takpochau, and the Achugao watersheds have been studied the most by wetland delineators. Using recent visual field assessments and the new 2017 NHD, and Wetland and Streams GIS data layers, analysis resulted in these wetlands being found unsupportive of the *Propagation of Aquatic Life* DU, but not due to a pollutant. Hydrological alterations from fill and the introduction of invasive species, and plants are the cause of impairment. Therefore, these wetlands were assigned a CALM Category of 4c.

Susupe Lake was also found unsupportive of the *Propagation of Aquatic Life*, and *Recreational* DUs for both invasive species and other water quality exceedances of the WQS. This is discussed in more detail in the South Susupe watershed sub-section, C.3.5.7.

TABLE C-30. Assessment of Saipan's Waterbodies DUs – Wetlands and Susupe Lake

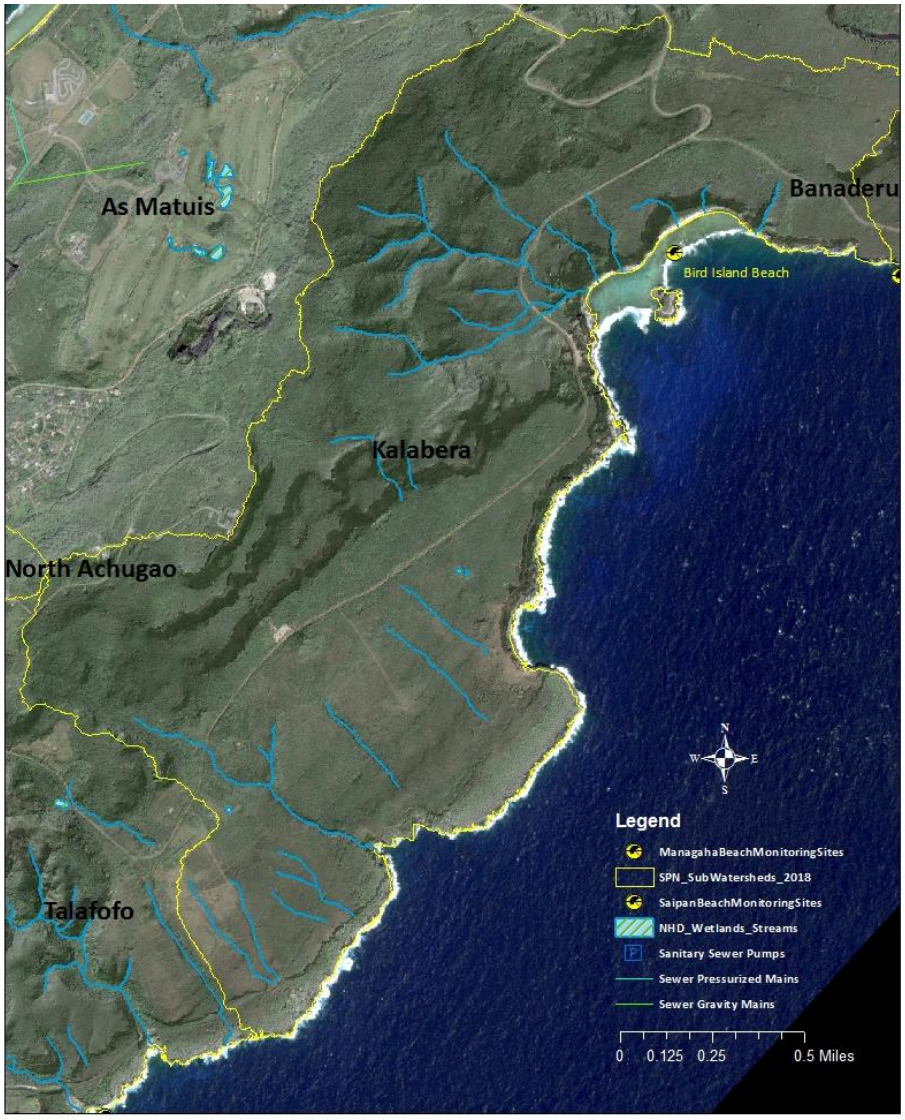
WATER BODY SEGMENT ID		12	13	14	15	16	17		18		19			20		21	22	23
							Isley		Susupe		W. Takpochau			Achugao				
							B	A	B	A	C	B	A	B	A			
Waterbody Type	**Designated Use**	Kalabera	Talofofo	Kagman	Lao Lao	Dan Dan	(East)	(West)	(South)	(North)	(South)	(Central)	(North)	(South)	(North)	As Matuis	Banaderu	Managaha
Lakes	Aquatic Life								N									
	Fish Consumption								I									
	Recreation								N									
	Potable Water Supply								***X***									
	Aesthetic Enjoyment/others								F									
CALM Assessment Category									5									
Wetlands	Aquatic Life		i	F		i	i	i	N	N	***X***	N	N	N	N			
CALM Assessment Category			3	1		3	3	3	4c	4c	***X***	4c	4c	4c	4c			

Subsections C.3.5.1-C.3.5.12., that follow provide specific details about each of Saipan's watersheds, and the condition of each type of waterbody that lies within.

C.3.5.1. KALABERA - Waterbody Segment 12

Kalabera Watershed is the northernmost watershed on Saipan's east coast (Figure C-7., on the following page).

FIGURE C-7. Kalabera Watershed (Segment 12)



Kalabera has only one long-term BEACH monitoring site, which is located on Bird Island Beach.

Kalabera - Coastal Marine Waters

Kalabera is one of the least developed watersheds on Saipan. It receives very little rainfall compared to other watersheds and as stated in the 2017 TMDL, Kalabera is, "…characterized by steep topographic relief from the central mountains to a wide shelf. The road network is paved in the northern end and serves as a transport corridor for popular tourist destinations." The exception to this is a secondary coral road leading to the historical Kalabera Cave site. Although,

this area is on the coastal shelf it is, "well buffered from the coastal waterbody through both vegetation and distance."

The watershed is also known for the Bird Island Sanctuary, a rookery for nesting swiftlets and other seabirds, which receives an estimated 29,000 visitors per month (2016-2017, MVA Site Visitation Numbers). An outlook on the upper cliff line allows for panoramic scenic views of Bird Island and the clear coastal waters below, which is often used as a backdrop for tourist photos. Therefore, Kalabera's coastal waters easily supports the *Aesthetic Enjoyment* DU.

The ALUS assessment of Kalabera's coastal near shore reefs were ranked as "Fair" this reporting cycle. In addition, new orthophosphate and nitrate water quality levels were measured using the FIA EPA Method 353.2, and all were well within the CNMI WQS for nutrients. This new data predisposes the erroneous data from 2004, which used an unreliable method that provided erroneous results. Therefore, Kalabera's coastal waters were removed from the 303(d) list as impaired for phosphate and now fully support the *Propagation of Aquatic Life* DU.

A heavy metal study was conducted by Denton, et.al, in 2016. The study evaluated the extent of sediment impacted by WWII wastes, and identified, "…high risk areas where… traditionally harvested food have levels beyond that acceptable for human consumption…" Soil and sediment samples were taken from dumpsite, "… drainage pathways, or coastal discharge points". The study noted that levels from Bird Island Beach south along the coastline to the Talofofo watershed was of "particular interest and imply rather widespread Cd contamination along this stretch of coastline." This is of importance given that metals are taken up by food organisms that may be harvested by local residents. It should be noted that although, Bird Island Beach is a" no-take" conservation area, which should provide some protection to public health, some individuals have been known to fish there illegally. Therefore, further study of heavy metal contamination in fish tissue and/or biota should be conducted from all highly contaminated areas to fully assess the *Fish and Shellfish Consumption* DU.

For this reporting period, Kalabera's coastal waters remain unsupportive of the *Recreational* DU due to *Enterococci* exceedances of the WQS. Based on field assessments, the contamination is most likely, "natural background from bird guano sources at Bird Island", and "from soil sources, delivered as sediment during rainfall events." (2017 TMDL). Surveys confirm that there are only a few dispersed houses and roaming domesticated livestock in the upper watershed, which are far removed from the vegetated coastline.

Kalabera – Fresh Water Streams

Kalabera's stream systems are ephemeral and only flow during strong rain events. No fresh water pools have been found during visual field assessments of the northern half of the watershed. Visual assessments have not been completed on the flat southern shelf of the watershed, but available aerial imagery, the 2017 NHD, and the Wetlands and Streams GIS data layers indicate that the geology and topography is less likely to support regular stream saturation and flow, or fresh water pools. Therefore, it is unlikely that fresh water aquatic life can exist in the Kalabera streams. Therefore, the *Support and Propagation* of *Aquatic Life,* and *Fish and Shellfish Consumption* DUs have been removed for assessment purposes.

Kalabera's ephemeral streambeds rarely flow for collecting water quality samples. Therefore, no *Enterococci* data are available for determining support of the *Recreational* DU. However, Kalabera's northern streambeds are known to be used by beach goers, "hashers", hikers, and by professional athletes to access bird island beaches and for exercise and training. Therefore, Kalabera streambeds continue to attain the *Aesthetic Enjoyment* DU.

The ephemeral streams flow too infrequently to provide streambed saturation or a stable and sufficient *Potable Water Supply*. Therefore, this DU has been removed for assessment purposes.

Kalabera – CALM Categories

Kalabera's coastal waters were upgraded to a CALM Category 4a this reporting cycle, as a TMDL for bacteriological impairment was completed in September 2017.

Kalabera's fresh water streams retain a cumulative CALM Category 2, due to insufficient water quality data to evaluate the *Recreational* DU.

C.3.5.2. TALOFOFO - Waterbody Segment 13

Talofofo Watershed's long-term BEACH monitoring sites are located on Hidden, Jeffrey's, and at The Old Man by the Sea Beaches as shown in Figure C-8., on the following page. An additional reef flat site, CNMI-104, is located in the shallows of Jeffry's fore reef.

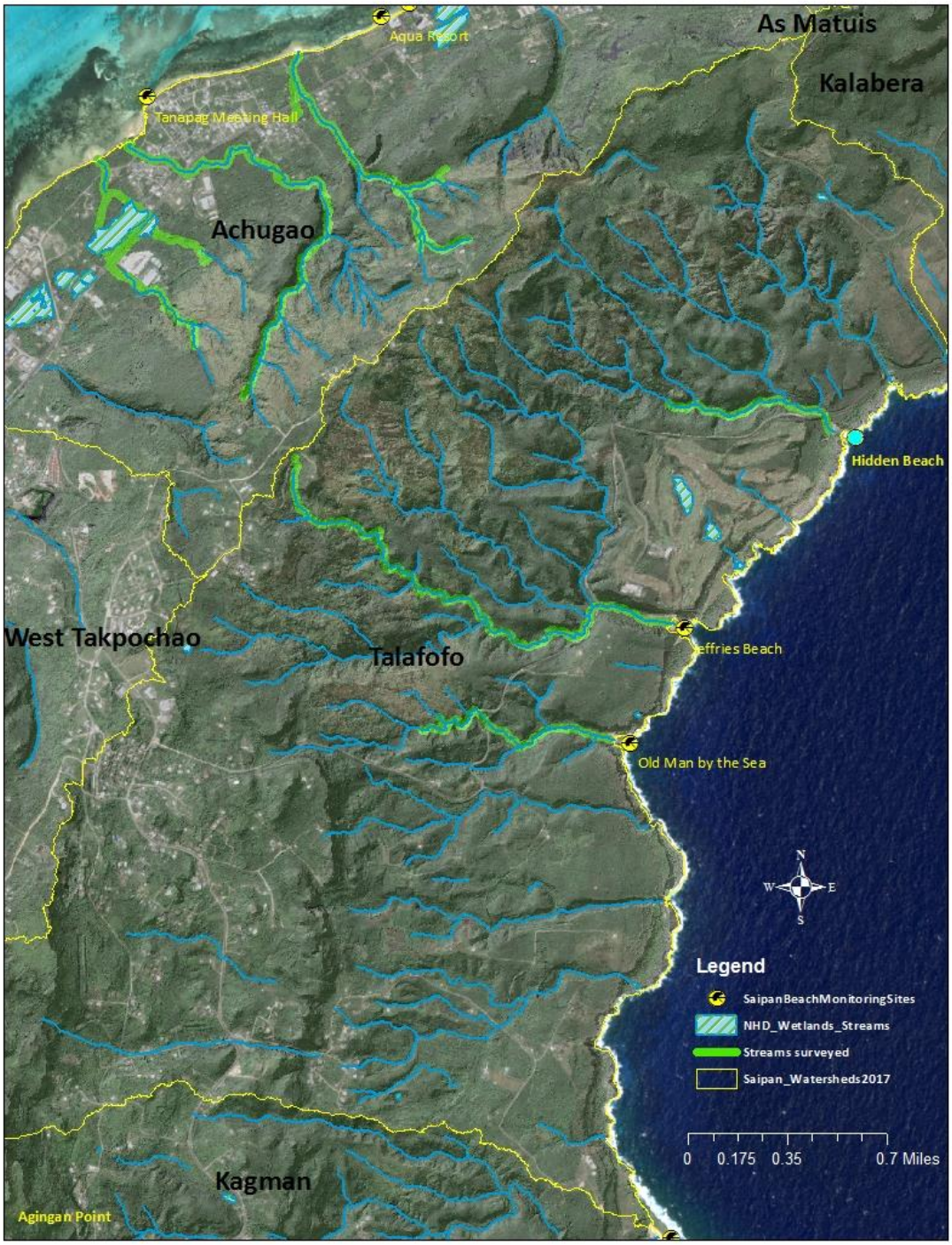
The Talofofo Watershed contains "a mix of land uses in a topographically complex environment." (2017 TMDL). Visual field assessments and aerial imagery reveal only a few houses and small subsistence farms in the upper watershed.

Talofofo – Coastal Marine Waters

Talofofo's "landscape is a patchwork mosaic of grasses and mixed scrub forest types, with frequent maintenance by fire to promote grasses… or clear land for agricultural" (2017 TMDL). This practice exposes hilltops and, "contributes directly to steep ravines that flow directly to the coastal edge…" Within this coastal edge lies three undeveloped beach accesses to Hidden Beach, Jeffry's Beach, and a trail to Old Man by the Sea beach. All of these remote sites are popular tourist destinations, none of which offer restroom facilities or trash collection services.

Visitors enjoy the ruggedness of this unspoiled terrain, and the isolation of its far-off beaches. The rutted coral roads leading down to Hidden and Jeffry's beaches in the lower watershed are, "… directly in-line with the slope…and are deeply eroded." (2017 TMDL). The erosion is almost entirely due to heavy traffic by tour companies and independent rented SUVs driving in "the gully networks" which contribute to sediment-laden storm water flowing directly to coastal waters.

FIGURE C-8. Talofofo Watershed (Segment 13)



Talofofo's pH, DO%, and recent nutrient water quality levels are all well within CNMI WQS. The latter resulted in Talofofo watershed being removed from the 303(d) list as impaired for phosphates.

However, due to high surf hazards, ALUS biological assessments have not been conducted on Talofofo's coastal waters to fully assess the *Support and Propagation of Aquatic Life* DU. Therefore, there is insufficient data to establish whether or not this DU is fully supported this reporting cycle.

The previously cited, 2016 heavy metal sediment study conducted by Denton, found "Other major site exceedances of Saipan's soil screening levels for Cu at 'Old Man by the Sea Beach….", and "Zn at 'Hospital Dump'", which is "located on the Kingfisher Golf Course at the base of a small cliff", further study of heavy metal contamination in fish tissue and/or biota in Talofofo's coastal waters should be conducted at this highly contaminated coastline to assess the *Fish and Shellfish Consumption* DU.

Talofofo's coastal marine waters are once again 303(d) listed as impaired for *Enterococci* exceedances of the CNMI WQS. The sources of impairment includes NPSs such as soil sediment carrying naturally occurring *Enterococci*, free-range domestic and feral animals, and human waste observed in caves adjacent to area beaches. The latter is due to a drastic increase in tourists visiting these remote locations where public restrooms are not available. Preliminary results from a pilot test using human and animal qPCR markers indicated that humans were the probable source of the contamination. This finding resulted in BECQ alerting government agencies that a public restroom was needed in the area, and visitor outreach was necessary to prevent further contamination. Therefore, Talofofo's coastal waters do not support the *Recreation* DU.

Talofofo coastal waters continue to attract thousands of visitors each month to view the dramatic shoreline, raised reef platforms and tide pools, and spectacular rock formations. Based on the consistent visitor numbers, this waterbody fully supports the *Aesthetic Enjoyment* DU.

Talofofo - Fresh Water Streams

The Talofofo Watershed has the most consistent stream flow of all of Saipan's watersheds. The stream systems in the upper and mid-watershed run nearly year round, although with limited volume during dry season (November through June). Mckagen's 2008 fish survey of Talofofo's surface waters sighted a great number of *Macrobrachium lar* and *Caridina typus (*a native shrimp species) in the streams of the upper watershed, which empty into Hidden Beach. The streams in the lower watershed have good species diversity as well, and contain three species of shrimp and two native fish, "fock flagtails (*Kuhlia rupestris*) and gobies (*Stiphodon elegans*). These streams flow into Jeffry's beach and are considered "pristine". Based on these findings, DO% levels, and visual field assessments, Talofofo's fresh water streams are considered supportive of the *Propagation of Aquatic Life* DU.

Although heavy metal contamination has been noted in Talofofo's sediments, no fish tissue and/or biota contamination studies have been conducted in Talofofo's streams. Therefore, there is insufficient data for assessing the *Fish and Shellfish Consumption* DU.

Talofofo's stream water quality data again exceeded the CNMI WQS for *Enterococci*. Therefore, they were added to the 303(d) list as impaired this reporting cycle and do not support the *Recreational* DU. Visual field assessments of the streambeds (thick green lines in Figure C-8., on page 86) established that waste from free-range cows, goats, and feral pigs, and soil-laden storm water were the primary sources of *Enterococci* contamination in the streams. This finding resulted in an agricultural land exchange to move a farm operation from the steep upper watershed to a more appropriate location away from the streams in 2017.

Although, Talofofo streams flow more regularly than those in other watersheds, they still do not flow year round and are not used as a *Potable Water Supply* for Saipan.

However, Talofofo's verdant streambeds and waterfalls are frequented by hunters, hikers, and triathletes for enjoyment, thus fully supporting the *Aesthetic Enjoyment* DU.

Talofofo - Wetlands

The Talofofo watershed has a few small isolated riparian areas located in the upper watershed near the ridge. However, the wetlands have not been delineated or assessed at this writing to evaluate the *Support and Propagation of Aquatic Life* DU.

Talofofo – CALM Categories

Talofofo's coastal waters were upgraded to CALM Category 4a, as this reporting cycle the 2017 TMDL was completed for *Enterococci*. There is still insufficient information to assess Talofofo's coastal waters support of the *Propagation of Aquatic Life* and *Fish and Shellfish Consumption* DUs.

Talofofo's fresh water streams were downgraded to CALM Category 5 due to exceedances of the WQS for *Enterococci*.

Talofofo's wetlands retain a CALM Category designation of 3 due to insufficient information.

C.3.5.3. KAGMAN - Waterbody Segment 14

The Kagman Watershed borders Lao Lao Bay and contains the Lao Lao Bay Golf Resort. It has three long-term BEACH monitoring sites located at Forbidden Island, Marine, and Tank beaches, as shown in Figure C-9., on the following page. The remote Forbidden Island site is rarely monitored. However, its location far removed from any development, provides' its coastal waters with protection from most anthropogenic stressors.

FIGURE C-9. Kagman Watershed (Segment 14)

This reporting cycle, the North Lao Lao (SEB 02) long-term BEACH monitoring site is now used to assess the Kagman watershed. This site was relocated from the Lao Lao watershed as the result of the newly delineated watershed boundaries using Saipan's watershed catchment basins, (Figure C-1 on page 34) shows that this site's water quality is actually influenced by rainfall in the Kagman watershed.

In addition to these BEACH sites, there are an additional three (3) ARRA sites that are used to assess Kagman's coastal waters. These sites were established in 2010 to evaluate the efficacy of the Lao Lao Bay road construction project, and revegetation and community outreach efforts. The project's aim was to minimize the amount of sediment and other NPS of pollution from entering Lao Lao Bay. These ARRA sites in addition to the Tank Beach reef flat site (CNMI-29) are all within wading distance to the beach and have continued to be monitored on a monthly basis. These sites are adjacent to LaoLao's northern beach, one of Saipan's most popular dive sites.

Kagman's uplands are composed of porous karst soil that allows surface water to percolate into the ground water aquifer and flow out to coastal waters through fresh waters seeps. Kagman watershed also has one of the highest incidences of rainfall, and a relatively shallow slope in the

lower watershed, which is why it has become “The single largest concentration of cropland” on Saipan (CNMI SWCS, Soil survey 1986).

Kagman’s headwaters form on the steep upper slopes of Mount Takpochau and flow into “a complex network of streams and gullies, with a large (paved) road network, and large and flat lowland areas suitable for agriculture and development.” (2017, TMDL). As such, it is also “the largest growing homestead area on Saipan, with approximately 6,000 inhabitants”. However, a municipal sewage collection and treatment facility is unavailable for village residents. So several low income families unable to afford “permittible” IWDS and leaching fields often are forced to rely on outhouses out of necessity. Given, Kagman’s karst soils, nutrient loading into ground and coastal waters is of growing concern.

Kagman - Coastal Marine Waters

Kagman’s upper watershed, like Talofofo’s, is frequently burned by wildfires, and at times intentionally burned to clear land. The steep and unpaved road leading to the Mt. Takpochau parking area in the upper watershed is used by off-road all terrain tour vehicles, which contribute to very high levels of erosion. However, the 2017 TMDL report noted that the NRCS Kagman Watershed Project has made “significant infrastructural investments… in storm water management and sediment mitigation”. Completion of the project’s final 70 million gallon reservoir and waterway would divert even more storm water from adversely impacting the biological habitat of the Tank Beach Conservation area, while providing essential water for agricultural irrigation purposes.

The efficacy of this Project, and completion of Phase IIa and IIb of the Cross Island Road Reconstruction project and its associated storm water BMPs, are reflected in the health of Kagman’s coastal habitat. The ALUS biological assessment ranked Kagman’s coastal waters as “Good”, again this reporting cycle. In addition, new nutrient water quality data though limited, was well within CNMI WQS, which is of importance given the increase in Kagman’s population and lack of a municipal wastewater collection and treatment system. The new valid nutrient levels resulted in Kagman coastal waters being removed from the 303(d) list as impaired for phosphates. These waters are now fully supporting the *Propagation of Aquatic Life* DU.

There has not been any data collected on fish tissue and/or biota contamination of Kagman’s coastal waters to assess support of the *Fish and Shellfish Consumption* DU.

However, *Enterococci* levels and all other water quality criteria were again within WQS demonstrating that Kagman coastal waters also support the *Recreational DU*.

Once again, Kagman’s coastal waters that surround Forbidden Island, Marine Beach and Tank Beach Conservation Area support the *Aesthetic Enjoyment* DU based on the number of visitors who come to enjoy the dramatic shorelines, sandy beaches, and scenic views.

Kagman - Fresh Waters Streams

To date, only two streams within the Kagman watershed have been visually assessed on foot and by aerial drone imagery. One stream system was previously listed as residing in the Lao Lao watershed (LAO-01), but has since been moved into Kagman watershed for assessment purposes based on newly delineated watershed boundaries. Additional information was taken from the 2008 study by McKagan, et.al, which reported on the aquatic life observed in the streams in the upper watershed. The study considered the streams "fairly pristine", with two species of shrimp. Based on all of these findings, the fresh water stream systems of Kagman Watershed retain the *Support and Propagation of Aquatic Life* DU this reporting cycle.

However, there is insufficient data concerning fish tissue or biota contamination in Kagman's stream systems to assess the *Fish and Shellfish Consumption* DU.

Kagman's streams did not have sufficient flow during rainy season to collect water samples this reporting cycle. Presently, there is insufficient data to make a definitive assessment for the *Recreational* DU. However, preliminary data last reporting cycle show elevated *Enterococci* levels, which would impair these waters should the trend continue. The sources of *Enterococci* contamination is associated with storm water runoff, erosion, and failing on-site systems based on professional judgement and the 2017 TMDL.

The ephemeral streams in the Kagman Watershed do not have a sufficiently sustained volume to provide a reliable *Potable Water Supply*. Therefore, they are not been assessed for this DU.

Like the other Saipan stream systems, Kagman Watershed's streambeds continue to meet the *Aesthetic Enjoyment DU* based on their continued use by "hashers", and recreational and professional athletes.

Kagman - Wetlands

The Kagman Watershed contains several small isolated marsh wetlands in the upper watershed and a constructed mitigation wetland, called "Education Island" in the mid-watershed (Segment 14WET). The mitigation was to offset wetland loss due to the construction of the reservoir for the NRCS Kagman Watershed Project. The mitigated wetland is used for educating schoolchildren about the importance of wetlands and their functions and wildlife habitat. The wetland is regularly maintained by NRCS and for this reason supports the *Propagation of Aquatic Life* DU.

Kagman – CALM Categories

Kagman's coastal waters retain a CALM Category 3, due to insufficient information fish tissue and biota contamination data to assess the *Fish and Shellfish Consumption* DU.

Kagman's fresh water streams have been downgraded to CALM Category 3 this reporting cycle due to the threat of *Enterococci* contamination, although there is insufficient data to assess the *Recreational* DU at this time.

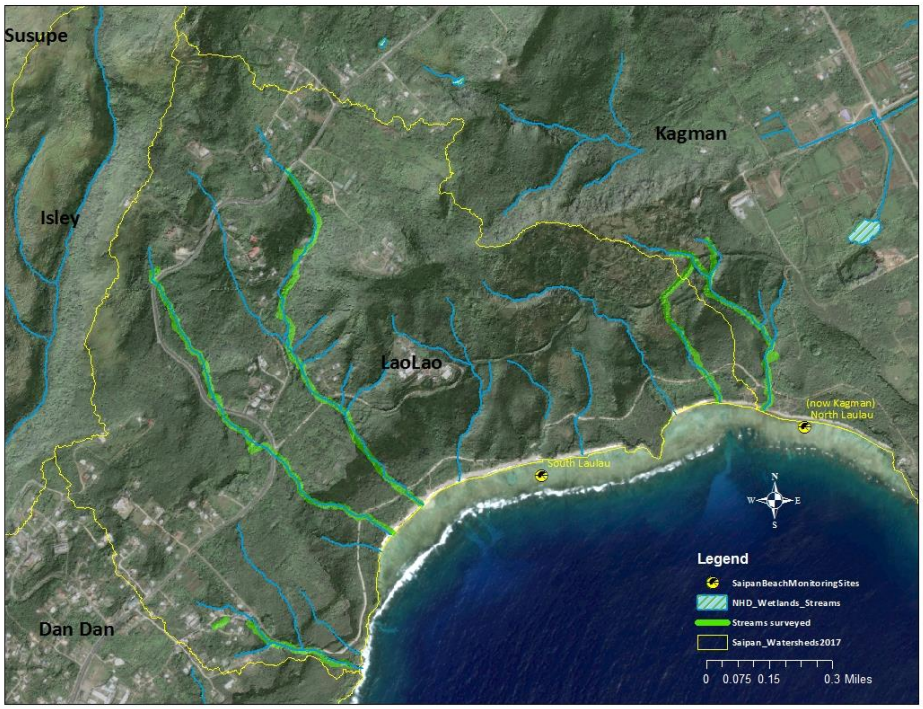
Kagman's wetlands retain CALM Category 1.

C.3.5.4. LAOLAO - Waterbody Segment 15

LaoLao watershed borders LaoLao Bay. It is home to one of Saipan's most popular snorkel and SCUBA sites, enjoyed by both residents and tourists.

This reporting cycle, one of LaoLao watershed's long-term BEACH sites was relocated. The North LaoLao site (SEB 02) now resides in the Kagman watershed to the east, due to newly delineated watershed boundaries based on Saipan's watershed catchment basins. Figure C-10., below shows that this placement is more appropriate for assessing coastal water conditions.

FIGURE C-10. LaoLao Watershed (Segment 15)



In addition, the three (3) northern ARRA LaoLao sites (B2, B5 and B8) have also been relocated to the Kagman watershed for the same reason.

All the ARRA sites are within wading distance of the coastal beaches and have continued to be monitored on a monthly basis since their establishment in 2010 to evaluate the efficacy of the ARRA LaoLao Road Improvement Project.

LaoLao - Coastal Marine Waters

There is now only one long-term BEACH monitoring site, South LaoLao (SEB 03); three (3) ARRA reef flat sites (C2, C5 and C8); and one reef flat site (CNMI-21) used for assessing Lao Lao watershed's coastal waters.

LaoLao's coastal waters were once again ranked as "Poor" in the biological ALUS assessment. The study conducted in 2010 on LaoLao Bay detected many exceedances of the CNMI WQS for ammonia, total filterable suspended solids, temperature, and turbidity. The source was associated with surface water runoff as upland soils are volcanic, and much less permeable than the karst soils located in Kagman's watershed. Therefore, rain cannot percolate into the ground water. Instead it flows over land to discharge into the Bay. However, runoff has substantially decreased in LaoLao watershed since the completion of Phase I of the Cross Island Road Reconstruction Project, and the ARRA LaoLao Road Improvement Project.

Of note, nutrient water quality data was all within the CNMI WQS for orthophosphate and nitrate. These findings resulted in LaoLao coastal waters being removed from the 303(d) list as impaired for phosphate. However, they are not considered supportive of the *Propagation of Aquatic Life* DU due to a "Poor" ALUS ranking, which is not a pollutant.

LaoLao's coastal water, were removed from the 303(d) list of impaired waters for *Enterococci* last reporting period. There were two exceedances of the STV for *Enterococci* this reporting cycle due to high surf conditions associated with the aftermath of Super Typhoon Soudelor and torrential rains at the start of FY2016. However, the exceedances stopped abruptly after October, with the beginning of dry season. There were no exceedances in FY2017. Therefore, the source was most probably due to sediment-laden storm water carrying naturally occurring *Enterococci* and not actual fecal contamination, or exceedances would have continued. The 2017 TMDL provides recommendations for improving these coastal waters found impaired for *Enterococci* in previous IRs and unsupportive of the *Recreation* DU.

There is insufficient data concerning fish tissue or biota contamination on LaoLao's coastal waters to assess the *Fish and Shellfish Consumption* DU.

However, LaoLao coastal waters fully support the *Aesthetic Enjoyment* DU as residents and visitors continue to enjoy Lao Lao's picnic beaches, LaoLao's SCUBA dive site, and the local boat launch for fishing. It is also the site where the Non-profit Micronesian Islands Nature Alliance holds educational outreach activities for the LaoLao watershed community and school children.

LaoLao - Fresh Water Streams

Visual field assessments of stream systems were completed in LaoLao's watershed last reporting cycle. The wide green lines in Figure C-10, on the previous page represent the streams that were ground-truthed and mapped using GPS and ArcGIS. These lines match very closely with the latest 2017 NHD, and Wetland and Streams GIS data layers. Based on these findings it appears that the precipitation, topographical, and geological features in the LaoLao watershed are too limited to sustain fresh water pools for any aquatic life to exist. Therefore, the *Support and Propagation of*

Aquatic Life, Fish and Shellfish Consumption, and *Potable Water Supply* DUs are no longer assessed as reflected in Table C-29., on page 80.

However, LaoLao's ephemeral streams have sufficient flow during a portion of the year for water quality sample collection. Very limited preliminary data from last reporting cycle showed elevated *Enterococci* levels. However, there was insufficient precipitation this cycle for collecting additional data to confirm impairment. The 2017 TMDL identified, "road runoff during storm events and failing septic systems", as the primary sources of *Enterococci* contamination in LaoLao's fresh water streams.

Like the other Saipan stream systems, LaoLao's streambeds continue to attain the *Aesthetic Enjoyment* DU based on their continued use by hikers, "hashers", and recreational and professional athletes.

LaoLao – CALM Categories

LaoLao's coastal waters were assigned a CALM Category 4a this reporting cycle due to completion of the 2017 TMDL for bacteria. LaoLao coastal waters were also delisted for phosphate, but still does not attain *the Support and Propagation of Fish* DU, due to a "Poor" ALUS ranking, and not due to a pollutant.

LaoLao's streams have been downgraded to CALM category 3 due to the threat of *Enterococci* contamination, although there is insufficient data at this time to fully assess the *Recreational* DU.

C.3.5.5. DANDAN - Waterbody Segment 16

The majority of the DanDan watershed's population resides in the upper watershed well away from the coastal shelf and cliff line. A municipal sewer line is unavailable for this watershed. Therefore, DanDan residents rely on IWDS for their wastewater collection and treatment.

The large Hawaiian Rock Quarry is located in the southern part of the watershed also far removed from the cliff line. The LauLau Bay Sea Cucumber Reserve lies in the northern half next to the LaoLao watershed boundary and downstream from one of the ephemeral streams in the Dan Dan watershed.

There is only one long-term reef flat monitoring site (CNMI 72) used for assessment purposes. It was established in 2010, as part of the National Coastal Condition Assessment study and is shown in Figure C-11., on the following page. It is located adjacent to a pristine beach next to a cliff line, which may only be accessed via a private road, with permission from the adjacent land owner. Visitors must use a rope to descend to the shoreline.

Dan Dan - Coastal Marine Waters

Dan Dan's coastal waters are separated from any development activities and homesteads by a sharp cliff line, thereby providing these waters with substantial protection from anthropogenic sources of pollution.

FIGURE C-11. DanDan Watershed (Segment 16)

Although, biological ALUS criteria was not assessed for Dan Dan's coastal waters this reporting cycle, new nutrient water quality data was collected at the reef flat biological monitoring site (CNMI-72). All nutrient and other water quality data was well within CNMI WQS resulting in Dan Dan's coastal waters attaining the *Support and Propagation of Aquatic Life,* and *Recreational* DUs.

No fish tissue or biota contamination data is available on Dan Dan's coastal waters to assess the *Fish and Shellfish Consumption* DU.

Dan Dan's rugged coastline is "pristine" with breathtaking reef assemblages for those few visitors with the opportunity to observe them. For this reason, Dan Dan's coastal waters fully support the *Aesthetic Enjoyment* DU.

Dan Dan – Fresh Water Streams

The 2017 NHD, and Wetlands and Streams GIS data layers indicate that there are two stream systems in the northernmost part of the Dan Dan watershed. The soils surrounding these streams are well drained with a 5-15% slope of Chinen clay loam and Takpochao-Rock outcrop complex, (2000, USGS Geological Survey). Residents have confirmed that these stream systems only flow during torrential rains and then quickly dry up. They do not contain any fresh water pools to support the *Propagation of Aquatic Life,* or *Fish and Shellfish Consumption* DUs, so these DUs are not assessed in Table C-29., on page 80.

An assessment of the *Recreational* DU has not been assessed at this time as stream flow is too limited to allow for sample collection to analyze *Enterococci* concentrations.

The topographical and geological features in the Dan Dan watershed are too limited to support a *Potable Water Supply*. So, this DU is also no longer assessed.

However, these streambeds are used for residents to hike to the Lau Lau Bay Sea Cucumber Reserve to swim and picnic on the beach. Therefore, Dan Dan's stream systems fully support the *Aesthetic Enjoyment* DU.

Dan Dan - Wetland

The 2017 NHD, and Wetland and Stream data layers show a very small riparian wetland in Dan Dan's upper middle watershed. However, it has not been delineated or valuated at the time of this writing to assess the wetlands' support of the *Propagation of Aquatic Life* DU.

Dan Dan – CALM Category

Dan Dan's coastal waters retain a CALM Category of 2 due to insufficient information about fish tissue and biota contamination to assess the *Fish and Shellfish Consumption* DU.

The Dan Dan's stream systems are now assigned a CALM Category of 2, due to insufficient *Enterococci* data to assess the *Recreational* DU.

The Dan Dan wetlands retain a CALM Category 3 due to insufficient information.

C.3.5.6. ISLEY - Waterbody Segments 17A and 17B

The Isley Watershed is divided into two sub-watersheds, East (17B) and West (17A), Figure C-12.

FIGURE C-12. Isley Watershed (Segment 17A and 17B)

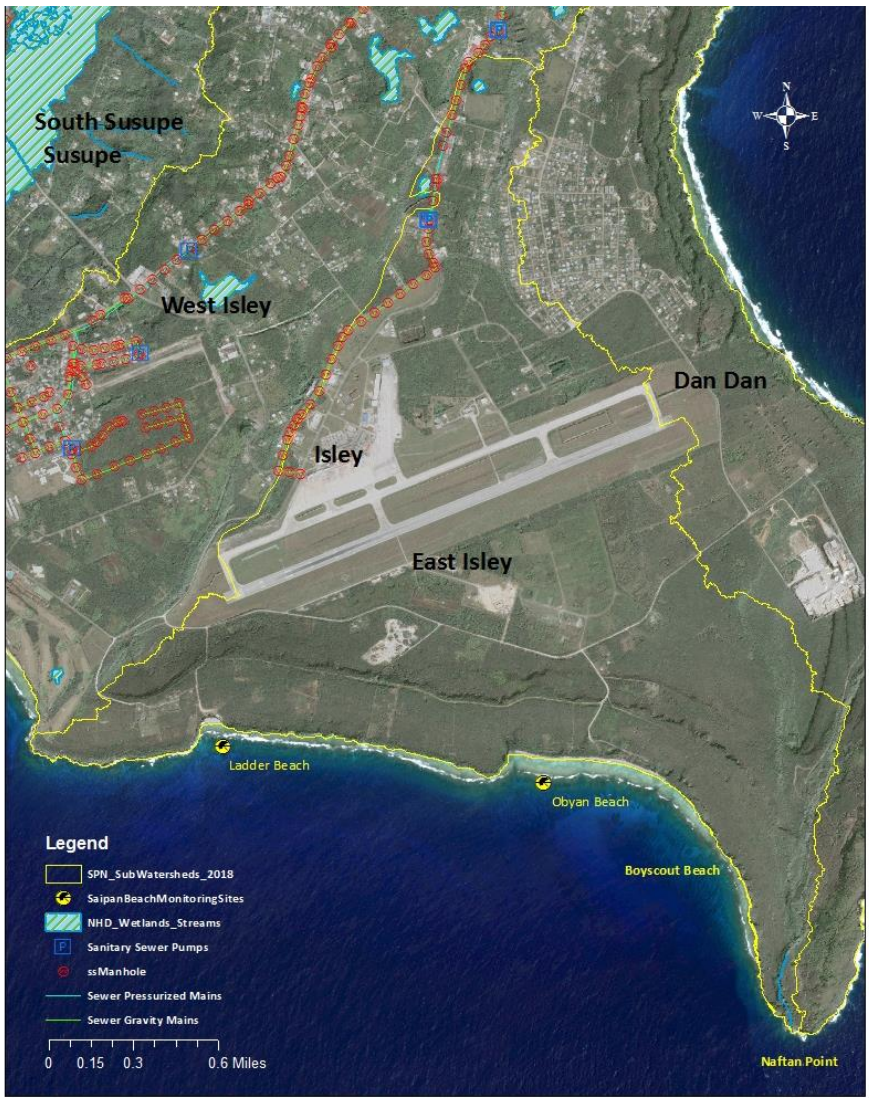
Isley's headwaters start in the center of Saipan at its peak, on Mt. Takpochau at 1554 feet and surface waters flow down to the south coast.

The CUC municipal sewer infrastructure is available for Isley residents and businesses. By CNMI law, all users are required to connect to the CUC sewer system where available. However, some residents in older structures may still be using IWDSs, or in some instances wastewater holding tanks for wastewater collection.

East Isley – Waterbody Segment 17B

East Isley's Watershed (Figure C-13.) contains Saipan's present day, Francisco C. Ada International Airport, and a WWII military dumpsite located at Naftan Point.

FIGURE C-13. East Isley Watershed (Segment 17B)



The watershed is sparsely populated with a few homes. There are three long-term BEACH monitoring sites located at Obyan, Ladder, and Boy Scout Beaches.

East Isley - Coastal Marine Waters

Obyan is a large public sandy beach, as well as a Green Sea Turtle nesting site. This beach is also a popular site for camping, snorkeling, and SCUBA. Boy Scout beach is a more remote pocket beach off Obyan's east coast and harder to access by land, thus providing further protection to its unique *Porites rus* interstitial reef from anthropogenic stressors. It is a favorite SCUBA and snorkeling site. However, Boy Scout Beach does not have a long-term BEACH water quality monitoring site.

Further west of Obyan lies Ladder beach a small sandy pocket beach surrounded by cliffs, undercuts, and caves accessible only by a set of stairs. It is a favorite site for weddings and other photo opportunities, thus East Isley's coastal waters attain the *Aesthetic Enjoyment* DU.

East Isley's coastal waters received a "Good" ALUS ranking for its coral reef assemblages at one site. The other site, which ranked as "Poor" last cycle, was not assessed this reporting cycle. This resulted in the coastal waters receiving an overall "Fair" ALUS ranking. New nutrient water quality data though limited, was well within CNMI WQS. Therefore, East Isley's coastal waters were removed from the 303(d) list as impaired for phosphate, and now attain the *Support and Propagation* of *Aquatic Life* DU.

The 2016 heavy metal sediment study conducted by Denton, et.al, found that soil collected from the "extensively fired ravine dump at 'Naftan Point' …was notably enriched with all metals, especially Ag, Cd, Cu, Hg, Pb, and Zn." This is of importance given that metals are taken up by territorial "food" organisms. However, it should be noted that Naftan Point has no easily accessible path to gain access to the coast for harvesting food. The currents are also very strong here for spearfishing, which should provide a degree of protection to public health. However, further study of heavy metal contamination in fish tissue and/or biota should also be conducted here, as well as at all highly contaminated sites to fully assess the *Fish and Shellfish Consumption* DU.

This reporting cycle, Ladder Beach once again had *Enterococci* levels exceeding the WQS. This is attributed to free-range cattle and the lack of restroom facilities at this remote beach, which is now more heavily visited by growing tourist numbers arriving on off-road all-terrain vehicles. The heavy traffic on East Isley's coral roads has resulted in erosion and soil laden storm water runoff.

In addition, human waste has been observed in the caves surrounding Ladder Beach, as there are no public restrooms at this remote public park. This has been brought to the attention of the joint Tourism Management Working Group who provide Tour Guide Education, and Certification Trainings. This has also spurred discussion within the Watershed Working Group about constructing public compost toilets as a NPS demonstration project at remote locations like this, which lack water supplies and traditional wastewater treatment facilities.

The *Enterococci* exceedances of WQS has resulted in East Isley's coastal waters deemed unsupportive of the *Recreational* DU.

East Isley – Fresh Water Streams

Based on the new 2017 NHD, and Wetlands and Streams GIS data layers, there are very limited topographical and geological features in the entire Isley watershed to support stream systems. Most precipitation flows by subterranean transport from land to sea. Fresh water streams are located in the very upper watershed near Mt. Takpochau. Another stream also emerges upland of Naftan Point, where it discharges to the ocean. Neither visual field assessments, nor water quality monitoring has been completed in these streams due to their location and the difficulty in accessing them, which is heavily vegetated with sawgrass, and far removed from any road or trail system. Therefore, no water quality data are available to assess the *Recreational* DU.

In addition, no information is available about the presence of fresh water pools or aquatic life in the stream system for assessing the *Support and Propagation of Aquatic Life,* or *Fish and Shellfish Consumption* DUs. However, it is clear that there is not enough precipitation to support the *Potable Water Supply* DU, as reflected in Table C-29., on page 80.

This reporting cycle residents have reported hiking in the dry watercourses of the watershed to hunt and for exercise. Based on this and professional judgement, East Isley's streambeds fully support the *Aesthetic Enjoyment* DU.

East Isley - Wetlands

The 2017 NHD, and Wetlands and Streams GIS data layers show very small emergent or marsh wetlands in the upper East Isley watershed. Due to their small size and difficulty in accessing these remote wetlands, they have not been delineated or valuated to date. Therefore, there are not data to assess the *Support and Propagation of Aquatic Life* DU.

East Isley – CALM Category

East Isley's coastal waters were upgraded to CALM Category 4a this reporting cycle due to the completion of the 2017 TMDL for bacteria.

The East Isley's fresh water streams retain a CALM category of 3, due to insufficient information.

East Isley's wetlands also retain a CALM Category of 3, due to insufficient information.

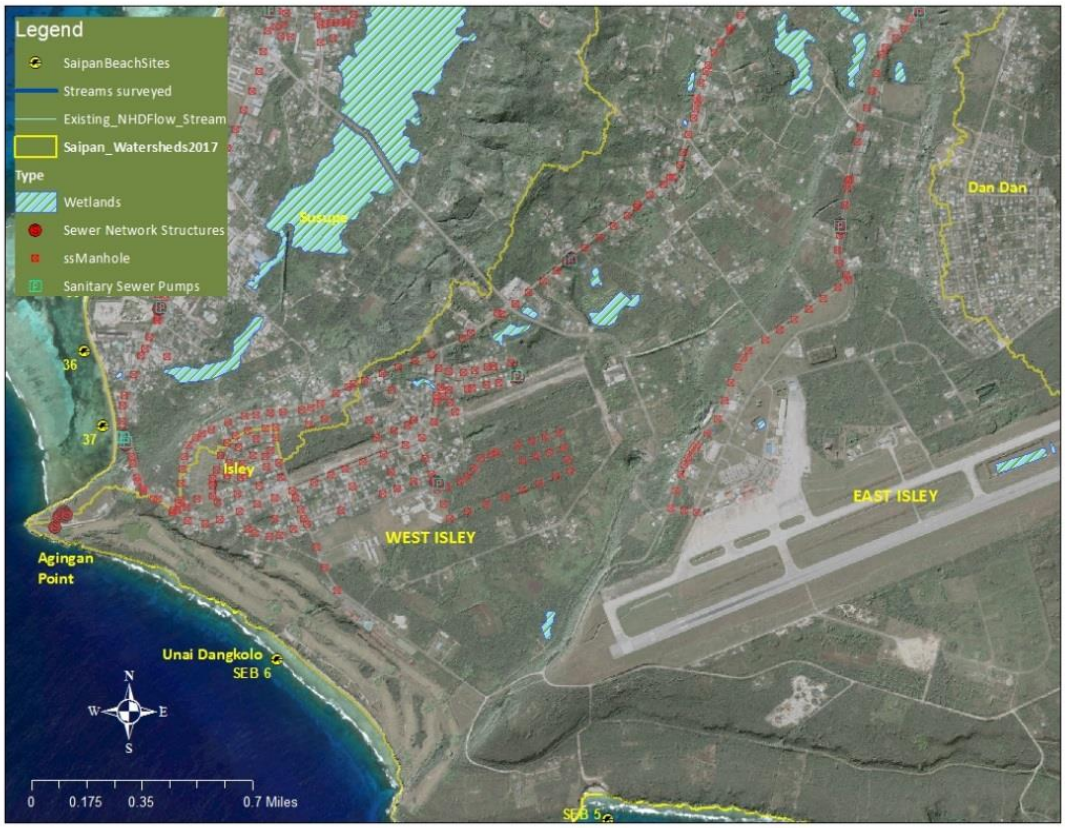
West Isley - Waterbody Segment 17A

West Isley's watershed contains the remains of the WWII Koblerville Airfield. At least annually, US EPA with the assistance of BECQ tests the airfield's monitoring wells for Volatile Organic

Compounds (VOCs) and other water contaminants associated with fuel spill(s) from wartime activities.

West Isley is more densely populated than East Isley with the majority of residents and businesses connected to the CUC municipal sewer system. CUC's Agingan WWTP outfall is located off "Agingan Point" on the western tip of the watershed, adjacent to the South Susupe watershed. The WWTP, which is NPDES permitted is now only working at approximately 50% capacity (2017 Watershed Working Group presentation, William Gilmore, CUC Deputy Director). West Isley has one long-term BEACH monitoring site located on Unai Dangkolo Beach located west of Coral Ocean Point Golf Course and Resort, as shown in Figure C-14.

FIGURE C-14. West Isley Watershed (Segment 17A)



West Isley - Coastal Marine Waters

The ALUS biological assessment of West Isley's coral reef assemblages were ranked as "Fair" this reporting cycle, upgraded from last cycle. In addition, new nutrient water quality data though limited, was well within CNMI WQS. Therefore, West Isley's coastal waters were removed from the 303(d) list as impaired for phosphate and its waters are now supportive of the *Propagation* of *Aquatic Life* DU.

A 2014 study by Denton, et al., reported copper and lead contamination of biota within West Isley coastal waters. The heavy metal contamination is thought to be associated with a former WWII debris dumpsite at Agingan point. The study found the site "extensively contaminated with several elements that could conceivably induce adverse biological effects in sensitive species." In addition, the Agingan WWTP's treated effluent is discharged here into a mixing zone. These finding has resulted in West Isley's coastal waters remaining unsupportive of the *Fish and Shellfish Consumption* DU.

However, West Isley's coastal water quality was well within CNMI WQS for *Enterococci* this reporting cycle. The improvement is associated with CUC facility enhancements, including upgrading and rehabilitating the A-16 lift station (2017, communication with Larry Manacop, CUC Chief Engineer). This resulted in West Isley's coastal waters were removed from the 303(d) list as impaired for *Enterococci*. They are now considered supportive of the *Recreational* DU.

Unai Dangkolo is a popular strand of beach located west of Coral Ocean Point Golf Course. It is a local favorite for snorkeling, picnicking, and fishing, for which West Isley's coastal waters fully attain the *Aesthetic Enjoyment* DU.

West Isley – Fresh Water Streams

West Isley shares the stream system near Mt. Takpochau with East Isley. The 2017 NHD, and Wetlands and Streams GIS data layers show very limited topographical and geological features to support stream systems. Most precipitation flows by subterranean transport from land to sea. There have not been any visual field assessments or water quality monitoring completed in this stream system due to the difficulty in accessing the ridge which is heavily vegetated with sawgrass. Therefore, there is no water quality data to assess the *Recreational* DU.

In addition, no information is available about the presence of fresh water pools to support the *Propagation of Aquatic Life,* or *Fish and Shellfish Consumption* DUs. However, it is clear that there is not enough precipitation to support the *Potable Water Supply* DU, as reflected in Table C-29., on page 80.

This reporting cycle residents have reported hiking in the dry watercourses of the watershed to hunt and for exercise. Based on this, and professional judgement West Isley's streambeds fully support the *Aesthetic Enjoyment* DU.

West Isley - Wetlands

The 2017 NHD, and Wetlands and Streams GIS data layers display emergent wetlands, or marsh areas in the mid and upper watershed, and a constructed mitigated wetland. However, a delineation or assessment of these wetlands have not been completed at the time of this writing.

West Isley – CALM Category

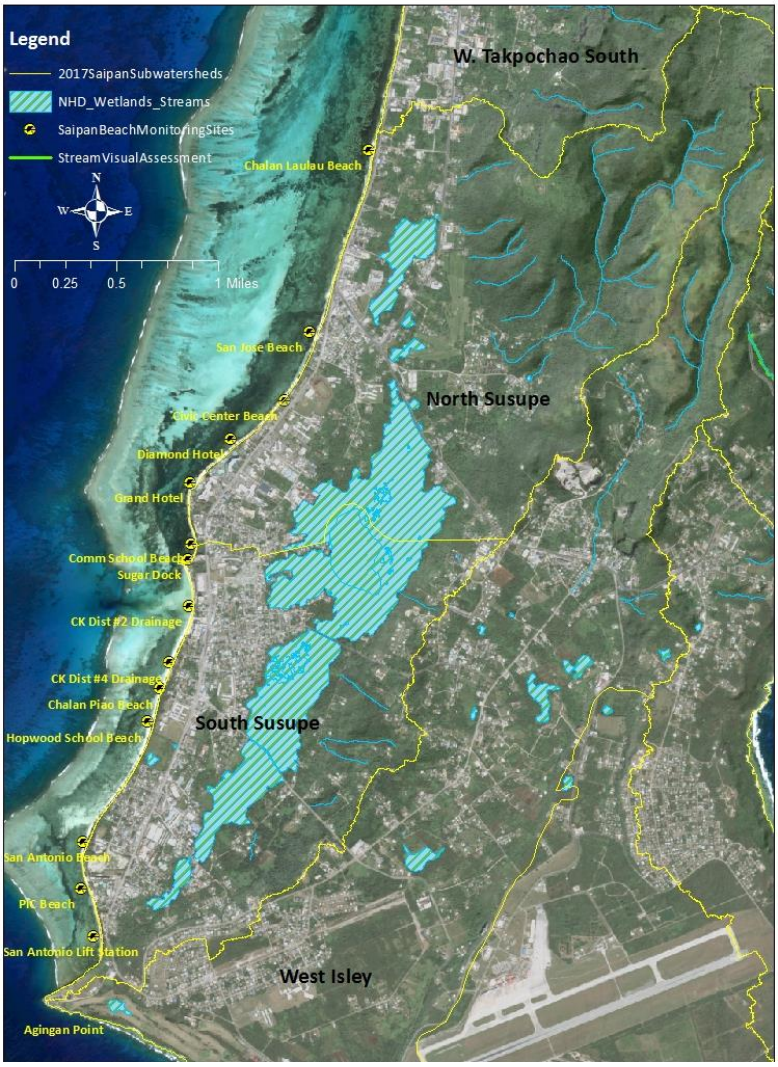
The West Isley coastal waters retain a CALM Category 5 due to heavy metal contamination of fish tissue and biota. However, these waters were 303(d) delisted for *Enterococci*.

The West Isley's fresh water streams and wetlands retain a CALM category of 3 due to lack of sufficient information.

C-3.5.7. SUSUPE - Waterbody Segment 18

The large Susupe watershed on Saipan's west coast is subdivided into two sub-watersheds, North (18A) and South (18B), as shown in Figure C-15.

FIGURE C-15. Susupe Watershed (Segment 18A and 18B)



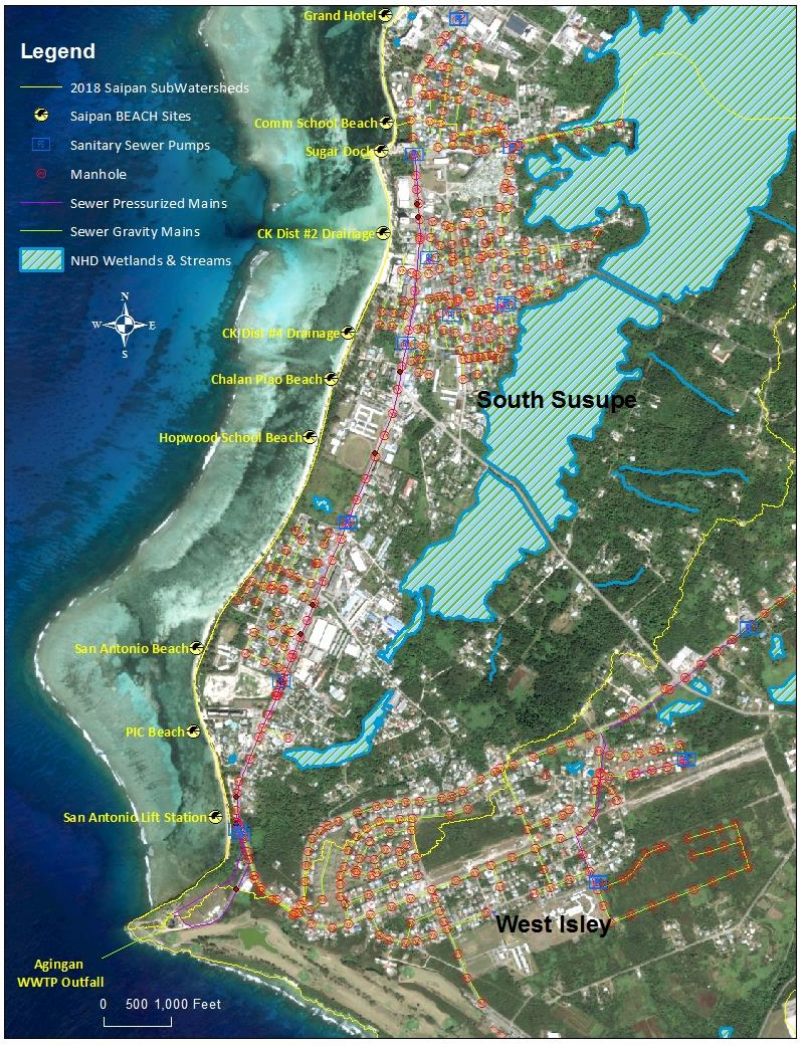
The sub-watersheds' boundaries are based primarily on Saipan's catchment basins, and also on general topography, placing the entire Susupe Lake in the southern half of the watershed for ease of reporting purposes.

The entire Susupe watershed is a very developed urban area, second only to the West Takpochau watershed, with many hotels, resorts, restaurants, stores, gas stations, a public library, two Local markets, and a cinema. CUC's municipal sewer system runs the entire length of this watershed.

South Susupe – Waterbody Segment 18B

South Susupe Watershed contains the largest wetland in the CNMI covering 292.4 acres and the only lake on Saipan (57.4 acres), Figure C-16.

FIGURE C-16. South Susupe Watershed (Segment 18B)



There are eight (8) long-term BEACH monitoring sites. The CUC San Antonio Sewer Lift Station A-16 is the southernmost Site. Sugar Dock is the northernmost site and is a popular boat launch, swimming, boogie boarding and platform diving site.

South Susupe - Coastal Marine Water

The South Susupe watershed drains into the southern part of Saipan's lagoon. The lagoon's clear waters and sandy beaches are widely used for barbeques, snorkeling, fishing and swimming. The ALUS biological assessment of seagrass assemblages in South Susupe's coastal waters were ranked as "Fair" overall this reporting cycle. In addition, new nutrient water quality data was within WQS, resulting in South Susupe's coastal waters being removed from the 303(d) list as impaired for phosphate. However, there were water quality impairments. DO% levels were low again this reporting cycle, resulting in South Susupe's coastal waters remaining unsupportive of the *Propagation of Aquatic Life* DU. The source of diminished DO% is unproven, but may be associated with urban runoff during heavy rains, sewer overflows, or groundwater seeps carrying nutrients and aerobic microbes, resulting in decreased oxygenation of coastal waters.

The 2016 heavy metal sediment study conducted by Denton, et.al, found exceedances of DEQ's screening levels for Cu, Pb, and Zn in soils taken from the former 'Agingan Point' dump, which was used for ocean disposal of ammunition after WWII, and for civilian wastes up into the 1970s. The study concluded that "The sediment quality guideline exceedances for Pb, Cu, and Hg at this site ...also suggest that sensitive species living in close proximity to these deposits may be exhibiting adverse biological effects." Therefore, further study of heavy metal contamination in fish tissue and/or biota in South Susupe's coastal waters should be conducted at this highly contaminated site to fully assess the *Fish and Shellfish Consumption* DU.

The South Susupe coastal waters remain 303(d) listed as impaired due to *Enterococci* exceedances of the WQS at Sugar Dock, and CK District #2 drainage BEACH monitoring sites. The other BEACH sites located down current (south) of these two sites all met the CNMI WQS for *Enterococci*. There are *many* potential sources of contamination at the Dock and drainage including leftover picnic waste (diapers), urban road run-off, stray dogs and cats, and more significantly, illicit connections, failing on-site systems, or CUC sewage overflows. Of note, a large multi-story apartment complex was built across from Sugar Dock in early 2015 and was connected to the municipal sewer line in April 2015. All of the units are currently occupied significantly increasing the volume of wastewater produced in the area. Therefore, further, investigation is needed to identify the major contributor(s) to this fecal contamination.

However, many of South Susupe's other sites have good water quality and are located on sandy beaches adjacent to resorts, restaurants, and public beach parks with "Pala Palas" (covered picnic structures) and barbeque pits. These are enjoyed daily by residents and visitors. Therefore, South Susupe continues to fully support the *Aesthetic Enjoyment* DU.

South Susupe – Fresh Water Streams

The 2000 USGS report on Lake Susupe stated that, "Stream channels on the western coastal plain … are not discernible in the field or on topographic maps," and that during "dry years, surface runoff into the lake is probably negligible." However 2016 imagery and the 2017 NHD, and Wetland and Stream data layers indicate that ephemeral streams probably run during rainy season in the upper watershed near the ridge line. However, there is no road access in this rugged undeveloped area. Therefore, to date, visual field assessments of the streams have not been completed. In addition, it is unlikely that water quality samples could ever be collected while the streams are flowing given how long it would take to reach these areas during a rain event. Therefore, there is insufficient information to assess the *Support and Propagation of Aquatic Life, Fish and Shellfish Consumption*, or *Recreational* DUs for South Susupe's stream systems. There is also insufficient flow to support a *Potable Water Supply*. Therefore, this DU is not assessed.

However, due to the streams remoteness in this undeveloped portion of the watershed, the South Susupe fresh waters streams, like the streambeds in other watersheds are considered to be fully supporting the *Aesthetic Enjoyment* DU, based on professional judgement.

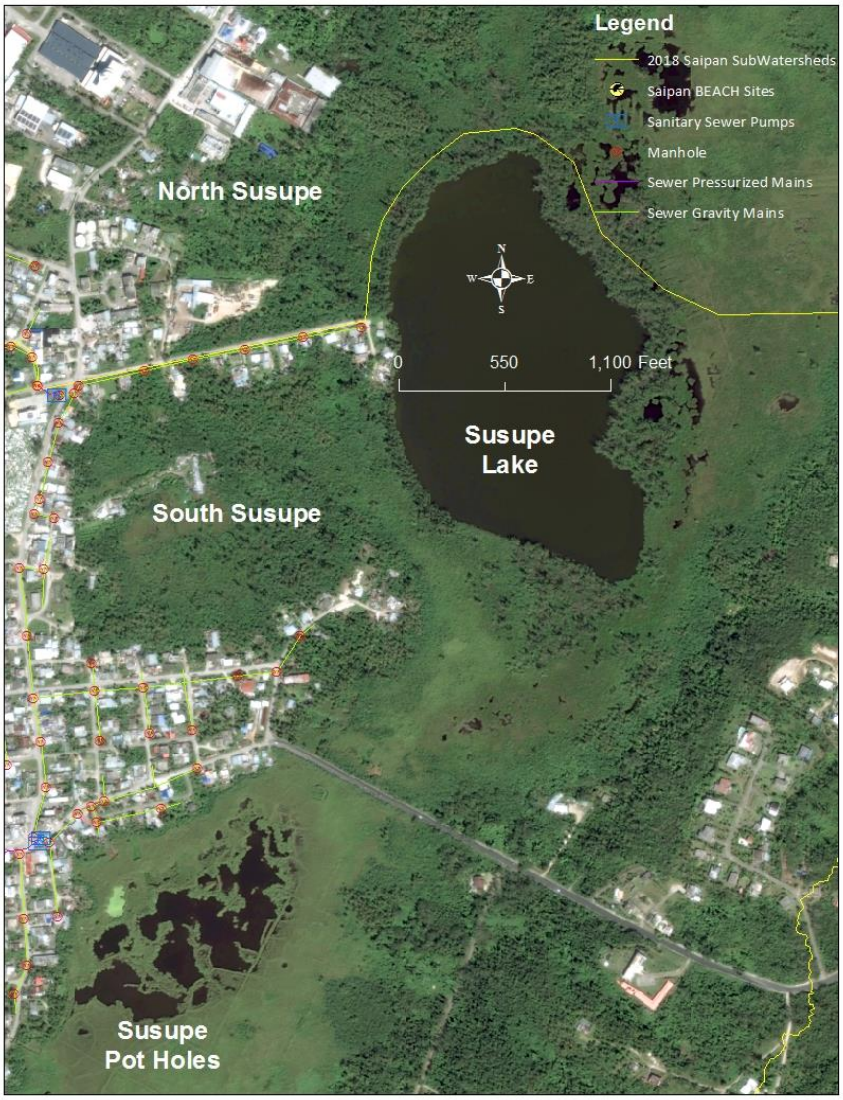
South Susupe – Wetlands and Susupe Lake

Saipan's only lake, "Susupe Lake" and the adjoining wetland complex, is located primarily in the South Susupe Watershed Figure C-17., on the following page. Lake water quality is tested by-weekly.

Although, a recent delineation and valuation has not been completed in the marsh wetland area and Susupe Pot holes recently, there has been a plethora of research done in the area by wetland experts and hydrologists exploring the feasibility of using the lake as a *Potable Water Supply* (US Dept. of the Interior, 2000: Davis, M.M., 2001 & 2005; Caruth, R.L., 2003; and Environet, 2006). This research shows that there have been substantial hydrological alterations in the surrounding area from fill for agriculture, homesteads, roadways, and developments (some permitted and some unpermitted resulting in local and federal violations and penalties).

The most recent study by Environet, Inc., in 2006, entitled "*Assessment of Toxicity and Water Quality of Lake Susupe*", concluded that Susupe Lake "consists primarily of rainfall with minimal ground water influence" and is "isolated from surrounding ground water and seawater systems". Chloride levels also have "quite pronounced" seasonal variations, as do other constituents. "No organochlorine pesticides, PCBs, volatile or semi-volatile compounds were detected." The study went on to conclude that the Lake would require treatment to be a *Potable Water Supply* due to chloride (unpalatability) and *E. coli* levels. Therefore, Susupe Lake could support the *Potable Water Supply* DU given appropriate treatment. However, as stated previously, no surface water on Saipan is used as a potable water supply. Therefore, this reporting cycle the *Potable Water Supply* DU for waterbody segment 18LAKB is not assessed.

FIGURE C-17. Susupe Lake and the Surrounding Wetlands and Potholes



In addition to these impairments, wildlife samples taken from the surrounding banks of the Lake by McKagan, et.al, in 2008, contained three types of non-native snails, mangrove prawns, Tilapia, sailfin molleys, and mosquitofish. There is also a predominance of introduced Red-eared slider turtles. Although Susupe Lake and the wetlands support aquatic life of many forms, many are invasive non-natives.

Water quality is also poor for several causes. This reporting cycle the lake water frequently exceeded the WQS for *E. coli*, and showed diminished DO%, and high pH concentrations resulting in the lake remaining on the 303(d) list of impaired waters for DO% and high pH. However, the lake was removed from the list for *E. coli* as the 2017 TMDL for bacteria is now being implemented to address this cause.

The sources of diminished DO% and elevated *E. coli* concentration are associated with nutrient loading from failing septic systems, sewer line overflows, and polluted runoff from roadways resulting in aerobic microbial activity depleting oxygen levels. The source of increased pH levels in this shallow lake is unproven at this time and requires further investigation to see if the alkalinity is related to natural daily fluctuations from photosynthesis and respiration increasing CO_2 levels, thus increasing pH. These findings resulted in Susupe Lake being assessed as unsupportive of the *Propagation of Aquatic Life* DU.

No fish tissue and/or biota contamination data is available on Susupe Lake to assess the *Fish and Shellfish Consumption* DU.

However, Susupe Lake is enjoyed by residents living near the lake, who boat and fish in its waters. Naturalists also enjoy bird watching and exploring this area, one of the last open water wetland complexes in the CNMI. For these reasons, the Lake and wetlands in the South Susupe watershed attain the *Aesthetic Enjoyment* DU.

South Susupe – CALM Categories

South Susupe's coastal waters retain a CALM Category 5 due to exceedances of the CNMI WQS for DO%. *Enterococci* exceedances are being addressed by the 2017 TMDL for bacteria.

South Susupe's Lake (18LAKB) retains a CALM Category 5 due to low DO% and high pH.

The South Susupe wetlands and potholes (18WETB) retain a CALM Category of 4c, due to non-native aquatic life, habitat alterations, and flow regime.

North Susupe – Waterbody Segment 18A

The North Susupe coastline extends from Saipan Community School in the south to Chalan LauLau Beach in the north. Chalan LauLau beach (WB 24) was relocated into the North Susupe watershed from the South West Takpochau watershed this reporting cycle. This is the result of the newly delineated watershed boundaries.

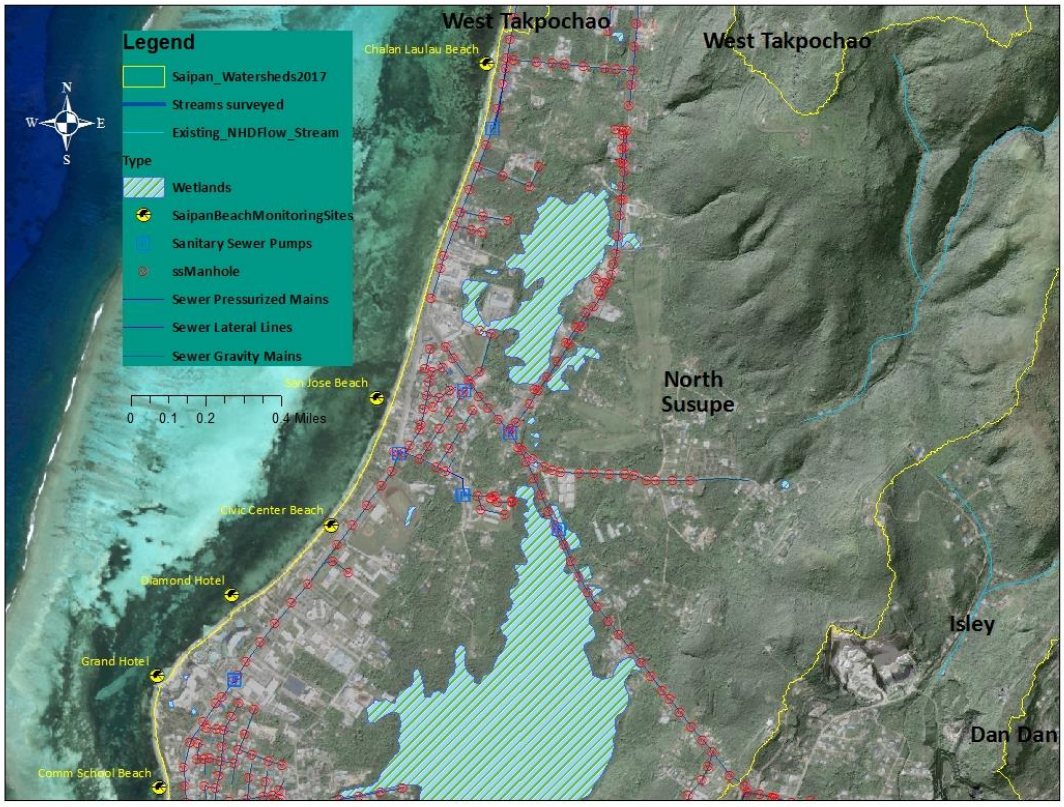
There are several large resorts, hotels, public beach parks, two Saturday public markets, and basketball courts (Figure C-18., on the following page). The strand of beach between San Jose Beach and Civic Center Beach across from Ada Gym is also used to park traditional outrigger canoes ("galaide"), used by many resident paddlers for training and competitions. Tourists and residents regularly enjoy these beaches for their scenic views, marine sports, swimming, and fishing, which is why North Susupe's coastal waters fully support the *Aesthetic Enjoyment* DU.

North Susupe - Coastal Marine Waters

The ALUS biological assessments of North Susupe's *coral reef* assemblages were ranked as "Good". Although, the seagrass assemblages were not reassessed this cycle, they were ranked as "Good" last cycle, which resulted in an overall "Good" ranking for North Susupe's coastal waters.

Also, new nutrient water quality data was within WQS, resulting in North Susupe's coastal waters being removed from the 303(d) list as impaired for phosphate. However, DO% levels were low again this reporting cycle and remain listed for this cause. These findings resulted in North Susupe's coastal waters being assessed as unsupportive of the *Propagation of Aquatic Life* DU. The source of diminished DO% is unproven but may be associated with urban runoff during heavy rains, sewer overflows, or groundwater seeps carrying nutrients and aerobic microbes, resulting in decreased oxygenation of coastal waters.

FIGURE C-18. North Susupe Watershed (Segment 18A)



There has been insufficient data collected on fish tissue and/or biota contamination from North Susupe's coastal waters to assess the *Fish and Shellfish Consumption* DU.

This reporting cycle the A-7 Lift Station located between Civic Center Beach (WB26) and the old Diamond Hotel, now Saipan World Resort (WB27) was rehabilitated (Nov. 2017, communication

with Larry Manacop, CUC Chief Engineer). All water quality data was well within the CNMI WQS for *Enterococci* this reporting cycle. Therefore, North Susupe's Coastal waters were removed from the 303(d) list and are supportive of the *Recreational* DU.

North Susupe – Fresh Water Streams

The USGS report completed in 2000 stated that there appears to be, "Some surface runoff from the southwest flank of Mount Tagpochau (sp), which does have discernable stream channels on the topographic maps." This correlates with the latest 2017 NHD, and wetland and stream GIS data layers, which also show a distinct stream system in the remote upper half of the North Susupe watershed. There are no roads to access this rugged undeveloped area. Therefore, to date, visual field assessments of the streams have not been completed. In addition, it is unlikely that water quality samples could ever be collected while the streams are flowing given the difficulty in reaching these remote sites in time to collect a sample. Therefore, there is insufficient information on North Susupe's stream system to assess the *Support and Propagation of Aquatic Life, Fish and Shellfish Consumption*, and *Recreational* DUs. There is also insufficient flow for a *Potable Water Supply* to exist, and therefore this DU is not assessed.

However, due to the streams remoteness in this undeveloped portion of the watershed, the North Susupe fresh waters streams are considered to be fully supportive of the *Aesthetic Enjoyment* DU as are Saipan's other streams, based on professional judgement.

North Susupe – Wetlands

Although, a recent delineation and valuation has not been completed over the entire Marsh wetlands in the North Susupe watershed, visual field assessments completed by BECQ report many disturbed areas and illegal fill activities in the wetlands behind the CNMI Department of Corrections and Marianas Business Plaza across from Texas road. The wetlands located between the Joeten Superstore and Chalan Pale Arnold road also have many disturbed areas and altered hydrology. There is no information about the aquatic life here. However, it is most likely that these wetlands also have introduced non-native species. Therefore, the North Susupe wetlands remain do not Support the *Propagation of Aquatic Life* DU, but not due to a pollutant.

North Susupe – CALM Categories

North Susupe's coastal waters retain a CALM Category 5 due to low DO%. Enterococci exceedances are being addressed by the 2017 TMDL for bacteria.

The North Susupe streams were assigned a CALM Category of 2 due to insufficient information.

The North Susupe wetlands retain a CALM Category of 4c, due to habitat alterations, non-native aquatic life, and flow regime, and not due to a pollutant.

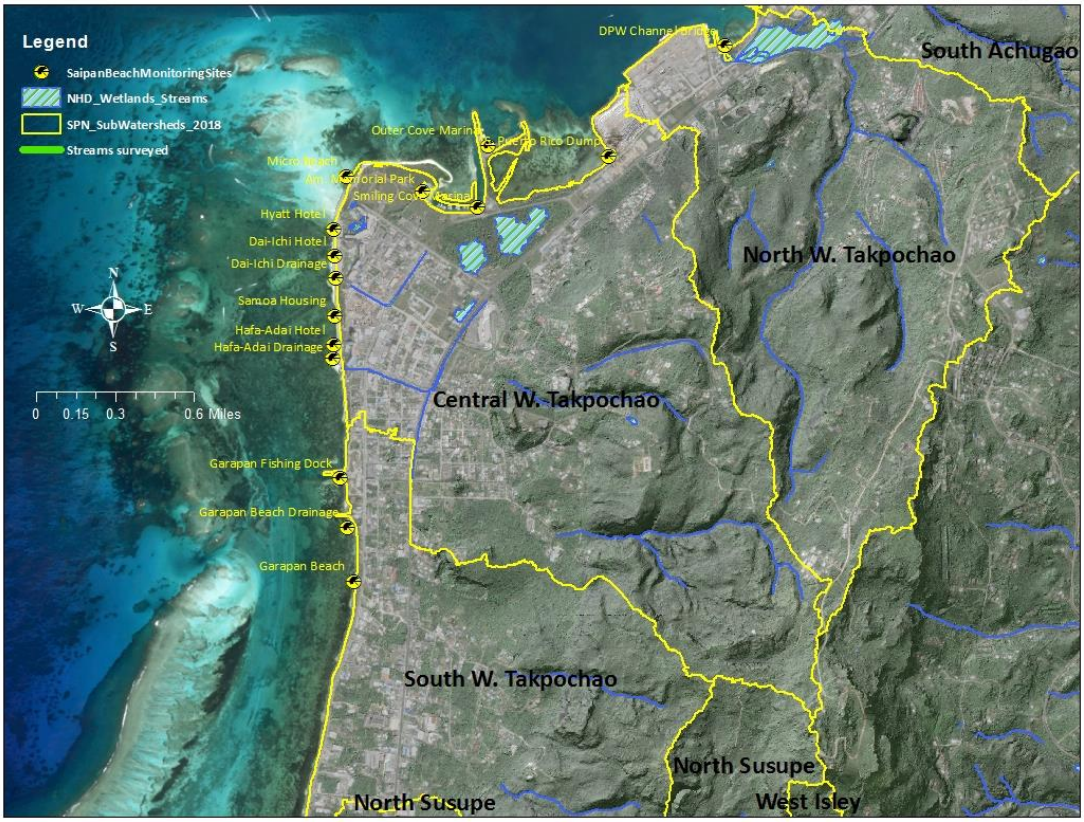
C.3.5.8. WEST TAKPOCHAU – Waterbody Segments 19A, 19B, and 19C

The West Takpochau watershed is the most urbanized watershed in the CNMI and the heart of Saipan's tourist district. It also has had the greatest pressure from rapid development this reporting cycle. The CUC municipal sewer system runs the entire length of this watershed, but some older dwellings may still be relying on aging IWDSs for wastewater treatment. It is by far the most challenging watershed from a NPS management standpoint due to its rapid growth, population density, and diversity. More than 15 languages and dialects are spoken within the Central Garapan tourist district (2010, Census).

This watershed flows from Saipan's highest peak, Mt. Takpochau, into Saipan Lagoon (Figure C-19., below). It is divided into three sub-watersheds (19A, B, and C).

The sub-watershed boundaries were newly delineated this reporting cycle using the 2017 Saipan watershed catchment basins.

FIGURE C-19. West Takpochau Watershed (Segments 19A, 19B, and 19C)

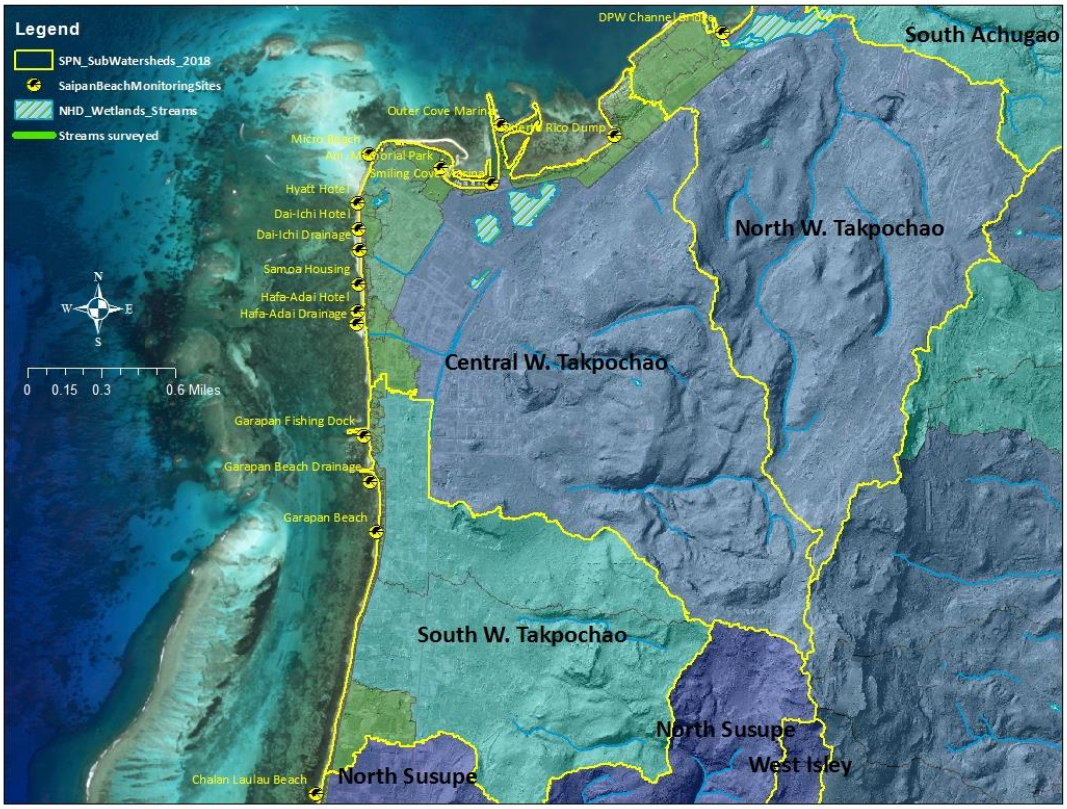


The new sub-watershed boundaries are display in Figure C-20., below and are depicted in various shades of green to purple based on size of land area.

The boundary changes have been significant for the West Takpochau watershed and have resulted in the relocation of several long-term BEACH sites into different sub-watersheds. The new watershed boundaries better reflect actual water flow and coastline discharge locations.

As was stated in the previous sub-section, the Chalan LauLau BEACH site (WB 23), which was located in the South W. Takpochau sub-watershed last IR, is now located in the North Susupe watershed (see Figure C-18., on page 109). Likewise, the BEACH sites from the South Puerto Rico Dump site to the American Memorial Park's Drainage site have been shifted south, out of the North West Takpochau sub-watershed into the Central sub-watershed.

FIGURE C-20. New Sub-watershed Boundaries using 2017 Watershed Catchment Basins

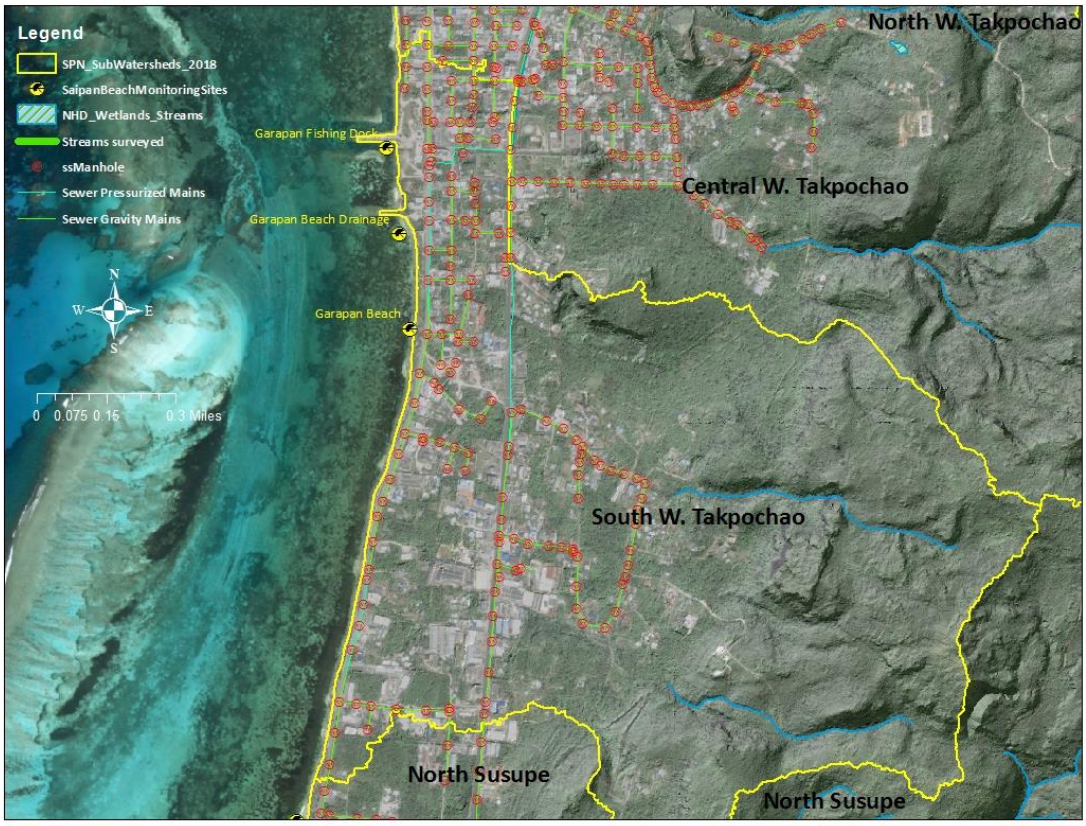


South W. Takpochau – Waterbody Segment 19C

The South W. Takpochau Watershed now contains three (3) long-term BEACH monitoring sites at Garapan Beach (WB22), north of the "13 Fishermen Monument", Garapan Drainage #3 (WB21), and Garapan Fishing Dock (WB22). These are displayed in Figure C-21., on the following page.

The lower watershed is densely populated with private homes and small businesses. The few hotels in the South West Takpochau sub-watershed are separated from the coast by Beach Road and other impervious surfaces.

FIGURE C-21. South W. Takpochau Watershed (Segment 19C)



South W. Takpochau - Coastal Marine Waters

The ALUS biological assessment of the seagrass assemblages in South West Takpochau's coastal waters were ranked as "Fair" at one site this reporting cycle. The other site was not re-assessed, but was ranked as "Poor" last cycle, resulting in an overall "Poor" ranking. In addition, DO% is again low this reporting cycle at all three BEACH sites, as is pH; exceeding CNMI WQSs.

However, the trend in low pH levels is new, with an average of 18% exceedances this reporting cycle, the source of which is unproven, but may be associated with maintenance or new construction projects in the area (2017, TMDL), or with residual cleaning solutions or other chemicals used on boat decks or hull surfaces at Garapan fishing dock.

Although new nutrient water quality data from Garapan Beach (WB22) and Garapan Beach Drainage#3 (WB23) show that phosphate levels were well within the WQS, they exceeded the

standard for nitrate. Therefore, South West Takpochau's coastal waters are delisted for phosphate in this IR, but are now added to the 303(d) list as impaired for nitrate. As a result, South West Takpochau's coastal waters do not support the *Propagation* of *Aquatic Life* DU.

The source of the low DO% and increased nitrate is also unproven, but is associated with urban runoff from expansive paved and populated areas (2017, TMDL). The runoff transports a variety of pollutants from failing on-site wastewater collection systems, overflowing sewer manholes, etc., that contribute to an excess of nutrients and aerobic bacteriological activity resulting in decreased oxygenation of coastal waters.

There is insufficient data collected on fish tissue and/or biota contamination from South W. Takpochau's coastal waters to assess the *Fish and Shellfish Consumption* DU.

Once again South West Takpochau's coastal waters exceeded the CNMI WQS for *Enterococci*. However, they were removed from the 303(d) list, as the 2017 TMDL was approved for bacteria. The source for this continued fecal contamination is primarily associated with sanitary sewer overflows, failing on-site systems, and animal waste from feral dogs as observed in the area.

The low pH levels discussed above were cause for adding South West Takpochau's coastal waters to the 303(d) list this reporting cycle, and for finding them unsupportive of the *Recreational* DU.

However, South W. Takpochau' coastal waters fully support the *Aesthetic Enjoyment* DU due to the expansive sandy beaches and the widely used 'Saipan Beach Pathway', which begins in this watershed and runs into the North W. Takpochau sub-watershed. The pathway is enjoyed by joggers, bikers and dog-walkers who can be seen enjoying the path every morning and evening, taking advantage of the cooling ocean breeze while capturing a sunrise or sunset.

South W. Takpochau – Fresh Water Streams

There are two ephemeral streams in the South West Takpochau watershed as seen in the 2017 NHD, and Wetlands and Stream GIS data layers. The streams' headwaters start at the ridge separating North Susupe from the South West Takpochau watershed. The streams flow on the surface from the steep upper watershed in the west, then subterraneous through the lower watershed, then discharge through fresh water seeps into Saipan Lagoon. At this writing, visual field assessments have not been completed in the upper watershed to see if fresh water pools exist to support *Aquatic Life*, nor has any water quality data been collected from these remote streams. Therefore, there is insufficient data on South West Takpochau's stream systems to assess the *Support and Propagation of Aquatic Life,* the *Fish and Shellfish Consumption,* and the *Recreational* DUs.

In addition, these ephemeral streams flow too infrequently to provide a stable and sufficient *Potable Water Supply* in this densely populated watershed, and therefore are not accessed for this DU.

However, these streambeds continue to provide hikers, "hashers", and recreational and professional athletes with a place to exercise and train, for which South West Takpochau's fresh water streambeds fully support the *Aesthetic Enjoyment* DU.

South W. Takpochau – Wetlands

There are no fully functioning wetlands in the South West Takpochau watershed other than a few small drainage areas demonstrating wetland soils, some wetland plants, and hydrology. Therefore, the wetland segment has been removed from Table C-30., on page 82 this reporting cycle.

However, these drainage areas still require protection from fill or alteration to continue to provide storm water retention and treatment before discharging to the lagoon.

South W. Takpochau – CALM Categories

The South W. Takpochau's coastal waters retain a CALM Category 5, due to water quality exceedances of the CNMI WQS for DO%, pH, and Nitrate. *Enterococci* exceedances are being addressed by the 2017 TMDL for bacteria.

South W. Takpochau's fresh water streams located in the upper watershed retain a CALM Category 2, due to insufficient information.

Central W. Takpochau – Waterbody Segment 19B

The Central W. Takpochau sub-watershed now contains 11 long-term BEACH monitoring sites starting at Hafa-Adai Drainage #2 BEACH site and running north up to the South Puerto Rico dump site (Figure C-22., on the following page). As has been stated, this is the result of the newly delineated watershed boundaries.

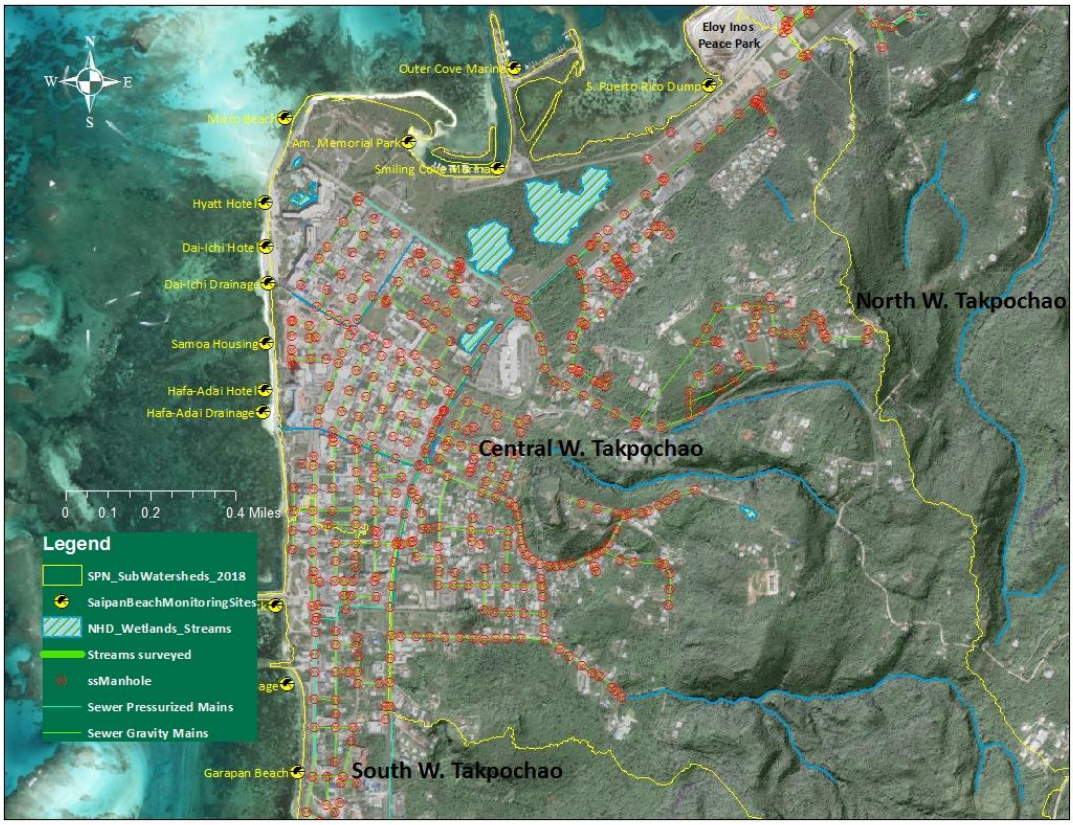
Garapan Fishing Dock (WB21) through Garapan Drainage #3 (WB23) have been relocated south to the South West Takpochau sub-watershed (see Figure C-21., in the previous section).

The Central West Takpochau sub-watershed contains many large-scale resort hotels, apartment buildings, nightclubs, restaurants, boutiques, duty free shops and other stores in the lower watershed, in what is called the 'Garapan Tourist District'. This is Saipan's busiest shopping and dining district. Homes and businesses in the area are required to connect to the CUC municipal sewer system. However, there may be older homes that still rely on separate IWDSs for wastewater treatment.

This reporting cycle, a multi-million dollar 14-story casino and hotel is currently under construction adjacent to the 'Samoa Housing' BEACH site. A continuous deflective separator storm water treatment BMP (visit: http://www.conteches.com/Products/Storm water-Management/Treatment/CDS.aspx) is being installed in the reconstructed 'Garapan Drainage #2'

BEACH site as part of the casino's major siting permit requirements, in efforts to improve water quality in this low lying and densely urbanized area.

FIGURE C-22. Central W. Takpochau Watershed (Segment 19B)



Other large scale resorts are located northward of the casino, adjacent to Micro Beach and south of the American Memorial Park. The park is a US National Historical Park, which contains a relatively large wetland, with some natural mangroves, and some disturbed wetland features. A smaller artificial wetland was enhanced in the late 1990's, to pre-treat storm water runoff from the Garapan Tourist District before discharging into Smiling Cove Marina's coastal waters.

Saipan's Beach Path winds its way along the Central West Takpochau's shoreline into Saipan's "industrial area". The coastal waters surrounding the industrial area have been designated as Class A waters, as discussed previously in Section B.1.4.2. These coastal waters contain Smiling Cove and Outer Cove Marinas.

The 'Beach Path' terminates at the closed "South Puerto Rico Dump" BEACH site. It is "rumoured to contain a plethora of toxic chemicals of both military and civilian origin (Ogden Environmental and Energy Services, 1994), as cited in Denton's 2009 study. The dump's closure was officially approved by EPA in 2003, and was turned into the Eloy S. Inos Peace Park in March 2017.

The mid-watershed contains Saipan's only hospital, several clinics, small grocery stores, repair shops, and several multi-story apartment complexes. The upper watershed contains small livestock farms and homesteads (2017, TMDL).

Central W. Takpochau - Coastal Marine Waters

The Central W. Takpochau's ALUS biological assessment of coral reef and seagrass assemblages was ranked as "Fair" this reporting cycle. In addition, new water quality nutrient data was well within CNMI WQS, which resulted in Central West Takpochau's coastal waters being removed from the 303(d) list as impaired for phosphate. However, DO% levels remain low, as were pH concentrations from Hafa Adai (now GrandVrio Hotel) BEACH site south to the Garapan BEACH site. The source of diminished DO% is unproven, but may be associated with urban runoff during heavy rains, sewer overflows, and groundwater seeps carrying nutrients and aerobic microbes, resulting in decreased oxygenation of coastal waters.

The source of low pH is also unknown, but may be associated with new construction projects in the Garapan Tourist District and with residual cleaning solutions or other chemicals used on boat decks or hull surfaces at the marinas. Therefore, Central West Takpochau's coastal waters remain unsupportive of the *Propagation of Aquatic Life* DU.

Fish tissue samples were collected in 2004 and 2005 by Denton, et.al, of WERI, to test for heavy metal accumulation in the near shore environment. Fish samples taken from the coastal outlet of Hafa-Adai Drainage #2 were found to have elevated levels of Mercury (Hg). The source of the contamination was traced back to the drainage leading from the Commonwealth Health Care Corporation (nee Commonwealth Health Center), which is "a few meters down gradient of an old incinerator site." (2011, Denton, et.al). For this reason, Central West Takpochau's coastal waters remain 303(d) listed as impaired for Hg and do not support the *Fish and Shellfish Consumption* DU. Of note, the hospital incinerator has since been upgraded and all storm water runoff in the area is collected for treatment, and no longer discharges to the drainages.

The Garapan Tourist District did experience some improvement in bacterial water quality in its surrounding coastal waters. This is attributed to an upgrade in CUC's sewer line near Coral Tree Ave., (2017 email communication, Larry Manacop, CUC Chief Engineer). The upgrade included replacement of asbestos cement pipes, lateral lines, installation of new manholes, and road restoration.

However, there continued to be exceedances of the CNMI WQS for *Enterococci* north and south of the Tourist District. This included the Puerto Rico dump and American Memorial Park drainage BEACH sites to the north, and the GrandVrio Hotel (nee Hafa-Adai Hotel) and Fiesta Drainage (nee Dai-Ichi Drainage #1) BEACH sites to the south. The source of fecal contamination has been attributed to, "sanitary sewer overflow, and runoff from roads and construction/maintenance during rain events." (2017, TMDL).

Another *Enterococci* source for the Fiesta Drainage site (nee Dai-Ichi Drainage #1) was identified as human waste observed on the shoreline by WQS/NPS samplers and linked to construction

workers who avoided using the portable toilets provided at their work site. BECQ met with the construction site's managers and cited the responsible parties with a Notice of Violation, after which the exceedances abruptly ceased in August 2016. Therefore, Central W. Takpochau's coastal waters remain 303(d) listed as impaired for low pH, and DO%, and do not support the *Recreational* DU.

However, Central W. Takpochau coastal waters continue to fully support of the *Aesthetic Enjoyment* DU. Its sandy shores are enjoyed daily by tourists and residents for sunbathing, swimming, and wind and kite surfing. Saipan's Beach Pathway also provides joggers with a well maintained trail terminating at the top of the Peace Park for a panoramic view of Saipan's Lagoon.

Central W. Takpochau – Fresh Water Streams

The headwaters of the ephemeral streams in the Central W. Takpochau sub-watershed begin at Mt. Takpochau and flow northwest into the mid-watershed. GPS mapping of the streams has been completed, but visual field assessments of each of the streams have not. However, a 2008 study conducted by McKagan, et.al, surveyed the lower half of the watershed. Fishermen living near the streams reported the presence of fresh water shrimp, and eels. These streams drain into constructed concrete conveyances that eventually flow out of Fiesta Drainage (nee Dai-Ichi Drainage #1). This drainage was also found to contain Thiarid snails and Sailfin Molleys (*Poecilia latipinna*) as the predominant species, along with juvenile milk fish, and "one Tilapia specimen". This resulted in the streams of Central West Takpochau having the most disturbed systems surveyed thus far, but not by a pollutant. Therefore, Central West Takpochau fresh water streams do not support the *Propagation of Aquatic Life* DU, but are not included in the 303(d) list of pollutants.

In addition, the Central West Takpochau fresh water streams are 303(d) listed as impaired due to the presence of mercury (Hg) contamination sourced back to the hospital parking area drainage. Therefore, they do not support the *Fish and Shellfish Consumption* DU.

Stream water quality data collected from Central West Takpochau also exceeded the CNMI WQS for *Enterococci* again this reporting cycle. The source is thought to be from urban stormwater and sewer overflows, erosion and sediment, and piggeries and other small animal pens in the upper watershed that are in close proximity to the streams. Some are operating without appropriate BMPs or animal wastewater collection systems. Therefore, Central West Takpochau's streams do not support the *Recreational* DU.

The ephemeral flow in Central West Takpochau is too infrequent to provide a stable and sufficient *Potable Water Supply* for this densely populated watershed, and therefore, it is not assessed for this DU.

In addition, the Central West Takpochau streams are considerably altered. The mid and lower streambeds are highly urbanized, with concrete conveyances channeling flow to the lagoon. Therefore, Central W. Takpochau fresh water streams are CNMI's only waterbodies that do not support the *Aesthetic Enjoyment* DU.

Central W. Takpochau - Wetlands

The Central West Takpochau mangroves located to the east of American Memorial Park have not been delineated recently or valuated by BECQ staff. However, the mangroves are known to have been hydrologically altered due to both pre and post-WWII activities, but they still provide storm water treatment and a home for a few endangered Mariana Common Moorhens and native fish (2016 communication, Mike Gawel, National Park Service, Integrated Resources Program Manager).

The artificial wetland that was reconstructed in the Park in the mid-1990s acts as a storm water catchment and treatment basin before discharging into Smiling Cove Marina. The wetlands also have introduced invasive aquatic vegetation (water hyacinth) and non-native fish species, but this wetland is not considered Commonwealth waters by definition. So it is not included for assessment purposes.

Central W. Takpochau – CALM Categories

Central W. Takpochau's coastal waters retain CALM Category 5, due to Mercury and exceedances of the CNMI WQS for DO%, and pH. *Enterococci* exceedances are being addressed by the 2017 TMDL for bacteria.

Central W. Takpochau streams also retain CALM Category of 5 due to Mercury, and water quality exceedances of the CNNI WQS for *Enterococci*.

The wetlands retain a CALM Category of 4c due to invasive plants, and hydrological changes, which are not considered pollutants.

North W. Takpochau – Waterbody Segment 19A

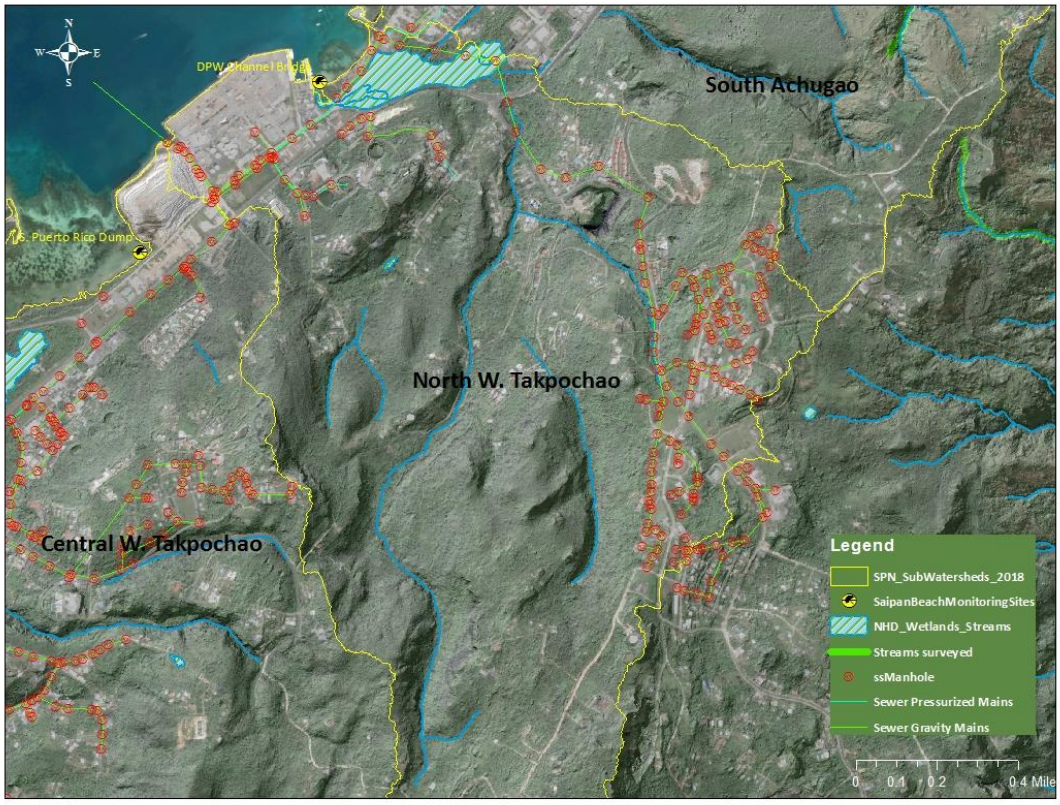
This reporting cycle there is only one (1) BEACH monitoring site in the North W. Takpochau Watershed, the DPW Channel Bridge BEACH site (Figure C-23., on the following page). Four BEACH sites were moved south from the North West Takpochau sub-watershed to the Central sub-watershed as a result of the newly delineated watershed boundaries. This includes Puerto Rico Dump, Smiling Cove Marina, American Memorial Park Drainage, and Outer Cove Marina. The remaining BEACH site, Sea Plane Ramp, was moved north to the Achugao South sub-watershed.

DPW Channel Bridge is located adjacent to one of the last remaining mangrove wetlands on Saipan. The CUC municipal sewer system running through the mangrove is in need of significant upgrades. Repairs to CUC's lift station S-1 between the mangrove and the DPW Channel Bridge was completed in late 2017 (communication, Larry Manacop, CUC Chief Engineer).

However, subsequent spikes in *Enterococci* concentrations led WQS/NPS and CUC staff to investigate other sources. Visual field surveys led to the discovery of another collapsed asbestos

sewer pipe in the mangrove, and other aging unmapped pipes dating back to the pre-WWII Japanese occupation (1930s - 1940s). Many repairs have had to be made within this location over the past five (5) years, and more are expected.

FIGURE C-23. North West Takpochau Watershed (Segment 19A)



In addition new hotels and housing developments continue to be built in the mid and upper watershed above the mangrove's lift station, increasing wastewater pump volumes and pressure.

North W. Takpochau - Coastal Marine Waters

All coastal water quality data for DO%, pH, and nutrients were within CNMI WQS this reporting cycle in North West Takpochau. Therefore, this watershed's coastal waters were removed from the 303(d) list as impaired for DO% and phosphate. This is not the result of improved water quality per se, but the relocation of several impaired BEACH sites to the Central West Takpochau sub-watershed this reporting cycle. Those BEACH sites continue to have diminished DO% levels.

The ALUS biological assessments of North West Takpochau's seagrass assemblages have not been conducted since 2008 when it was ranked as "Poor". Therefore, until new biological assessments

are conducted, North West Takpochau's coastal waters remain unsupportive of the *Propagation of Aquatic Life* DU.

A 2009 study by Denton, et.al, (Mar Poll Bulletin 58 (2009) 424-455) tested heavy metals in sediment, biota and tissue from juvenile fish traditionally harvested for food by local residents. Samples were collected from within the tidal zone at 12 sites within Tanapag Lagoon starting at the base of Puerto Rico Dump in the south to Pau Pau Beach in the North Achugao's sub-watershed. "Levels of copper, lead, and zinc in sediment from the base of the dump were at least two orders of magnitude higher than the lowest values..." elsewhere in the lagoon. Three species of bivalves collected from Puerto Rico dump to the Lower Base Channel (north of Central Repair Shop in the South Achugao watershed) had *lead* levels in exceedance of US FDA advisory guidelines. The study concluded that this was of greatest concern "From a human health standpoint..", as all other metals were well below critical threshold levels of concern. These findings resulted in North West Takpochau's coastal waters being added to the 303(d) list as impaired for lead (Pb) in bivalves. Therefore these coastal waters do not support the *Fish and Shellfish Consumption* DU.

As was the case for the South West Takpochau's coastal waters, the northern waters remain unsupportive of the *Recreational* DU due to *Enterococci* exceedances of the WQS. The primary source being the aging CUC Municipal sewer line in the mangrove, which has since been by-passed at the time of this writing. Other potential sources include urban runoff from the industrial port complex.

However, although North West Takpochau's coastal waters are industrialized, they continue to fully support the *Aesthetic Enjoyment* DU, as local residents use this beach daily for fishing, or enjoying lunch, or a sunset under the shade of the iron wood trees surrounding the coastline.

North W. Takpochau – Fresh Water Streams

Initial visual field assessments of North W. Takpochau's stream systems were carried out in 2013 to establish five (5) water quality monitoring sites, one of which (WTN01_MA) is now known to be part of the South Achugao watershed based on the newly delineated watershed boundaries. There has been very limited water quality data collected thus far, and no new data this reporting cycle due to lack of flow. Therefore, there is insufficient data to assess the *Support and Propagation of Aquatic Life* DU.

The heavy metal studies by Denton, et.al, did not mention collecting fish tissue or biota samples from North West Takpochau streams systems upland from the DPW Channel Bridge BEACH site. Visual assessments conducted in the stream revealed no overt evidence of WWII debris. Therefore, there is insufficient information to assess the *Fish and Shellfish Consumption* DU.

There is only limited preliminary water quality data from North W. Takpochau's streams collected last reporting cycle. Until more data is collected, there cannot be a full assessment of the *Recreational* DU.

The ephemeral streams in the North West Takpochau sub-watershed flow too infrequent to provide a stable and sufficient *Potable Water Supply* for this densely populated watershed, and therefore they are not assessed for this DU.

However, the North West Takpochau streams continue to meet the *Aesthetic Enjoyment* DU based on their continued use by hikers, "hashers", and recreational and professional athletes for training and exercise.

North W. Takpochau – Wetlands

The Mangrove within the North West Takpochau sub-watershed has had many alterations since the pre-WWII Era until present. In addition, many mangrove trees were felled by Super Typhoon Soudelor, which landed in August 2015. However, to date there has been no data collected to assess the *Propagation of Aquatic Life* DU.

North W. Takpochau – CALM Categories

North West Takpochau's coastal waters retain a CALM Category 5, due to a lead contamination. *Enterococci* exceedances of the WQS are being addressed by the 2017 TMDL for bacteria. North West Takpochau's coastal waters, remain impaired for the *Propagation of Aquatic Life* DU.

North West Takpochau streams retains a CALM Category 2 due to insufficient information.

The wetlands retain a CALM Category 4c due to hydrological changes, which are not a pollutant, and therefore not 303(d) listed.

C.3.5.9. ACHUGAO - Waterbody Segments 20A and 20B

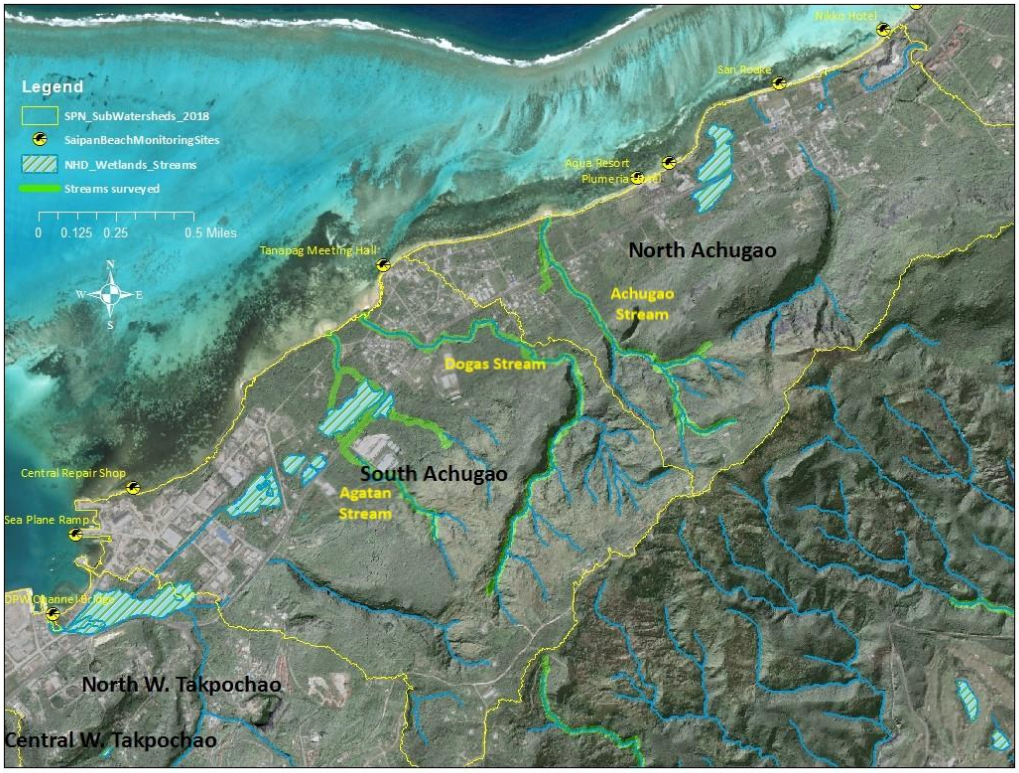
The headwaters of Achugao Watershed flow from "Wireless Ridge" in the southeast and empties into the Tanapag Lagoon. Achugao's coastline contains the northern portion of Saipan's industrial area ("lower base"), whose coastal water are designated as Class A (Figure C-24., on the following page).

There are several small farming operations and a few worker barracks located in the low to mid-watershed in South Achugao, east of Route 30 ("Middle Road"). Some of these farms and the barracks have contributed to fecal contamination in the wetlands located in the immediate vicinity.

Presently, there are two large resorts in operation in the North Achugao's lower watershed, with more developments scheduled to begin construction by next reporting cycle.

Large grasslands cover the upper watershed along Wireless Ridge, which frequently burn due to wildfires. In addition, there are three major stream systems that flow from ridge to reef starting with Saddok Agatan, and Dogas in the southern sub-watershed, and the Achugao Stream in the north.

FIGURE C-24. Achugao Watershed (Segment 20)



Several cisterns from the Japanese occupation, and waste from WWII munitions, planes and other equipment were found and mapped in the mid and upper Dogas stream system. Several lush bamboo strands and small pristine waterfalls, and ripple pools are located above this in the upper watershed.

South Achugao – Waterbody Segment 20B

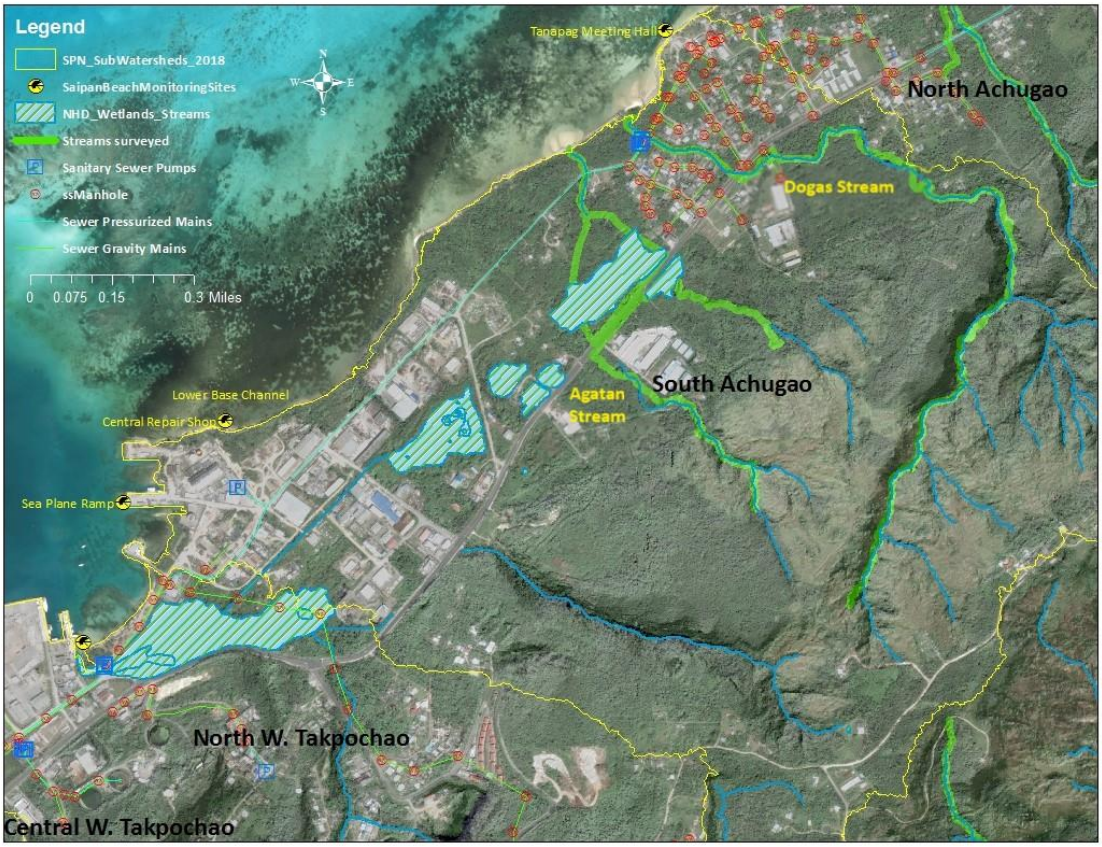
South Achugao contains Tanapag Village located north of Lower Base industrial area. The South Achugao Sub-watershed contains three BEACH monitoring sites; two in the Industrial Class A waters, the Sea Plane Ramp and Central Repair Shop BEACH sites; and one in front of the Tanapag Meeting Hall to the north (Figure C-25., on the following page).

South Achugao - Coastal Marine Waters

An ALUS biological assessment of South Achugao's seagrass assemblages was not conducted this reporting cycle, but past assessments were ranked as "Poor". Once again, DO% was low at the Central Repair Shop BEACH site. The source of which is most likely runoff from boat maintenance.

However, new nutrient data, was within standards. Therefore, South Achugao's coastal waters remain 303(d) listed as impaired for DO%, but were delisted as impaired for phosphate.

FIGURE C-25. South Achugao Sub-watershed (Segment 20B)



Based on visual field assessments the sources of diminished DO% are associated with failing septic systems at the worker barracks, marina maintenance runoff, and unsanitary agricultural practices at small scale farms causing an excess of aerobic bacteriological activity that depletes oxygenation in coastal waters. Given the state of South Achugao's benthic habitat and diminished DO% levels, this watershed's coastal waters remain unsupportive of the *Propagation of Aquatic Life* DU.

A 2009 study by Denton, et.al, tested heavy metals in sediment, biota, and tissue from juvenile fish traditionally harvested for food by local residents. "Levels of copper, lead, and zinc in sediment from the base of the dump were at least two orders of magnitude higher than the lowest values..." elsewhere in the lagoon. Three species of bivalves collected from Puerto Rico dump to the Lower Base Channel (north of Central Repair Shop) had *lead* levels in exceedance of US FDA advisory guidelines. The study concluded that this was of greatest concern "From a

human health standpoint...", as all other metals were well below critical threshold levels of concern. These findings resulted in South Achugao's coastal waters being added to the 303(d) list as impaired for lead in bivalves, and unsupportive of the *Fish and Shellfish Consumption* DU.

South Achugao's coastal waters again exceeded the WQS for *Enterococci*. Sources of contamination include failing septic systems, sewer overflows, stray dogs, and free-range feral animals and livestock, urban runoff, and sedimentation. Therefore, South Achugao's coastal waters do not support the *Recreational* DU.

However, the local community continues to use the Tanapag Meeting hall, the surrounding playground, boat launch, and sandy beaches for fishing, swimming and picnicking, thus fully supporting the *Aesthetic Enjoyment* DU.

South Achugao – Fresh Water Streams

As an impaired and priority listed Watershed, visual field assessments and mapping have been completed within and around the South Achugao As Agatan and Saddok Dogas stream systems. In the mid and upper watershed WWII dumpsites can be found containing rusted out metal drums, aircraft and motor vehicle parts, and other types of military hardware. However, McKagan's 2008 study found As Agatan stream to be relatively pristine upland of Tanapag village with *Macrobrachium lar* shrimp present, although no eels were observed. This was substantiated by WQS/NPS staff findings in both the As Agatan and Saddok Dogas stream systems in the upper watershed where fresh water pools are located. Therefore, South Achugao's fresh waters fully support the *Propagation of Aquatic Life* DU.

The 2009 study by Denton, et.al, found high mercury levels in the "sediment from the mouth of Saddok Dogas", which was associated with "past military activities further upstream". In addition, the three species of bivalves collected from the Lower Base Channel, a drainage of the stream system north of Central Repair Shop (shown in Figure C-25.) had lead levels in exceedance of US FDA advisory guidelines and were considered a human health concern. A more recent 2016 study by, Denton, et.al, also found heavy metals in sediment and biota samples taken from As Agatan and Saddok Dogas stream. Given these findings and the amount of WWII debris seen during visual field assessments of the As Dogas stream, the South Achugao streams are added to the 303(d) list as impaired for lead, and do not support the *Fish and Shellfish Consumption* DU this reporting cycle.

There is limited water quality data available from South Achugao streams' middle and upper sampling sites. However, samples taken from the lower sites regularly exceed the CNMI WQS for *Enterococci*. Therefore, the South Achugao streams are added to the 303(d) list as impaired, and do not support the *Recreational* DU.

Sources on fecal contamination include CUC sewer overflows, failing septic systems, and road runoff from the lower watershed, and to a lesser degree feral animals and piggeries belonging to homesteaders in the mid and upper watershed (2017, TMDL). Realizing that these farms are owned by low to zero income families, BECQ created a community based NPS educational and

outreach campaign last reporting cycle to gain community collaboration in remediation efforts. Three videos were created for field staff to share with homeowners when investigating potential illicit wastewater discharges and illegal dumping. These videos are uploaded to cell phones for easy viewing and have resulted in community cooperation with litter removal, and compliance with animal pens setback requirements from streams. The videos may be viewed at: https://crm.gov.mp/resources-publications/dcrm-videos/watershed-protection/.

The flow from South Achugao stream systems is too low in volume to provide a stable and sufficient *Potable Water Supply* for this watershed, and therefore are not assessed for this DU.

The As Agatan stream is deep enough in the lower watershed nearer to the shoreline for homeowners living adjacent to the stream to boat and fish year round. The upper As Agatan and Saddok Dogas stream systems are also used by hikers and "hasher" for exercise and training, thus supporting the *Aesthetic* DU.

South Achugao – Wetlands

The wetlands located in South Achugao's lower watershed have not been fully delineated or assessed. However, the wetland's hydrology has been altered by roadway changes and fill, and some non-native plants have also been observed. Therefore, South Achugao's wetlands do not support the *Propagation of Aquatic Life* DU, but not due to pollutants. Therefore, they are not included on the 303(d) list as impaired.

Of note, a new resort development is being constructed in close proximity to the wetland, which poses new anthropogenic stressors to the area. In efforts to minimize the risk of adverse impacts, the resort has been permitted with several wetland protection requirements, e.g., a 50ft vegetated buffer on either side of the streams and the wetland itself.

South Achugao – CALM Categories

South Achugao's coastal waters retain a CALM Category 5, due to lead contamination in biota, and water quality exceedances of the CNMI WQS for DO%. However, Enterococci exceedances are now being addressed by the 2017 TMDL for bacteria. South Achugao's coastal waters do not support the *Propagation of Aquatic Life* DU.

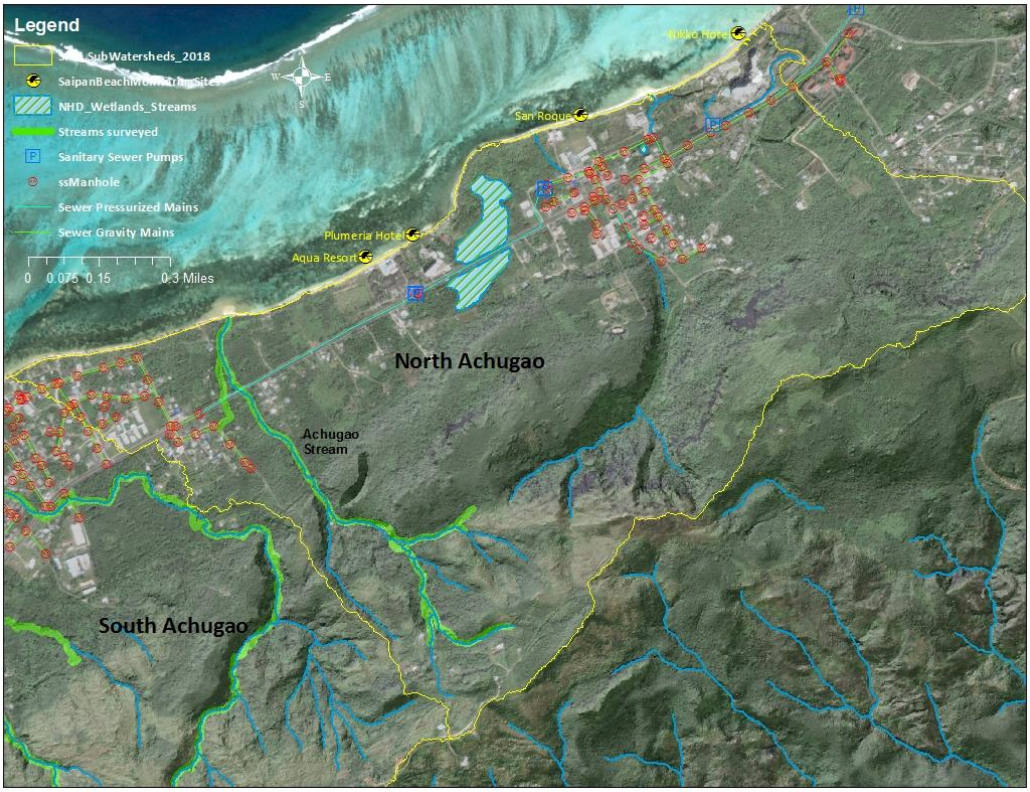
South Achugaos' streams were downgraded to a CALM Category 5 this reporting cycle due to heavy metal contamination and exceedances of the CNMI WQS for *Enterococci*.

The wetlands retain a CALM Category of 4c due to alteration of habitat, non-native plants, and hydrological changes from roadways and fill, and not due to a pollutant.

North Achugao – Waterbody Segment 20A

The North Achugao Sub-watershed has similar topography to that of South Achugao, with its headwaters beginning on Wireless Ridge and flowing into Tanapag lagoon (Figure C-26., below). San Roque village is located in the lower watershed, as are three hotel complexes: Aqua Resort, Plumeria Hotel, and Kensington Hotel (nee Nikko Hotel), and San Roque Elementary School. There are four (4) long-term BEACH monitoring sites located at these same locations.

FIGURE C-26. North Achugao Sub-watershed (Segment 20A)



The Plumeria Hotel has been out of operation for the past four years. However, the renovation of Kensington Hotel (nee Nikko Hotel) that began last reporting cycle, has now been completed including an upgrade to the nearby sewer lift station. The Kensington is now operating at full capacity.

North Achugao - Coastal Marine Waters

ALUS biological assessments of North Achugao's seagrass assemblages was not conducted this reporting cycle, but past assessments ranked three locations as "Fair" and one as "Poor" for an overall ranking of "Fair". New nutrient water quality data was well within WQS. This resulted in North Achugao's coastal waters being removed from the 303(d) list as impaired for phosphate. However, DO% levels were diminished at the Kensington Hotel and San Roque School. The diminished DO% may be associated with failing septic systems, road and maintenance and

construction runoff adversely effecting coastal waters (2017, TMDL), thus contributing to increased aerobic bacteriological activity. These findings resulted in North Achugao's coastal waters being added to the 303(d) list as impaired for DO%, and removed from the list as impaired for phosphate. Therefore, North Achugao's coastal waters remain unsupportive of the *Propagation of Aquatic Life* DU.

The 2009 study by Denton, et.al, found traces of heavy metal contamination in fish tissue and other biota (seagrass, sea cucumbers, and bivalves) taken from the Plumeria Hotel and San Roque School BEACH sites. However, levels did not pose a public health concern. Heavy metal concentrations, "were well below critical threshold levels of concern when weighted against existing USA advisories…and food standards of other countries". Therefore, North Achugao's coastal waters support the *Fish and Shellfish Consumption* DU.

In addition, water quality data met the CNMI WQS for *Enterococci*, a noticeable improvement from last reporting cycle. This resulted in North Achugao's coastal waters being removed from the 303(d) list as impaired for *Enterococci,* and assessed as being supportive of the *Recreational* DU.

This improvement in water quality is thought to be associated with the upgrade of CUC's SR-1 lift station located between San Roque School and Plumeria Hotel, which was completed this reporting cycle. There are no longer sewer overflows occurring in this area as a result of the upgrade. The SR-3 lift station located between Aqua Resort and Plumeria Hotel was also rehabilitated last reporting cycle (2017 communication, Larry Manacop, CUC Chief Engineer).

North Achugao's sandy beaches and calm coastal waters are used daily by local residents and tourists for fishing, swimming, and picnicking, thus fully supporting the *Aesthetic Enjoyment* DU.

North Achugao – Fresh Water Streams

Visual field assessments and GPS mapping of the Achugao Stream system has been completed. The stream flows from Wireless Ridge through the pristine upper watershed and into the Lagoon. There are very few homes nearby. One home did have a small pig sty located adjacent to Achugao stream last reporting cycle. However, the violator complied with the Notice of Violation and has since removed the pen entirely.

There are several fresh water pools within the Achugao stream system that contain many shrimp and eels in the upper and mid-watershed, thus North Achugao's streams support the *Propagation of Aquatic Life* DU.

There has been no data collected on North Achugao's streams' water quality, or on fish tissue and/or biota contamination to assess the *Fish and Shellfish Consumption,* or the *Recreational* DUs.

North Achugao's stream flow is too low in volume to provide a stable and sufficient *Potable Water Supply* for this watershed. Therefore, this stream is not assessed for this DU.

However, many "Hashers", hikers, and tri-athletes enjoy training throughout the jungle areas and within dry streambeds in the pristine upper and mid-watershed. Therefore, North Achugao's streams fully support the *Aesthetic Enjoyment* DU.

North Achugao – Wetland

The centrally located wetland in North Achugao's lower watershed has not been fully delineated or valuated. However, the wetland's hydrology is known to have been altered by fill for the roadway that dissects the wetland. Therefore, North Achugao's wetland does not support the *Propagation of Aquatic Life* DU, but not due to a pollutant. Therefore, it is not included in the 303(d) list as impaired.

Of note, a new resort development is also proposed for the North Achugao sub-watershed. The resort lies in close proximity to the North Achugao wetland. In efforts to minimize the risk of adverse impacts, the resort has been permitted with several wetland protection requirements, e.g., a 50ft vegetated buffer on either side of the stream and the wetland itself.

North Achugao – CALM Categories

North Achugao's coastal waters retain CALM Category 5, due to diminished DO% concentrations. However, *Enterococci* concentrations have substantially improved due to sewer line upgrades resulting in its removal from the 303(d) list as impaired. Additionally, a TMDL for bacteria was completed in 2017 and its recommendations are being implemented.

The Achugao stream system retains CALM Category of 2 due to insufficient information.

The wetlands retain CALM Category of 4c due to alteration of habitat, and hydrological changes from roadways and fill, which are not pollutants.

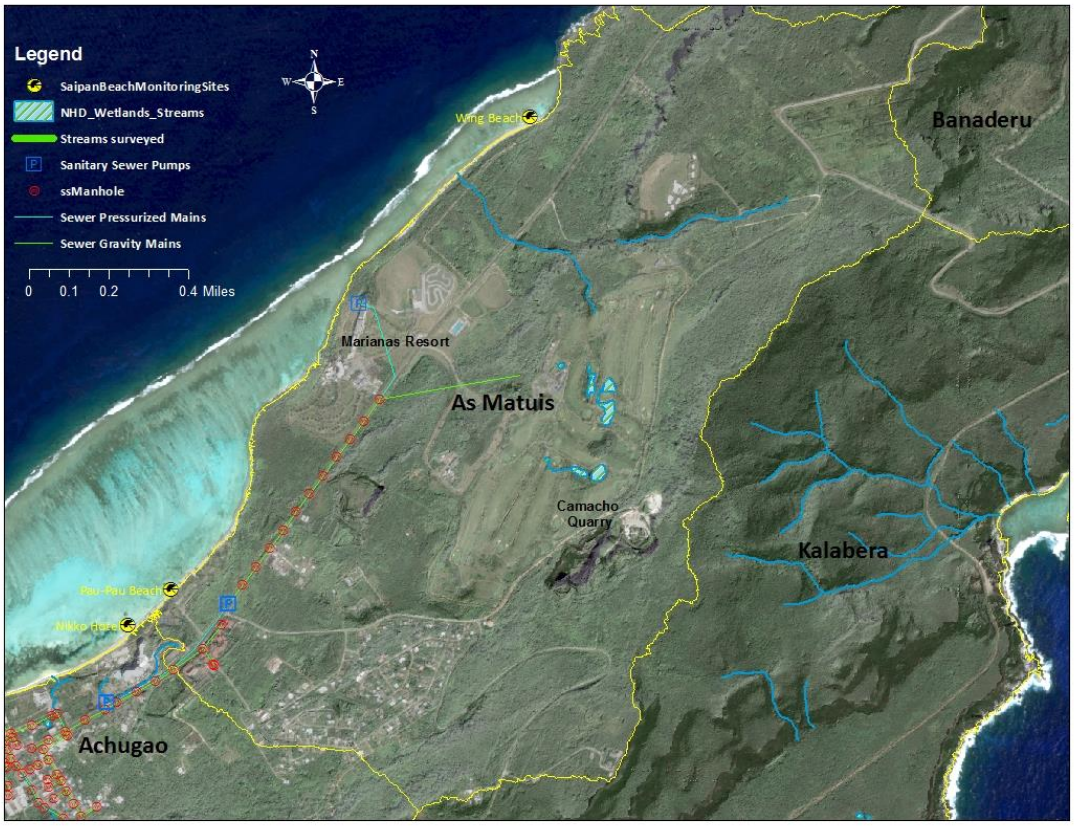
C.3.5.10. AS MATUIS – Waterbody Segment 21

The As Matuis watershed contains the old Camacho Quarry in the upper watershed, which is no longer in operation. In addition, there is one village located in the southern mid to upper watershed (Figure C-27., on the following page). Marianas Resort, next to the coast is the only large hotel complex in the area, to which the Golf Course and public swimming pool belong. The CUC municipal sewer line ends here and is only available for connection with homes located near Middle Road in the lower watershed. Therefore, the majority of homes rely on IWDS for wastewater collection and treatment.

As Matuis - Coastal Marine Waters

As Matuis has two (2) long-term BEACH monitoring sites at Pau Pau and Wing Beaches, and an additional reef flat site at Wing Beach.

FIGURE C-27. As Matuis Watershed (Segment 21)



The ALUS biological assessment of the coral reef assemblages in As Matuis' coastal waters were ranked as "Good". There was no assessment of the seagrass assemblages, which was ranked as "Poor" last reporting period. This resulted in an overall ranking of "Fair".

New nutrient water quality data was well within CNMI WQS, which resulted in As Matuis' coastal waters being removed from the 303(d) list as impaired for phosphate. However, DO% remains diminished at Pau Pau beach, and pH was low at Wing Beach. The source of these impairments is unknown. Therefore, As Matuis' coastal waters remain unsupportive of the *Propagation* of *Aquatic Life* DU.

No fish tissue and/or biota contamination has been collected on As Matuis' coastal waters to assess the *Fish and Shellfish Consumption* DU.

However, As Matuis' water quality met CNMI WQS for *Enterococci* this reporting cycle, resulting in its removal from the 303(d) list as impaired. There are few homes near the beach monitoring sites, so bacteriologic water quality improvement is thought to be associated with better farming practices. MVA requested that farmers in the area keep their cattle penned to reduce the risk of vehicular accidents, as this had become an issue with the increase in visitor numbers (personal

communication, 2017, Kuen-Hee Han, MVA Tour Operator Certification Program Manager). Cattle are no longer seen roaming free on the roadway or beaches, as was observed in years past. However, given that As Matuis's coastal waters were added to the 303(d) list as impaired for pH, this watershed still is not considered supportive of the *Recreational DU.*

As Matuis' shoreline is a relatively long drive from Saipan's busy tourist district. However, both PauPau and Wing Beaches, remain very popular picnic, swimming, and snorkeling areas for tourists and residents. Pau Pau's calm and shallow waters are ideal for triathletes training for open water swimming competitions.

Wing Beach in the north is a popular camping and SCUBA site with limited light pollution. This attribute makes it a very important nascent nesting site for the endangered Green Sea Turtle. Wing Beach was closed off from vehicular traffic in 2004 for this very reason. This has allowed a return of its natural beach profile, and native vegetation providing a suitable location for turtles to nest. Divers and bloggers alike have referred to Wing Beach as the "Jewel of Saipan". For this reason, As Matuis' coastal waters fully support the *Aesthetic Enjoyment* DU.

As Matuis – Fresh Water Streams

The As Matuis watershed is comprised of porous soil, so the streams only flow during torrential rain events here. Therefore, no water quality data has been collected. In addition, visual field assessments have not been completed in the remote upper watershed to determine if fresh water pools exist there to support aquatic ecosystems. However, there existence is unlikely. They do not exist in the mid and lower watershed. Therefore, there is insufficient information to assess the *Support and Propagation of Aquatic Life, Fish and Shellfish Consumption,* and the *Recreational* DUs.

These streams are insufficient to provide a viable *Potable Water Supply,* and therefore they are not assessed for this DU.

However, many "Hashers", hikers, bikers, and tri-athletes enjoy exercising and training throughout the jungle areas and within the dry streambeds, thus As Matuis' streambeds fully support the *Aesthetic Enjoyment* DU.

As Matuis – Wetland

The 2017 NHD, and Wetlands and Streams GIS data layers exhibit a few wetland areas in the As Matuis Watershed. These are actually artificial wetlands created as water traps in the Marianas Country Club's Golf Course. Therefore, they are not considered a wetland, and therefore, they are not assessed.

As Matuis – CALM Categories

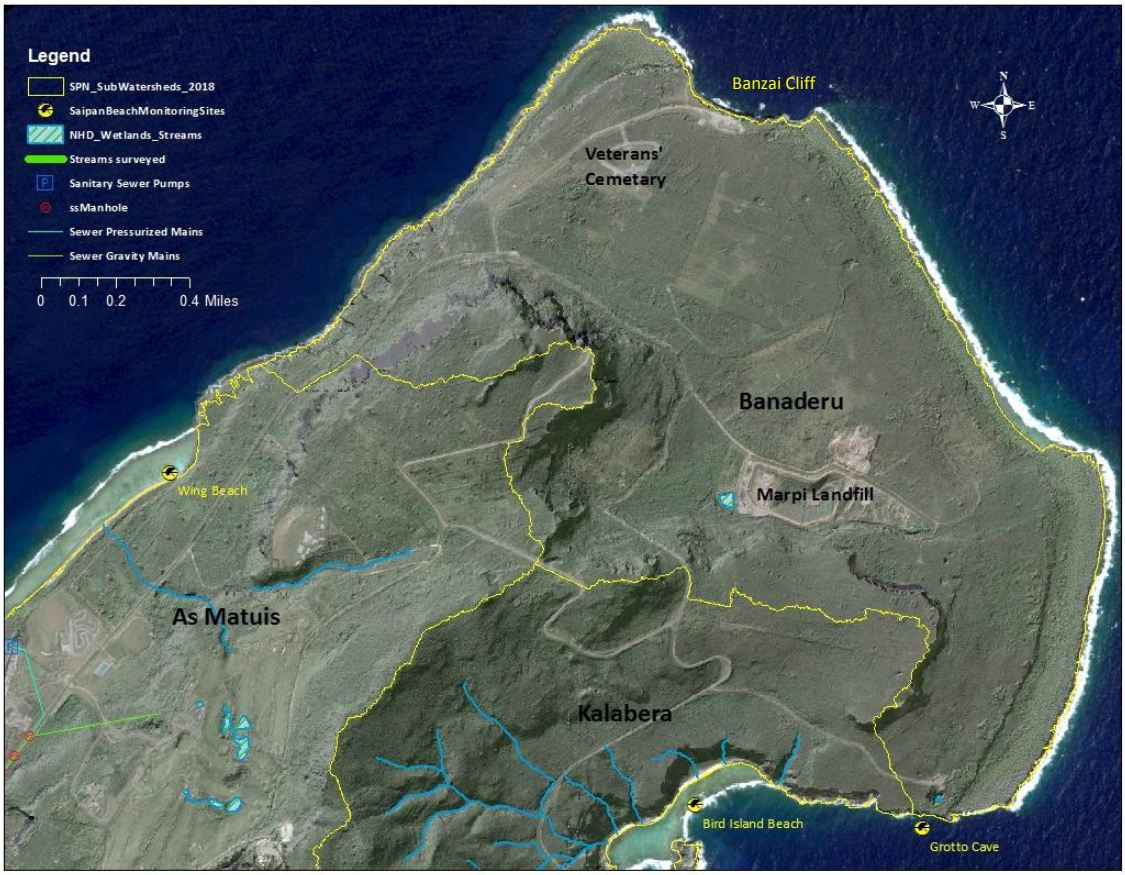
As Matuis's coastal waters retain CALM Category 5, due to low DO% and pH levels.

As Matuis' fresh water streams retain CALM category of 2 due to insufficient information.

C.3.5.11. BANADERU – Waterbody Segment 22

Banaderu is the northernmost watershed on Saipan. It contains Banzai Cliff lookout, Marpi's Public Cemetery, the Veteran's Cemetery, many WWII memorials, and the EPA certified Marpi Landfill (Figure C-28.). There are no municipal water supplies or sewer infrastructure available for homesteads or businesses here. The few homes that are located in the watershed use IWDSs for wastewater collection and treatment. Banaderu lacks any surface water streams or wetlands.

FIGURE C-28. Banaderu Watershed (Segment 22)



Banaderu - Coastal Marine Waters

There is only one (1) long-term BEACH monitoring site located in the Grotto Cave. The cave is a naturally formed grotto with deep clear waters for cliff diving, snorkeling and SCUBA. It is often featured in international dive publications.

There are no biological ALUS monitoring sites within Banaderu's coastal waters. However, the grotto itself has some of the most diverse coral reef coverage in Saipan and a plethora of fish, as attested by the hundreds of thousands that dive at the Grotto each year.

There is very limited development in this remote watershed. The cemeteries and the Marpi Landfill are located well away from the coastline. All coastal water quality data are within the CNMI WQS for nutrients, DO%, and pH. Therefore, Banaderu coastal waters were removed from the 303(d) list as impaired for phosphate, and fully support the *Propagation of Aquatic Life* DU.

However, the heavy metal sediment study conducted by Denton, et.al, in 2016 found "Other major site exceedances of Saipan's soil screening levels for ….Pb and Zn at a former dumpsite and ocean disposal tipping point atop 'Banzai Cliff'". However, there has been no data on fish tissue and/or biota in Banaderu's coastal waters, or the Grotto to assess the *Fish and Shellfish Consumption* DU.

Banaderu's coastal water quality data exceeded the CNMI WQS for *Enterococci* again this reporting cycle. There was a substantial increase in violations from the last IR, with 33% and 24% exceedances in FY2016 and 2017 respectively, compared to 18% violations in FY2015. Therefore, Banaderu's coastal waters do not support the *Recreational* DU.

The increase in violations is associated with a steady increase in visitors to the Grotto Cave, which lacks 24-hr public restroom facilities. Given the lack of water and sewer infrastructure, the public restrooms at the Grotto are fitted with a septic holding tank, which is maintained by pump out on a weekly schedule. When "spikes" in *Enterococci* concentrations were noted last reporting cycle, the restrooms were inspected by BECQ WEEC and found to be in good working order. However, it was revealed by the Tourism Management Working Group that DLNR Parks and Recreation closes the restrooms between regular visitor hours, or whenever there is an insufficient volume of water for flushing toilets and handwashing. This resulted in visitors resorting to the surrounding jungle area when the restrooms were closed. This was confirmed as human waste was identified as the primary source of *Enterococci* using a qPCR human-marker microbial source tracking test. In response, the Tourism Management Working Group met with legislators to address this issue through new regulations, installation of a gate to control visitor access to the site, and increased bathroom maintenance and Park Ranger presence. In addition, MVA revised the Tour Operator Certification Regulations in August 2017, and implemented the Tour Operator Education and Certification Program with Northern Mariana College in October 2017. Tour Operators are now instructed to observe all sanitary and environmental laws, and are held responsible for informing their patrons of these laws, and ensuring their compliance with them.

The Grotto Cave continues to be featured in numerous Dive Magazines as a premier dive site, and sees over 30,000 visitors per month (2017, MVA Tourist Survey). It is for this reason, and its high ranking in MVA's tourist exit surveys that Banaderu coastal waters continue to fully support the *Aesthetic Enjoyment* DUs.

Banaderu – CALM Categories

Banaderu's coastal waters were upgraded to a CALM Category 4a due to implementation of the 2017 TMDL for *Enterococci.*

C.3.5.12. MAÑAGAHA - Waterbody Segment 23

Mañagaha Island is a small sand cay in the Saipan Lagoon covering only 0.03 square miles, with 0.6 miles of coastline (Figure C-29.). It is the number one destination for tourists visiting the CNMI with close to 300,000 visitors a year (MVA tourist exit surveys, 2016).

FIGURE C-29. Mañagaha (Segment 23)

Mañagaha is surrounded by a "no-take" Marine Protected Area and contains a terrestrial conservation area for pelagic shearwater birds that nest here each year. It also contains public restrooms and showers. Generated wastewater is collected and treated with a permitted Membrane Bioreactor WWTP.

The cay has insufficient precipitation, topographical and geological features to support any surface waters. Precipitation flows directly by subterranean transport from land to sea.

There are 11 long-term BEACH monitoring sites surrounding Mañagaha's shoreline and pier.

Mañagaha - Coastal Marine Waters

In FY2017, Mañagaha's coastal BEACH site M11, had a low pH trend. This site is located next to the pier where boats tie up to embark and disembark passengers. Therefore, Mañagaha's coastal waters were added to the 303(d) list as impaired for pH, but removed from the list for phosphate impairment. The source of low pH is unknown, but may be associated with residual cleaning solutions or other chemicals used on the boats' decks or hull surfaces.

Mañagaha was assessed as no longer supporting the *Propagation of Aquatic Life* DU this reporting cycle. However, it should be noted that no visitors are allowed to swim at this location due to motorized boat safety hazards. All other Mañagaha BEACH sites where people are allowed to recreate in the water were well within WQS, including for nutrients this reporting cycle.

There is insufficient data collected on fish tissue and/or biota contamination of Mañagaha's coastal waters to assess the *Fish and Shellfish Consumption* DU.

Mañagaha's coastal waters were well within the CNMI WQS for *Enterococci* at all BEACH sites, and for pH at all the other BEACH sites where visitors are allowed to swim. Therefore, Mañagaha continues to fully support the *Recreational* DU.

Mañagaha's wide sandy beaches, panoramic views, and recreational activities draw the largest number of visitors than any other tourist site in the CNMI. For this reason, Mañagaha's coastal waters fully support the *Aesthetic Enjoyment* DUs.

Managaha – CALM Categories

Mañagaha 's coastal waters were downgraded to a CALM Category 5 due to low pH levels at the pier.

C.3.6. Five-Part Categorization of Rota's Surface Waters

"Rota's topography has five geomorphic subdivisions including coastal lowlands, a northern plateau, a southern plateau (the Sabana), a volcanic area, and the western peninsula." (2017, Talakhaya Watershed Soil Loss Assessment). Rota has the lowest population of the three southern islands of the archipelago. The 2010 Census listed only 2,527 residents. However, there are much fewer residents today due to an economic downturn and the closure of many businesses and hotels on the island (February 2018, personal communication, Malcolm Johnson, NOAA Coral Reef Fellow).

As a result, Rota is developed to a far lesser degree than Saipan or Tinian, and lacks a municipal sewage treatment facility, and landfill. Area residents rely on IWDSs for wastewater treatment and an unlined dump for disposing solid waste.

Rota is split into five (5) watersheds, with 12 regularly monitored BEACH sites, Figure C-30.

FIGURE C-30. Rota's BEACH Water Quality Monitoring Sites

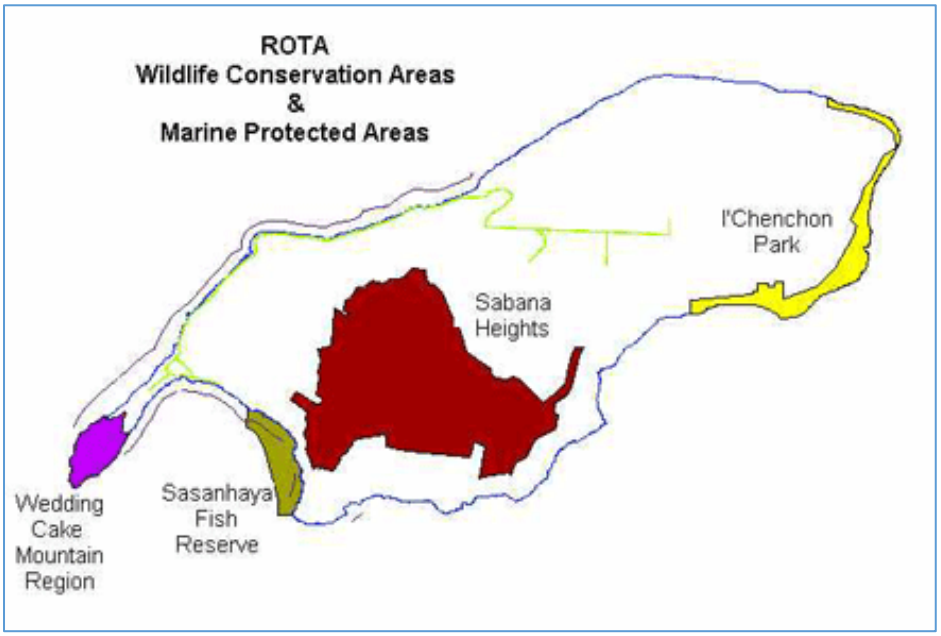
Rota has three wildlife preserves, Wedding Cake Mountain Region on the southwest peninsula, Sabana Heights in the island's upper plateau, and l'Chenchon Park on the Dugi/Gampapa/Chenchon watershed's coastline. Rota also has one Marine Protected Area, Sasanhaya Fish Reserve off the Sabana/Talakhaya/Palie coastline.

There is limited data available on Rota's coastal water quality due to limited staffing on island, and a truncated 8-week sampling schedule. The schedule allows for seasonal year round sampling of Rota, and other less densely populated islands (i.e., Tinian and Mañagaha), or less frequented beach sites (i.e., Saipan's east beaches). This is necessary to make the best use of limited resources for staff, air travel, and boat availability.

There are also five (5) weekly monitored streams sites within Rota's Sabana/Talakhaya/Palie watershed. These sites are used to measure the efficacy of revegetation efforts in the watershed's upper badlands (discussed in detail in sub-section C.3.6.2., that follows).

Comparatively speaking, Rota's flora has been less altered than Saipan or Tinian, partially due to being less devastated from the impacts of the WWII conflict, leaving vast canopies in the upper and lower watersheds.

FIGURE C-31. Rota's Wildlife Preserves and Marine Protected Area



(Source: www.dfw.gov.mp/Wildlife/RotaWildlife.html)

ROTA - COASTAL MARINE WATERS

Rota's coastlines are relatively untouched. Residents regularly barbeque under the covered "Pala Pala" picnic areas along the coastline. These sites are often used for government hosted community events. Rota's beaches are also ideal camp sites and provide residents and visitors with beautiful tide pools and vistas to enjoy, thus fully supporting the *Aesthetic Enjoyment and Other Uses* DU for all its coastal waters (Table C-31., on the next page).

ALUS biological assessments of benthic habitat and coral reef assemblages in Rota's coastal waters ranged from a "fair" ranking at four sites, to "poor" at one site. Nutrient levels were not tested this reporting cycle. Therefore, although the nutrient data used in the 2004 IR assessment are known to have provided erroneous results, Rota's coastal waters cannot be removed from the 303(d) list as impaired for phosphate this reporting cycle.

Therefore, Rota's overall ranking is "Fair", for the *Support and Propagation of Aquatic Life* DU. This is in contrast to Saipan's overall rating of "Good" to "Fair". However, if the potential environmental stressors that increased populations have on marine biological communities are considered, one would expect that the communities of the sparsely populated island of Rota would be in better condition relative to the populated island of Saipan. However, using the current ALUS analysis, Saipan's reefs are determined to be in better condition than Rota's.

TABLE C-31. Assessment of Rota Waterbodies' DUs – Coastal Marine Waters

		No sites, but very remote	Coral Garden, Kokomo, Talakhaya	Mobil, E. Harbor, Teweksberry, W. Harbor, Storm drains	Vet Memorial, Teteto Beach	Swimming Hole
			R1-R2 R13	R3-R8	R9-R11	R12
WATER BODY SEGMENT ID		1	2	3	4	5
	Designated Use	Dugi/Gampapa/Chenchon	Sabana/Talakhaya/Palie	Songsong	Uyulanhulo/Teteto	Chaliat/Talo
Coastal Waters	Aquatic Life	F	***Fair Habitat,*** No new nutrient data	Fair Habitat, ***DO% Good,*** No new nutrient data	Fair Habitat, No new nutrient data	***Poor Habitat,*** No new nutrient data
	Fish Consumption	F	i	i	i	i
	Recreation	F	N	N	F	N
	Aesthetic enjoyment/others	F	F	F	F	F
	CALM Assessment Category	1	5	5	***5***	5
	Not Attaining DU		Insufficient Information			Support

This lack of clarity when comparing Saipan and Rota's reefs is not unique to this report. Two recent peer reviewed publications have had contradicting results. In general, the paper by Houk, et al., (2014), demonstrates that *Rota's* reefs are more resilient to disturbances caused by the Crown of Thorns Sea Star, while Maynard et al. determined that *Saipan's* reefs are more resilient to the threats caused by climate change (2015, *Assessing Relative Resilience Potential of Coral Reefs to Inform Management in the CNMI*) . Therefore, it may be speculated that the present protocol for determining the status of marine biological communities maybe more complex, and insufficient for assessing Rota's unique tropical reef setting.

There has not been a fish tissue or biota study completed for the island of Rota. Therefore, there is insufficient information to assess the *Fish and Shellfish* DU at the time of this writing.

Rota's Sabana/Talakhaya/Palie and Songsong watersheds again do not support the *Recreation* DU. The primary sources of *Enterococci* contamination in the sparsely populated Sabana/Talakhaya/Palie watershed are soil-laden storm water runoff from eroded badlands, and free-range livestock grazing. The sources of contamination in Songsong's coastal waters include fresh water seeps carrying human waste from failing septic systems, and animal waste from free-range livestock.

Although, there was improvement to the bacteriological water quality of Chaliat/Talo coastal waters. The improvement is associated with a drastic decrease in both the island's resident population and visitor numbers. However, it could not be delisted for *Enterococci* given the exceedances of the WQS at the Swimming Hole BEACH site in 2013 and 2015. Therefore, Chaliat/Talo's coastal waters remain unsupportive of the Recreation DU this reporting cycle.

ROTA – FRESH WATER STREAMS

Rota has riparian areas and several lush streams. The Sabana/Talkakaya/Palie watershed is the only watershed on Rota that provides sufficient precipitation, topographical and geological features to support a fresh water spring system. The water caves and the streams in this watershed provide 90% of Rota's potable water supply. The assessment results for these streams are provided in Table C-32., on the following page.

The stream systems also contain beautiful waterfalls for which they fully support the *Aesthetic Enjoyment* DU. All other waterbodies' precipitation flows through subterranean transport from land to sea.

ROTA – WETLANDS AND LAKES

There are no lakes on Rota. Historically there have only been created wetlands reported. However, a complete valuation of potential emergent or riparian wetland areas has not been completed by BECQ at the time of this writing.

The following watershed sub-sections, C.3.6.1., through C.3.6.5, provide further detail about each of Rota's watersheds, coastal waters, and the fresh surface waterbodies contained therein.

TABLE C-32. Assessment of Rota Waterbodies' DUs – Fresh Water Streams

		No sites, but very remote	Coral Garden, Kokomo, Talakhaya	Mobil, E. Harbor, Teweksberry, W. Harbor, Storm drains	Vet Memorial, Teteto Beach	Swimming Hole
			R1-R2 R13	R3-R8	R9-R11	R12
WATER BODY SEGMENT ID		1	2	3	4	5
	Designated Use	Dugi/Gampapa/Chenchon	Sabana/Talakhaya/Palie	Songsong	Uyulanhulo/Teteto	Chaliat/Talo
Streams	Aquatic Life		i			
	Fish Consumption		i			
	Recreation		i			
	Potable Water Supply		***F***			
	Aesthetic Enjoyment/others		F			
	CALM Assessment Category		2			

Not Attaining DU | Insufficient Information | Support | No fresh surface water

C.3.6.1. DUGI/GAMPAPA/CHENCHON – Waterbody Segment 1

The Dugi/Gampapa/Chenchon is the largest watershed on Rota based on land coverage and contains Rota's Benjamin Taisacan Manglona International Airport. It is also the most remote and undeveloped area on Rota, as shown in Figure C-32., on the following page.

FIGURE C-32. Dugi/Gampapa/Chenchon (Segment 1)

Dugi/Gampapa/Chenchon - Coastal Marine Waters

The Dugi/Gampapa/Chenchon watershed does not contain paved roads or any consistently well-maintained trails to allow easy access to the remote coastline for regular water quality monitoring. Therefore, there is not an established long-term BEACH monitoring site for this watershed. The rugged cliff line drops off to deep water, with extremely hazardous surf most of the year. This has resulted in very limited water quality data as samples may only be collected by boat during calm weather, which is usually done in conjunction with biological monitoring of reef flat sites.

This reporting cycle the ALUS assessment of coral reef assemblages again ranked Dugi/Gampapa/Chenchon coastal waters as “Fair”. Environmental stressors include agriculture, and cattle grazing, more so here than at most other watersheds on the island (2018, communication, Malcolm Johnson, NOAA Fellow). However, given that no other anthropogenic sources of pollution are present, this may mean that the reef system is in its ambient condition.

These findings result in the Dugi/Gampapa/Chenchon coastal waters retaining the *Support and Propagation of Aquatic Life* DU.

For this same reason, the Dugi/Gampapa/Chenchon coastal waters also attain the *Fish and Shellfish Consumption*, and *Recreational* DUs based on visual field assessments and professional judgement.

Dugi/Gampapa/Chenchon - Fresh Water Streams

The Dugi/Gampapa/Chenchon watershed has insufficient precipitation, topographical and geological features to support stream systems. Precipitation flows through subterranean transport from land to sea. Therefore, they are no streams present for assessment purposes.

Dugi/Gampapa/Chenchon – CALM Categories

The Dugi/Gampapa/Chenchon watershed retains a CALM Category 1 for its coastal waters.

C.3.6.2. SABANA/TALAKHAYA/PALIE – Waterbody Segment 2

The Sabana/Talakhaya/Palie watershed is steep with a barren badland area in Talakhaya's upper slopes as shown in Figure C-33., on the following page. This is the result of vast clear cutting for agriculture purposes during the Japanese occupation. Presently, there are new clearings for agricultural plots located above Rota's primary potable water source, the Water Cave system.

A multi-phase revegetation project, which began in 2007, is ongoing and is supported through US Coral Reef Initiative funding. The project's aim is to stabilize soils and prevent erosion and sedimentation from entering Sabana/Talakhaya/Palie's coastal waters.

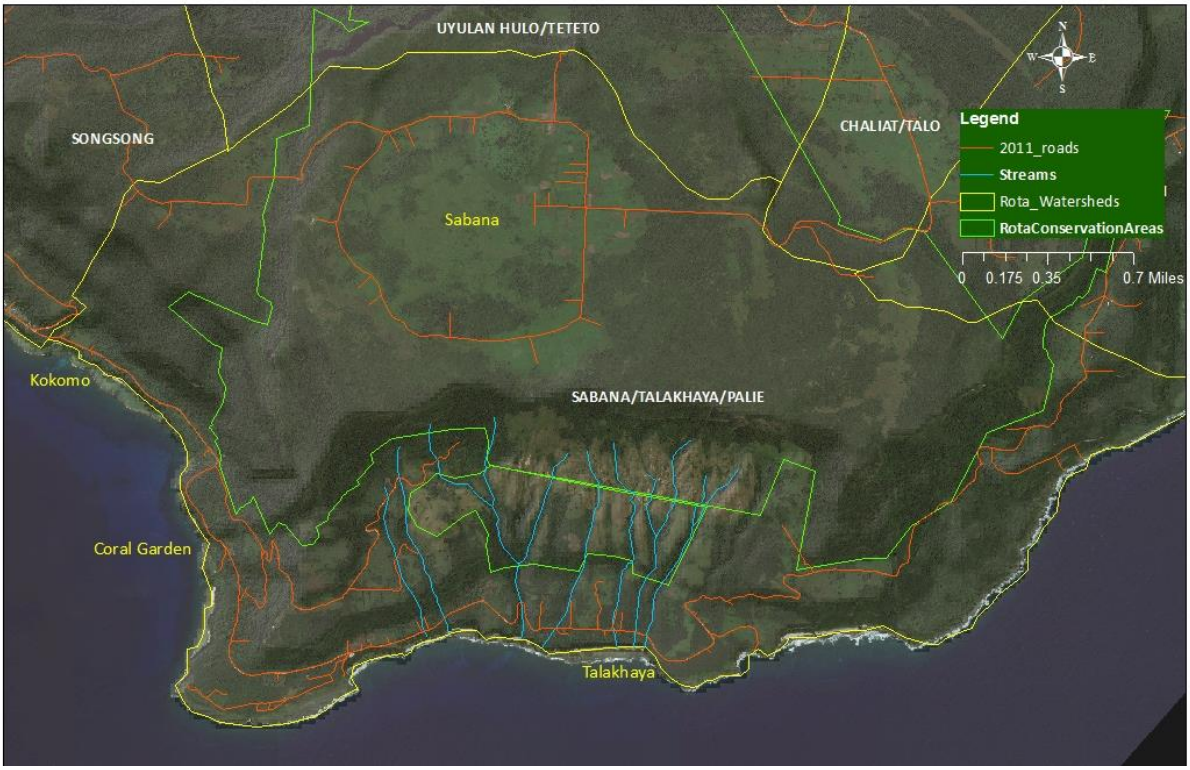
There are three long-term BEACH water quality monitoring sites. However, one site, at Coral Garden beach was discontinued in FY 2010 due to hazards associated with accessing the shoreline. Regular monitoring of the Talakhaya site began in earnest in the latter part of FY 2015. Therefore, assessments are based primarily on BEACH water quality data from the Kokomo beach, and the Talakhaya sites. There are also an additional 7 coastal sites at the mouth of several streams in Talakhaya that are monitored to evaluate the efficacy of the revegetation project in the upper badlands.

Sabana/Talakhaya/Palie - Coastal Marine Waters

The ALUS assessment ranked Sabana/Talakhaya/Palie coral reef assemblages as "Fair", an improvement from last reporting cycle. However, even though the nutrient data from the 2004 IR is known to be erroneous, there is insufficient new data to remove these coastal waters from

the 303(d) list as impaired for phosphate. Therefore, these coastal waters remain unsupportive of the *Propagation of Aquatic Life* DU, this reporting cycle.

FIGURE C-33. Sabana/Talakhaya/Palie (Segment 2)



No data is available on fish tissue and/or biota contamination from Sabana/Talakhaya/Palie's coastal waters to assess the *Fish and Shellfish Consumption* DU.

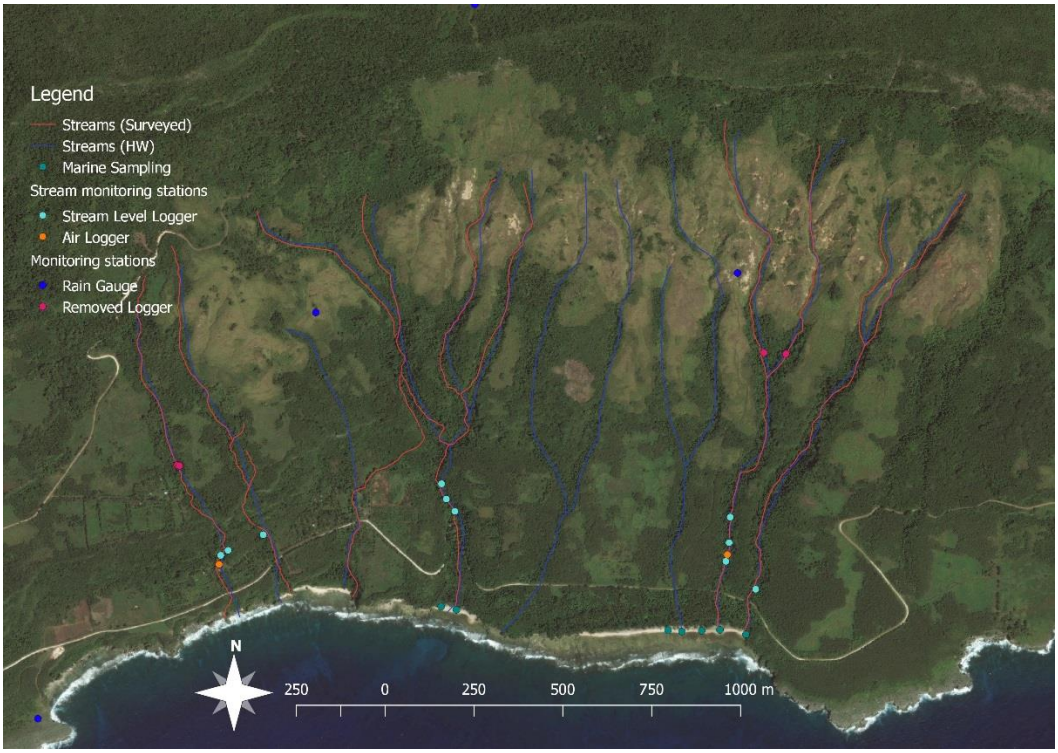
Again, this reporting cycle water quality exceeded the CNMI WQS for *Enterococci.* Therefore, this watershed's coastal waters remain on the 303(d) list as impaired, and they do not support the *Recreational* DU. The sources of *Enterococci* in this sparsely populated watershed is associated with fresh water seeps carrying human waste from failing septic systems, animal waste from free-range livestock, and sediment laden storm water.

Sabana/Talakhaya/Palie – Fresh Water Streams

Sabana/Talakaya/Palie is the only watershed with perennial fresh water streams on Rota, as shown in Figure C-34., on the following page. This watershed contains the Talakhaya springs, and several water caves along the Sabana ridge, Rota's primary potable water source, for which the Sabana/Talakaya/Palie attains the *Potable Water Supply* DU.

A portion of the Water Caves' lush stream system flows to the coast primarily during rainy season. Other portions are hyporheic during dry season. There are 10 stream water quality sampling sites within the Talakhaya area that are monitored to evaluate the efficacy of the revegetation project in the upper badlands.

FIGURE C-34. Talakhaya Stream Water Monitoring Sites



Residents, and some tourists, trek through the Okgok Waterfall trail to view beautiful waterfalls in the Sabana/Talakhaya/Palie watershed. Residents regularly fish in the fresh water pools for prawns (*Macrobrachium lar),* Eels (*Anguilla marmorata),* and fish (*Kuhlia rupestris*) (2018 email, Malcolm Johnson, NOAA Coral Reef Fellow). Therefore, the idyllic Sabana/Talakaya/Palie fresh water stream systems fully support the *Propagation of Aquatic Life,* and the *Aesthetic Enjoyment* DUs.

No data is available on fish tissue and/or biota contamination from Sabana/Talakhaya/Palie's stream systems to assess the *Fish and Shellfish Consumption* DU.

The streams in the Sabana/Talakhaya/Palie's watershed are not used as a potable water supply so this DU is not assessed.

There are only very limited water quality data from the Sabana/Talakaya/Palie' fresh water streams. Therefore, there is insufficient information to assess the *Recreational* DU.

Sabana/Talakhaya/Palie – CALM Categories

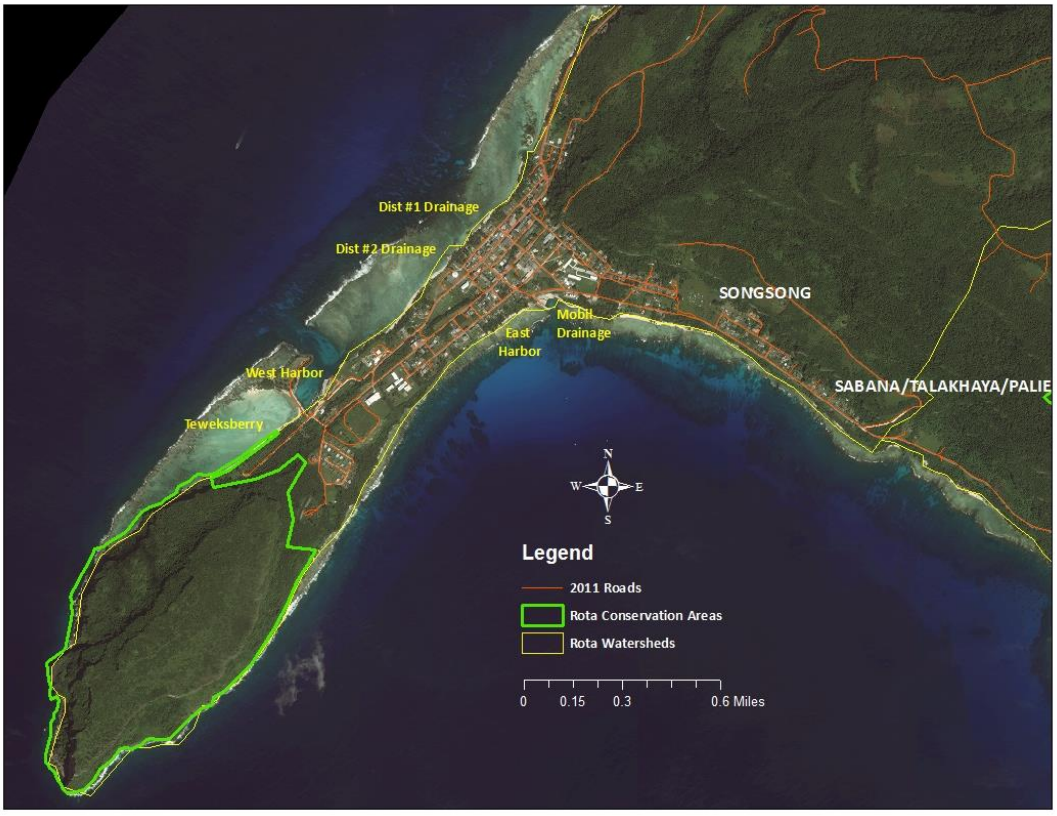
Sabana/Talakhaya/Palie's coastal waters retain a CALM Category 5 due to *Enterococci* exceedances of the CNMI WQS.

The Sabana/Talakhaya/Palie's fresh water streams retain a CALM Category 2, due to insufficient information.

C.3.6.3. SONGSONG – Waterbody Segment 3

There are six (6) long-term BEACH monitoring sites surrounding the Songsong watershed, on Rota's western peninsula (Figure C-35., below). The peninsula contains the most developed and densely populated area on Rota, Songsong Village. It also contains the East and West Harbor and the fuel depot, which are Rota's only designated Class A waters.

FIGURE C-35. Songsong (Segment 3)



Songsong - Coastal Marine Waters

Residents and tourists enjoy Teweksberry beach, and more frequently the beaches adjacent to Songsong's harbors, and Mobil fuel depot for picnics, fishing and to enjoying sunsets, for which this watershed attains the *Aesthetic Enjoyment* DU.

The ALUS biological assessment for Songsong's coral reef assemblages were ranked as "Fair". In addition, all the DO% concentrations were well within CNMI WQS this reporting cycle, including the West Harbor's coastal waters. However, there is no new nutrient data. Therefore, there is insufficient information to remove Songsong from the 303(d) list as impaired for phosphate, and its coastal waters do not support the *Propagation of Aquatic Life* DU.

No fish tissue and/or biota contamination data is available on Songsong's coastal waters to assess the *Fish and Shellfish Consumption* DU.

Songsong's coastal water quality data exceeded the CNMI WQS for *Enterococci* this reporting cycle. Therefore, Songsong's coastal waters remain on the 303(d) list as impaired waters, and they do not support the *Recreational* DU.

The sources of *Enterococci* loading include fresh water seeps carrying human waste from failing septic systems, and possibly animal waste from free-roaming domestic pets.

Songsong - Fresh Water Streams

The Songsong watershed has insufficient precipitation, topographical and geological features to support stream systems. Precipitation flows through subterranean transport from land to sea. Therefore, they are no streams present for assessment purposes.

Songsong – CALM Categories

Songsong's coastal waters retain CALM Category of 5 this reporting cycle. This was due to *Enterococci* exceedances of the CNMI WQS.

C.3.6.4. UYULANHULO/TETETO – Waterbody Segment 4

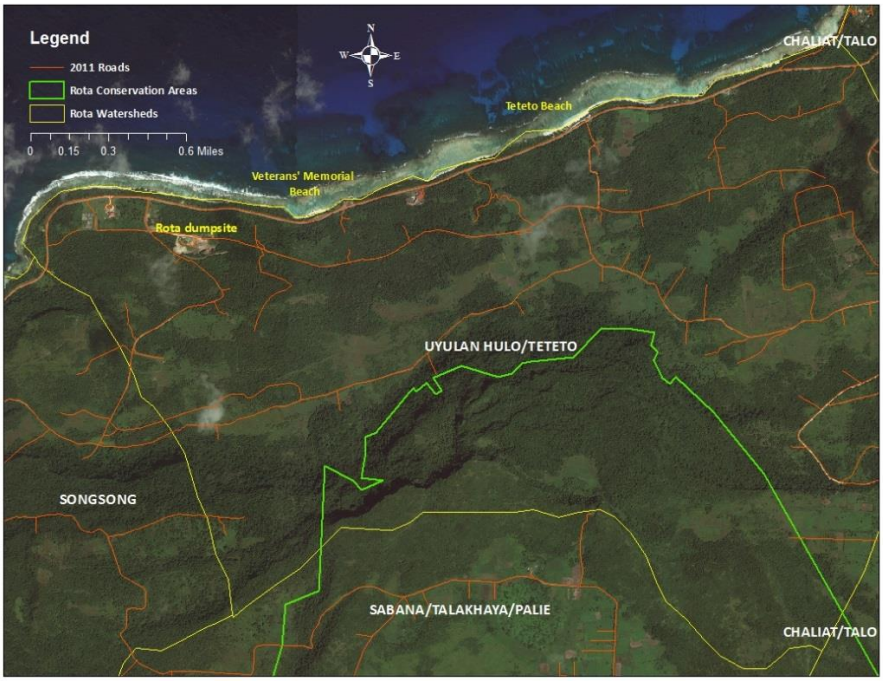
The Uyulanhulo/Teteto watershed contains two (2) long-term BEACH monitoring sites, Veterans' Memorial and Teteto beaches (Figure C-36., on the next page). These idyllic beaches are frequented by residents and tourists, for swimming, picnicking and barbeques, even more so then those beaches along the Songsong coastline.

Uyulanhulo/Teteto's coastal waters are exposed to much less NPS pollution from the immediate shoreline than Songsong's. However, Rota's unlined dumpsite is located in the lower watershed, and may be contributing pollutants to coastal waters through fresh water seeps.

Uyulanhulo/Teteto - Coastal Marine Waters

Uyulanhulo/Teteto coastal waters again received an overall ALUS coral reef assemblage ranking of "Fair" this reporting cycle. However, no new nutrient data is available. Therefore, its coastal waters remain on the 303(d) list as impaired for phosphate, and do *not support the Propagation of Aquatic Life* DU.

FIGURE C-36. Uyulanhulo/Teteto (Segment 4)



No fish tissue and/or biota contamination data is available on Uyulanhulo/Teteto coastal waters to assess the *Fish and Shellfish Consumption* DU.

All water quality data were again well within the CNMI WQS for *Enterococci.* Therefore, Uyulanhulo/Teteto coastal waters fully support of the *Recreational* DU.

The beaches surrounding the Uyulanhulo/Teteto watershed overlook remarkable volcanic rock formations rising out of its coastal waters. These beaches are ideal for swimming and enjoying secluded sunsets and barbeques for which these waters support the *Aesthetic Enjoyment* DU.

Uyulanhulo/Teteto - Fresh Water Streams

The Uyulanhulo/Teteto watershed has insufficient precipitation, topographical and geological features to support stream systems. Precipitation flows through subterranean transport from land to sea. Therefore, they are no streams present for assessment purposes.

Uyulanhulo/Teteto – CALM Categories

Uyulanhulo/Teteto coastal waters had been incorrectly re-assigned a CALM Category of 3 last reporting cycle, previous erroneous nutrient data. However, since new data is lacking it should remain on the 303(d) list as impaired for phosphate, and for this reason does not support the *Propagation of Aquatic Life* DU.

C.3.6.5. CHALIAT/TALO – Waterbody Segment 5

The Chaliat/Talo watershed contains the Rota Resort and Golf Course, which utilizes man-made ponding basins with vegetation for natural filtration of greywater before it is re-used to irrigate the golf course greens (Figure C-37., below). These open pools attract native invertebrates, birds, and numerous introduced and invasive *Rhinella merianae*, or 'Cane toad'.

FIGURE C-37. Chaliat/Talo (Segment 5)

There is only one (1) long-term BEACH monitoring site, located at the Swimming Hole. The Swimming Hole is a natural tide pool with fresh water seeps. It is a popular tourist destination, as the nearby reef provides a protective barrier from surf; for less experienced snorkelers to safely enjoy a swim in the ocean, and observe marine life.

Chaliat/Talo - Coastal Marine Waters

The ALUS biological assessment of coral reef assemblages ranked Chaliat/Talo's coastal waters as "Poor" this reporting cycle, a downgrade from last. This decline, and the lack of new nutrient data resulted in Chaliat/Talo remaining on the 303(d) list as impaired for phosphate, and unsupportive of the *Propagation of Aquatic Life* DU.

No fish tissue and/or biota contamination data is available on Chaliat/Talo coastal waters to assess the *Fish and Shellfish Consumption* DU.

The Swimming Hole's water quality was well within the CNMI WQS for *Enterococci* this reporting cycle, an improvement from last. The reason for the improvement in bacteriological quality is unknown, but may be due to a drastic decrease in residents and visitors visiting this site. However, Chaliat/Talo coastal waters had other exceedances over the past five (5) years, and therefore could not be removed from the 303(d) list. Chaliat/Talo remains unsupportive of the *Recreation* DU.

Chaliat/Talo coastal waters are surrounded by grassy beaches equipped with covered "Pala Palas", and barbeque pits for visitors to relax after a swim, for which it continues to support the *Aesthetic Enjoyment* DU.

Chaliat/Talo - Fresh Water Streams

The Chaliat/Talo watershed has insufficient precipitation, topographical and geological features to support stream systems. Precipitation flows through subterranean transport from land to sea. Therefore, they are no streams present for assessment purposes.

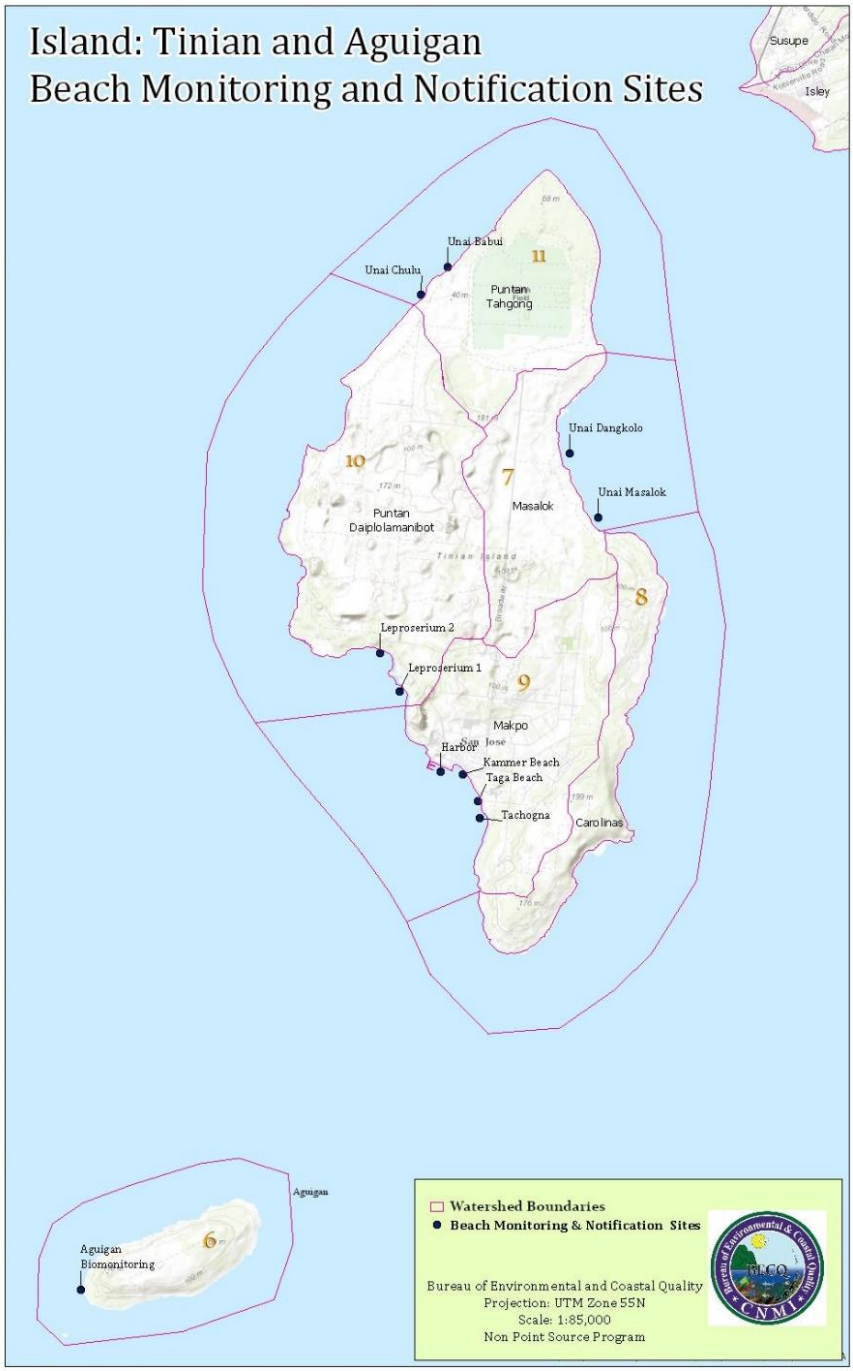
Chaliat/Talo – CALM Categories

Chaliat/Talo coastal waters retain a CALM Category of 5 this reporting cycle, due to "Poor" ALUS assessment rankings and exceedances of the CNMI WQS for *Enterococci* over the past five years.

C.3.7. Five-Part Categorization of Tinian's Surface Waters

The 2010 CNMI Census listed Tinian as having only 3,136 residents. However, there are drastically fewer residents and foreign workers today for several reasons. This includes the closure of Tinian Dynasty in August 2015, followed by residents leaving the island due to infrastructure damage and power outages after Super Typhoon Soudelor. Lastly, there was a drastic reduction in foreign workers allowed in the CNMI as the result of the Federal government's cap on CW-1 visas from 12,999 up to December 2016, to just 4,999 in January 2017. Unsurprisingly, most CW-1 workers are employed on Saipan, which offers the most job opportunities. In addition, there are also proportionally much fewer cattle now reared on Tinian for consumption, or export to Guam. Tinian's population is not expected to increase in the foreseeable future.

FIGURE C-38. Tinian BEACH Water Quality Sites and Aguigan Biological Monitoring Site



Tinian is divided into six (6) watersheds, including the uninhabited island of Aguigan ("Goat Island") off the southwestern tip of Tinian.

FIGURE C-39. Tinian Selected Reef Flat Biological Criteria Monitoring Sites

Tinian's few residents and tourists have a plethora of open spaces to enjoy isolated views and hidden beaches for swimming and fishing. There are several remote sandy beaches along Tinian's coastline except for the Carolinas watershed, which drops from a sharp cliff face to the ocean.

Makpo is the most developed and populated watershed on Tinian, which contains San Jose Village, and Tinian harbor; the latter is Tinian's only Class A designated waters.

As was stated for Rota, there are only limited water quality data for Tinian's coastal waters taken from 10 long-term BEACH monitoring sites and one *Biological* site on Aguigan. (Figure C-38., and 39., on the previous pages).

Like Rota, Tinian does not have a municipal sewage treatment facility or landfill. Residents rely on IWDS for wastewater collection and treatment, and use an unlined dump located in the Puntan Diaplolamanibot watershed to dispose of solid waste.

TINIAN - COASTAL MARINE WATERS

The assessment results for Tinian's coastal waters are provided in Table C-33.

TABLE C-33. Assessment of Tinian Waterbodies' DUs – Coastal Marine Waters

		Goat Island	Unai Masalok, Dangkolo		Tachogna, Taga, Kammer	Harbor	Leprosarium I & II	Unai Babui, Chulu
			T1-T2		T7-T10	T9	T5-T6	T3-T4
		Aguigan	**Tinian**					
WATER BODY SEGMENT ID		6	7	8	9	9 H	10	11
	Designated Use	Aguigan	Masalok	Carolinas	Makpo	Makpo Harbor	Puntan Diaplolamanibot	Puntan Tahgong
Coastal Waters	Aquatic Life	Fair Habitat	Good Habitat, No new Nutrient data	F	Poor Habitat, No new Nutrient data, ***pH Low***	Poor Habitat, No new Nutrient data, DO% Low	***Poor Habitat,*** No new Nutient data	Poor Habitat, No new Nutrient data
	Fish Consumption	F	i	F	i	i	i	i
	Recreation	F	***F***	F	***pH Low***	***F***	***F***	***F***
	Aesthetic enjoyment/others	F	F	F	F		F	F
	CALM Assessment Category	1	5	1	5	5	5	5
	Not Attaining DU		Insufficient		Supporting		***Changes in bold italics***	

All of Tinian's coastal waters fully support the *Aesthetic enjoyment* DU. The sandy beaches surrounding the Makpo watershed are calm and equipped with picnic areas. These beaches are the most frequented by tourists and residents. The beaches within the Masalok, Puntan Diaplolamanibot, and Puntan Tahgong watersheds are equally beautiful, but frequently have strong currents and high surf, which are appropriate for use by more advanced swimmers.

ALUS biological assessments of Tinian's coral reef assemblages were not assessed this reporting period. This resulted in a carryover of the ALUS rankings from previous years, which were ranked as "Poor" for all Tinian's coastal waters except Masalok's. Therefore, most do not support the *Propagation of Aquatic Life* DU.

Although, Masalok's ALUS biological assessment was ranked as "Good" this reporting cycle, new nutrient water quality was not available. Therefore, none of Tinian's coastal waters could be removed from the 303(d) list as impaired for phosphate, even though the previous data used in the 2004 IR assessment is known to be erroneous.

The Tachogna's BEACH site in the Makpo watershed (Segment 9) had low pH levels, the cause of which is unknown. The water quality in the adjacent San Jose Harbor BEACH site in the Makpo Harbor watershed (Segment 9H) once again had diminished DO% levels. The source of which is associated with runoff from boat maintenance in the marina, and nutrients from other impervious surfaces, causing increased aerobic microbial activity depleting oxygen levels.

There has not been a fish tissue or biota study completed for the island of Tinian to date. Therefore, there is insufficient information to assess the *Fish and Shellfish Consumption* DU at the time of this writing.

However, all the BEACH monitoring sites were well within the CNMI WQS for *Enterococci* this reporting cycle. Tinian's substantive bacteriological improvement is associated with a drastic decrease in the island's resident population, in tourist numbers, and the number of free roaming cattle being reared for subsistence, and export.

TINIAN - FRESH WATER STREAMS

There are insufficient topographical and geological features on Tinian to support stream systems. Precipitation flows through subterranean transport from land to sea. Therefore, they are no streams present for assessment purposes as shown in Table C-34., on the following page.

TABLE C-34. Assessment of Tinian Waterbodies' DUs – Fresh Water Streams

		Goat Island	Unai Masalok, Dangkolo		Tachogna, Taga, Kammer	Harbor	Leprosarium I & II	Unai Babui, Chulu
			T1-T2		T7-T10	T9	T5-T6	T3-T4
		Aguigar		Tinian				
WATER BODY SEGMENT ID		6	7	8	9	9 H	10	11
	Designated Use	Aguigan	Masalok	Carolinas	Makpo	Makpo Harbor	Puntan Daiplolamanibot	Puntan Tahgong
Streams	Aquatic Life							
	Fish Consumption							
	Recreation							
	Potable Water Supply							
	Aesthetic Enjoyment/others							
	CALM Assessment Category							
No fresh surface water								

TINIAN – WETLANDS AND LAKES

There are no lakes on Tinian. There are a few created wetlands (Bateha and Mahalang Complexes) and one large natural wetland covering a total of 83.5 acres.

The Hagoi Wetland (38.2 acres) is a large natural wetland in the Puntan Tahgong watershed in the northern half of the island, which is leased by the US military for training purposes. Hagoi is considered the most "pristine" wetland of the southern inhabited islands and is used as the reference wetland for evaluating the status of other wetlands using the 2016 CNMI Wetland RAM. The RAM is discussed in detail in Section C.4. "Wetland Program" that follows this section.

There is a small wetland area in Masalok that has not been fully evaluated. There is also a protected wetland area near the water supply for San Jose village on the southern side of the island in the Makpo watershed, but these have not been fully assessed or delineated. Table C-35., on the following page shows the assessment results for the *Propagation of Aquatic Life* DU, and the wetland's CALM category for each watershed.

TABLE C-35. Assessment of Tinian Waterbodies' DUs – Wetlands

		Goat Island	Unai Masalok, Dangkolo		Tachogna, Taga, Kammer	Harbor	Leprosarium I & II	Unai Babui, Chulu
			T1-T2		T7-T10	T9	T5-T6	T3-T4
		Aguigan	**Tinian**					
WATER BODY SEGMENT ID		6		8	9	9H	10	11
	Designated Use	Aguigan	Masalok	Carolinas	Makpo	Makpo Harbor	Puntan Daiplolamanibot	Puntan Tahgong
Wetlands	**Propagation of Aquatic Life**		***i***		i		***F***	F
	CALM Assessment Category		***2***		3		***1***	1
	No wetland present		Fully		Insufficient		***Changes in bold italics***	

The next watershed sub-sections, C.3.7.1. - C.3.7.6, provide further detail about Aguigan and each of Rota's watersheds, coastal waters, and the fresh surface waterbodies contained therein.

C.3.7.1. AGUIGAN – Waterbody Segment 6

Aguigan is a small uninhabited coralline island located southwest of Tinian (Figure C-40., on the following page). Aguigan's coastal waters are designated as a conservation area by DLNR DFW. This provides the island with substantial protection from anthropogenic stressors.

During calm weather, Aguigan's coastal waters are enjoyed almost daily by dive enthusiasts. Approximately twice per year, DFW receives permit requests from visiting researchers who wish to conduct marine mammal surveys in Aguigan's coastal waters. In addition, BECQ conducts biological ALUS assessments of the coral reef assemblages surrounding the island at least once per year, weather permitting.

CNMI residents wishing to visit the island to hunt coconut crabs or goats may only do so after obtaining a hunting permit from the Tinian Mayor's office. Therefore, the island's terrestrial habitat is not frequently visited, and also greatly protected.

There are no long-term BEACH monitoring sites in Aguigan's coastal waters. However, a water quality sample is collected from the Biological Monitoring site whenever biological assessments are conducted there.

FIGURE C-40. Aguigan (Segment 6)

Aguigan - Coastal Marine Waters

An ALUS assessment of Aguigan's coral reef assemblages was not conducted this reporting cycle. This was due to difficulty in reaching the island by boat during high surf conditions. However, given the previous "Fair" ranking, and lack of development on the island, and any anthropogenic stressors, Aguigan is assessed as fully supporting the *Propagation of Aquatic Life, Fish and Shellfish Consumption*, *Recreational* and the *Aesthetic Enjoyment* DUs, based on professional judgement.

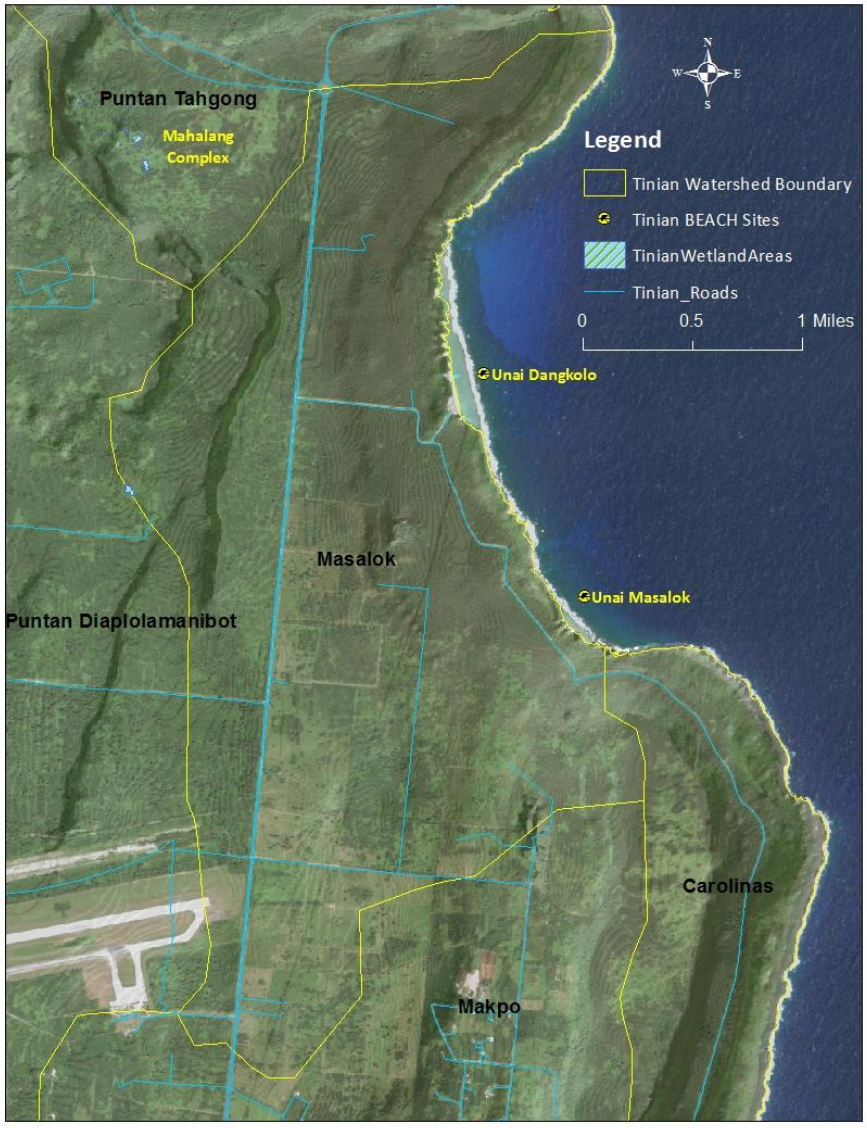
Aguigan – CALM Categories

Aguigan's coastal waters retain a CALM Category of 1 this reporting cycle.

C.3.7.2. MASALOK – Waterbody Segment 7

The Masalok watershed is a long drive from San Jose Village, and other homesteads. It contains two long-term BEACH water quality monitoring sites, Unai Masalok, and Unai Dangkolo as shown in Figure C-41. , below.

FIGURE C-41. Masalok (Segment 7)



Unai Masalok consists of three small pocket beaches, and Unai Dangkolo ("long beach"). These are white sandy beaches surrounded by a narrow and shallow lagoon. These beaches are the only easily accessible beaches on the east coast of Tinian. However, the reef line is relatively close to

the sandy shore creating a dynamic surf that can have strong wave activity throughout a large portion of the year.

Masalok - Coastal Marine Waters

An ALUS biological assessment of Masalok's coral reef assemblages was not conducted this reporting cycle, but past assessments ranked this site as "Good". Water quality data continues to meet all CNMI WQS. However, there are no new nutrient data to reassess the *Support and Propagation of Aquatic Life* DU. Therefore, Masalok's coastal waters remain 303(d) listed as impaired for phosphate, even though the data presented in the 2004 IR is known to be erroneous.

There has been no data collected on fish tissue and/or biota contamination to assess the *Fish and Shellfish Consumption* DU. However, ever effort should be made to collect baseline data. This is especially important given that the US military has indicated that Unai Dangkolo beach may be an alternative site for expanding training exercises on Tinian as stated in the CJMT EIS.

This reporting cycle Masalok water quality was well within the CNMI WQS for *Enterococci*. The improvement to water quality is associated with the drastic decrease in visitors and considerably less cattle roaming free to graze. Therefore, Masalok's coastal waters were removed from the 303(d) list as impaired for *Enterococci* and now fully support the *Recreational* DU.

Both Unai Dangkolo and Masalok Beaches are frequented by both residents and visitors for swimming, snorkeling, and to visit the ancient latte stone sites nearby, for which Masalok's coastal waters attain the *Aesthetic Enjoyment* DU.

Masalok - Wetlands

In the previous 2016 IR, a wetland was not assessed in the Masalok watershed. However, there appears to be potential depressional wetlands in the Wetlan2017 NHD, and Wetland and Streams GIS data layers for Tinian. However, these areas have not been recently delineated or assessed.

However, every effort should be made to gather baseline data on Masalok's wetlands given the US Military's interest in expanding training exercises on Tinian, and the large number of heavy metal contaminated sites found by Denton et.al, near WWII debris sites on Saipan.

Masalok – CALM Categories

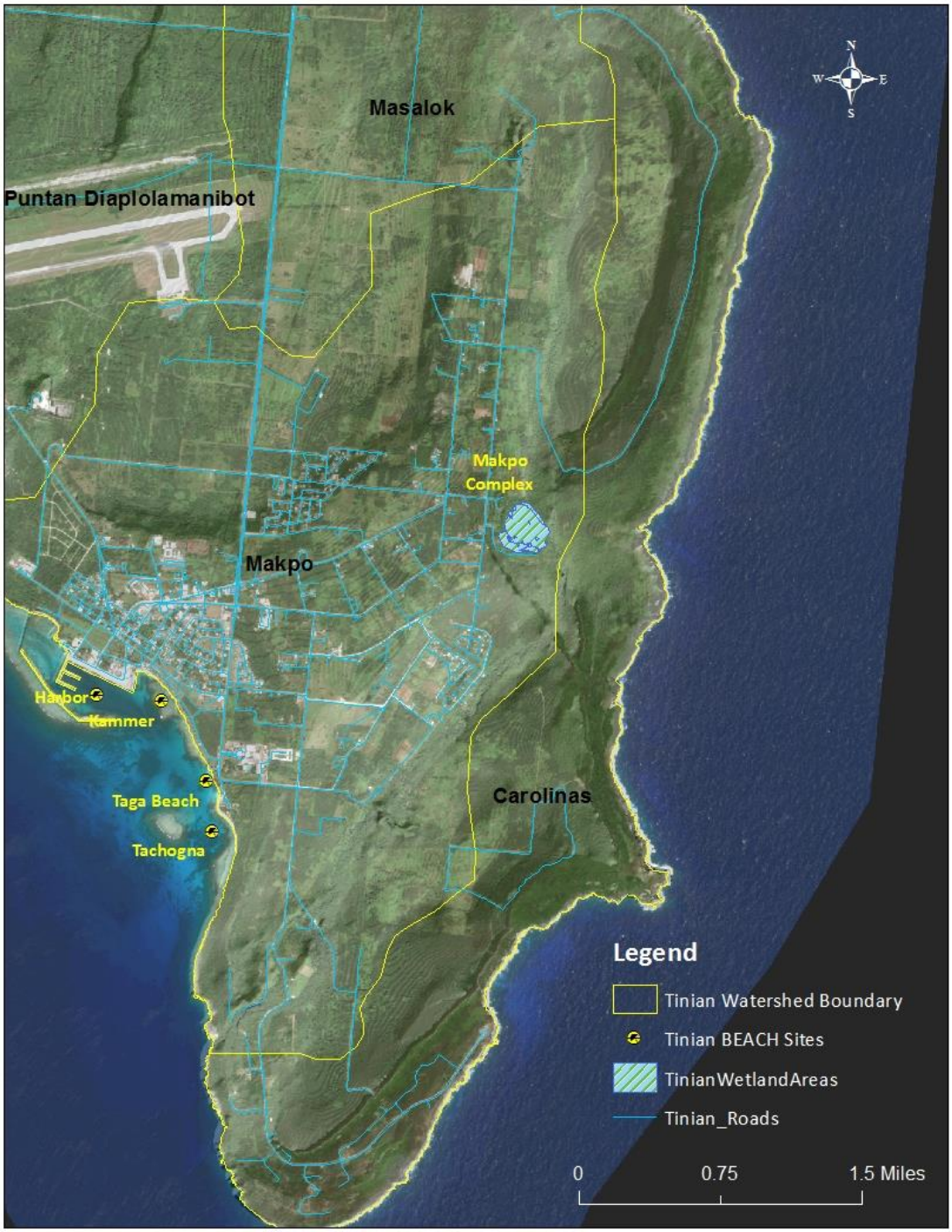
Masalok's coastal waters retain a CALM Category 5 this reporting cycle, due lack of new nutrient data to remove them from the 303(d) list as impaired for phosphate.

Masalok's wetlands are assigned a CALM category of 2 for insufficient information.

C.3.7.3. CAROLINAS – Waterbody Segment 8

The Carolinas watershed lies along the southern east coast of Tinian (Figure C-42.).

FIGURE C-42. Carolinas (Segment 8)



It is comprised of steep cliff faces dropping to hazardous coastal waters below. At present, there are no developments in this remote area. However, the Carolinas' watershed contains the Tinian Marine Reserve that starts at the southernmost point of the watershed and continues northwest up to San Jose Harbor of the Makpo Harbor watershed.

There are no long-term BEACH water quality, or biological monitoring sites in Carolinas coastal waters, as there are no roads or well-maintained trails to readily access the cliff line. The surf along the coast is also hazardous for accessing by boat. Therefore, careful attention must be paid to weather conditions before scheduling any sampling or monitoring events.

Carolinas - Coastal Marine Waters

The Carolinas watershed's rough terrain, remote location, and hazardous coastline provides protection from potential pollutants and other anthropogenic stressors. Therefore, this watershed has been determined to fully support the *Propagation of Aquatic Life, Fish and Shellfish Consumption*, *Recreational,* and the *Aesthetic Enjoyment* DUs. This is based on visual field assessments, and professional judgement.

Carolinas – CALM Categories

The Carolinas watershed's coastal waters retain a CALM Category 1 this reporting cycle.

C.3.7.4. MAKPO – Waterbody Segments 9 and 9H

The Makpo watershed is subdivided in two segments. It contains four of Tinian's most popular beach sites, Tachogna, Taga, Kammer, and San Jose Harbor beaches.

The most densely populated village on Tinian is San Jose. It lies within the Makpo sub-watershed (Segment 9).

Tinian San Jose Harbor's beach is Tinian's only designated Class A waters and lies within the Makpo Harbor sub-watershed (Segment 9H).

Last reporting cycle, Tinian's largest resort and casino, the Tinian Dynasty, closed. The closure vastly decreased the number of guest workers residing in the Makpo watershed, and tourists visiting Tinian, as there are very few other hotels on island for accommodation.

Makpo – Waterbody Segment 9

Figure C-43., on the following page shows the three (3) long-term BEACH monitoring sites in Makpo's coastal waters, and the one BEACH site in Makpo Harbor's coastal waters.

FIGURE C-43. Makpo and Makpo's "San Jose" Harbor (Segment 9 and 9H)

Makpo - Coastal Marine Waters

An ALUS biological assessment of Makpo's coral reef assemblages was not conducted this reporting cycle. Therefore, the "Poor" ranking reported in the 2016 IR is carried over to this

reporting cycle. In addition, there are no new nutrient data to remove Makpo's coastal waters from the 303(d) list for phosphate this reporting cycle. There were also low pH levels at the Tachogna BEACH site. The cause of the low pH trend remains unknown. Given these results, Makpo's coastal waters do not support the *Propagation of Aquatic Life* DU.

To date, there has been no data collected on fish tissue and/or biota contamination in Makpo's coastal waters to assess the *Fish and Shellfish Consumption* DU.

However, there have been notable improvements to *Enterococci* levels in Makpo's coastal waters. All BEACH sites were well within the CNMI WQS this reporting cycle. This is thought to be associated with the closure of Tinian Dynasty, which was a suspected source from fresh water seeps carrying wastewater from the hotel's IWDS and other nearby on-site systems. However, exceedances of the WQS for pH resulted in Makpo's coastal waters being added to the 303(d) listed as impaired for pH. Therefore, they do not support the *Recreational* DU.

Taga's pocket beach is surrounded by a rock outcropping that is a popular place for residents and tourists to jump off into the ocean below. Makpo's other beaches offer picnic areas, Pala Palas, water sports, or just a place to relax and take in a sunset. The beaches also provide easy access for snorkeling and diving to explore Tinian's reefs, near shore shipwrecks, and to observe endangered Green Sea Turtles and other marine life. For this reason, Makpo fully supports the *Aesthetic Enjoyment* DU.

Makpo –Wetlands

The Makpo watershed has no lakes, but contains the "Makpo Complex", a wetland in the upper watershed near the Carolinas watershed boundary. This wetland is where the San Jose village's ground water supply is sourced. At the time of this writing, there is insufficient information to assess whether Makpo's wetlands support the *Propagation of Aquatic Life* DU. However, it is hoped that more information will be available before next reporting cycle, as efforts are currently underway to further delineate and assess Tinian's wetlands using the newly approved 2016 CNMI Wetland RAM.

Makpo – CALM Categories

Makpo coastal waters retain a CALM Category 5 due to low pH, and no new nutrient data to remove them from the 303(d) list for phosphate.

Makpo's wetlands were assigned a CALM Category of 3, due to insufficient information, and potential for anthropogenic stressors from surrounding developments and grazing livestock.

Makpo Harbor – Waterbody Segment 9H

Tinian's San Jose Harbor is located in the Makpo Harbor Sub-watershed (Segment 9H), and is Tinian's only designated as Class A waters.

Since last reporting cycle, there has been vastly less tourists visiting Tinian. However, permits are now in place for a new development next to the harbor. If the plans are implemented they will include construction of a small commercial building with retail office space, and restaurants. A ferry terminal has also been considered for providing additional means for residents to travel to and from Saipan.

Makpo Harbor - Coastal Marine Waters

An ALUS biological assessment of Makpo Harbor's coral reef assemblages was not conducted this reporting cycle. Therefore, the "Poor" ranking reported in the 2016 IR is carried over to this reporting cycle. In addition, there are no new nutrient water quality data to remove Makpo Harbor's coastal waters from the 303(d) list as impaired for phosphate. The Harbor's coastal waters also had diminished DO% levels. Potential sources of the latter include nutrients from on-site treatment systems, and run-off from the marina where boat maintenance is performed, which may increase aerobic microbial activity and oxygen depletion. Given these findings, the Makpo Harbor's coastal waters do not support the *Propagation of Aquatic Life* DU.

To date, there have been no data collected on fish tissue and/or biota contamination in Makpo Harbor's coastal waters to assess the *Fish and Shellfish Consumption* DU.

However, there have been improvements. The Harbor's water quality levels were well within the CNMI WQS for *Enterococci* this reporting cycle, resulting in Makpo Harbor being removed from the 303(d) list as impaired for *Enterococci*, and now attains the *Recreation* DU.

Makpo's Harbor is the primary site where fisherman launch their boats. It also offers picnic areas, water sports and easy access for snorkeling and diving. For this reason, Makpo Harbor fully supports the *Aesthetic Enjoyment* DU.

Makpo Harbor – CALM Categories

Makpo Harbor's coastal waters retain a CALM Category 5 due to Low DO%.

C.3.7.5. PUNTAN/DIAPLOLAMANIBOT – Waterbody Segment 10

The Puntan/Diaplolamanibot watershed contains Tinian's international airport. It also contains two long-term BEACH monitoring sites named Leprosarium I and II. These beaches were used during the Spanish occupation to provide a distant location to quarantine a Leprosy colony (see Figure C-44., on the following page).

These calm shallow beach areas are protected by a shallow fringing reef. Cuts were made into the reef for supply boats to access the beach and to bring provisions to the colony. The cuts are still visible today, but are no longer used for boat landing. However, the beach sites may be easily reached by using a secondary coral road.

FIGURE C-44. Puntan/Diaplolamanibot (Segment 10)

Tinian's only solid waste disposal site is an unlined dump located in the Puntan/Diaplolamanibot watershed, upland of the Leprosarium Beaches coral access road. The dump is sometimes left exposed without day-cover; thus, birds and other feral animals scavenge the waste creating further land-based sources of pollution, other than picnic waste left at the beach sites.

Puntan/Diaplolamanibot - Coastal Marine Waters

The sandy Leprosarium I and II beach areas in the Puntan/Diaplolamanibot watershed, are well maintained and shaded by native trees. Their remote location away from homes and businesses limit light pollution making them ideal turtle nesting sites. These beaches are enjoyed by island residents for picnics, sunsets, camping, and star gazing. For these reasons Puntan/Diaplolamanibot coastal waters fully support the *Aesthetic Enjoyment* DU.

An ALUS biological assessment of Makpo's coral reef assemblages was not conducted this reporting cycle. Therefore, the "Poor" ranking reported in the 2016 IR is carried over to this reporting cycle. In addition, no new nutrient data are available to remove phosphate from the 303(d) list as impaired. Since these coastal waters are also located down slope from Tinian's open dump, there is threat of nutrient loading. Therefore, Puntan/Diaplolamanibot coastal waters do not support the *Propagation of Aquatic Life* DU.

There is no available data on fish tissue and/or biota contamination on Puntan/Diaplolamanibot's coastal waters to assess the *Fish and Shellfish Consumption* DU.

However, water quality data was well within the CNMI WQS for *Enterococci* this reporting cycle. The decrease in violations is associated with a drastic decrease in the number of residents and visitors to Puntan/Diaplolamanibot beaches, and a decrease the volume of solid waste being generated and left at the dump. Therefore, the Puntan/Diaplolamanibot watershed was removed from the 303(d) list as impaired for *Enterococci* and now fully supports the *Recreational* DU.

Puntan/Diaplolamanibot – Wetlands

This reporting cycle wetland delineations and assessments were conducted on a few locations on Tinian to field test the 2016 CNMI Wetland RAM. During the field test, the smaller wetlands in the Puntan/Diaplolamanibot watershed, named the Bateha I and II Complex were explored, but not fully delineated or assessed by BECQ.

However, a survey conducted for the US military states that these complexes are shallow depressional areas thought to be the result of anthropogenic activities (March 2015, *Survey Report of Potential Wetland Sites on Tinian in Support of the CJMT EIS/OEIS*). The survey cites the USFWS National Wetland Inventory that determined these areas to be palustrine, emergent, wetlands. The survey also states that the Bateha I and II Complexes have "suitable hydrology, wetland vegetation, and hydric soils…" Therefore, Bateha I (7.1 acres) and Bateha II (5.8 acres) are isolated wetlands and support the *Propagation of Aquatic Life* DU.

Puntan/Diaplolamanibot – CALM Categories

The Puntan/Diaplolamanibot watershed's coastal waters retain a CALM Category 5 due to lack of new nutrient data to remove them for the 303(d) list as impaired for phosphate.

The Puntan/Diaplolamanibot wetlands, Bateha Complex, were assigned CALM Category 1.

C.3.7.6. PUNTAN/TAHGONG – Waterbody Segment 11

The northern most watershed on Tinian is the Puntan/Tahgong watershed, which contains US military leased land. It also contains two long-term BEACH monitoring sites, Unai Babui ("Pig Beach") and Unai Chulu beaches (see Figure C-45., on the following page). Both beaches have energetic shorelines that make them hazardous for swimmers. They are undeveloped, remote, and are not as frequented by tourists or residents as other beaches. This leaves them in a nearly pristine state with few anthropogenic stressors.

Puntan/Tahgong - Coastal Marine Waters

An ALUS biological assessment of Puntan/Tahgong coral reef assemblages was not conducted this reporting cycle. Therefore, the "Poor" ranking from the 2016 IR is carried over to the present cycle. However, the "Poor" ranking is not due to anthropogenic impacts in this remote coastline, but more likely caused by high wave action that may limit the development of highly rugose coral reef structure. Additionally, ground water seeps, essential for some marine species, are far from any potential anthropogenic nutrient loading, which may also play a role in creating this unique marine habitat.

Efforts should be made to further evaluate Puntan/Tahgong's benthic habitat and coral assemblages, and to prevent any future anthropogenic stresses on the ambient condition of this unique coral reef ecosystem. This is especially important as the US military has listed Unai Babui and Chulu beaches as alternatives for expanding training exercises in the CJMT EIS.

Puntan/Tahgong coastal water quality continues to meet all CNMI WQS. However, there are no new nutrient data to remove Puntan/Tahgong's coastal waters from the 303(d) listed as impaired for phosphate, even though the data presented in the 2004 IR is known to be erroneous. Therefore, Puntan/Tahgong's coastal waters remain unsupportive of the *Propagation of Aquatic Life* DU.

There are no available data on fish tissue and/or biota contamination of the Puntan/Tahgong coastal waters to assess the *Fish and Shellfish Consumption* DU. However, ever effort should be made to collect baseline data, as elevated heavy metals concentrations have been detected in sediment and biota near WWII debris and dump sites. Any exceedances of CNMI WQS caused by military exercises would require immediate action to restore Puntan/Tahgong's coastal waters to their ambient state.

FIGURE C-45. Puntan/Tahgong (Segment 11)

Puntan/Tahgong's coastal waters were well within the CNMI WQS for *Enterococci* this reporting cycle. The decrease in violations at these very remote beaches are associated with the drastic decrease in the island's population and the number of free-roaming cattle.

Puntan/Tahgong – Wetlands

Puntan/Tahgong watershed contains the only significant open surface waterbody on Tinian, the Hagoi wetland covering 38.2 acres, and the Mahalang Compex with 20 depressional areas. The latter's largest two wetland features are estimated to cover 1.2 acres each (2015, CJMT EIS/OEIS survey). Both Hagoi and the Mahalang Complex are located in the Military Leased land area.

Due to Hagoi's size, remote location, lack of nearby development and anthropogenic sources of pollution, it is considered "pristine" and is used as a "reference" wetland for CNMI wetland RAM assessments.

BECQ delineators describe the Mahalang complex as a series of depressional wetlands that occur in rows and appear to have been formed by large explosions. Several of these depressional areas exhibit wetland hydrology, vegetation, and in some cases, hydric soils. These findings are concurrent with that of the US FWS, but do not align with that of the 2015 military survey, which states that, "Although the NWI classifies all the Mahalang wetlands as marshes (e.g., palustrine), based on recent field investigations, they appear to function more like ephemeral ponds (e.g., lacustrine)." Therefore, a full delineation and assessment of the entire Mahalang Complex should be completed by agency delineators using the peer reviewed 2016 Wetland RAM to resolve these conflicting assessments.

However, since the Mahalang Complex, like Hagoi Wetland, are far removed from any anthropogenic stressors, these wetlands are considered to be fully attaining the *Propagation of Aquatic Life* DU.

Puntan/Tahgong – CALM Categories

The Puntan/Tahgong's coastal waters retain a CALM Category 5 due to lack of new nutrient data to remove them from the 303(d) list as impaired for phosphate.

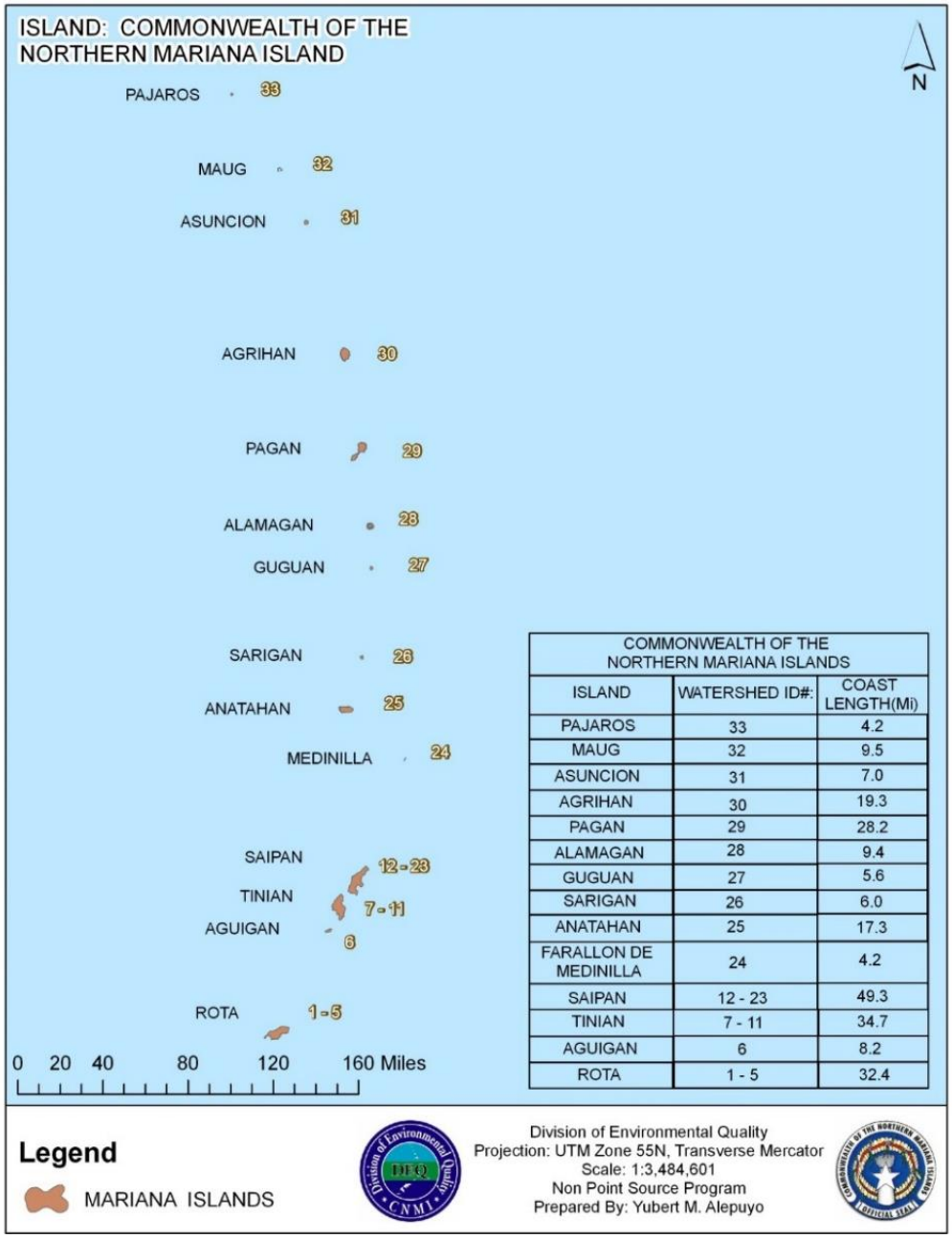
Puntan/Tahgong's wetlands are assigned a CALM Category of 1.

C.3.8. Five-Part Categorization of the Northern Islands' Surface Waters

The CNMI archipelago contains 10 Northern Islands as shown in Figure C-46., on the following page. They are from north to south: Farallon de Pajaros (also known as "Uracas"), Maug, Asuncion, Agrihan, Pagan, Alamagan, Guguan, Sarigan, Anatahan, and Farallon de Medinilla. The three northernmost islands were designated as the Marianas Trench Marine National Monument by then President George W. Bush in 2009. It protects approximately 95,216 square miles of submerged lands and waters (https://www.fws.gov/nwrs/threecolumn.aspx?id=2147497737).

Only three of the Northern Islands are populated with seasonally; Pagan, Alamagan, and Anatahan. Agrihan was also seasonally inhabited until 1990, when it was evacuated due to volcanic activity.

FIGURE C-46. The 10 Northern Islands and the Southern Inhabited Islands of the CNMI



COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS		
ISLAND	WATERSHED ID#:	COAST LENGTH(Mi)
PAJAROS	33	4.2
MAUG	32	9.5
ASUNCION	31	7.0
AGRIHAN	30	19.3
PAGAN	29	28.2
ALAMAGAN	28	9.4
GUGUAN	27	5.6
SARIGAN	26	6.0
ANATAHAN	25	17.3
FARALLON DE MEDINILLA	24	4.2
SAIPAN	12 - 23	49.3
TINIAN	7 - 11	34.7
AGUIGAN	6	8.2
ROTA	1 - 5	32.4

Pagan contains an airstrip, but the other northern islands may only be accessed by boat or helicopter. Therefore, most of the anthropogenic stressors are limited to WWII debris, dumpsites, or unexploded ordinance, ongoing US military bombing exercises on Farallon de Medinilla (FDM), and introduced species, specifically goats and pigs used for subsistence purposes by island inhabitants.

However, it should be noted that expansion of US Military exercises within the Northern Islands, places the islands' natural resources at heightened risk of adverse impacts.

Due to the limited information about the Northern Islands, the following section will discuss assessments of DUs for each type of waterbody in the Northern Islands, rather than for each watershed as was done for the inhabited islands of Saipan, Rota and Tinian. Every effort should be made to gather baseline data for assessing each DU for these islands before further development takes place, or military activities increase. Again, any exceedances of WQS would require immediate action to prevent impairment to these valuable, pristine, Tier 3 waters.

Northern Islands - Coastal Marine Waters

Due to the lack of development, the uninhabited, and seasonally inhabited Northern Islands, have negligible anthropogenic impacts from residents or visitors. It is unlikely that contaminants or other pollutants pose a significant threat to coastal waters.

These Islands' remoteness, lack of easy accessibility, and the recent listing of the three northernmost islands as a US National Marine Monument, make them fully supportive of all coastal water DUs based on visual field assessments, available biological and water quality data, as well as professional judgment, as shown in Table C-36.

TABLE C-36. Assessment of the Northern Islands Waterbodies' DUs – Coastal Marine Waters

	WATER BODY SEGMENT ID	24	25	26	27	28	29	30	31	32	33
	Designated Use	Farallon De Medinilla	Anatahan	Sarigan	Guguan	Alamagan	Pagan	Agrihan	Asuncion	Maug	Farallon De Pajaros
Coastal Waters	Aquatic Life	F	F	F	F	F	F	F	F	F	F
	Fish Consumption	F	F	F	F	F	F	F	F	F	F
	Recreation	F	F	F	F	F	F	F	F	F	F
	Aesthetic enjoyment/others	F	F	F	F	F	F	F	F	F	F
	CALM Assessment Category	1	1	1	1	1	1	1	1	1	1

Northern Islands – Fresh Water Streams

Little is known of the Northern Islands' stream systems. However, due to their remoteness from any potential anthropogenic impacts, they are assessed as fully supporting all DUs, except for Farallon De Medinilla (FDM), who's topographical and geological features do not support stream systems (Table C-37.). Precipitation on FDM flows through subterranean transport from land to sea.

TABLE C-37. Assessment of the Northern Islands Waterbodies' DUs – Fresh Water Streams

	WATER BODY SEGMENT ID	24	25	26	27	28	29	30	31	32	33
	Designated Use	Farallon De Medinilla	Anatahan	Sarigan	Guguan	Alamagan	Pagan	Agrihan	Asuncion	Maug	Farallon De Pajaros
Streams	Aquatic Life		F	F	F	F	F	F	F	F	F
	Fish Consumption		F	F	F	F	F	F	F	F	F
	Recreation		F	F	F	F	F	F	F	F	F
	Potable Water Supply		F	F	F	F	F	F	F	F	F
	Aesthetic enjoyment/others		F	F	F	F	F	F	F	F	F
	CALM Assessment Category		1	1	1	1	1	1	1	1	1

Northern Islands – Wetlands and Lakes

There are two lakes on Pagan, and one lake within the active volcanic crater on Anatahan. The two lakes on Pagan are located on the northern part of the island's west coast. One is named Sanhalom (CN 29LAK B), or "Inner Lake", which covers 27 acres and is warmed by natural hot springs. The other is named Laguna Sanhiyong (CN 29LAK A), or "Laguna Lake", which covers 34 acres and is separated from Pagan's lagoon by a sandbar, as reported in the 1978 "*Physical Development Master Plan for the Commonwealth of the Northern Mariana Islands",* by the Pacific Planning and Design Consultants. The report goes on to describe, "Storm driven waves occasionally over top the bar, and enter the lake.", making it brackish.

While there are limited data available on these water bodies, fish have been observed in both lakes. BECQ plans to conduct further research in 2019 to confirm these findings and collect additional water quality data.

All Northern Island lakes are considered fully supportive of all their DUs based on their remote location, limited anthropogenic stressors, and professional judgement (see Table C-38, on the following page).

There are rather young undeveloped wetland marshes with emergent vegetation surrounding Pagan's lakes (CNMI DFW, Oceana, 1990). In previous years, the biggest threat to these wetlands were grazing by free roaming ungulates; goats, pigs and cows, and from fallen ash due to volcanic eruptions.

At this writing, there is insufficient water quality data to assess the wetland and lakes on Pagan, or the lake on Anatahan. However, due to the remoteness of these islands, and the fact that only a few individuals occasionally reside on Pagan and Anatahan, there is little risk from anthropogenic stressors to these waterbodies. Therefore, these segments fully support all DUs based on this, and professional judgment.

TABLE C-38. Assessment of the Northern Islands Waterbodies' DUs –Wetlands and Lakes

WATER BODY SEGMENT ID		24	25	26	27	28	29B	29A	30	31	32	33
Waterbody Type	Designated Use	Farallon De Medinilla	Anatahan	Sarigan	Guguan	Alamagan	Pagan (Inner Lake)	Pagan (West side Lagoon)	Agrihan	Asumcion	Maug	Farallon De Pajaros
Lakes	Aquatic Life		F				F	F				
	Fish Consumption		F				F	F				
	Recreation		F				F	F				
	Potable Water Supply		F				F	F				
	Aesthetic Enjoyment/others		F				F	F				
CALM Assessment Category			1				1	1				
Wetlands	Aquatic Life						F	F				
CALM Assessment Category							1	1				

However, it should be noted that any development in the Northern Islands or expansion of military exercises would pose serious risk to all DUs due to the potential for hydrological alterations, sedimentation caused by erosion from heavy equipment, and live fire from military exercises, as well as surface and ground water pollution from munitions. Depending on the extent and location of proposed agricultural activities on the island, eutrophication issues may be of concern in the future.

Northern Islands – CALM Categories

The Northern Islands' coastal waters retain CALM Category 1 due to lack of potential anthropogenic stressors.

The Northern Islands' fresh water streams retain CALM Category 1 due to lack of potential anthropogenic stressors.

The Northern Islands' wetlands and lakes retain CALM Category 1 due to lack of potential anthropogenic stressors.

C.4. WETLANDS PROGRAM

Wetlands are only found on the islands of Saipan, Tinian, and Pagan, with several stream systems and associated riparian areas on Rota. As with coastal and surface waters, there is vastly more information available about wetlands on the southern inhabited islands than on any the Northern Islands. Therefore, the following subsections will provide a more comprehensive picture of: impairments; enforced regulations; implemented management measures; and remediation and restorations efforts.

Although no current wetland water quality monitoring data exists, DCRM has been conducting wetland delineations, and limited assessments of wetlands since the early 1990's with the Army Corps of Engineers. In 1990, the CRM office adopted the *Saipan Comprehensive Wetlands Management Plan* (Plan). This Plan identified and classified wetlands on Saipan using the 1989 National Wetlands Inventory from the United States Fish and Wildlife Service, with limited ground-truthing of boundaries using color aerial photographs from 1987 and soil maps from the USDA Soil Conservation Service. The Plan assigned wetland values based on a matrix using hierarchical weighing based on vegetative, wildlife, hydrology, regional significance, and degree of isolation. Potential mitigation options were discussed and periodic plan reevaluation and revisions were recommended. In 1996, the CNMI Wetlands Management Report to Governor Froilan C. Tenorio, an interagency effort to support ecosystem and habitat management objectives, recommended improvements to the regulatory framework in order to minimize negative impacts of development on these systems. In 1998, DEQ completed a Unified Watershed Assessment for Saipan, Tinian, Rota, and the Northern Islands. This assessment noted rehabilitation of wetland, mangroves, and streams as feasible and recommended, to achieve watershed management objectives.

To further support management efforts, a draft CNMI Hydrogeomorphic ("HGM") Functional Assessment manual was developed in 2001. The 2001 manual proposed evaluating wetlands against the "Hagoi complex" on Tinian, which was considered a "high value" reference wetland with little impact from pollution or development. The draft manual included "functional" assessments (valuation) of wetlands on Saipan in comparison to the Hagoi reference wetland. Functionality was measured by evaluating the presence of invasive species, quality of hydrologic

function, soil integrity, etc. For example, a wetland with overgrowth of the reed *Phragmites,* which occurs throughout most CNMI wetlands, may rate a lower score in terms of plant community and wildlife habitat. Similarly, wetlands scoring as "impaired" for hydrological reasons are often scored that way due to construction of roads, easements, channelization, input from freshwater or sea level rise, and other development, which has altered the hydrological function of the wetland.

A task force of wetland specialists attempted to finalize the HGM method in 2004. It was not finalized, but the task force recommended further revision, as the method was considered a valuable tool in need of further improvement (Davis, M.M., (2005). To support further planning efforts, the CNMI Wetlands Report: State of the Wetlands and Recommendations for New Wetlands was prepared for the CRM office and the CNMI Wetlands Task Force. Due to the *Supreme Court's 2001 Solid Waste Agency of Northern Cook County (SWANCC) v. United States Army Corps of Engineers* (Slip Opinion No. 99-1178) decision, which clarified application of the Clean Water Act to "waters of the United States" under the Commerce Clause, the 2005 report outlined regulatory options but noted that "the CRMO requirements for both major sitings and APCs is comprehensive, does not limit a wetland to that defined as waters of the U.S., and therefore is not affected by the SWANCC decision". That report recommended adoption of minimum buffers identified by the 1990 Plan and a much larger buffer for "high value wetlands" as well as implementation of the articulated "no net loss" policy and renewed efforts to map and assess functions of CNMI wetlands. By 2007, the HGM manual fell out of favor with EPA wetland experts and DCRM began developing a similar valuation tool to quantify wetlands functions in the CNMI. These efforts led to the development of the CNMI's Rapid Assessment Method (RAM). The RAM considered HGM and National Wetland Inventory classification systems and applicable data across a wide array of wetland studies.

In 2014, DCRM's wetland assessment and management efforts began in earnest. Over the past three years DCRM has made great strides in establishing a collaborative BECQ Wetlands Program. With support of agency partners and wetland experts, the CNMI Wetland RAM was finalized in 2016 to support quantitative valuation of wetland systems for management purposes, and to establish protective vegetative buffers from development. The RAM is a streamlined quantitative assessment tool, which assessed 13 reference wetlands representative of typical "high", "medium", and "low" valued wetland systems. 11 of the sites were HGM "depressional" systems and two (2) were "tidal fringe" systems. The BECQ Wetlands Program also provides intra and interagency staff training in the use of the peer reviewed 2015 CNMI Wetland RAM. In 2017, DCRM arranged a facilitated delineation training. DCRM continued the development of wetland assessment guidance, and clarification of requirements for wetland delineation reports that was published with support from the U.S. Army Corps of Engineers. In January of 2018, DCRM adopted revised regulations clarifying the definition of "wetlands" in CNMI to include all systems that exhibit hydric soils, vegetation, and hydrology, and formally incorporating requirements for minimum vegetative buffers to support the long-standing "no net loss" policy. A policy on implementing the mitigation hierarchy to ensure no net loss for wetlands as well as sea grass and corals was also published, and included an outline of mitigation opportunities for wetland systems should unavoidable impacts occur. BECQ continues to work to with agency partners and

stakeholders to support comprehensive management for the protection and restoration of CNMI's wetlands.

C.4.1. Extent of Wetland Resources

The 1990 DCRM "*Saipan Comprehensive Wetlands Management Plan*" states that only 36% of the original wetland acreage still exists. Based on current CNMI GIS data layers they cover less than 2% of the CNMI land mass. The CNMI's National Wetland Inventory document also states that wetlands comprise a total land area of approximately 600 acres (US Fish and Wildlife, 1989). Recent wetland measures using the 2017 NHD, and Wetland and Stream GIS data layers, support this finding.

This reporting cycle DCRM completed GPS mapping of wetland boundaries on public lands on Saipan, Tinian, and Rota. Private properties were also ground-truthed as opportunities arose. Collected wetland geospatial data were used this reporting cycle to update the BECQ GIS wetland data layer. Additional updates to the GIS data layer include identification of "lost wetlands", by subtracting building footprints from Saipan's National Wetland Inventory GIS data layer.

Over the next three years, management efforts will continue to map wetland boundaries and focus on identifying and implementing BMPs for wetland remediation and protection.

Wetland management trends are also reported in the DCRM "Section 309 Assessment and Strategy Report", which is produced every five years to evaluate present management efforts and to update program plans to better protect CNMI natural resources into the future.

DCRM Planners and Technical staff calculate acres of wetlands based on previous assessments and the most recently complied GIS data layers. The Section 309 Assessment lists the degree of potential risk to each of the islands' wetlands from low to high, based on perceived anthropogenic threats.

C.4.2. Wetland Water Quality Standards and Protection Activities.

CNMI wetlands are protected through: 1) permitting provisions of the Section 401 Water Quality Certification Program; 2) the WQS/NPS Program's Enforcement of the CNMI WQS anti-degradation policy; and 3) DCRM's enforcement of a "no net loss" of wetlands policy and Area of Particular Concern (APC) Regulations:

The implementation rules for the WQS Anti-degradation policy state that, "point or non-point sources of pollution shall not cause destruction or impairment of wetlands" and that, "all wetlands are to remain in as near their natural state as possible and shall be protected to support the propagation of aquatic and terrestrial life". The rules also require demonstration of compliance with the CWA Section 404(b)(1) rules regarding placement of fill, i.e., wetlands may not be filled unless it can be shown that the proposed action is the "least environmentally damaging practicable alternative", and all current mitigation guidelines are applied.

In addition, the 1990 Plan, established a "no net loss" of wetlands policy. This policy is reflected in DCRM's 2018 adoption of "Guidance on Using the Mitigation Hierarchy to Avoid Impacts of Projects and Activities", which extends this principle to not only wetlands, but also to seagrass and coral reef systems.

The Mitigation Hierarchy policy also provides guidelines for "offset" projects, should impacts to wetland systems, or other high value ecosystems be unavoidable. However, the policy makes clear that avoidance and minimization should be implemented before mitigation is proposed.

In addition, DCRM adopted revised regulations that included updated wetland and mangrove APC definitions and standards as well as supporting policies and BMPs in 2018. The revisions were based on pertinent literature reviews, e.g., required vegetative buffer zones, guidance in delineation methods, and detailed implementation of the Mitigation Hierarchy Policy. Buffer zones were based on minimum buffer recommendations contained in the 1990 Plan, as well as a literature review entitled "Guidance for Establishing Wetland Buffers in CNMI to Protect 'Environmentally Sensitive Areas' and Ensure 'No Net Loss". The 1990 Plan recommended and updated regulations to require at a minimum, a 50-foot vegetated buffer zone around all wetlands, and a 100-foot buffer for "high value" wetlands based on CNMI Wetland RAM assessments. These buffers are to ensure a "no net loss" of wetland systems and their ecosystem services from development.

At present, the CNMI WQS lack specific wetland water quality criteria. Instead, wetlands are assessed using the WQS criteria for fresh surface waters, i.e., lakes and streams.

There are no regularly monitored wetlands in the CNMI other than annual to semi-annual monitoring of American Memorial Park's artificial wetland and mangroves on Saipan; conducted by the US National Park Service. Instead, the WQS/NPS program devotes most staff time towards monitoring marine shorelines, and streams systems, which comprise a vastly larger proportion of CNMI waterbodies.

The 2016 CNMI Wetland RAM is also being used to determine existing wetland conditions on public lands on Saipan as well as Tinian's US Military leased land, and on Pagan. The latter is to establish present condition so impacts from expansion of US military exercises and live firing ranges proposed in the Department of Defense's CJMT EIS, can be assessed and mitigated, should proposed activities come to fruition.

C.4.3. Integrity of CNMI Wetlands

In 2015, BECQ DCRM held two meetings with government and nonprofit agencies, and marine service operators, to obtain stakeholder feedback regarding challenges and opportunities for coastal priority enhancement areas for strategic planning purposes to support the development of the *2016-2020 DCRM Section 309 Assessment Strategy and Report*. The nine survey respondents represented the non-profit MINA, Hotel Association of the Northern Mariana Islands, MVA, Saipan Zoning Office, DPL, DLNR DFW, and the Historical Preservation Office. Respondents ranked the top high-priority areas as wetlands, followed by coastal hazards, public

access, and cumulative and secondary impacts. Based on this and input from resource management experts, the following impairments to CNMI wetland systems were listed in the *2016-2020 DCRM Section 309 Assessment Report*, development/fill due to limited land availability, alteration of hydrology, lack of education about the value of wetlands, and inadequate tools to support permitting requirements and enforcement of DCRM APC regulations for protecting wetlands.

Heightened development pressures are a leading threat to the protection of wetland quality and functions in the CNMI, especially on Saipan and Tinian, which are experiencing a rapid resurgence of development proposals. Risk of further loss remains high due to public demand for land for homesteads, private business and/or their expansion, and the necessary easements associated with each.

Leading wetland stressors or threats of impairment and their geographic scope are reported in Table C-39., below.

TABLE C-39. Wetland Stressors/Threats in the CNMI

	Stressor / Threat	Geographic Scope - (throughout coastal zone or specific areas most threatened)
Stressor 1	Development	Primarily Saipan and Tinian
Stressor 2	Pollution	Primarily Saipan and Tinian, but also some watershed management challenges in Rota as well as current concerns due to proposed land use activities in Pagan
Stressor 3	Invasive species	Saipan, Tinian, and to some degree in Rota and the Northern Islands

These threats are similar to those reported in previous *DCRM Section 309 Assessment Reports*. Although, an assessment of the *Support and Propagation of Aquatic Life* DU has not been completed for every wetland, cumulative findings from the previous HGM assessment method, the DCRM *Section 309 Assessment Reports*, and the current CNMI Wetland RAM assessments were used for purposes of this IR's Wetland 303(d) listing. Table C-40., on the following page provides the CALM Categories used for Wetland assessment and 303(d) listing.

TABLE C-40. Wetland Assessment Method (HGM, Section 309 Report, and RAM findings)

EPA CALM CATEGORY:	DESCRIPTION	Assessment of Wetland Functional Values
1	Propagation of Aquatic Life DU is supported, not threatened	All Functions ≥ 0.7
2	Attains some DUs, no DU is threatened, and there is insufficient information to determine if remaining DUs are attained/or impaired	lacking other pertinent data, no potential threats
3	There is insufficient data and/or information to assess all DUs, Potential stressors may cause impairment	lacking other pertinent data, potential threats
4c	Propagation of Aquatic Life not supported, but not by a pollutant, for example hydrological modification, invasive species, low vegetative diversity, etc.	Some functions < 0.7, due to non-pollutant causes
5	Available data/information indicates that the Propagation of Aquatic Life DU is not supported or is threatened, because of a pollutant, and a TMDL is needed	At least 1 function < 0.7 due to a pollutant

Table C-41., below provides a summary of the acres of wetlands supporting, not supporting, or with insufficient information to assess the *Support and Propagation of Aquatic Life* DU.

TABLE C-41. Wetland Designated Use Support Summary

Designated Use	*Total in State (Acres)	Total Assessed (Acres)	Supporting/ Attaining (Acres)	Not Supporting/ Attaining due to non-pollutant	Insufficient Data / Does not exist (Acres)
ALL WETLANDS (Class 1)					
Propagation of shellfish and other aquatic life	717.8	717.8	85.6	568.4	63.8

* Pagan's wetlands have not been fully delineated, or valuated.

Table C-42., on the following page provides the assessed acres of wetlands and their assigned CALM Category.

TABLE C-42. Size of CNMI Wetlands Assigned to Each CALM Category

Waterbody Type	Category							total in State	total Assessed
	1	2	3	4a	4b	4c	5		
Wetland (Acres)	85.6	1.6	62.2			568.4		717.8	717.8

The causes of impairment to Saipan's wetlands are not considered pollutants, so these waterbodies are not 303(d) listed. However, the causes are listed in Table C-43., below for reference.

TABLE C-43. Size of Saipan Wetlands Impaired and the Causes

Cause/Impairment Type	EPA Cause ID	Size of Waters Impaired (Acres)	Comments
ALL WETLANDS (Class 1)			
Habitat Alterations	504	568.4	non-pollutant
Non-native Aquatic Plants	312	568.4	non-pollutant
Nonnative Fish, Shellfish, or Zooplankton	313	568.4	non-pollutant
Flow Regime Modification	319	568.4	non-pollutant

The sources of impairment to Saipan's wetlands are listed in Table C-44., below.

TABLE C-44. Size of Saipan's Wetlands Impaired by Sources

Sources of Impairment	EPA Source ID	Size of Waters Impaired (Acres)	Comments
ALL WETLANDS (Class 1)			
Drainage/Filling/Loss of Wetlands	36	568.4	non-pollutant
Flow Alterations from Water Diversions	42	568.4	non-pollutant
Introduction of Non-native Organisms	180	568.4	non-pollutant

C.5. TREND ANALYSIS FOR SURFACE WATERS

At present there is insufficient data on other CNMI surface waters, i.e., streams, to perform a trend analysis. Lake water quality trends are reported in Section C.3.4., Table C-27., on page 73

of this report. It is hoped that with the finalization of the SVAP and staff training that WQS/NPS in collaboration with DCRM can systematically begin valuation of streams before next reporting cycle, beginning with priority watersheds.

C.6. PUBLIC HEALTH ISSUES

C.6.1. Beach Water Quality Issues

Microbiological Contamination:

One of the primary purposes of the BECQ Surface Water Monitoring Program is to evaluate compliance with the CNMI WQS for *Enterococci*. Beach Advisories are published and posted for the general public specifying not to swim within 300 feet of a contaminated sampling site for the next 48 hours whenever:

> A single sample result exceeds the ***Enterococci* STV of 130 MPN/100ml** for any Class of marine waters; ***OR*** when the **GM exceeds 35 MPN/100ml** based on samples taken within any 30 day interval, **UNLESS** the **Single Sample** Result is **<35 MPN/100ml**.

Beach Advisory signboards are posted at 10 sites on Saipan's shoreline with internationally recognizable symbols for "no swimming" and "no fishing", as shown in Figure C-47., below. Red Placards are posted whenever results call for a Public Advisory.

FIGURE C-47. BEACH Advisory Sign Boards

Due to the frequency with which some beaches exceed the CNMI WQS for *Enterococci*, an elevated risk to public health exists for several beaches surrounding the more developed areas of Saipan, Tinian and Rota. Many of BECQ's programs are aimed at reducing this risk. Along

Saipan's western shoreline most of the *Enterococci* contamination occurs in densely populated areas. These sites are suspected to be contaminated with human or waste from feral dogs and cats. Known sources of the bacterial contamination are overflows and leaks from sewage collection systems, and runoff from densely populated areas. Sample sites are commonly placed in areas frequently used by the public, which have been listed as impaired for the *Recreational* DU.

Enterococci contamination observed on some of Saipan's remote western and eastern beaches are likely due to livestock, birds, and sediment-laden runoff containing naturally occurring *Enterococci,* rather than human waste.

However, unrestricted cattle grazing and feral pigs have been observed in several of Saipan's eastern watersheds resulting in moderate to severe erosion and the likely transport of fecal matter into the coastal waters where these streams discharge. BECQ has begun conducting water quality monitoring and visual field assessments of these watersheds by implementing the 2013 CNMI Surface Water Quality Monitoring Plan and the SVAP. The continued observance of *Enterococci* exceedances on the eastern shoreline, along with a handful of suspected and highly publicized leptospirosis infections resulted in at least one death in 2000.

It is likely that restrictions on grazing in these watersheds could significantly reduce the problem, although leptospirosis carried by feral wildlife in addition to livestock, remains an issue. Therefore, BECQ has already begun implementing recommendations contained in the 2017 TMDL to reduce bacteriological contaminant levels on Saipan.

Mercury and Heavy Metals in Fish Tissue and Biota

The discovery of elevated levels of mercury and other heavy metals in fish tissue and biota harvested from WWII debris dumpsites around the island of Saipan, has underscored the need for more fish tissue and biota testing. At present most sites have levels below what would trigger a consumption advisory. However, The West Takpochao North, and Achugao South watersheds' had lead levels in bivalves that exceeded the US FDA consumption guidelines, which is of a human health concern.

This emphasizes the need for continued collaboration with UoG's WERI Lab, to carry out further testing in biota and fish tissue around the islands as resources permits.

C.6.2. Public Water Supply/Drinking Water Use Issues

The 2016 *Guidelines for Preparation of the Comprehensive State Water Quality Assessments 305(b) Reports* recommends reporting three tables containing use of surface water in public drinking water supplies including:

1. A list of waterbodies used as surface water sources and a list of contaminants assessed;
2. A summary of drinking water use assessments for rivers and streams; and
3. A summary of drinking water use assessments for lakes and reservoirs.

In general, no surface waterbodies are officially designated as water supplies for PWSs in the CNMI, so the three recommended tables would contain no data if they were presented here. However, if one queried the Safe Drinking Water Branch one would find two PWSs listed in the Safe Drinking Water Information System (SDWIS) as having a surface water source. A brief discussion of these two PWSs, and their sources are provided below.

The first system is the CUC PWS on the island of Rota. The source of water for this system is a spring emerging from within the main Water Cave. This cave collects spring water in a pool at the mouth of the cave which is open to the atmosphere and potentially subject to contamination from local fauna visiting or living in the cave. Therefore, the cave is classified as a surface water source. In June 2015, CUC finalized a *Drinking Water and Wastewater Master Plan* for the island of Rota. As part of that Master Plan, a Ground water Under the Direct Influence of Surface Water (GWUDI) study was conducted on the water from the main Water Cave from September 2012 through January 2014. In October 2014, EPA and BECQ agreed with CUC's findings, that the main Water Cave on Rota is not GWUDI, based on the results from Micro-Particulate Analysis (MPA) of on-line water quality for turbidity, conductivity, and bacteria. The MPA results for the main Cave demonstrated low risk for potential contamination associated with surface water.

The second system is the Saipan CUC PWS, which has numerous ground water sources and one rain water source. Rainwater runoff is collected from the Saipan International Airport runway rainwater catchment system and stored in a concrete reservoir. Since the rainwater travels across the surface of the ground the source water is considered "surface water" as defined in the CNMI Safe Drinking Water Regulations. However, no surface water in the CNMI PWS is considered "navigable water".

To date, there has not been an assessment of the water in the Saipan airport's runway rainwater catchment system. However, the system has not been in use during this reporting cycle.

PART D. GROUND WATER MONITORING AND ASSESSMENT

This section describes known or suspected sources of ground water contamination, existing ground water protection programs, and summarizes the quality of ground water in the CNMI.

D.1. OVERVIEW OF GROUNDWATER CONTAMINATION CAUSES & SOURCES

There are very few incidents of ground water contamination in the CNMI, as shown in Table D-1., on the following page.

TABLE D-1. Major Sources of Ground Water Contamination

Contaminant Source	Suspected Sources	Factors Considered in Selecting Contaminant Source A. Human Health and/or environmental risk (Toxicity) B. Size of population at risk C. Location of the sources relative to drinking water sources D. Number and/or size of contaminant sources E. Hydrogeological sensitivity F. CNMI findings, other findings G. Documented from mandatory reporting H. Geographic distribution/occurrence I. Other criteria	Contaminants A. Inorganic pesticides B. Organic pesticides C. Halogenated solvents D. Petroleum compounds E. Nitrate F. Fluoride G. Salinity/brine H. Metals I. Radionuclides J. Bacteria K. Protozoa L. Viruses M. Other
Agricultural Activities			
Agricultural chemical facilities			
Animal feedlots			
Drainage wells			
Fertilizer applications			
Irrigation practices			
Pesticide applications			
On-farm mixing and loading procedures			
Land application of manure unregulated			
Storage and Treatment Activities			
Land application (regulated/permitted)			
Material stockpiles			
Storage tanks (above ground)			
Storage tanks (underground)	X	A, B, C, D, E, F, G	D
Surface impoundments			
Waste piles			
Waste tailings			
Disposal Activities			
Deep injection wells			
Landfills	X	A, E	A, B, C, D, E, H, J, K, L
Septic tanks	X	A, B, C, D, E, H	E, J, K, L
Shallow injections wells			
Other			
Hazardous waste generators			
Hazardous waste sites			
Large industrial facilities			
Material transfer operations			
Mining and mine drainage			
Pipelines and sewer lines	X	A, B, C, D, E, H	E, J, K, L
Salt storage and road salting			
Salt water intrusion	X	B, C, D, E, F, G, H	G
Spills			
Transportation of materials			
Urban runoff			
Small-scale manufacturing/repair shops	X	A, C, D, E, H	C, D, H

There are only six confirmed or highly suspected sources in the CNMI based on professional judgements. They are "X" 'd in the table's second column, and the factors considered in selecting the contaminant sources, and the actual contaminants are subsequently identified. Contaminants/classes were selected based on data indicating that certain chemicals or classes of chemicals may be originating from an identified source. A more detailed discussion of contamination sources is provided in section D.3 that follows.

There are no known ground water contamination problems on the island of Rota. There was one documented leaking above ground fuel storage tank on the island of Tinian, which has since been addressed.

D.2. OVERVIEW OF STATE GROUND WATER PROTECTION PROGRAMS

DEQ is the Territorial agency whose primary responsibility is to protect and manage ground water resources for the CNMI. To do so several DEQ Programs administer and enforce several sets of regulations including: 1) Well Drilling and Well Operation; 2) Wastewater Disposal; 3) Underground Storage Tank; 4) Underground Injection Control; and 5) Safe Drinking Water Regulations. Table D-2., on the following page summarizes the status of Program implementation.

D.2.1. Well Drilling and Well Operation Regulations

The SDW branch enforces the Well Drilling and Well Operation Regulations, which defines the qualifications individuals and firms must possess to be allowed to drills wells. The regulations designate: 1) setbacks from potential sources of contamination; 2) allows BECQ to set maximum pump withdrawal rates to minimize salt water intrusion; and 3) requires semi-annual water quality analysis of all active wells.

A revision to the regulations in 2005, added Ground Water Management Zones for Saipan which are used in other BECQ regulations to set additional restrictions on activities that may contaminate ground water including wastewater disposal systems, land disposal of waste, and above ground and underground storage tanks.

In addition, the SDW Program maintains a database on all wells in the CNMI. As of September 2015, the program has documented the locations of 662 wells in the CNMI (606 on Saipan, 33 on Tinian, 22 on Rota, and 1 on Pagan). The majority of these wells are used for drinking water sources (357), while some are used for irrigation (27). There are also monitoring wells (110), exploratory wells (21), which have not been designated for another use yet, injections wells (18), wells where the water is used for industrial purposes (12), and wells that have been destroyed (115).

D.2.3. Underground Storage Tank Regulations

The Pesticide and Storage Tank (PEST) Program is responsible for administering and enforcing the Underground Storage Tank Regulations. These regulations stipulate how underground storage tanks are to be constructed and monitored for integrity to prevent leaks and spills from contaminating land, surface waters, and ground water aquifers.

TABLE D-2. Summary of State Ground Water Protection Programs

Programs or Activities	Applicable to the CNMI	Implementation Status	Responsible DEQ Branch
Active SARA Title III Program			
Ambient ground water monitoring system			
Aquifer vulnerability assessment			
Aquifer mapping			
Aquifer characterization			
Comprehensive data management system	X	continuing efforts	SDW
EPA-endorsed Core Comprehensive State Ground Water Protection Program			
Ground water discharge permits			
Ground water Best Management Practices	X	fully established	SDW
Ground water legislation	X	fully established	SDW
Ground water classification	X	continuing efforts	SDW
Ground water quality standards	X	fully established	SDW
Interagency coordination for ground water protection activities	X	continuing efforts	SDW
Nonpoint source controls	X	fully established	WQS/NPS
Pesticide State Management Plan	X	continuing efforts	PEST
Pollution Prevention Program	X	continuing efforts	All DEQ
Public Water System Supervision Program	X	fully established	SDW
Resource Conservation and Recovery Act (RCRA) Primacy	X	For RCRA-D (only solid waste)	*ATM
Source Water Assessment Program	X	continuing efforts	SDW
State Superfund			
State RCRA Program with more stringent requirements than RCRA Primacy			
State septic system regulations	X	fully established	WEEC
Underground storage tank installation requirements	X	fully established	PEST
Underground storage tank remediation fund			
Underground Storage Tank Permit Program	X	fully established	PEST
Underground Injection Control Program	X	fully established	SDW
Vulnerability assessment for drinking water/wellhead protection	X	continuing efforts	SDW
Well abandonment regulations	X	fully established	SDW
Wellhead Protection Program (EPA-approved)	X	continuing efforts	SDW
Well installation regulations	X	fully established	SDW

* ATM – Air and Toxic Waste Management Program

D.2.4. Underground Injection Control Regulations

The SDW program administers and enforces the Underground Injection Control Regulations, which define under what conditions the injection of wastewater, reverse osmosis brine, or other substances may be injected into the ground.

D.2.5. Other Monitoring Events/Programs

In addition to the regulatory Ground water Protection Programs, there have been other ground water monitoring activities in the CNMI, most notably on the island of Saipan. In May 2000, EPA Region 9 and DEQ conducted an island-wide ground water study of Saipan. A total of 178 ground water samples were collected from 160 private drinking water supply wells. This included private wells that do not serve as public water supplies. The objective of the study was to determine the extent of Volatile Organic Compound (VOC) contamination of ground water. 156 samples were analyzed and of these, 34 detected VOCs. 11 of the 34 had VOC concentrations exceeding the MCL for Trichloroethylene (TCE), Vinyl Chloride (VC), Dichloroethylene (DCE), and Perchloroethylene (PCE) also known as Tetrachloroethylene. The remaining 23 were below the MCL for a certain VOC. The samples containing concentrations over the MCL were localized to four areas of Saipan including: San Antonio, As Lito, Lower Base, and Puerto Rico.

In 2004, DEQ generated an inventory list of other potential facilities requiring further assessment and site investigations, as they were associated with the 34 samples exceeding an MCL for a VOC. The list consisted of 28 facilities, the owners of which were issued a joint Superfund Information Request letter from DEQ and EPA pursuant to Section 104(e) of CERCLA. Based on the results of the May 2000 sampling event, and information provided by the 28 facilities, DEQ recommended that six (6) facilities be added to the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) database for future cleanup consideration, which is maintained by EPA as part of the Superfund Program.

In 2009 DEQ conducted a follow up ground water study of 64 privately operated wells, and 12 publicly operated wells, all within a 1 mile radius of the respective contaminated areas of San Antonio, As Lito, Lower Base, and Puerto Rico. The primary objective was to collect the current concentration levels on contaminants detected in 2000. Most of the well operators that still had VOC levels exceeding the SDW standards discontinued their operations. The wells that remained in operation now treat water with granular activated carbon to remove VOC contaminants. Their production water now meets primary SDW standards and are safe for consumption. These well operators are required to monitoring these wells for VOCs once every three years as part of their permit requirements.

In April 2008 through April 2009, DEQ and CUC conducted a joint study of spatial and temporal nitrate concentrations in ground water from the southern part of Saipan. Samples were collected from 20 wells every week and analyzed for combined nitrate-nitrite, *E. coli*, turbidity, temperature, conductivity, pH, and Hardness. Rainwater data was also collected from four (4) rain gauges in the study area to compare variations in ground water quality to rainfall events.

The study found that the concentration of nitrates varied spatially across southern Saipan from an average of 10.6 mg/l at one well, to an average of 0.66 mg/l at another. However, nitrate concentrations did not vary much temporally, or with the rates of rainfall.

In 2010 through 2011, DEQ conducted a baseline ground water quality study in areas of Saipan that had high concentrations of homes without access to municipal sewer collection systems. Ground water samples were collected quarterly from 16 wells in Kagman homestead, and 30 wells near DanDan homestead for one year. While the quality of the ground water varied spatially across each of the two well fields, the quality of the ground water at each particular well did not change much temporally. The bacterial quality was good throughout both homesteads with few to no detections, and the nitrate-nitrite concentrations were below 10 mg/L for all but one of the wells. The study's findings were provided to CNMI Government planners, regulators, and decision makers for consideration when earmarking resources for infrastructure improvements.

Between August 2012 and November 2013, CUC conducted a study to determine if well fields on Saipan, Tinian and Rota were GWUDI. 11 sites were selected on Saipan, and one each on Tinian, and Rota respectively. Ground water at each of the sites was monitored continuously for turbidity, temperature, pH, and conductivity. Rainfall data was also collected at each site. Samples from each site were collected after large rain events and evaluated for bacterial contamination and multi-particulates. As a result of the study, one well on Saipan was determined to be GWUDI, and the well was removed from service. The other sites did not have obvious influences from surface water.

D.3. SUMMARY OF CNMI GROUND WATER CONTAMINATION SOURCES

Rota and the Northern Islands have no known ground water contamination issues. However, some exit on the island of Saipan and Tinian. They are listed in Table D-3., below.

TABLE D-3. Summary of State Ground Water Contamination

Source Type	Total Sites (n =)	Listed and/or confirmed releases (n =)	Confirmed ground water contaminates (n =)	Contaminants	Investigations (n =)	Stabilized or source removed (n =)	Corrective action plans (n =)	Active remediation (n =)	Cleanup completed (n=)
NPL	0								
CERCLIS	1	1	1	PCB					
DOD/DOE	13	13	2	SVOCs, VOCs, Metals, UXO	13	3	0	0	3
LUST*	0								
LAST**	0								
RCRA Corrective action	2	2	0	Petroleum products	0	2	2	0	2
Underground Injection	37	0	0						
State Sites	0								
NPS	0								

* No new leaking underground storage tank sites (LUST). There have been LUST sites in previous periods, but all sites have been cleaned up.

** For this reporting period there are no new leaking above ground storage tank (LAST) sites.

Agricultural activity on Saipan is somewhat limited in scope except for in central Kagman watershed. However, there are no large-scale feed lots or land application of manure, but there are many free grazing cattle as well as feral pigs in As Matuis and Banaderu Watersheds in the west, and in the eastern watersheds.

There have been no inorganic or organic pesticides levels detected in ground water samples that are tested as required by the CNMI Safe Drinking Water regulations.

Saipan has 18 underground injection wells used to dispose of reverse-osmosis (reject) brine. The injection wells belong primarily to tourist hotels located along the coast line of West Takpochau. The wells terminate below the freshwater/saltwater interface, and therefore do not pose a contamination risk to ground water withdrawn for consumption.

There are also 20 shallow wastewater disposal leaching fields on Saipan that serve more than 20 people. Therefore, they are considered underground injection wells. There have been no known contamination events from these sources.

D.4. SUMMARY OF GROUND WATER QUALITY

Table D-4., on the following page summarizes ground water quality monitoring results for untreated well water on the islands of Saipan, Rota and Tinian.

Monitoring is required under The SDW Well Drilling and Well Operation, and The SDW Regulations. In addition, the SDW Program requires annual monitoring of private wells as part of their permit requirements, and periodic monitoring for regulated contaminants. SDW also requires special water quality studies be conducted on public wells of interest.

30 PWSs in the CNMI (20 on Saipan, one on Rota, and one on Tinian) were tested for VOCs and Synthetic Organic Carbons (SOC) during this reporting cycle.

PWSs are not required to monitor their raw untreated well water for VOCs and SOCs. They are only required to monitor treated well water that is sold commercially. These systems collect the sample at the point of entry to the distribution system, which may or may not combine water from many different sources including: ground water, rain water, or filtered sea water. For this reason, detection of VOCs in well water from the entry point does not necessarily indicate contamination of the ground water supply. The 1997 EPA Guidance recommends that constituents should only be considered if they are known to be representative of the source water. For this reason, the VOC and SOC results detected by the PWSs are not reported in Table D-4.

Ground water from 115 wells in the CNMI, 112 in Saipan, 2 Rota, and 1 on Tinian were analyzed for nitrates during this reporting period. Two (2) wells had water that exceeded the MCL of 10

mg/l, but they were not removed from service because their water is blended with water from wells with lower concentrations of nitrates.

TABLE D-4. Aquifer Monitoring Data for Saipan, Tinian and Rota (FY 2009 to 2017)

Monitoring Results from Untreated Water From Wells Used in Assessment (n =)	Parameter Groups	Number of Wells						
		No detections of parameters above MDLs or background levels (ND)	Nitrate concentrations ranges from background levels to ≤5 mg/l No detections of parameters other than nitrate > MDLs or background levels	Nitrate ranges from > 5 to ≤10 mg/l Other parameters are detected at concentrations exceeding MDL but ≤ MCLs	Parameters are detected at concentrations > MCLs	Wells removed from service	Wells requiring special treatment	Background parameters > MCLs.
Saipan								
0	VOC							
0	SOC							
225	NO_3	20	147	56	2	0	0	0
0	Other							
Rota								
0	VOC							
0	SOC							
13	NO_3	0	13	0	0	0	0	0
0	Other							
Tinian								
0	VOC							
0	SOC							
1	NO_3	0	0	1	0	0	0	0
0	Other							

D.5. SUMMARY OF GROUND WATER-SURFACE WATER INTERACTIONS

Ground water to surface water interactions, as well as surface to ground water interactions exist in the CNMI, but the effects of one contaminating the other are not well documented; that is with the exception of salt water intrusion affecting the basal lens aquifers on Saipan. Nutrient-laden ground water emerging from near shore underwater seeps in the Saipan lagoon is suspected of contributing to periodic algal blooms and DO% deficits.

Salt water intrusion is arguably the most significant ground water contamination issue on Saipan, and the CNMI as a whole. Even though the water supplied by CUC's municipal public utility on Saipan complies with all EPA regulated contaminants, and is considered safe for human

consumption, it is unpalatable due to the high chloride concentration (an unregulated contaminant). Therefore, most people on Saipan do not drink the water provided by the public utility. Instead they rely on treated bottled water produced locally or rain water. There are several reasons for the high chloride concentration in the water from these aquifers. Older wells in these areas were completed and screened into the freshwater/saltwater transition zone, or near the bottom of the freshwater layer. They are spaced relatively close together and/or are pumped at relatively high rates. Due to these practices the underlying salt water is drawn upward in the vicinity of these wells and mixes with the fresher water at the ground water surface. Therefore, chloride concentrations in these well range from just beyond the Secondary MCL of 250 mg/l, to as high as 2,000 mg/l and above [Carruth, 2003].

The salt water intrusion issue is being addressed primarily by CUC which owns and operates most of the affected wells. In years past the demand for water has been so great that the utility could not produce enough to provide 24-hour service to all utility customers on Saipan. A vigorous leak detection and repair program over the past reporting period has reduced the demand significantly such that nearly every CUC customer has 24-hour water. CUC is now beginning the process of developing a ground water management plan, which will guide them in taking high chloride concentration wells and/or high pump rate wells off-line; reducing the overall chloride concentration of the water delivered to customers. In addition, the utility has given careful consideration to well depths relative to sea level, well spacing, and pumping rates for newer wells constructed after the year 2000.

As mentioned above in Section D.2.5., CUC discontinued use of one well when it was discovered that it was under the direct influence of surface water. Water quality analysis of the ground water from this well showed changes in turbidity and conductivity immediately following rain events.

PART E. PUBLIC PARTICIPATION

A Notice of the draft 2018 CNMI IR, and a request for public comments was posted on the DEQ website beginning July 13th and remained posted until August 19th, 2018 (see Appendix VIII).

Email notices were also sent on July 17th, 2018 to the Water Quality Report E-list. The E-list contains email addresses for each individual, business, hotel, and government entity that has requested to receive BEACH Advisories (“Red Flags”).

In addition, public notices were also published in both local newspapers beginning on July 18th, 2018, and again on July 25th, and August 8th.

The thirty (30) day comment period ended on August 19, 2018. Only a few comments were received as shown below, along with responses.

COMMENT – John Gourley, Micronesia Environmental Services

"I noticed that BECQ didn't recognize the Hagoi wetland complex as a surface water feature (e.g., lake) in the DRAFT report.. Could you enlighten me on why?"

RESPONSE – Kathy Yuknavage

"The Hagoi wetland complex has been listed as a wetland as opposed to a lake in all the previous 305(b) reports, based on the National Wetland Inventory and other documentation. The 2010 305(b) report explains this designation as follows: ""Lake Hagoi" on Tinian is not considered a lake, but rather a small open water segment of the Hagoi wetland, which is used in the CNMI's draft wetland hydrogeomorphic (HGM) assessment program as the "reference" wetland. "Lake Hagoi" was initially listed and evaluated as a lake in the draft version of this report (July, 2010), however, after reviewing all available references, it was removed from consideration as a lake, and returned to the wetland category only, to be consistent with previous reports and evaluations. "

I maintained this designation in the 2018 draft for consistency, and based on the limited open water surface area in the Hagoi complex." *08/16/18*

08/16/2018

COMMENT – Heidi Yelin, CUC Laboratory Manager

"Page 14, Figure B-3 - *add perimeter border* of 1000 ft from Outfall location described *at 15° 7' 7.88" N 145° 41' 18.29*" E as shown in NPDES permit MP0020028"

Page 16, 4th paragraph, 2nd sentence - delete "," after "As" to read: "*As more water quality...."*

AND last paragraph - term "low abundance" is contradiction in terms. Suggested replacing "low abundance" to: "*There are few wetlands, streams, and lakes in the CNMI."*

Page 186, 2nd paragraph - revise sentence to: "*CUC conducted a study to determine if well fields on Saipan, Tinian, and Rota were GWUDI."*

RESPONSE – Kathy Yuknavage

A 1000 ft perimeter has been added to Figure B-3. All grammatical corrections were incorporated into the final version, except the term "low abundance" was retained, as this is its correct use to describe degree of plentifulness. *08/16/18.*

08/17/2018

COMMENT – Erin Derrington, DCRM Permit Manager and Wetland Delineator

Additional information on the development of the BECQ wetland program overtime and revision to the DCRM Wetland Regulations were provided for inclusion in Section C.4., Wetlands Program. This included adding that:

"In 1990 the Coastal Resources Management Office adopted the Saipan Comprehensive Wetlands Management Plan (Comprehensive Management Plan). This plan identified and classified wetlands on Saipan using the 1989 National Wetlands Inventory from the United States Fish and Wildlife Service based on the Cowardin method, with limited ground trothing of boundaries using color aerial photographs from 1987 and soil maps from the USDA Soil Conservation Service. The Comprehensive Management Plan assigned wetland values based on a matrix analysis and hierarchical weighing based on the following criteria: vegetative, wildlife, hydrology, regional significance, and degree of isolation. Potential mitigation options were discussed and periodic plan reevaluation and revisions were recommended. In 1996 the CNMI Wetlands Management Report to Governor Froilan C. Tenorio, an interagency effort to support ecosystem and habitat management objectives, recommended improvements to the regulatory framework in order to minimize negative impacts of development on these systems. In 1998, DEQ a Unified Watershed Assessment was completed for Saipan, Tinian, Rota, and the Northern Islands. This assessment noted rehabilitation of wetland, mangroves, and streams is feasible and recommended to achieve watershed management objectives. "

and

"To support further planning efforts, the CNMI Wetlands Report: State of the Wetlands and Recommendations for New Wetlands was prepared for the CRMO and the CNMI Wetlands Task Force. Due to the *Supreme Court's 2001 Solid Waste Agency of Northern Cook County (SWANCC) v. United States Army Corps of Engineers* (Slip Opinion No. 99-1178) decision which clarified application of the Clean Water Act to "waters of the United States" under the Commerce Clause, the 2005 report outlined regulatory options but noted that "the CRMO requirements for both major sitings and APCs (areas of particular concern) is comprehensive, does not limit a wetland to that defined as waters of the U.S., and therefore is not affected by the SWANCC decision". That report recommended adoption of minimum buffers identified by the 1990 Comprehensive Management Plan and a much larger buffer for "high value wetlands" as well as implementation of the articulated "no net loss" policy and renewed efforts to map and assess functions of CNMI wetlands."

and

"In 2017, DCRM arranged a facilitated inter-agency wetlands delineation training with staff from DEQ, Department of Lands and Natural Resources, Zoning, and Department of Public Lands. Work continued on development of wetland assessment guidance, and clarification of requirements for wetland delineation reports was published with support from the U.S. Army Corps of Engineers. In January of 2018, DCRM adopted revised regulations clarifying the definition of "wetlands" in CNMI to include all systems that exhibit hydric soils, vegetation, and hydrology, and formally incorporating requirements for minimum vegetative buffers to support the long-standing "no net loss" policy. A policy on implementing the mitigation hierarchy to ensure no net loss for wetlands as well as sea grass and corals was also published, and included an outline of mitigation opportunities for wetland systems should unavoidable impacts occur. DCRM and DEQ continue to work to with agency partners and stakeholders to support comprehensive management that enables protection and restoration of CNMI's wetlands.

RESPONSE – Kathy Yuknavage

This additional information was incorporated to the final IR revision with minor grammatical changes. The suggestion of including the phrase, "A separate stream assessment and valuation methodology has been developed by DCRM with input from DEQ and DFW to support baseline data collection and restoration prioritization for streams on Saipan and Rota"., was not incorporated into SC.4., as it appears earlier in the IR under Surface Water Surveillance Program and elsewhere. *08/21/18.*

08/17/2018

COMMENT – John Gourley, Micronesia Environmental Services

Mr. Gourley provided a number of grammatical and typographical corrections that were incorporated into the report as appropriate.

Substantive comments included:

1. Pg. 3 – What is the measure of Enterococci violations.
2. Pg. 5 - Intermittent and ephemeral are redundant.
3. Pg. 5 - Define Lakes or characterize
4. Pg. 7 - Cross out delineated, use revised or updated for the new watershed catchment basins.
5. Pg. 8 - delete "chains"... The Mariana archipelago is only one island chain - not multiple chains.
6. Pg. 8 - This is incorrect. The National Marine Monument DOES NOT include these islands. The Monument boundaries are limited to marine waters that stop at the mean low water line. These islands belong to the CNMI Government.
7. Figure B-1 - should show two geologically distinct "zones" by lat/long marks
8. Pg. 10 - You are comparing magnitude of impacts from population, visitor arrivals and development, but don't mention the relative magnitude of each impact on the three (inhabited) islands...
9. Pg. 12. - Sadog Tasi WWTP is the correct name... the WWTP is not located in Lower Base.
10. Table B-2. - In regard to FDM being Tier 3 waters...even with all the UXO in the waters and sitting on the islands?? Keep in mind that FDM is a military bombing range.
11. Table B-3. - Without showing the 1,000-foot boundary line, this figure is meaningless.
12. Pg. 17. - I believe it may be premature to classify the two Pagan Lakes (Lagona and Sinalung Lakes) as a"outstanding resource." Corwin, et. al. (1957) states the water for Lagona Lake is "unsuitable for most uses with an average chloride content of 7,000 ppm and total dissolved solids of 16,000 ppm." The same comment toward Sinalung Lake is also provided...
13. Pg. 19. – this permit is called the "Construction General Permit"
14. Pg. 27. – And so what were the results of the 2016 study
15. Pg. 31. - please fact check.... I believe the SIZES of fish are larger in the Northern Islands when compared to the populated southern islands - not "fish populations"

16. Pg. 66. – this sentence should be deleted as it is pure speculation, "Biological monitoring suggests that degradation at these sites is likely due to a reduction in herbivory and/or water quality.
17. Pg. 69. - so wetlands aren't monitored unless the developments are "proposed"??
18. Pg. 69. – "However, expansion of military training exercises to the Northern Islands could drastically hinder support of this DU in the future." Pure speculation.
19. Pg. 70. – in reference to Pagan's lakes "Interesting...Corwin et al. (1957) notes them as Lagona Lake and Sinulung Lake in pubished Federal documents. What is the citation for these names?"
20. Pg. 70. - I believe only the Section 401 WQC requires a anti-degradation review
21. Pg. 71. - In reference to Susupe Lake covers 57.4 acres in Saipan's South Susupe watershed. "citation?"
22. Table C-24. – table does not identify any introduced species
23. this needs a citation...(in reference to historic loss of wetland acres) i would like to see the document claiming these wetland losses.
24. Pg. 88. - if they (isolated riparian areas) haven't been "delineated or assessed", how do you know they are wetlands?
25. Pg. 107. - not all non-natives become invasive.... there is a big difference.
26. Pg. 114. - are they (South W. Takpochau streams) named on the USGS topo map??
27. Pg. 175. - this (1990 DCRM Saipan Comprehensive Wetlands Management Plan) was never officially adopted as policy by DCRM!

RESPONSE – Kathy Yuknavage

1. Edited for clarification, "Rota and Tinian's reduction in the percent of violations of the WQS for the FIB *Enterococci* is also associated with reduced rainfall in 2017, as well as a substantive decrease in the islands' populations and wastewater production during last, and this reporting cycle…"
2. "Ephemeral streams have less flow than intermittent streams, that are typically shallow, and have flowing water for brief periods in response to rainfall. Ephemeral streams and ditches are normally dry for most of the year." www.wetlandsprofessional.com. See edits.
3. The CNMI WQS do not define CNMI Lakes, just "fresh waters" meaning waters with dissolved inorganic ions of less than 500 ppm. However, all four CNMI lakes are brackish. Therefore, no definition is provided herein for "lake", brackish or otherwise. A formal definition was not use to designate the four lakes in previous IRs. This IR is maintaining their designation for consistency, and in keeping with the 2006 EPA Assessment guidance.
4. Delineation is more appropriate as this means to sketch out, draw, while define is to explain clearly. In this case the boundaries were redrawn.
5. There are two geologically distinct chains, the four southern islands that are the result of limestone reef deposition, that are no longer volcanically active, and the northern Marianas islands that are still volcanically active as noted in previous IRs. The paragraph will be rewritten to better convey this finding.
6. For those individuals who may misconstrue what a Marine monument encompasses, this will be edited to read, "the waters surrounding...".

7. Noted. The new map indicates the divide between the four southern islands and the volcanically active northern islands in the revision.
8. At present we do not have a specific baseline for each island to report the relative magnitude of impact at the time of this writing. However, in general, it can be stated that Saipan has greater anthropogenic threats than that of Rota or Tinian.
9. Noted name correction.
10. Still an important bird nesting site and provides support of the propagation of aquatic life, and fishing for consumption. The military report entitled by Smith. (2016). *De-facto marine protection from a Navy bombing range: Farallon De Medinilla, Mariana Archipelago, 1997 to 2012*, Marine Pollution Bulletin, Vol 102, Issue 1.,. states, "The health, abundance and biomass of fishes, corals and other marine resources are comparable to or superior to those in similar habitats at other locations within the Mariana Archipelago ". This is why a Tier 3 was retained since last IR.
11. Noted. A perimeter demarcating the 1000 ft perimeter will be added to the existing 1000 ft scale bar at the bottom of the map.
12. All the designated uses must be considered and these remote lakes have more designated uses than just a potable water supply. They also provide support and propagation of Aquatic life and wildlife, Fish consumption, Aesthetic enjoyment, and Recreational uses. All these are considered for assessment purposes. All lakes being so few in number make them especially important resources, which require protection.
13. There are several other NPDES general permits other than that for construction. This just gives a couple examples.
14. Noted, will be edited that they were high levels of heavy metal contamination. Further discussion for each affected watershed follows this Special Concern Section. Citation will be included.
15. "Population" revised to "abundances".
16. This finding is based on the professional judgement of the MMT that have been monitoring this site since the late 1990s.
17. Not regularly monitored, no, but they are assessed whenever GIS layers are to be updated or it is requested due to a proposed development. more follows in Section C.4. Wetland Program
18. Depends on what military exercises are undertaken, their frequency, extent of area used, and their duration.
19. 1978. Physical Development Master Plan for the CNMI, Pacific Planning and Design Consultants. Volume V, Pagan, Government printing office.
20. The CNMI water quality standards also have antidegradation requirements for all waters. in 1.2.3 Section 65-130-010., not just those being reviewed for section 401 certification.
21. As previously stated in this IR, acres of lakes and wetlands were were recalculated based on the most recent 2017 USGS National Hydrography Dataset (NHD) and GIS wetland delineation data layers.
22. No, these non-pollutants are not listed here. Although they are discussed in Section C-3.5.7. Susupe - Waterbody Segment 18B.
23. Based on current GIS assessment and previous IRs and many other government documents' text. The original documents are the 1989, US Fish and Wildlife National Wetland Inventory and the 1990 Commonwealth of the Northern Mariana Islands Wetlands Conservation Plan

24. The wetlands were already designated in previous IRs, and based on the most recent NHD and wetland and stream data layers. Until such time that a visual assessment is conducted they must remain in the IR document, per EPA assessment guidelines
25. The non-native snails, tilapia, and red eared sliders are considered invasive and are in abundant numbers.
26. They do not have names in the 2017 USGS NHD, and Wetlands and Stream data layer. These data layers incorporated all previous topo findings from USGS.
27. DCRM has revised this section accordingly. It now reads, "the 1990 Plan, established a “no net loss” of wetlands policy. This policy is reflected in DCRM’s 2018 adoption of “Guidance on Using the Mitigation Hierarchy to Avoid Impacts of Projects and Activities”, which extends this principle to not only wetlands, but also to seagrass and coral reef systems. " and, “In addition, DCRM adopted revised regulations that included updated wetland and mangrove APC definitions and standards as well as supporting policies and BMPs in 2018. The revisions were based on pertinent literature reviews, e.g., required vegetative buffer zones, guidance in delineation methods, and detailed implementation of the Mitigation Hierarchy Policy.”

PART F. CHANGES IN THIS INTEGRATED REPORT

F.1. TMDL FOR SAIPAN’S COASTAL WATERS IMPAIRED BY BACTERIA

A *TMDL for Coastal Waters Impaired by Bacteria on Saipan* was completed in September 2017. This resulted in several watersheds being delisted for Enterococci and E. coli. They are discussed at length in each watershed’s sub-section in Sections C.3.5.1., through C.3.5.12.

F.2. NEW SAIPAN WATERSHED BOUNDARIES

This reporting cycle new watershed boundaries were established based on new Saipan watershed catchment basins. This has resulted in an update to the miles of coastal shoreline miles for several watersheds, and relocation of some long-term BEACH monitoring sites into new watersheds.

The new watershed boundaries better reflect actual water flow and coastline discharge locations.

F.3. NEW MONITORING SITES USED FOR ASSESSMENTS

An additional five (5) new near shore reef flat monitoring sites, and six (6) LaoLao bay ARRA beach reef flat sites are now included for DU assessments.

F.4. WATERBODY TIER DESIGNATION

Several coastal waters surrounding the islands of Saipan, Tinian and Rota have been designated as Tier 2 or 3 waters this reporting cycle. Tier 3, pristine waters, like those surrounding the Northern Islands, have exceptional resource value due to their relatively pristine state, and limited potential anthropogenic stressors. They have the highest level of protection as required by the CNMI WQS Anti-degradation Policy (Section Part 3.1 §65-130-100).

In addition, several stream systems in Saipan and Rota have also been designated as Tier 2 or 3 waters due to their important hydrological and ecological functions, and for providing essential native aquatic and wildlife habitat.

F.5. ATTAINS database

The CNMI ATTAINS database had not been completely populated with previous IR assessment data. EPA's contractor, RTI international was still completing data entry at the time of this writing.

Therefore, all the Tables in this IR were calculated using ADB entries and the new miles of coastal shoreline calculated from the new 2017 Watershed boundaries.

The new CNMI ATTAINS database will be updated with this IR's data and used in the next reporting cycle in 2020.

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APPENDIX I: Dimensions of Aquatic Resources in Each Watershed Segment

TABLE I - a. 2018 Dimensions of Aquatic Resources for Rota, Aguigan, and Tinian Watershed Segments

Watershed	Num.	WQ Sampling Stations	Ocean Shoreline Miles	Stream ID	Stream Miles	Wetland ID	Wetland Acres	Wetland Type	Lake ID	Lakes Acres	Latitude	Longitude
ROTA:												
Dugi/Gampapa/Chenchon	1	none	11.1	none	0	none	0		none	0	14°11'57.65"N	145°15'25.29"E
Sabana/Talakaya/Palie	2	R1,R2, R15	7.3	**2STR**	6.1	none	0		none	0	14° 6'55.71"N	145°11'18.38"E
Songsong	3	R3, R4, R5, R6, R7, R8,R14	7.9	none	0	none	0		none	0	14° 8'16.98"N	145° 8'12.31"E
Uyulanhulo/Teteto	4	R9,R10, R11,R13	3.5	none	0	none	0		none	0	14°10'4.67"N	145°10'1.89"E
Chaliat/Talo	5	R12	2.6	none	0	none	0		none	0	14°11'33.80"N	145°13'32.69"E
Rota Total:			***32.4***		***6.1***		***0.0***			***0.0***		
AGUIGAN:												
Aguigan	6	AGU1,2	8.2	none	0	none	0		none	0	14°51'7.07"N	145°33'31.41"E
Aguigan Total:			***8.2***		***0.0***		***0.0***			***0.0***		
TINIAN:												
Masalok	7	T1, T2	3.5	none	0	7WET	1.6		none	0	15° 2'4.71"N	145°38'55.28"E
Carolinas	8	none	10.4	none	0	none	0		none	0	14°56'18.83"N	145°39'8.49"E
Makpo	*9*				*0*					*0.0*		
Makpo	9	T7, 8, 9, 10	3			9WET	28.4		none	0	*** 14°56'10.57"N**	**145°37'46.5"E**
Makpo Harbor	9H	9H	1.5	none	0	none	0		none	0	**14°57'54.54"N**	**145°37'30.23"E**
Puntan Diaplolamanibot	10	T5, T6	9.9	none	0	10WET	12.9		none	0	14°58'56.89"N	145°36'44.43"E
Puntan Tahgong	11	T3, T4	6.4	none	0	11WET	40.6	**Marsh/Pond**	none	0	15° 4'18.30"N	145°36'55.59"E
Tinian Total:			***34.7***		***0.0***		***83.5***			***0.0***		

* **Bold Red Font** indicates new information or new dimensions calculated from the latest available data

TABLE I - b. 2018 Dimensions of Aquatic Resources for Saipan and Mañagaha Watershed Segments

Watershed	Num.	WQ Sampling Stations	Ocean Shoreline Miles	Stream ID	Stream Miles	Wetland ID	Wetland Acres				Latitude	Longitude
SAIPAN:												
Kalabera	12	NEB02	4.1	12STR	7.8		0		none	0	15°15'33.43"N	145°49'22.18"E
Talofofo	13	NEB 03, NEB04, NEB07	5.4	13STR	34.5	13WET	2.6	Riparian	none	0	15°13'42.86"N	145°47'50.11"E
Kagman	14	NEB05, NEB06,	6.7	14STR	12.2	14WET	5.1	Marsh	none	0	15° 11'6.09"N	145°46'49.95"E
Lao Lao	15	SEB02, SEB03	1.4	15STR	6.7	none	0		none	0	15° 9'47.58"N	145°45'45.42"E
Dan Dan	16	none	6.3	16STR	0.8	16WET	2.8	Riparian	none	0	15° 9'14.68"N	145°44'54.7"E
Isley	*17*						*28.4*					
Isley (West)	17A	SEB06	1.7	17STRA	3.5	17WETA	*3.4* 23.0	*Constructed* Marsh	none	0	15° 6'25.95"N	145°42'25.66"E
Isley (East)	17B	SEB4-5, SEB08	4.2	17STRB	0.3	17WETB	2.0	Marsh	none	0	15° 5'31.13"N	145°44'53.4"E
Susupe	*18*						*489.7*			*57.4*		
Susupe (North)	18A	WB25 - WB29	2.4	18STRA	7.0	18WETA	*194.6* 2.7	*Marsh* Pot Holes	none	0	15° 9'9.43"N	145°42'1.91"E
Susupe (South)	18B	WB30 - WB37	2.8	18STRB	1.4	18WETB	292.4	Marsh /Pot holes	18LAKB	57.4	15° 7'12.32"N	145°41'22.67"E
West Takpochau	*19*						*40.7*					
W. Takpochau (North)	19A	WB9-WB13	1	19STRA	4.7	19WETA	*18.0* 2.2	*Marsh* Pond	none	0	15°13'26.77"N	145°43'55.64"E
W. Takpochau (Central)	19B	WB14 - WB23	4.4	19STRB	3.2	19WETB	20.5	Marsh	none	0	15°12'18.38"N	145°42'58.7"E
W. Takpochau (South)	19C	WB24	1.9	19STRC	1.3		0		none	0	15°10'56.16."N	145°42'49.25"E
Achugao	*20*						*38.0*					
Achugao (North)	20A	WB3-6	1.9	20STRA	3.4	20WETA	*0.8* 12.1	*Constructed* Marsh	none	0	15°14'35.26"N	145°45'16.66"E
Achugao (South)	20B	WB7-8	2.4	20STRB, 20STRC	6.5	20WETB	24.4 0.7	Marsh Pond	none	0	15°13'42.13"N	145°44'21.53"E
As Matuis	21	WB1, WB2	2.2	21STR	1.1	none	0		none	0	15°15'15.07"N	145°46'42.88"E
Banaderu	22	NEB01	5.1	none	0	none	0		none	0	15°16'36.29"N	145°47'47.03"E
Saipan Total:			*53.9*		*94.4*		*607.3*			*0.0*		
MANAGAHA:												
Managaha	23	MG01 - MG11	0.6	none	0	none	0		none	0	15°14'28.59"N	145°42'44.64"E
Managaha Total:			*0.6*		*0.0*		*0.0*			*0.0*		

TABLE I - c. 2018 Dimensions of Aquatic Resources for the Northern Islands Watershed Segments and Grand Totals

Watershed	Num.	WQ Sampling Stations	Ocean Shoreline Miles	Stream ID	Stream Miles	Wetland ID	Wetland Acres				Latitude	Longitude
NORTHERN ISLANDS:												
Farallon De Medinilla	24	none	4.2	none	0	none			none	0	16° 1'10.96"N	146° 3'34.61"E
Anatahan	25	none	17.3	none	0	none			25LAK	149	16°21'5.04"N	145°41'3.42"E
Sarigan	26	none	6.0	none	0	none			none	0	16°42'12.38"N	145°46'46.90"
Guguan	27	none	5.6	none	0	none			none	0	17°18'32.51"N	145°50'33.47"E
Alamagan	28	none	9.4	none	0	none			none	0	17°35'54.81"N	145°50'3.59"E
Pagan	*29*										*18° 7'16.62"N*	*145°45'49.20"E*
Pagan	29	none	28.2	none	0	29WET	27		29LAKA	34		
									29LAKB	27		
Agrihan	30	none	19.3	none	0	none			none	0	18°46'2.86"N	145°40'18.73"E
Asuncion	31	none	7.0	none	0	none			none	0	19°41'26.38"N	145°24'13.47"E
Maug	32	none	9.5	none	0	none			none	0	20° 1'13.95"N	145°13'59.72"E
Farallon De Pajaros	33	none	4.2	none	0	none			none	0	20°32'42.64"N	144°53'34.04"E
Northern Islands Totals:			**110.7**				**27.0**			**210.0**		
CNMI Grand Total:			***240.5***		***100.5***		***717.8***			***267.4***		

APPENDIX II: Surface Water Quality Criteria Data Used in 2018 Waterbody Assessments

NOTES:

1. "% violation" means percent of samples which triggered Beach Advisories. Beach Advisories are triggered if a sample exceeds either the Statistical Threshold Value (STV), or geometric mean in instances where sampling data exists for a 30 day period.
2. "Geomean" means geometric mean of the most recent 30 day period including the single sampling event.
3. * - Means not sampled, ** - Means newly established long-term sites without sufficient data for statistical inference for that year.
4. COLOR LEGEND: = impaired (>10-20); = severely impaired (>20); = Not sampled, or dangerous access

TABLE II - a. Rota Coastal *Enterococci* Exceedances of CNMI WQS

Enterococci % Violations																
Sample Station ID	Sampling Station Name	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Segment Class
SEGMENT 2: SABANA/TALAKAYA/PALIE																
R1	Coral Garden	8	4	0	5	17	19	26	0	*	*	*	*	*	*	AA
R2	Kokomo Beach Club	0	3	7	5	20	8	19	10	15	21	0	13	0	0	AA
R13	Talakhaya	*	*	*	*	*	*	*	*	*	*	**	**	10	24	AA
SEGMENT 3: SONGSONG																
R3	Mobil Storm Drain	0	10	0	0	7	12	19	5	19	50	38	43	9	0	A
R4	East Harbor Dock	4	4	0	0	0	5	4	0	7	21	14	26	13	0	A
R5	Tweksberry Beach	12	0	0	0	0	4	4	5	7	0	5	4	0	0	AA
R6	W. Harbor Marina	12	10	0	0	7	12	0	14	15	29	29	9	13	32	A
R7	Dist #2 Storm Drain	42	17	4	14	27	12	4	4	19	43	45	35	4	20	AA
R8	Dist #1 Storm Drain	4	3	0	9	10	0	7	10	11	7	5	0	0	8	AA
SEGMENT 4: UYULANHULO/TETETO																
R9	Veterans Memorial	0	0	4	0	0	0	4	5	4	0	5	0	0	0	AA
R10	Teteto Beach	0	0	0	0	0	0	4	5	0	0	0	9	0	0	AA
R11	Guata Beach	19	14	4	5	0	0	4	14	7	0	0	0	0	0	AA
SEGMENT 5: CHAILIAT/TALO																
R12	Swimming Hole	19	7	7	0	0	0	0	9	7	29	5	13	0	0	AA

TABLE II - b. Tinian Coastal *Enterococci* Exceedances of CNMI WQS

Enterococci % Violations																
Sample Station ID	Sampling Station Name	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Segment Class
SEGMENT 7: MASALOK																
T1	Unai Masalok	4	0	0	8	7	7	9	0	18	17	13	16	8	0	AA
T2	Unai Dangkolo	4	15	4	4	4	3	9	7	18	7	13	11	4	4	AA
SEGMENT 9: MAKPO																
T7	Tachogna	8	4	4	0	4	0	0	11	11	10	4	5	8	0	AA
T8	Taga Beach	8	0	0	0	0	0	14	7	4	3	5	5	4	0	AA
T10	Kammer	4	4	0	4	0	0	14	0	4	0	9	5	0	4	AA
SEGMENT 9H: MAKPO HARBOR																
T9A	Harbor	4	19	7	0	7	0	0	4	0	17	13	20	8	0	A
SEGMENT 10: PUNTAN DIAPLOMANIBOT																
T5	Leprosarium I	4	4	0	12	7	7	10	4	11	21	13	11	8	0	AA
T6	Leprosarium II	0	12	0	15	4	7	20	7	4	7	17	20	4	4	AA
SEGMENT 11: PUNTAN TAHGONG																
T3	Unai Babui	4	15	7	4	18	7	0	4	11	3	9	16	4	0	AA
T4	Unai Chulu	4	19	0	0	7	0	0	7	14	3	9	11	4	4	AA

TABLE II - c. Saipan Coastal *Enterococci* Exceedances of CNMI WQS

Enterococci % Violations																
Sample Station ID	Sampling Station Name	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Segment Class
	SEGMENT 12: KALABERA															
NEB 02	Bird Island	23	30	34	10	3	7	7	14	7	21	23	23	15	38	AA
	SEGMENT 13: TALOFOFO															
NEB 07	Hidden	38	30	31	24	30	22	18	24	13	50	17	32	11	31	AA
NEB 03	Jeffrey's	15	50	38	29	37	26	21	38	20	29	9	18	7	17	AA
CNMI-104	Jeffrey's Beach Reef flat	*	*	*	*	*	*	*	*	*	*	*	*	0	0	AA
NEB 04	Old Man By the Sea	20	50	24	24	10	19	7	24	7	31	18	41	19	31	AA
	SEGMENT 14: KAGMAN															
NEB 05	Marine Beach	15	15	3	14	13	11	11	0	10	29	8	0	4	7	AA
CNMI-29	Tank Beach Reef flat	*	*	*	*	*	*	*	*	*	*	*	*	0	0	AA
NEB 06	Tank Beach	23	5	3	19	10	4	7	10	3	13	4	5	4	0	AA
SEB 01	Forbidden Island	*	*	*	*	*	*	*	*	*	*	*	*	*	*	AA
SEB 02	North LaoLao Beach	19	30	14	19	13	19	7	10	23	16	8	9	4	0	AA
ARRA B2	North Laolao Reef Flat	*	*	*	*	*	*	*	*	*	*	*	*	0	8	AA
ARRA B5	North Laolao Reef Flat	*	*	*	*	*	*	*	*	*	*	*	*	8	0	AA
ARRA B8	North Laolao Reef Flat	*	*	*	*	*	*	*	*	*	*	*	*	8	0	AA

TABLE II - c. Saipan Coastal *Enterococci* Exceedances of CNMI WQS Continued

Enterococci % Violations																
Sample Station ID	Sampling Station Name	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Segment Class
	SEGMENT 15: LAO LAO															
CNMI-21	Central LaoLao Beach reef flat	*	*	*	*	*	*	*	*	*	*	*	*	0	0	AA
SEB 03	South Laolao	19	25	10	33	37	15	25	14	23	16	0	5	15	0	AA
ARRA C2	South Laolao Reef Flat	*	*	*	*	*	*	*	*	*	*	*	*	8	15	AA
ARRA C5	South Laolao Reef Flat	*	*	*	*	*	*	*	*	*	*	*	*	0	8	AA
ARRA C8	South Laolao Reef Flat	*	*	*	*	*	*	*	*	*	*	*	*	0	0	AA
	SEGMENT 16: DAN DAN															
CNMI-72	DanDan Reef Flat	*	*	*	*	*	*	0	*	*	0	0	*	0	0	AA
	SEGMENT 17A: ISLEY (WEST)															
SEB 06	Unai Dangkolo	46	35	14	33	13	37	43	19	37	16	33	5	4	3	AA
	SEGMENT 17B: ISLEY (EAST)															
SEB 04	Obyan Beach	27	15	0	10	3	15	7	5	20	10	8	5	4	7	AA
SEB 05	Ladder Beach	12	20	10	5	0	7	21	33	17	10	22	0	11	7	AA
CNMI-30	Ladder Beach Reef Flat	*	*	*	*	*	*	*	*	*	*	*	*	0	0	AA
	SEGMENT 18A: SUSUPE (NORTH)															
WB 24	Chalan Laulau	17	4	6	6	2	4	0	6	2	6	13	6	0	4	AA
WB 25	San Jose	6	2	6	9	0	8	8	12	2	0	12	10	0	0	AA
WB 26	Civic Center	4	0	4	11	4	2	4	6	2	6	12	10	2	2	AA
WB 27	Diamond Hotel	6	6	8	9	2	6	12	15	4	2	11	0	0	0	AA
WB 28	Grand Hotel	4	4	8	4	2	6	12	8	0	8	4	4	2	4	AA
WB 29	Community School	8	8	8	6	2	4	8	2	0	10	3	4	0	0	AA

TABLE II - c. Saipan Coastal *Enterococci* Exceedances of CNMI WQS Continued

Enterococci % Violations																
Sample Station ID	Sampling Station Name	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Segment Class
	SEGMENT 18B: SUSUPE (SOUTH)															
WB 30	Sugar Dock	52	14	19	19	66	37	19	29	21	29	32	18	6	15	AA
WB 31	CK Dist #2 Drain	17	10	8	21	32	25	12	25	15	25	29	14	10	13	AA
WB 32	CK Dist #4 Lally	10	6	6	6	6	6	8	19	11	12	13	10	8	4	AA
WB 33	Chalan Piao	10	6	6	13	4	8	17	6	8	8	0	6	0	4	AA
WB 34	Hopwood School	21	6	13	21	6	2	15	10	8	10	14	16	8	6	AA
WB 35	San Antonio	19	6	6	0	4	6	8	6	4	6	3	0	6	4	AA
WB 36	PIC	6	4	2	6	6	6	8	6	6	4	4	0	0	2	AA
WB 37	San Antonio Lift Stn.	33	6	4	13	22	10	12	10	6	4	23	12	4	2	AA
	SEGMENT 19A: WEST TAKPOCHAU (NORTH)															
WB 10	DPW Channel Bridge	33	67	77	66	86	79	75	88	69	67	64	47	38	44	A
	SEGMENT 19B: WEST TAKPOCHAU (CENTRAL)															
WB 11.2	South Puerto Rico Dump	42	76	56	68	70	50	42	33	33	39	24	33	17	27	A
WB 13	Outer Cove Marina	10	21	4	13	0	2	2	8	4	0	14	6	2	2	A
WB 12	Smiling Cove Marina	6	14	4	19	2	12	13	21	11	4	19	14	13	2	A
WB 12.1	American Memorial Park Drain	25	39	29	32	40	50	27	48	20	21	6	15	10	28	A
WB 14	Micro Beach	8	17	13	21	12	8	13	12	21	18	4	14	2	2	AA
WB 15	Hyatt Hotel	10	21	13	15	2	4	10	17	8	12	4	12	2	6	AA
WB 16	Dai-Ichi Hotel	17	25	17	17	0	8	12	4	6	8	13	15	11	4	AA
WB 17	Drainage #1 (Dai-ichi)	54	37	31	36	20	10	25	17	8	12	14	10	32	2	AA
WB 18	Samoa Housing	17	17	12	15	8	2	2	12	8	10	19	18	4	4	AA
WB 19	Hafa-Adai Hotel	31	25	29	26	40	19	19	38	17	14	29	23	9	18	AA
WB 20	Drainage #2 (Hafa-Adai Hotel)	33	31	38	32	46	17	25	29	13	24	32	20	13	23	AA

TABLE II - c. Saipan Coastal *Enterococci* Exceedances of CNMI WQS Continued

Enterococci % Violations																
Sample Station ID	Sampling Station Name	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Segment Class
	SEGMENT 19C: WEST TAKPOCHAU (SOUTH)															
WB 21	Garapan Fishing Dock	56	35	33	36	50	63	56	69	55	31	54	47	49	40	AA
WB 23	Drainage #3 (Garapan)	13	10	17	43	48	33	27	56	10	14	14	16	12	15	AA
WB 22	Garapan Beach	21	17	12	23	6	10	21	31	17	16	27	20	4	12	AA
	SEGMENT 20A: ACHUGAO (NORTH)															
WB 03	Nikko Hotel	21	8	6	19	4	6	0	10	8	8	7	16	0	0	AA
WB 04	San Roque School	35	14	13	17	14	10	4	8	6	10	18	14	4	2	AA
WB 05	Plumeria Hotel	10	12	6	13	4	0	4	19	4	2	18	12	4	6	AA
WB 06	Aqua Resort Hotel	8	14	12	13	2	4	6	8	2	4	28	12	2	4	AA
	SEGMENT 20B: ACHUGAO (SOUTH)															
WB 07	Tanapag Meeting Hall	44	35	50	32	36	38	37	35	26	40	44	42	15	31	AA
WB 08	Central Repair Shop	33	35	35	34	34	56	23	38	39	37	26	39	6	23	A
WB 09	Sea Plane Ramp	0	4	2	15	0	0	0	2	2	2	3	2	4	6	A
	SEGMENT 21: AS MATUIS															
WB 01	Wing Beach	11	14	10	13	4	6	4	4	4	2	4	14	2	10	AA
CNMI-19	Wing Beach Reef Flat	*	*	*	*	*	*	*	*	*	*	*	*	0	0	
WB 02	Pau-Pau Beach	25	6	6	15	2	10	0	0	4	10	10	18	4	0	AA
	SEGMENT 22: BANADERU															
NEB 01	Grotto Cave	27	10	0	5	0	4	7	0	3	10	0	18	33	24	AA

TABLE II - d. Mañagaha Coastal *Enterococci* Exceedances of CNMI WQS Continued

Enterococci % Violations																
Sample Station ID	Sampling Station Name	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Segment Class
	SEGMENT 23: MANAGAHA															
MG 01	Dock	0	4	8	0	0	0	0	0	4	0	9	5	0	0	AA
MG 02	Swimming Area A	0	7	4	4	0	0	5	4	7	0	5	0	4	0	AA
MG 03	Swimming Area A	8	4	4	0	4	0	5	0	0	0	0	8	0	0	AA
MG 04	Swimming Area B	4	4	0	0	0	4	***19	0	***15	0	5	4	0	7	AA
MG 05	Managaha Beach	4	4	0	0	0	0	5	4	***11	0	0	0	4	0	AA
MG 06	Managaha Beach	8	0	4	4	0	0	5	7	7	3	***18	4	4	0	AA
MG 07	Managaha Beach	0	4	7	0	0	7	5	4	4	0	0	4	0	0	AA
MG 08	Beach Near Statue	0	4	0	0	0	4	5	0	7	7	5	4	0	0	AA
MG 09	Managaha Beach	0	4	0	0	0	0	5	0	4	7	9	4	0	0	AA
MG 10	Managaha Beach	0	0	4	4	4	0	5	0	4	7	0	4	0	0	AA
MG 11	Next to Dock	***15	4	4	0	4	0	10	0	7	3	9	***13	4	0	AA

*** Very few exceedance. Given that Mañagaha has such a strong historical record of meeting all bacteriological, chemical and physical WQS, and the many storms during these reporting cycles, it appears that these were instances of resuspension of naturally occurring Enterococci. This and the fact that the biological monitoring data confirms good aquatic health, Mañagaha was not placed on the 303(d) list as impaired based on this and professional judgement.

TABLE II - e. Rota Coastal Dissolved Oxygen (DO%) Exceedances of CNMI WQS

DO % Exceedences												
Sampling Station ID	Sampling Station Name	*2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Segment Class
SEGMENT 2: SABANA/TALAKAYA/PALIE												
R1	Coral Garden	36	19	0	0	**	**	**	**	**	**	AA
R2	Kokomo Beach Club	36	20	0	0	0	0	5	5	0	0	AA
R13	Talakhaya	**	**	**	**	**	**	***	***	0	0	AA
SEGMENT 3: SONGSONG												
R3	Mobil Storm Drainage	0	14	0	0	0	0	0	5	0	0	A
R4	East Harbor Dock	0	0	0	0	0	0	0	10	0	0	A
R5	Teweksberry Beach	32	24	0	0	0	0	0	5	0	4	AA
R6	West Harbor Marina	36	14	0	0	0	0	5	11	0	4	A
R7	Dist #2 Storm Drain	36	19	0	0	0	0	0	5	0	0	AA
R8	Dist #1 Storm Drain	32	19	0	0	0	0	0	5	0	4	AA
SEGMENT 4: UYULANHULO/TETETO												
R9	Veterans Memorial	32	5	0	0	0	0	0	5	0	0	AA
R10	Teteto Beach	36	10	0	0	0	0	0	10	0	0	AA
R11	Guata Beach	36	10	0	0	0	0	0	5	0	0	AA
SEGMENT 5: CHAILIAT/TALO												
R12	Swimming Hole	0	0	0	0	0	0	0	5	0	0	AA

TABLE II - f. Tinian Coastal Dissolved Oxygen (DO%) Exceedances of CNMI WQS

DO % Exceedences												
Sampling Station ID	Sampling Station Name	*2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Segment Class
SEGMENT 7: MASALOK												
T1	Unai Masalok Beach	30	0	0	0	0	7	0	0	0	4	AA
T2	Unai Dangkolo	30	0	0	0	0	7	0	0	0	0	AA
SEGMENT 9: MAKPO												
T7	Tachogna Beach	30	0	0	0	0	7	0	0	4	8	AA
T8	Taga Beach	33	5	0	0	0	11	0	0	4	8	AA
T10	Kammer Beach	30	0	0	0	0	4	0	5	4	4	AA
SEGMENT 9H: MAKPO HARBOR												
T9	Harbor	33	35	0	0	4	25	0	10	32	35	A
SEGMENT 10: PUNTAN DIAPLOMANIBOT												
T5	Leprosarium I	30	0	0	0	0	4	0	0	4	0	AA
T6	Leprosarium II	30	0	0	0	0	7	0	0	0	0	AA
SEGMENT 11: PUNTAN TAHGONG												
T3	Unai Babui	30	0	0	4	0	7	0	0	0	0	AA
T4	Unai Chulu	30	0	0	4	0	4	0	0	0	4	AA

TABLE II - g. Saipan Coastal Dissolved Oxygen (DO%) Exceedances of CNMI WQS

% DO Exceedences												
Sampling Station ID	Sampling Station Name	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Segment Class
SEGMENT 12: KALABERA												
NEB 02	Bird Island Beach	0	8	0	0	0	0	0	0	4	0	AA
SEGMENT 13: TALOFOFO												
NEB 07	Hidden Beach	0	4	0	0	0	0	0	0	0	0	AA
NEB 03	Jeffrey's Beach	0	4	0	0	0	0	0	0	0	0	AA
NEB 04	Old Man By the Sea	0	4	0	0	0	0	0	0	0	0	AA
SEGMENT 14: KAGMAN												
SEB 01	Forbidden Island	*	*	*	*	*	*	*	*	*	*	AA
NEB 05	Marine Beach	0	0	0	0	0	0	0	0	0	0	AA
NEB 06	Tank Beach	0	0	0	0	0	0	0	0	0	0	AA
SEB 02	North Laolao Beach	7	0	0	0	0	0	0	0	0	0	AA
ARRA B2	North Laolao Beach	*	*	*	0	0	0	0	0	8	0	AA
ARRA B5	North Laolao Beach	*	*	*	0	0	0	0	0	0	0	AA
ARRA B8	North Laolao Beach	*	*	*	0	0	0	0	0	0	0	AA
SEGMENT 15: LAO LAO												
SEB 03	South Laolao Beach	0	4	0	0	3	0	0	0	0	0	AA
ARRA C2	South Laolao Beach	*	*	*	0	0	0	0	0	0	0	AA
ARRA C5	South Laolao Beach	*	*	*	0	0	0	0	0	8	0	AA
ARRA C3	South Laolao Beach	*	*	*	0	0	0	0	0	8	0	AA
SEGMENT 16: DAN DAN												
CNMI 72	DanDan Reef Flat	*	*	*	*	*	*	0	*	*	0	AA
SEGMENT 17A: ISLEY (WEST)												
SEB 06	Unai Dangkolo	0	0	0	0	0	0	0	0	0	0	AA
SEGMENT 17B: ISLEY (EAST)												
SEB 04	Obyan Beach	0	0	0	0	0	0	0	0	4	0	AA
SEB 05	Ladder Beach	0	0	0	0	0	0	0	0	0	0	AA

TABLE II - g. Saipan Coastal Dissolved Oxygen (DO%) Exceedances of CNMI WQS Continued

% DO Exceedences												
Sampling Station ID	Sampling Station Name	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Segment Class
SEGMENT 18A: SUSUPE (NORTH)												
WB 24	Chalan Laulau Beach	13	33	27	33	34	35	22	73	50	42	AA
WB 25	San Jose Beach	7	15	10	19	13	8	10	53	25	27	AA
WB 26	Civic Center Beach	7	19	12	15	8	4	8	35	23	27	AA
WB 27	Diamond Hotel Beach	3	15	6	15	6	2	8	33	19	12	AA
WB 28	Grand Hotel	4	8	2	17	0	2	6	29	12	10	AA
WB 29	Community School Beach	4	13	4	13	2	0	6	29	15	17	AA
SEGMENT 18B: SUSUPE (SOUTH)												
WB 30	Sugar Dock	7	15	4	13	15	2	17	39	25	40	AA
WB 31	CK Dist #2 Drainage	2	8	2	6	4	0	6	15	21	25	AA
WB 32	CK Dist #4 Lally Beach	2	8	4	4	0	0	6	17	19	10	AA
WB 33	Chalan Piao Beach	2	4	4	4	0	0	3	27	23	10	AA
WB 34	Hopwood School Beach	7	6	4	4	0	0	6	24	27	19	AA
WB 35	San Antonio Beach	4	8	5	6	0	0	6	7	17	13	AA
WB 36	PIC Beach	4	4	0	6	0	0	2	4	21	19	AA
WB 37	San Antonio Lift Stn.	4	6	0	10	0	0	4	9	19	21	AA
SEGMENT 19A: WEST TAKPOCHAU (NORTH)												
WB 10	DPW Channel Bridge	4	8	6	6	10	0	0	8	8	4	A
SEGMENT 19B: WEST TAKPOCHAU (CENTRAL)												
WB 11.2	South Puerto Rico Dump	8	18	12	10	14	10	11	28	22	18	A
WB 13	Outer Cove Marina	0	2	6	2	4	0	0	0	2	0	A
WB 12	Smiling Cove Marina	4	18	6	12	10	2	11	12	29	17	A
WB 12.1	American Memorial Park Drainage	2	10	6	10	8	0	4	9	26	15	A
WB 14	Micro Beach	0	2	2	2	4	2	0	2	4	2	AA
WB 15	Hyatt Hotel	2	6	2	2	4	0	2	0	6	8	AA
WB 16	Dai-Ichi Hotel	0	6	2	0	4	0	0	2	2	8	AA
WB 17	Drainage #1 (Dai-ichi drainage)	0	10	6	4	4	0	0	2	13	6	AA
WB 18	Samoa Housing	2	4	4	6	4	0	0	2	4	0	AA
WB 19	Hafa-Adai Hotel	11	19	15	29	30	21	6	55	38	45	AA
WB 20	Drainage #2 (Hafa-Adai Hotel drainage)	9	13	19	29	31	19	23	59	37	40	AA

TABLE II - g. Saipan Coastal Dissolved Oxygen (DO%) Exceedances of CNMI WQS Continued

% DO Exceedences												
Sampling Station ID	Sampling Station Name	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Segment Class
SEGMENT 19C: WEST TAKPOCHAU (SOUTH)												
WB 21	Garapan Fishing Dock	18	31	35	33	34	31	15	50	45	37	AA
WB 23	Drainage #3 (Garapan Beach Drainage)	13	21	12	25	21	17	11	33	23	35	AA
WB 22	Garapan Beach	11	29	17	19	28	25	18	67	40	52	AA
SEGMENT 20A: ACHUGAO (NORTH)												
WB 03	Nikko Hotel	2	12	2	4	12	4	8	4	19	21	AA
WB 04	San Roque School Beach	2	6	8	4	10	2	6	2	13	8	AA
WB 05	Plumeria Hotel	10	8	6	2	6	0	0	4	4	4	AA
WB 06	Aqua Resort Hotel	2	6	4	4	8	0	0	2	4	8	AA
SEGMENT 20B: ACHUGAO (SOUTH)												
WB 07	Tanapag Meeting Hall	2	8	8	10	6	0	4	8	15	10	AA
WB 08	Central Repair Shop	4	16	13	21	19	16	10	16	16	27	A
WB 09	Sea Plane Ramp	2	8	6	4	4	0	3	2	4	0	A
SEGMENT 21: AS MATUIS												
WB 01	Wing Beach	0	2	0	0	0	0	0	2	2	10	AA
WB 02	Pau-Pau Beach	6	18	10	10	10	8	6	12	35	37	AA
SEGMENT 22: BANADERU												
NEB 01	Grotto Cave	0	8	0	0	0	0	0	5	0	0	AA

TABLE II – h. Mañagaha Coastal Dissolved Oxygen (DO%) Exceedances of CNMI WQS

% DO Exceedences												
Sampling Station ID	Sampling Station Name	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Segment Class
SEGMENT 23: MANAGAHA												
MG 01	Dock	0	4	5	7	0	11	0	0	4	0	AA
MG 02	Swimming Area A	0	4	0	0	0	4	0	0	4	0	AA
MG 03	Swimming Area A	0	8	5	0	0	4	0	0	8	7	AA
MG 04	Swimming Area B	0	0	0	0	0	4	0	0	0	0	AA
MG 05	Managaha Beach	0	0	0	0	0	0	0	0	4	0	AA
MG 06	Managaha Beach	0	0	0	4	0	0	0	0	0	4	AA
MG 07	Managaha Beach	0	0	0	0	0	0	0	0	4	4	AA
MG 08	Beach Near Statue	0	0	0	4	0	4	0	0	4	0	AA
MG 09	Managaha Beach	0	0	0	0	0	0	0	0	4	0	AA
MG 10	Managaha Beach	0	0	0	0	0	0	0	0	4	0	AA
MG 11	Next to Dock	0	4	0	0	0	0	0	0	4	4	AA

TABLE II – i. Rota Coastal pH Exceedances of CNMI WQS

pH % Exceedences						
Sampling Station ID	Sampling Station Name	***2014	2015	2016	2017	Segment Class
SEGMENT 2: SABANA/TALAKAYA/PALIE						
R1	Coral Garden	*	*	*	*	AA
R2	Kokomo Beach Club	33	0	0	0	AA
R13	Talakhaya	**	**	0	0	AA
SEGMENT 3: SONGSONG						
R3	Mobil Storm Drainage	30	0	0	0	A
R4	East Harbor Dock	30	0	0	0	A
R5	Teweksberry Beach	38	5	0	0	AA
R6	West Harbor Marina	33	0	0	0	A
R7	Dist #2 Storm Drain	19	0	0	0	AA
R8	Dist #1 Storm Drain	33	0	0	0	AA
SEGMENT 4: UYULANHULO/TETETO						
R9	Veterans Memorial	38	0	0	0	AA
R10	Teteto Beach	43	0	0	0	AA
R11	Guata Beach	29	0	0	0	AA
SEGMENT 5: CHAILIAT/TALO						
R12	Swimming Hole	39	0	4	0	AA

TABLE II – j. Tinian Coastal pH Exceedances of CNMI WQS

pH % Exceedences							
Sampling Station ID	Sampling Station Name	2014	2015	2016	2017	Segment Class	Comments
SEGMENT 7: MASALOK							
T1	Unai Masalok Beach	0	0	0	0	AA	
T2	Unai Dangkolo	0	0	0	4	AA	
SEGMENT 9: MAKPO							
T7	Tachogna Beach	0	0	8	12	AA	Acidic trend
T8	Taga Beach	5	0	4	8	AA	
T10	Kammer Beach	0	0	0	0	AA	
SEGMENT 9H: MAKPO HARBOR							
T9A	Harbor	0	0	0	0	A	
SEGMENT 10: PUNTAN DIAPLOMANIBOT							
T5	Leprosarium I	0	0	0	0	AA	
T6	Leprosarium II	0	0	0	0	AA	
SEGMENT 11: PUNTAN TAHGONG							
T3	Unai Babui	0	0	0	0	AA	
T4	Unai Chulu	0	0	0	0	AA	

TABLE II – k. Saipan Coastal pH Exceedances of CNMI WQS

% pH Exceedences							
Sampling Station ID	Sampling Station Name	2014	2015	2016	2017	Segment Class	Comments
	SEGMENT 12: KALABERA						
NEB 02	Bird Island Beach	0	7	4	7	AA	
	SEGMENT 13: TALOFOFO						
NEB 07	Hidden Beach	0	13	4	3	AA	No trend, suspect
NEB 03	Jeffrey's Beach	0	7	0	3	AA	
NEB 04	Old Man By the Sea	0	7	4	3	AA	
	SEGMENT 14: KAGMAN						
SEB 01	Forbidden Island	*	*	*	*	AA	
NEB 05	Marine Beach	0	0	4	0	AA	
NEB 06	Tank Beach	0	0	4	3	AA	
SEB 02	North Laolao Beach	0	0	0	0	AA	
ARRA B2	North Laolao Beach	0	0	8	0	AA	
ARRA B5	North Laolao Beach	0	0	0	0	AA	
ARRA B8	North Laolao Beach	0	11	0	0	AA	No trend, suspect
	SEGMENT 15: LAO LAO						
SEB 03	South Laolao Beach	0	0	0	0	AA	
ARRA C2	South Laolao Beach	0	0	0	0	AA	
ARRA C5	South Laolao Beach	0	0	0	0	AA	
ARRA C8	South Laolao Beach	0	0	0	0	AA	
	SEGMENT 16: DAN DAN						
CNMI 72	DanDan Reef Flat	0	*	0	0	AA	
	SEGMENT 17A: ISLEY (WEST)						
SEB 06	Unai Dangkolo	0	0	4	3	AA	
	SEGMENT 17B: ISLEY (EAST)						
SEB 04	Obyan Beach	0	0	0	3	AA	
SEB 05	Ladder Beach	0	0	0	0	AA	
	SEGMENT 18A: SUSUPE (NORTH)						
WB 24	Chalan Laulau Beach	2	14	6	8	AA	No trend, suspect
WB 25	San Jose Beach	2	2	0	6	AA	
WB 26	Civic Center Beach	2	2	0	6	AA	
WB 27	Diamond Hotel Beach	0	0	0	4	AA	
WB 28	Grand Hotel	2	0	0	4	AA	
WB 29	Community School Beach	0	0	0	4	AA	

TABLE II – k. Saipan Coastal pH Exceedances of CNMI WQS Continued

% pH Exceedences							
Sampling Station ID	Sampling Station Name	2014	2015	2016	2017	Segment Class	Comments
	SEGMENT 18B: SUSUPE (SOUTH)						
WB 30	Sugar Dock	0	2	0	4	AA	
WB 31	CK Dist #2 Drainage	2	6	0	4	AA	
WB 32	CK Dist #4 Lally Beach	2	6	0	2	AA	
WB 33	Chalan Piao Beach	0	0	2	0	AA	
WB 34	Hopwood School Beach	0	2	0	4	AA	
WB 35	San Antonio Beach	0	0	0	2	AA	
WB 36	PIC Beach	2	2	0	8	AA	
WB 37	San Antonio Lift Stn.	2	2	2	4	A	
	SEGMENT 19A: WEST TAKPOCHAU (NORTH)						
WB 10	DPW Channel Bridge	6	15	8	10	A	suspect
	SEGMENT 19B: WEST TAKPOCHAU (CENTRAL)						
WB 11.2	South Puerto Rico Dump	7	3	7	2	A	
WB 13	Outer Cove Marina	3	2	2	2	A	
WB 12	Smiling Cove Marina	3	6	4	2	A	
WB 12.1	American Memorial Park Drainage	4	0	3	2	A	
WB 14	Micro Beach	10	0	6	0	AA	
WB 15	Hyatt Hotel	8	2	4	2	AA	
WB 16	Dai-Ichi Hotel (Fiesta)	6	2	4	2	AA	
WB 17	Drainage #1	0	4	8	0	AA	
WB 18	Samoa Housing	6	4	6	0	AA	
WB 19	Hafa-Adai Hotel (GrandVrio)	2	2	8	23	AA	pH Low
WB 20	Drainage #2	0	2	0	12	AA	pH Low
	SEGMENT 19C: WEST TAKPOCHAU (SOUTH)						
WB 21	Garapan Fishing Dock	0	6	4	19	AA	pH Low
WB 23	Drainage #3	3	10	10	13	AA	pH Low
WB 22	Garapan Beach	4	21	6	21	AA	pH Low
	SEGMENT 20A: ACHUGAO (NORTH)						
WB 03	Nikko Hotel	10	2	4	4	AA	
WB 04	San Roque School Beach	3	2	4	0	AA	
WB 05	Plumeria Hotel	0	2	4	0	AA	
WB 06	Aqua Resort Hotel	6	2	4	2	AA	

TABLE II – k. Saipan Coastal pH Exceedances of CNMI WQS Continued

% pH Exceedences							
Sampling Station ID	Sampling Station Name	2014	2015	2016	2017	Segment Class	Comments
	SEGMENT 20B: ACHUGAO (SOUTH)						
WB 07	Tanapag Meeting Hall	6	0	2	10	AA	
WB 08	Central Repair Shop	3	3	4	3	A	
WB 09	Sea Plane Ramp	3	2	4	2	A	
	SEGMENT 21: AS MATUIS						
WB 01	Wing Beach	2	0	8	12	AA	pH Low
WB 02	Pau-Pau Beach	6	0	2	6	AA	
	SEGMENT 22: BANADERU						
NEB 01	Grotto Cave	0	7	4	10	AA	

TABLE II – l. Mañagaha Coastal pH Exceedances of CNMI WQS

% pH Exceedences							
Sampling Station ID	Sampling Station Name	2014	2015	2016	2017	Segment Class	Comments
	SEGMENT 23: MANAGAHA						
MG 01	Dock	0	0	4	15	AA	pH Low
MG 02	Swimming Area A	0	0	8	4	AA	
MG 03	Swimming Area A	0	0	8	0	AA	
MG 04	Swimming Area B	0	0	4	0	AA	
MG 05	Managaha Beach	0	0	4	0	AA	
MG 06	Managaha Beach	0	0	8	0	AA	
MG 07	Managaha Beach	0	0	8	0	AA	
MG 08	Beach Near Statue	0	0	8	0	AA	
MG 09	Managaha Beach	0	0	8	0	AA	
MG 10	Managaha Beach	0	0	4	0	AA	
MG 11	Next to Dock	0	0	4	0	AA	

TABLE II – m. Saipan Coastal Nutrient Exceedances of CNMI WQS

Coastal Marine Waters % Nutrient Exceedences						
		2016		2017		
Sampling Station ID	Sampling Station Name	PO4	NO3	PO4	NO3	Segment Class
	SEGMENT 12: KALABERA					
NEB 02	Bird Island Beach	*	*	0	0	AA
	SEGMENT 13: TALOFOFO					
NEB 07	Hidden Beach	*	*	0	0	AA
NEB 03	Jeffrey's Beach	*	*	0	0	AA
CNMI-104	Jeffrey's Beach Reef Flat	0	0	*	*	AA
NEB 04	Old Man By the Sea	*	*	0	0	AA
	SEGMENT 14: KAGMAN					
NEB 05	Marine Beach	*	*	0	0	AA
CNMI-29	Tank Beach Reef flat	0	0	*	*	AA
NEB 06	Tank Beach	*	*	0	0	AA
SEB 01	Forbidden Island	*	*	*	*	AA
SEB 02	North Laolao Beach	*	*	0	0	AA
ARRA B2	North Laolao Beach	9	0	0	0	AA
ARRA B5	North Laolao Beach	0	0	0	0	AA
ARRA B8	North Laolao Beach	0	0	0	0	AA
	SEGMENT 15: LAO LAO					
CNMI-21	Central Laolao Beach Reef flat	0	0	0	0	AA
SEB 03	South Laolao Beach	*	*	0	0	AA
ARRA C2	South Laolao Beach	9	0	0	0	AA
ARRA C5	South Laolao Beach	9	0	0	0	AA
ARRA C8	South Laolao Beach	0	0	0	0	AA
	SEGMENT 16: DAN DAN					
CNMI 72	DanDan Reef Flat	0	0	0	0	AA
	SEGMENT 17A: ISLEY (WEST)					
SEB 06	Unai Dangkolo	*	*	0	0	AA
	SEGMENT 17B: ISLEY (EAST)					
SEB 04	Obyan Beach	*	*	0	0	AA
SEB 05	Ladder Beach	*	*	0	0	AA
CNMI-30	Ladder Reef Flat	0	0	0	0	AA
	SEGMENT 18A: SUSUPE (NORTH)					
WB 24	Chalan Laulau Beach	*	*	0	*	AA
WB 25	San Jose Beach	*	*	0	*	AA
WB 26	Civic Center Beach	*	*	0	*	AA
WB 27	Diamond Hotel Beach	*	*	0	*	AA
WB 28	Grand Hotel	*	*	0	*	AA
WB 29	Community School Beach	*	*	0	*	AA

TABLE II – m. Saipan Coastal Nutrient Exceedances of CNMI WQS Continued

Coastal Marine Waters % Nutrient Exceedences						
		2016		2017		
Sampling Station ID	Sampling Station Name	PO4	NO3	PO4	NO3	Segment Class
	SEGMENT 18B: SUSUPE (SOUTH)					
WB 30	Sugar Dock	*	*	0	*	AA
WB 31	CK Dist #2 Drainage	*	*	0	*	AA
WB 32	CK Dist #4 Lally Beach	*	*	0	*	AA
WB 33	Chalan Piao Beach	*	*	0	*	AA
WB 34	Hopwood School Beach	*	*	0	*	AA
WB 35	San Antonio Beach	*	*	0	*	AA
WB 36	PIC Beach	*	*	0	*	AA
WB 37	San Antonio Lift Station	*	*	0	*	AA
	SEGMENT 19A: WEST TAKPOCHAU (NORTH)					
WB 10	DPW Channel Bridge	*	*	0	0	A
	SEGMENT 19B: WEST TAKPOCHAU (CENTRAL)					
WB 11.2	South Puerto Rico Dump	*	*	0	0	A
WB 13	Outer Cove Marina	*	*	0	0	A
WB 12	Smiling Cove Marina	*	*	0	0	A
WB 12.1	American Memorial Park Drainage	*	*	0	0	A
WB 14	Micro Beach	*	*	0	0	AA
WB 15	Hyatt Hotel	*	*	0	0	AA
WB 16	Dai-Ichi Hotel	*	*	0	0	AA
WB 17	Drainage #1 (Dai-ichi drainage)	*	*	0	0	AA
WB 18	Samoa Housing	*	*	0	0	AA
WB 19	Hafa-Adai Hotel	*	*	0	0	AA
WB 20	Drainage #2 (Hafa-Adai Hotel draina	*	*	0	0	AA
	SEGMENT 19C: WEST TAKPOCHAU (SOUTH)					
WB 21	Garapan Fishing Dock	*	*	0	*	AA
WB 23	Drainage #3 (Garapan Beach Draina	*	*	0	100	AA
WB 22	Garapan Beach	*	*	0	50	AA
	SEGMENT 20A: ACHUGAO (NORTH)					
WB 03	Nikko Hotel	*	*	0	0	AA
WB 04	San Roque School Beach	*	*	0	0	AA
WB 05	Plumeria Hotel	*	*	0	0	AA
WB 06	Aqua Resort Hotel	*	*	0	0	AA
	SEGMENT 20B: ACHUGAO (SOUTH)					
WB 07	Tanapag Meeting Hall	*	*	0	0	AA
WB 08	Central Repair Shop	*	*	0	0	A
WB 09	Sea Plane Ramp	*	*	0	0	A
	SEGMENT 21: AS MATUIS					
WB 01	Wing Beach	*	*	0	0	AA
CNMI-19	Wing Beach Reef Flat	0	0	*	*	AA
WB 02	Pau-Pau Beach	*	*	0	0	AA
	SEGMENT 22: BANADERU					
NEB 01	Grotto Cave	*	*	0	0	AA

TABLE II – n. Mañagaha Coastal Nutrient Exceedances of CNMI WQS

Coastal Marine Waters % Nutrient Exceedences						
		2016		2017		
Sampling Station ID	Sampling Station Name	PO4	NO3	PO4	NO3	Segment Class
SEGMENT 23: MANAGAHA						
MG 01	Dock	*	*	0	0	AA
MG 02	Swimming Area A	*	*	0	0	AA
MG 03	Swimming Area A	*	*	0	0	AA
MG 04	Swimming Area B	*	*	0	0	AA
MG 05	Managaha Beach	*	*	0	0	AA
MG 06	Managaha Beach	*	*	0	0	AA
MG 07	Managaha Beach	*	*	0	0	AA
MG 08	Beach Near Statue	*	*	0	0	AA
MG 09	Managaha Beach	*	*	0	0	AA
MG 10	Managaha Beach	*	*	0	0	AA
MG 11	Next to Dock	*	*	0	0	AA

TABLE II – o. Rota Stream *Enterococci* Exceedances of CNMI WQS

Enterococci % Violations				
Sample Station ID	Sampling Station Name	2017	Segment Class	Average MPN/100 ml
SEGMENT 20B: TALAKHAYA				
TK0		**	1	Insufficient data
TK1		**	1	Insufficient data
TK2		**	1	Insufficient data
TK3		**	1	Insufficient data
TK4		**	1	Insufficient data

STREAM DATA

TABLE II – p. Saipan Stream *Enterococci* Exceedances of CNMI WQS

Enterococci % Violations								
Sample Station ID	Sampling Station Name	2013	2014	2015	2016	2017	Segment Class	Average MPN/100 ml
SEGMENT 13: TALOFOFO								
TAL03_L	Lower 3 Stream	**	100	100	50	*	1	7197
TAL01_L	Lower 1 Stream	**	100	100	100	*	1	4203
TAL02_L	Lower 2 Stream	**	100	67	100	*	1	5801
TAL02_U	Upper 2 Stream	**	80	67	100	*	1	5767
SEGMENT 14: KAGMAN								
KAG01_L	Lower 1 Stream	**	*	*	*	*	1	5794
KAG01_U	Upper 1 Stream	**	*	*	*	*	1	1065
KAG02_L	Lower 2 Stream	**	*	*	*	*	1	Insufficient data
KAG02_M	Middle 2 Stream	**	*	*	*	*	1	294
KAG02_UK1	Upper 2 Stream	**	*	*	*	*	1	195
SEGMENT 15: LAO LAO								
LAO03_U	Upper 3 Stream	**	*	*	*	*	1	Insufficient data
LAO04_U	Upper 4 Stream	**	*	*	*	*	1	161
LAO04_M	Middle 4 Stream	**	*	*	*	*	1	1325
LAO03_M	Middle 3 Stream	**	*	*	*	*	1	1486
LAO01_U	Upper 1 Stream	**	*	*	*	*	1	Insufficient data
LAO01_UA	Upper 1A Stream	**	*	*	*	*	1	Insufficient data
LAO01_L	Lower 1 Stream	**	*	*	*	*	1	Insufficient data
LAO02_L	Lower 2 Stream	**	*	*	*	*	1	Insufficient data
LAO03_L	Lower 3 Stream	**	*	*	*	*	1	3171
LAO04_L	Lower 4 Stream	**	*	*	*	*	1	1532
LAO05_L	Lower 5 Stream	**	*	*	*	*	1	1934
SEGMENT 19A: WEST TAKPOCHAU (NORTH)								
WTN_UB1	Upper 1B Stream	**	*	*	*	*	1	4583
WTN01_MB	Middle 1B Stream	**	*	*	*	*	1	9702
WTN01_UB2	Upper 1B Stream	**	*	*	*	*	1	44078
WTN01_L	Lower 1 Stream	**	*	*	*	*	1	2296

TABLE II – p. Saipan Stream *Enterococci* Exceedances of CNMI WQS Continued

Enterococci % Violations								
Sample Station ID	Sampling Station Name	2013	2014	2015	2016	2017	Segment Class	Average MPN/100 ml
SEGMENT 19B: WEST TAKPOCHAU (CENTRAL)								
WTC03_UA	Upper 3A Stream	**	*	*	*	*	1	3110
WTC03_MA	Middle 3A Stream	**	*	*	*	*	1	3222
WTC01_L	Lower 1 Stream	**	*	*	*	*	1	13525
WTC02_L	Lower 2 Stream	**	*	*	*	*	1	52932
WTC03_L	Lower 3 Stream	**	*	*	*	*	1	22653
WTRC03_UC	Upper 3C Stream	**	*	*	*	*	1	26564
WTC03_MC	Middle 3C Stream	**	*	*	*	*	1	21870
WTC03_MB	Middle 3B Stream	**	*	*	*	*	1	15031
WTC03_UB	Upper 3B Stream	**	*	*	*	*	1	10007
SEGMENT 20A: ACHUGAO (NORTH)								
ACH01_L	Lower 1 Stream	**	100	*	*	*	1	35840
ACH01_M	Middle 1 Stream	**	67	*	*	*	1	24990
ACH01_U	Upper 1 Stream	**	100	*	*	*	1	21532
SEGMENT 20B: ACHUGAO (SOUTH)								
WTN01_MA	Middle 1 Stream	**	*	*	*	*	1	1498
ACH02_L	Lower 2 Stream	**	67	*	*	*	1	34192
ACH02L_Site 1	Lower 2 Stream Lagoon outlet	**	*	100	78	94	1	2531
ACH02L_Site 2	Lower 2 Stream Culvert side	**	*	86	67	100	1	3436
AGATAN	Agatan Stream	**	*	*	*	100	1	2355

TABLE II – q. Saipan Stream Nutrient Exceedances of CNMI WQS

Fresh Water Streams % Nutrient Exceedences						
		2016		2017		
Sampling Station ID	Sampling Station Name	PO4	NO3	PO4	NO3	Segment Class
SEGMENT 13: TALOFOFO						
TAL01_L	Outlet at Hidden beach	50	100	*	*	1
TALO2_U	Upland of Talofofo Rd, old bridge	0	100	*	*	1
TAL02_L	Outlet at Jeffrey's Beach	50	100	*	*	1
TAL03_L	Outlet at Old Man by the Sea	100	100	*	*	1

TABLE II – q. Saipan Stream Nutrient Exceedances of CNMI WQS Continued

Fresh Water Streams % Nutrient Exceedences						
		2016		2017		
Sampling Station ID	Sampling Station Name	PO4	NO3	PO4	NO3	Segment Class
SEGMENT 14: KAGMAN						
KAG01_U	Hikamus Way at barrel vault culvert	*	*	*	*	1
KAG01_L	Outlet at Marine Beach	*	*	*	*	1
KAG02_U	Pina Drive upper stream	*	*	*	*	1
KAG02_M	Cul-de-sac on Sereguidiyas Pl	*	*	*	*	1
KAG02_L	Outlet at Tank Beach	*	*	*	*	1
LAO01_U	Railway culvert	*	*	*	*	1
LAO01_L	Lao Lao Bay Rd x Gap Gap Rd	*	*	*	*	1
SEGMENT 15: LAO LAO						
LAO02_L	Lao Lao Bay Rd Dive site	*	*	*	*	1
LAO03_U	Isa Rd near Santos Acres	*	*	*	*	1
LAO03_M	Railroad Dr. culvert	*	*	*	*	1
LAO03_L	Lao Lao Bay Rd Picnick site	*	*	*	*	1
LAO04_U	Isa Dr	*	*	*	*	1
LAO04_M	Isa Dr x Railroad Dr	*	*	*	*	1
LAO04_L	Lao Lao Bay Rd	*	*	*	*	1
LAO05_L	Lao Lao Bay Rd at check-dam	*	*	*	*	1
SEGMENT 19A: WEST TAKPOCHAU (NORTH)						
WTN01_UB1	Isa Rd Ogumoro land	0	100	*	*	1
WTN01_MA	Pale Arnold Rd x Orhopay Pl	*	*	*	*	1
WTN01_UB2	Abandoned house	*	*	*	*	1
WTN01_MB	Isa Rd x Rubentacion Rd	100	100	*	*	1
WTN01_L	DPW Channel bridge mangroves	100	100	*	*	1
SEGMENT 19B: WEST TAKPOCHAU (CENTRAL)						
WTC03_UA	Navy Hill Rd x Bus Sta 139	100	100	*	*	1
WTC03_MA	Pale Arnold Rd x Navy Hill Rd	*	*	*	*	1
WTC01_L	Culvert outlet	*	*	*	*	1
WTC02_L	Open channel upstream of parking area	*	*	*	*	1
WTC03_UB	Navy Hill Rd x Gravel Rd to Takpochao	100	50	*	*	1
WTC03_MB	Pale Arnold Rd x Garapan Rd	100	0	*	*	1
WTC03_UC	Falipe Rd. Tanaka land	100	0	*	*	1
WTC03_MC	Pale Arnold Rd x Kopa Dioro St	100	0	*	*	1
WTC03_L	On walkway downstream	*	*	*	*	1
SEGMENT 20B: ACHUGAO (SOUTH)						
ACH01_U	Achugao Bobo waterfall	*	*	*	*	1
ACH01_M	Pale Arnold Rd south of Dogas	*	*	*	*	1
ACH01_L	Ste Remedios Rd Iguel land	*	*	*	*	1
ACH02_U	PaiPai Dr to CUC Tanapag 2	*	*	*	*	1
ACH02_M	Lissie Rd.	*	*	*	*	1
ACH02_L	Ste Remedios Rd CUC T-1	*	*	*	*	1
ACH03_U	PaiPai Dr. culvert at pasture	*	*	*	*	1
ACH03_M	Pale Arnold Rd KC Market	*	*	*	*	1
ACH03_L	Ste Remedios Rd Tegita land	*	*	*	*	1

LAKE DATA

TABLE II – r. Susupe Lake *E. Coli* Exceedances of CNMI WQS

Lake Susupe E. Coli % Violations			
Fiscal Year	Number of Samples (n =)	Number of Exceedences (n =)	Percent Exceedences (%)
2010	20	2	10
2011	19	3	16
2012	19	1	5
2013	16	3	19
2014	19	2	11
2015	23	2	9
2016	16	7	44
2017	28	8	29

TABLE II – s. Susupe Lake Dissolved Oxygen (DO%) Exceedances of CNMI WQS

Lake Susupe Annual Percent DO% Exceedances			
Fiscal Year	Number of Samples (n =)	Number of Exceedences (n =)	Percent Exceedences (%)
2010	20	11	55
2011	18	12	67
2012	18	15	83
2013	18	8	50
2014	19	11	58
2015	19	14	74
2016	16	5	31
2017	28	10	36

TABLE II – t. Susupe Lake pH Exceedances of CNMI WQS

Lake Susupe Annual Percent pH Exceedances			
Fiscal Year	Number of Samples (n =)	Number of Exceedences (n =)	Percent Exceedences (%)
2012	19	3	16
2013	14	0	0
2014	19	2	11
2015	18	3	17
2016	15	9	60
2017	27	3	11

APPENDIX III: CNMI Coastal Biological Monitoring Criteria Data Used in 2018 Waterbody Assessments

TABLE III – a. Rota Aquatic Life Use Support Values for Benthic Substrate and Cora Diversity/Seagrass Trends

FY2016-2017							Aquatic Life Use Support Values						
MMT Site No.	Seg ID	Watershed Segment Name	Benthic Substrate Ratio Trends		Coral Diversity / Seagrass Trends		2008 IR FY06-07	2010 IR FY08-09	2012 IR FY10-11	2014 IR FY12-13	2016 IR FY14-15	2018 IR FY16-17	*2018 IR Overal Ranking*
Rota													
22	1	Dugi/Gampapa/Chenchon	Non-significant change	↔	Non-significant change	↔	No ranking	No ranking	No ranking	Fair	Fair	Fair	***Fair***
23	2	Sabana/Talakhaya/Palie	Significant Increase	↑	Non-significant change	↔	Fair	Fair	Fair	Fair	Fair	Fair	***Fair***
24	2	Sabana/Talakhaya/Palie	Significant Decrease	↓	Non-significant change	↔	Fair	Fair	Fair	Fair	Fair	Poor	
25	2	Sabana/Talakhaya/Palie	Non-significant change	↔	Non-significant change	↔	Good	Good	Good	Good	Good	Good	
26	3	Songsong	No New Data	*	No New Data	*	Fair	Fair	Good	Good	Good	No New Data	***Fair***
27	3	Songsong	Significant Increase	↑	Non-significant change	↔	Poor	Poor	Fair	Fair	Fair	Fair	
28	3	Songsong	No New Data	*	No New Data	*	No ranking	Fair	Fair	Good	Fair	No New Data	
29	4	Uyulanhulo/Teteto	No New Data	*	No New Data	*	No ranking	No ranking	No ranking	Good	Good	No New Data	***Fair***
30	4	Uyulanhulo/Teteto	Non-significant change	↔	Non-significant change	↔	Fair	Fair	Good	Fair	No New Data	Fair	
31	5	Chaliat/Talo	Significant Decrease	↓	Significant Decrease	↓	No ranking	No ranking	No ranking	Poor	Fair	Poor	***Poor***

TABLE III – b. Aguigan and Tinian Aquatic Life Use Support Values for Benthic Substrate and Cora Diversity/Seagrass Trends

FY2016-2017							Aquatic Life Use Support Values						2018 IR Overal Ranking
MMT Site No.	Seg ID	Watershed Segment Name	Benthic Substrate Ratio Trends		Coral Diversity / Seagrass Trends		2008 IR FY06-07	2010 IR FY08-09	2012 IR FY10-11	2014 IR FY12-13	2016 IR FY14-15	2018 IR FY16-17	
Aguigan													
21	6	Aguigan	No New Data	*	No New Data	*	Good	Good	No New Data	Fair	No New Data	No New Data	***Fair***
Tinian													
16	7	Masalok	No New Data	*	No New Data	*	Fair	Good	Good	No New Data	Good	No New Data	***Good***
17	9	Makpo	No New Data	*	No New Data	*	No ranking	Fair	Poor	Poor	No New Data	No New Data	***Poor***
18	9	Makpo	No New Data	*	No New Data	*	Poor	Poor	No New Data	Poor	Poor	No New Data	
19	9	Puntan Diaplomanibot	No New Data	*	No New Data	*	Fair	Fair	No New Data	Fair	Poor	No New Data	***Poor***
20	11	Puntan Tahgong	No New Data	*	No New Data	*	Poor	Poor	Poor	No New Data	No New Data	No New Data	***Poor***

TABLE III – c. Saipan Aquatic Life Use Support Values for Benthic Substrate and Cora Diversity/Seagrass Trends

FY2016-2017							Aquatic Life Use Support Values						
MMT Site No.	Seg ID	Watershed Segment Name	Benthic Substrate Ratio Trends		Coral Diversity / Seagrass Trends		2008 IR FY06-07	2010 IR FY08-09	2012 IR FY10-11	2014 IR FY12-13	2016 IR FY14-15	2018 IR FY16-17	*2018 IR Overal Ranking*
Saipan													
1	12	Kalabera	Significant Increase	↑	No New Data	*	Fair	Fair	Good	Fair	Fair	Fair	***Fair***
2	14	Kagman	Non-Significant Change	↔	No New Data	*	No Ranking	No Ranking	No Ranking	Good	No New Data	Good	***Good***
3	15	Laolao	Significant Increase	↑	No New Data	*	Fair	Fair	Fair	Fair	No New Data	Fair	***Poor***
4	15	Laolao	Significant Increase	↑	Non-Significant Change	↔	Poor1,2	Poor1,2	Poor1,2	Poor1,2	Poor1,2	Poor1,2	
6	17b	Isley (East)	Non-Significant Change	↔	No New Data	*	Fair	Fair	Good	Good	Good	Good	***Fair***
7	17b	Isley (East)	No New Data	*	No New Data	*	Good	Poor2	Poor2	Poor2	Poor2	No New Data	
5	17a	Isley (West)	Non-Significant Change	↔	No New Data	*	Fair	Poor1,2	Fair	No New Data	Fair	Fair	***Fair***
55	18b	Susupe (South)	*	*	Seagrass Significantly Less than Algae	↓	No Ranking	No Ranking	No Ranking	Fair	Good	Poor	***Fair***
56	18b	Susupe (South)	*	*	Seagrass Significantly Greater than Algae	↑	Good	No New Data	No New Data	Fair	Fair	Good	
57	18b	Susupe (South)	*	*	No New Seagrass Data	*	Good	No New Data	Good	Fair	No New Data	No New Data	
8	18a	Susupe (North)	Non-Significant Change	↔	No New Data	*	Good	Good	Good	Good	No New Data	Good	***Good***
53	18a	Susupe (North)	*	*	No New Seagrass Data	*	No Ranking	Fair	Fair	Fair	Good	No New Data	
46	19c	West Takpochao (South)	*	*	Non-Significant Change in Seagrass	↔	Poor1	Poor1	Poor1	No New Data	Fair	Fair	***Poor***
49	19c	West Takpochao (South)	*	*	No New Seagrass Data	*	Good	Good	No New Data	Poor1	No New Data	No New Data	

TABLE III – c. Saipan Aquatic Life Use Support Values for Benthic Substrate and Cora Diversity/Seagrass Trends Continued

FY2016-2017							Aquatic Life Use Support Values						2018 IR Overal Ranking
MMT Site No.	Seg ID	Watershed Segment Name	Benthic Substrate Ratio Trends		Coral Diversity / Seagrass Trends		2008 IR FY06-07	2010 IR FY08-09	2012 IR FY10-11	2014 IR FY12-13	2016 IR FY14-15	2018 IR FY16-17	
9	19b	West Takpochao (Central)	Non-Significant Change	↔	No New Data	*	No Ranking	Poor1	Fair	No New Data	Fair	Fair	***Fair***
11	19b	West Takpochao (Central)	No New Data	*	No New Data	*	No Ranking	No Ranking	No Ranking	Good	Good	No New Data	
42	19b	West Takpochao (Central)	*	*	No New Seagrass Data	*	No Ranking	No Ranking	No Ranking	Fair	Fair	No New Data	
43	19b	West Takpochao (Central)	*	*	No New Seagrass Data	*	No Ranking	No Ranking	No Ranking	Fair	Fair	No New Data	
N/A	19a	West Takpochao (North)	*	*	No New Seagrass Data	*	Poor1	No New Data	No New Data	No New Data	No New Data	No New Data	***Poor***
41	20b	Achugao (South)	*	*	No New Seagrass Data	*	Poor1	Poor1	Poor1	No New Data	Poor1	No New Data	***Poor***
36	20a	Achugao (North)	*	*	No New Seagrass Data	*	Poor1	Fair	Good	Good	No New Data	No New Data	***Fair***
37	20a	Achugao (North)	*	*	No New Seagrass Data	*	No Ranking	No Ranking	No Ranking	Fair	Fair	No New Data	
38	20a	Achugao (North)	*	*	No New Seagrass Data	*	Poor1	No New Data	Poor1	Fair	No New Data	No New Data	
39	20a	Achugao (North)	*	*	No New Seagrass Data	*	No Ranking	No Ranking	No Ranking	Fair	No New Data	No New Data	
15	21	As Matuis	Significant Increase	↑	No New Data	*	Good	Good	Good	Good	No New Data	Good	***Fair***
34	21	As Matuis	*	*	No New Seagrass Data	*	Good	No New Data	Good	Poor1	Poor1	No New Data	
12	23	Managaha	Non-Significant Change	↔	No New Data	*	Good	Good	Good	Good	Good	No New Data	***Good***
13	23	Managaha	No New Data	*	No New Data	*	No Ranking	Good	Good	No New Data	No New Data	No New Data	

APPENDIX IV: CNMI Coastal Waterbodys Reported by Assigned CALM Categories

TABLE IV-a. Category 1: Coastal Waters Attaining All DUs

Coastal Miles CALM Category 1				
Segment ID	Segment Name	Segment Class	Segment Size (Miles)	Comments
Rota				
1	Dugi/Gampapa/Chenchon	AA	11.1	All uses attained
Tinian and Aguigan				
6	Aguigan	AA	8.2	All uses attained
8	Carolinas	AA	10.4	All uses attained
Saipan				
	N/A			
Northern Islands				
24	Farallon De Medinilla	AA	4.2	All uses attained
25	Anatahan	AA	17.3	All uses attained
26	Sarigan	AA	6.0	All uses attained
27	Guguan	AA	5.6	All uses attained
28	Alamagan	AA	9.4	All uses attained
29	Pagan	AA	28.2	All uses attained
30	Agrihan	AA	19.3	All uses attained
31	Asuncion	AA	7.0	All uses attained
32	Maug	AA	9.5	All uses attained
33	Farllon De Pajaros	AA	4.2	All uses attained
			140.4	**TOTAL**

TABLE IV-b. Category 2: Coastal Waters Attaining Some DUs, Insufficient Information about Remaining DUs

Coastal Miles CALM Category 2				
Segment ID	Segment Name	Segment Class	Segment Size (Miles)	Comments
Rota				
	N/A			
Tinian and Aguigan				
	N/A			
Saipan and Managaha				
16	Dan Dan	AA	***6.3**	No fish tissue data, excellent but insufficient water quality data, very remote.
Northern Islands				
	N/A			
		TOTAL	**6.3**	**Miles**

* **Bold Red Font** indicates new dimensions calculated from the latest available data

Table IV-c. Category 3: Coastal Waters with Insufficient Information to Assess All DUs

Coastal Miles CALM Category 3				
Segment ID	Segment Name	Segment Class	Segment Size (Miles)	Comments
Rota				
	N/A			
Tinian and Aguigan				
	N/A			
Saipan and Managaha				
14	Kagman	AA	***6.7**	No fish tissue data, all other uses supported
Northern Islands				
	N/A			
		TOTAL	**6.7**	**Miles**

* **Bold Red Font** indicates new dimensions calculated from the latest available data

Table IV-d. Category 4a: Coastal Waters with Impaired DUs by Pollutant(s), But Have Approved TMDL

Coastal Miles CALM Category 4a				
Segment ID	Segment Name	Segment Class	Segment Size (Miles)	Comments
Rota				
	N/A			
Tinian and Aguigan				
	N/A			
Saipan				
12	Kalabera	AA	***4.1**	
13	Talofofo	AA	**5.4**	
15	Lao Lao	AA	**1.4**	
17B	Isley (East)	AA	**4.2**	
22	Banaderu	AA	**5.1**	
Northern Islands				
	N/A			
		TOTAL	**20.2**	**Miles**

* **Bold Red Font** indicates new dimensions calculated from the latest available data

Table IV-e. Category 5: Coastal Waters with Impaired DUs by Pollutants, TMDL Required

Coastal Miles CALM Category 5				
Segment ID	Segment Name	Segment Class	Segment Size (Miles)	Comments
Rota				
2	Sabana/Talakhaya/Palie	AA	7.3	Enterococci exceedances, No new nutrient levels to delist phosphate
3	Songsong	A	7.9	Enterococci exceedances, No new nutrient levels to delist phosphate
4	Uyulan hulo/Teteto	AA	3.5	No new nutrient levels to delist phosphate
5	Chaliat/Talo	AA	2.6	Poor ALUS rank, Enterococci exceedances, No new nutrient levels to delist
Tinian and Aguigan				
7	Masalok	AA	3.5	No new nutrient levels to delist phosphate
9	Makpo	AA	3	Poor ALUS rank, pH Low, No new nutrient levels to delist phosphate
9H	Makpo Harbor	A	1.5	Poor ALUS rank, DO% Low, No new nutrient levels to delist phosphate
10	Puntan Diaplolamanibot	AA	9.9	Poor ALUS rank, No new nutrient levels to delist phosphate
11	Puntan Tahgong	AA	6.4	Poor ALUS rank, No new nutrient levels to delist phosphate
Saipan				
17A	Isley (West)	A	***1.7**	Cu & Pb in biota
18B	Susupe (South)	AA	**2.8**	DO% Low, Enterococci exceedances
18A	Susupe (North)	AA	**2.4**	DO% Low
19C	W. Takpochau (South)	AA	**1.9**	Poor ALUS rank, DO% and pH Low, High Nitrate levels, Enterococci exceedances
19B	W. Takpochau (Central)	A	**4.4**	DO% and pH Low, Hg in Fish tissue, Enterococci exceedances
19A	W. Takpochau (North)	AA	**1**	Poor ALUS rank, Pb in bivalves, Enterococci exceedances
20B	Achugao (South)	AA	**2.4**	Poor ALUS rank, DO% Low, Pb in bivalves, Enterococci exceedances
20A	Achugao (North)	AA	**1.9**	DO% Low
21	As Matuis	AA	**2.2**	DO% and pH Low
Managaha				
23	Managaha	AA	**0.6**	pH Low at Dock
Northern Islands				
	N/A			
		TOTAL	**66.9**	**Miles**

*** Bold Red Font** indicates new dimensions calculated from the latest available data

APPENDIX V: CNMI Fresh Water Streams Reported by Assigned CALM Categories

Table V-a. Category 1: Streams Attaining All DUs

Stream Miles CALM Category 1				
Segment ID	Segment Name	Segment Class	Segment Size (Miles)	Comments
Saipan				
	N/A			
Rota				
	N/A			
Tinian				
	N/A			
Northern Islands				
24STR	Farallon de Medinilla	1	Unknown	Fish tissue data not available, very limited monitoring data. However, remote, lack of anthropogenic sources of pollution and stressors.
25STR	Anatahan	1	Unknown	Fish tissue data not available, very limited monitoring data. However, remote, lack of anthropogenic sources of pollution and stressors.
26STR	Sarigan	1	Unknown	Fish tissue data not available, very limited monitoring data. However, remote, lack of anthropogenic sources of pollution and stressors.
27STR	Guguan	1	Unknown	Fish tissue data not available, very limited monitoring data. However, remote, lack of anthropogenic sources of pollution and stressors.
28STR	Alamagan	1	Unknown	Fish tissue data not available, very limited monitoring data. However, remote, lack of anthropogenic sources of pollution and stressors.
29STR	Pagan	1	Unknown	Fish tissue data not available, very limited monitoring data. However, remote, lack of anthropogenic sources of pollution and stressors.
30STR	Agrihan	1	Unknown	Fish tissue data not available, very limited monitoring data. However, remote, lack of anthropogenic sources of pollution and stressors.
31STR	Asuncion	1	Unknown	Fish tissue data not available, very limited monitoring data. However, remote, lack of anthropogenic sources of pollution and stressors.
32STR	Maug	1	Unknown	Fish tissue data not available, very limited monitoring data. However, remote, lack of anthropogenic sources of pollution and stressors.
33STR	Farallon De Pajaros	1	Unknown	Fish tissue data not available, very limited monitoring data. However, remote, lack of anthropogenic sources of pollution and stressors.
		Total Miles	**Unknown**	

Table V-b. Category 2: Streams Attaining Some DUs, Insufficient Information about Remaining DUs

Stream Miles CALM Category 2				
Segment ID	Segment Name	Segment Class	Segment Size (Miles)	Comments
Rota				
2	Sabana/Talakhaya/Palie	1	6.1	Fish tissue data not available, very limited monitoring data. Sediment laden stormwater
Tinian				
	No Streams			
Saipan				
12STR	Kalabera	1	***7.8**	Very limited monitoring data
16STR	Dan Dan	1	**0.8**	Very limited monitoring data
18STRB	Susupe (South)	1	**1.4**	Fish tissue data not available, very limited monitoring data
18STRA	Susupe (North)	1	**7**	Fish tissue data not available, very limited monitoring data
19STRC	W. Takpochau (South)	1	**1.3**	Fish tissue data not available, very limited monitoring data
19STRA	W. Takpochau (North)	1	**4.7**	Fish tissue data not available, very limited monitoring data
20STRA	Achugao (North)	1	**3.4**	Fish tissue data not available, very limited monitoring data
21STR	As Matuis	1	**1.1**	Fish tissue data not available, very limited monitoring data
Northern Islands				
	N/A			
		Total Miles	**33.6**	

*** Bold Red Font** indicates new dimensions calculated from the latest available data

Table V-c. Category 3: Streams with Insufficient Information to Assess All DUs

Stream Miles CALM Category 3				
Segment ID	Segment Name	Segment Class	Segment Size (Miles)	Comments
Rota				
	N/A			
Tinian				
	No Streams			
Saipan				
12STR	Kagman	1	***12.2**	Fish tissue data not available, very limited monitoring data
15STR	Lao Lao	1	**6.7**	Very limited monitoring data
17STRB	Isley (East)	1	**0.3**	Fish tissue data not available, very limited monitoring data
17STRA	Isley (West)	1	**3.5**	Fish tissue data not available, very limited monitoring data
Northern Islands				
	N/A			
		Total Miles	**22.7**	

*** Bold Red Font** indicates new dimensions calculated from the latest available data

Table V-d. Category 5: Streams with Impaired DUs by Pollutant(s), TMDL Required

Stream Miles CALM Category 5				
Segment ID	Segment Name	Segment Class	Segment Size (Miles)	Comments
Rota				
	N/A			
Tinian				
	No Streams			
Saipan				
13STR	Talofofo	1	*34.5	Fish tissue data not available, very limited monitoring data
19STRB	W. Takpochau (Central)	1	3.2	Very limited monitoring data
20STRB	Achugao (South)	1	6.5	Fish tissue data not available, very limited monitoring data
Northern Islands				
	N/A			
		Total Miles	**44.2**	

APPENDIX VI: CNMI Lakes Reported by Assigned CALM Categories

Table VI-a. Category 1: Lakes Attaining All DUs

Lakes Acres CALM Category 1				
Segment ID	**Segment Name**	**Segment Class**	**Segment Size (Acres)**	**Comments**
Rota				
	N/A			
Tinian				
	N/A			
Saipan				
	N/A			
Northern Islands				
29LAK	Anatahan	1	149	Fish tissue data not available, very limited monitoring data. However, remote, lack of anthropogenic sources of pollution and stressors
29LAKA	Pagan (Sanhiyong, "Laguna Lake")	1	34	Fish tissue data not available, very limited monitoring data. However, remote, lack of anthropogenic sources of pollution and stressors
29LAKB	Pagan (Sanhalom, "Inner Lake")	1	27	Fish tissue data not available, very limited monitoring data. However, remote, lack of anthropogenic sources of pollution and stressors
		Total Miles	**210.0**	

Table VI-b. Category 5: Lake with Impaired DU(s) by Pollutants, TMDL Required

Lakes Acres CALM Category 5				
Segment ID	**Segment Name**	**Segment Class**	**Segment Size (Acres)**	**Comments**
Rota				
	N/A			
Tinian				
	N/A			
Saipan				
18LAKB	Susupe (South)	1	***57.4**	E. coli exceedances, limited biota data indicating heavy metal contamination
Northern Islands				
	N/A			
		Total Miles	**57.4**	

APPENDIX VII: CNMI Wetlands Reported by Assigned CALM Categories

Table VII-a. Category 1: Wetlands Attaining All Designated Uses

Wetland Acres CALM Category 1				
Segment ID	**Segment Name**	**Segment Class**	**Segment Size (Acres)**	**Comments**
Rota				
	N/A			
Tinian				
10WET	Puntan Diaplolamanibot	1	12.9	Limited data available. However, remote, lack of anthropogenic sources of pollution and stressors
11WET	Puntan Tahgong	1	40.6	Hagoi Wetland is considered pristine and is used as the high quality reference wetland for the Saipan Wetland RAM
Saipan				
14WET	Kagman (Education Island)	1	5.1	Deliniation completed, Limited data available. However, wetland maintained by USDA NRCS staff.
Northern Islands				
29WET	Pagan	1	27	Limited data available, Need baseline monitoring data. However, remote, lack of anthropogenic sources of pollution and stressors
		Total Miles	**85.6**	

Table VII-b. Category 2: Wetlands Attaining Some DUs, Insufficient Information about Remaining DUS, No Threats

Wetland Acres CALM Category 2				
Segment ID	**Segment Name**	**Segment Class**	**Segment Size (Acres)**	**Comments**
Rota				
	N/A			
Tinian				
7WET	Masalok	1	1.6	Limited data available. However, remote, lack of anthropogenic sources of pollution and stressors
Saipan				
	N/A			
Northern Islands				
	N/A			
		Total Miles	**1.6**	

Table VII-c. Category 3: Wetlands with Insufficient Information to Determine Attainment of Designated Uses

Wetland Acres CALM Category 3				
Segment ID	**Segment Name**	**Segment Class**	**Segment Size (Acres)**	**Comments**
Rota				
	N/A			
Tinian				
9WET	Makpo	1	28.4	Insufficient information, Delineation and assessment required
Saipan				
13WET	Talafofo	1	2.6	Insufficient information, Delineation and assessment required
16WET	Dan Dan	1	2.8	Insufficient information, Delineation and assessment required
17WETB	Isley (East)	1	2.0	Insufficient information, Delineation and assessment required
17WETA	Isley (West)	1	26.4	Insufficient information, Delineation and assessment required
Northern Islands				
	N/A			
		Total Miles	**62.2**	

Table VII-d. Category 4c: Wetlands with Impairment, not Caused by a Pollutant (TMDL) Not Required

Wetland Acres CALM Category 4c				
Segment ID	**Segment Name**	**Segment Class**	**Segment Size (Acres)**	**Comments**
Rota				
	N/A			
Tinian				
	N/A			
Saipan				
18WETA	Susupe (North)	1	197.3	Alteration in wetland habitats, Non-native Aquatic Plants, Other flow regime alterations
18WETB	Susupe (South)	1	292.4	Alteration in wetland habitats, Non-native Aquatic Plants, Other flow regime alterations
19WETA	W. Takpochau (North)	1	20.2	Alteration in wetland habitats, Non-native Aquatic Plants, Other flow regime alterations
19WETB	W. Takpochau (Central)	1	20.5	Alteration in wetland habitats, Non-native Aquatic Plants, Other flow regime alterations
20WETA	Achugao (North)	1	12.9	Alteration in wetland habitats, Non-native Aquatic Plants, Other flow regime alterations
20WETB	Achugao (South)	1	25.1	Alteration in wetland habitats, Non-native Aquatic Plants, Other flow regime alterations
Northern Islands				
	N/A			
		Total Miles	**568.4**	

APPENDIX VIII: Public Comment Period Announcements

Figure VIII-a. July 13th, 2018 Posted Public Notice on BECQ Website Homepage

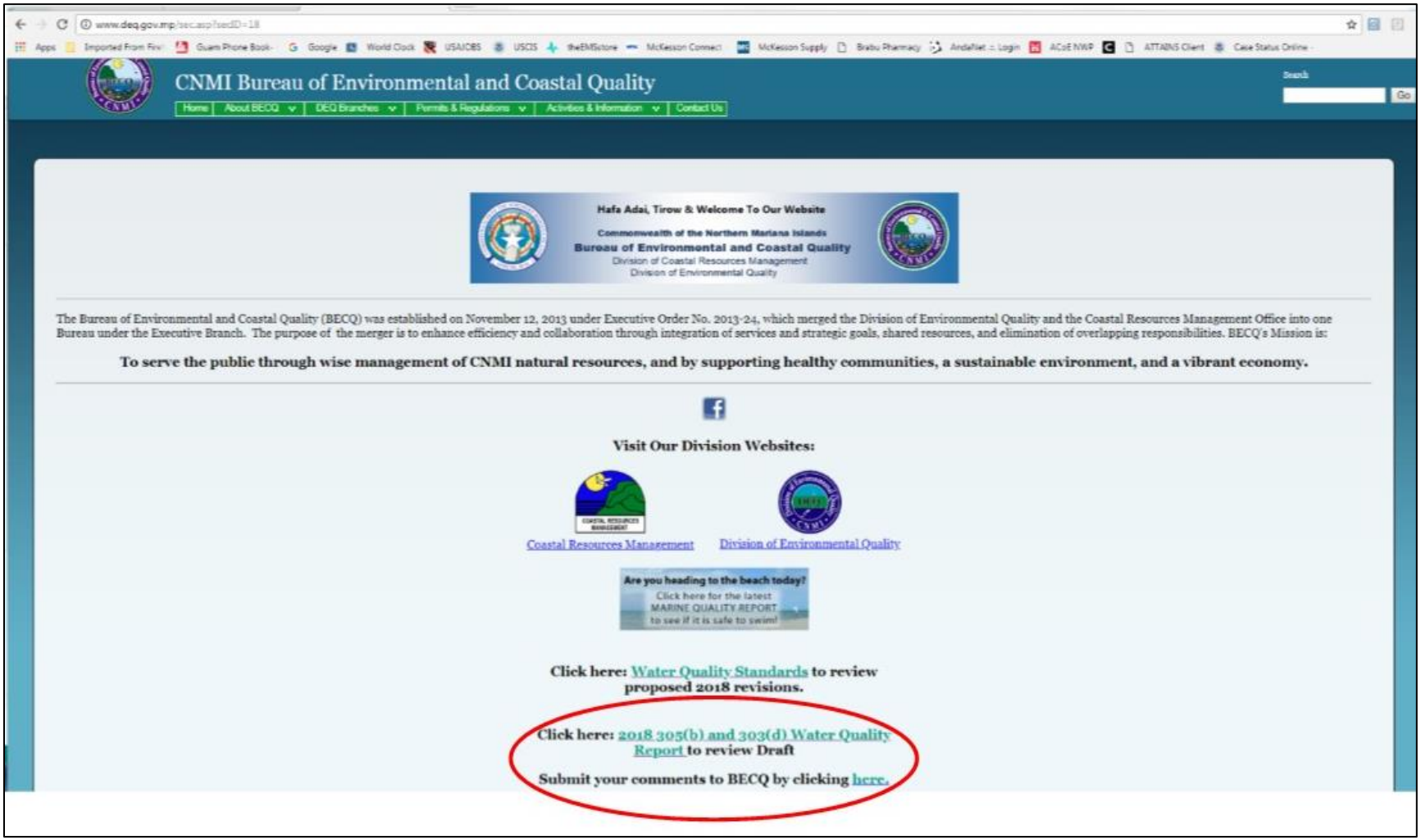
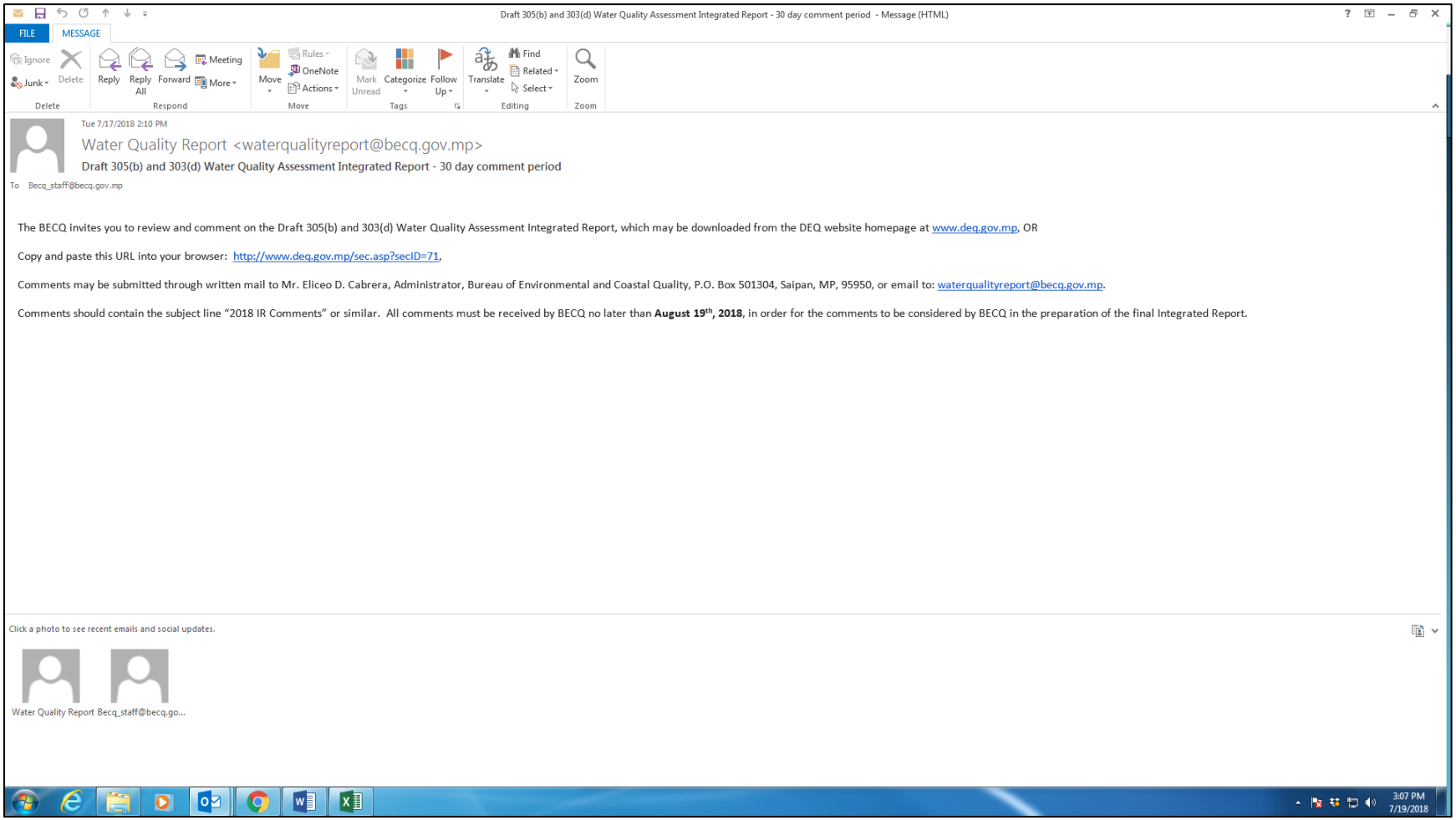


Figure VIII-b. July 17th, 2018 Public Notice Sent to BEACH Advisory E-list



Draft 305(b) and 303(d) Water Quality Assessment Integrated Report - 30 day comment period - Message (HTML)

FILE MESSAGE

Ignore Junk Delete | Reply Reply All Forward Meeting More | Move Rules OneNote Actions | Mark Unread Categorize Follow Up | Translate Find Related Select | Zoom

Delete Respond Move Tags Editing Zoom

Tue 7/17/2018 2:10 PM

Water Quality Report <waterqualityreport@becq.gov.mp>

Draft 305(b) and 303(d) Water Quality Assessment Integrated Report - 30 day comment period

To Becq_staff@becq.gov.mp

The BECQ invites you to review and comment on the Draft 305(b) and 303(d) Water Quality Assessment Integrated Report, which may be downloaded from the DEQ website homepage at www.deq.gov.mp, OR

Copy and paste this URL into your browser: http://www.deq.gov.mp/sec.asp?secID=71,

Comments may be submitted through written mail to Mr. Eliceo D. Cabrera, Administrator, Bureau of Environmental and Coastal Quality, P.O. Box 501304, Saipan, MP, 95950, or email to: waterqualityreport@becq.gov.mp.

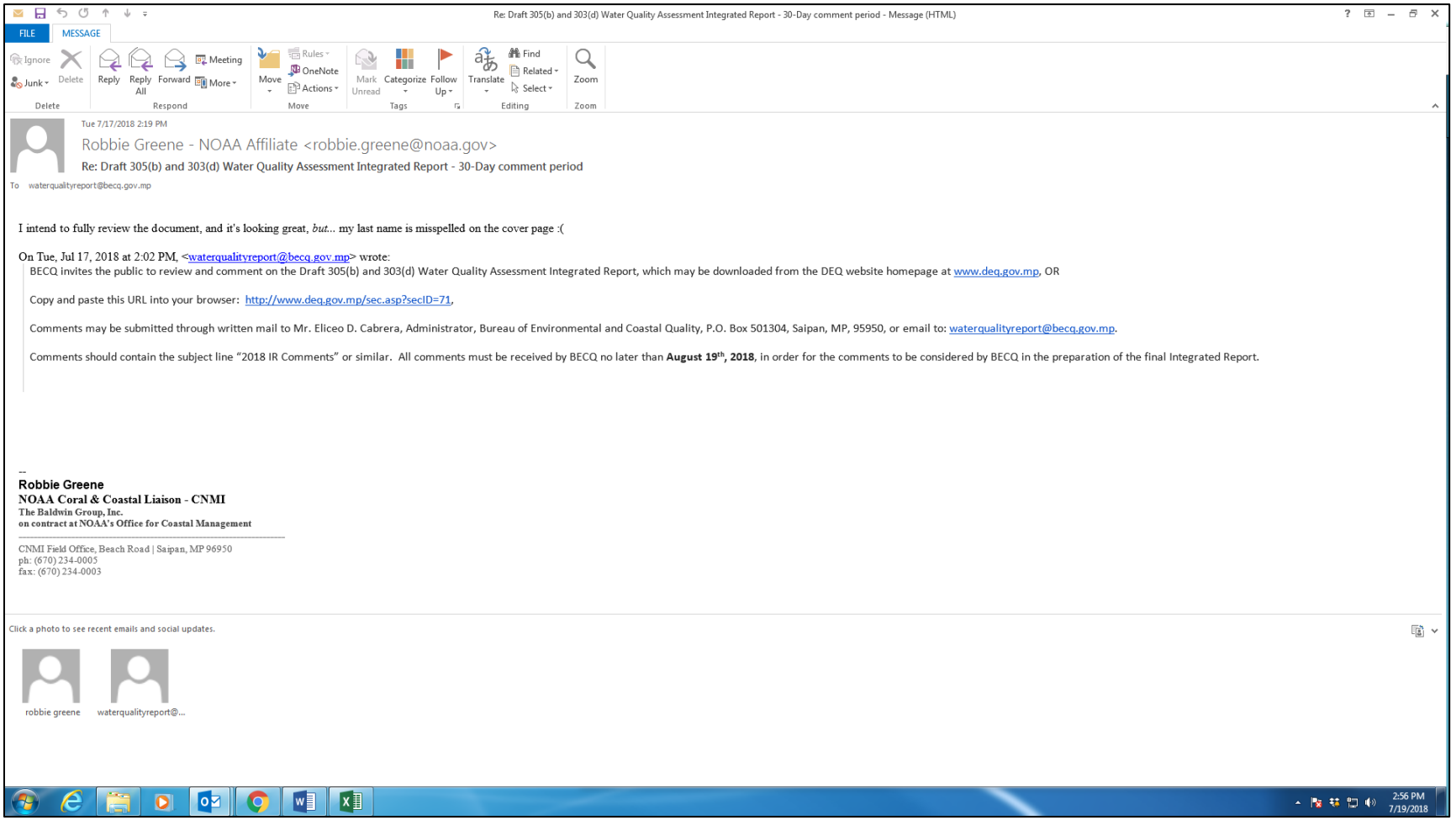
Comments should contain the subject line "2018 IR Comments" or similar. All comments must be received by BECQ no later than **August 19th, 2018**, in order for the comments to be considered by BECQ in the preparation of the final Integrated Report.

Click a photo to see recent emails and social updates.

Water Quality Report Becq_staff@becq.go...

3:07 PM 7/19/2018

Figure VIII-c. First Comment from BEACH Advisory E-list Recipient



Re: Draft 305(b) and 303(d) Water Quality Assessment Integrated Report - 30-Day comment period - Message (HTML)

FILE MESSAGE

Ignore Junk Delete | Reply Reply All Forward Meeting More | Move Rules OneNote Actions | Mark Unread Categorize Follow Up | Translate Find Related Select | Zoom

Delete Respond Move Tags Editing Zoom

Tue 7/17/2018 2:19 PM

Robbie Greene - NOAA Affiliate <robbie.greene@noaa.gov>

Re: Draft 305(b) and 303(d) Water Quality Assessment Integrated Report - 30-Day comment period

To waterqualityreport@becq.gov.mp

I intend to fully review the document, and it's looking great, *but*... my last name is misspelled on the cover page :(

On Tue, Jul 17, 2018 at 2:02 PM, <waterqualityreport@becq.gov.mp> wrote:

BECQ invites the public to review and comment on the Draft 305(b) and 303(d) Water Quality Assessment Integrated Report, which may be downloaded from the DEQ website homepage at www.deq.gov.mp, OR

Copy and paste this URL into your browser: http://www.deq.gov.mp/sec.asp?secID=71,

Comments may be submitted through written mail to Mr. Eliceo D. Cabrera, Administrator, Bureau of Environmental and Coastal Quality, P.O. Box 501304, Saipan, MP, 95950, or email to: waterqualityreport@becq.gov.mp.

Comments should contain the subject line "2018 IR Comments" or similar. All comments must be received by BECQ no later than **August 19th, 2018**, in order for the comments to be considered by BECQ in the preparation of the final Integrated Report.

--

Robbie Greene
NOAA Coral & Coastal Liaison - CNMI
The Baldwin Group, Inc.
on contract at NOAA's Office for Coastal Management

CNMI Field Office, Beach Road | Saipan, MP 96950
ph: (670) 234-0005
fax: (670) 234-0003

Click a photo to see recent emails and social updates.

robbie greene waterqualityreport@...

2:56 PM 7/19/2018

Figure VIII-d. July 25th, 2018 began Newspaper Public Notices of 30-day Comment Period

PUBLIC NOTICE

BECQ RELEASES 2018 DRAFT INTEGRATED WATER QUALITY ASSESSMENT REPORT

The CNMI Bureau of Environmental and Coastal Quality (BECQ), under the Office of the Governor, hereby notifies the public that the Draft 2018 Water Quality Assessment 305(b) and 303(d) Integrated Report has been made available for public review and comment on BEEQ's web page, www.deq.gov.mp.

Sections 303(d) and 305(b) of the U.S. Clean Water Act require that all states and territories, including the CNMI, monitor and assess all waters within the state and report the results to the public, USEPA, and the U.S. Congress every two years. Prior to final submittal to USEPA and the U.S. Congress, public review is required and DEQ must address comments received by the public.

BECQ invites the public to review and comment on the 2018 Integrated Report, by submitting written comments in person to the BECQ office at the Gualo Rai Center on Middle Road (across from the Subway restaurant), by mail or email to: kathyyuknavage@becq.gov.mp.

Mailed comments should be addressed to Mr. Eli D. Cabrera, Administrator, Bureau of Environmental and Coastal Quality, P.O. Box 501304, Saipan, MP, 95950.

Comments should contain the subject line "2018 IR Comments" or similar. All comments must be received by BECQ no later than August 17th, 2018, in order for the comments to be considered by BECQ in the preparation of the final Integrated Report.

Figure VIII-e. Newspaper Advertisements of 30-day Public Comment Period

UOG Press offers intimate look at Litekyan

The University of Guam Press invites the community to celebrate the release of its newest publication, *Lina'la': Portraits of Life at Litekyan*. This groundbreaking book features an incredible collection of photography, educational illustrations, research, and stories about the ancient village of Litekyan (Ritidian) in Northern Guam. The book's launch will take place from 5:30pm to 7pm on Thursday, July 26, at the historic Jose P. Lujan House, located at 167 Padre Palomo Street in Hagåtña. The book will be available for sale at the event for $42.

"*Lina'la': Portraits of Life at Litekyan* is an especially unique and powerful publication that not only provides valuable information about such a significant historic and cultural site, but also about the history of the CHamoru people," said Victoria-Lola Leon Guerrero, managing editor of the University of Guam Press.

The book gives readers an intimate understanding of Litekyan, one of the only places on Guam where every period of human life can still be traced. It also serves as a community resource that weaves the historic significance of the area with its modern-day community value and highlights recent efforts to protect Litekyan from restricted access to the area due to the U.S. military's plans to construct a nearby firing range.

Lina'la': Portraits of Life at Litekyan is a publication of the Richard Flores Taitano Micronesian Area Research Center (MARC), which holds the most extensive repository of information about Guam and Micronesia.

"The book features a stunning collection of photos that capture the artifacts and legacies of Litekyan, so it will be a vital addition to MARC's regional scholarship and storytelling resources," said Dr. Monique C. Storie, Interim Director of MARC.

This publication was funded in part by a contribution from the Guam Preservation Trust, whose goal is to preserve and protect Guam's historic sites, culture, and perspectives for the benefit of the island's people and future. The book was also made possible through the contributions of images and information from Litekyan landowners, community organizations, traditional healers, cultural practitioners, researchers, the Guam Wildlife Refuge, and local artists and photographers.

The community is also invited to learn more about Litekyan on July 28 during Archeology Day at the Guam Wildlife Refuge Ritidian Unit. Activities will be held at Litekyan throughout the day from 7:30am to 4:30pm. For more information about Archeology Day, contact the Guam National Wildlife Refuge at 355-5096 or email Program Manager Dr. Larisa Ford at larisa_ford@fws.gov.

For more information about the book and its launch, please contact Victoria-Lola M. Leon Guerrero at 735-2154 or victorialola@triton.uog.edu.

The University of Guam Press (www.uog.edu/uog-press) publishes an array of academic and literary books and journals with a specific focus on the unique history, environment, peoples, cultures, and languages of the islands that make up the Western Pacific region. UOG Press strives to increase the availability of exceptional scholarly and literary texts that can be used as learning resources about Guam and Micronesia for people and institutions in the region and throughout the world. *(PR)*

Cover of *Lina'la': Portraits of Life at Litekyan.* CONTRIBUTED PHOTO

Residents to visit Fena Cave on US Naval Base Guam

SANTA RITA, Guam—As part of Liberation Day events, a site visit will be held at the Fena Cave located at the Naval Munitions Annex on U.S. Naval Base Guam this July 19.

The visit, coordinated between Naval Base Guam, the Agat Mayor's Office, and Navy Munitions Command Pacific East Asia Division Unit Guam, will precede a memorial held for Fena Cave Massacre victims at Old Agat Cemetery. Attendees are asked to meet at 8:30am at the cemetery where they will board a bus and proceed to the cave site.

After the cave visit, a memorial will be held at 10am at the cemetery.

On July 19, 1944 the Fena Cave Massacre occurred, when Japanese soldiers killed more than 30 young men and women from Agat and Sumay with grenades and bayonets in the caves near Fena Lake. During the past several years, the NBG commanding officer has invited the victims' families to visit the caves as part of Liberation Day ceremonies. *(PR)*

United Airlines adds 4 more flights to Guam-Nagoya service

TAMUNING, Guam—In response to an increase in demand for travel between Japan and Guam, United Airlines is restoring four weekly flights between Guam and Nagoya from Dec. 2, 2018 through the end of March 2019. United currently operates one daily flight between Guam and Nagoya, and with the addition of four-weekly flights, business and leisure travelers will have more opportunities to travel between the two cities with 11 weekly flights operated with Boeing 737 aircraft. The additional four flights add more than 1,000 seats per week and over 16,000 seats between Guam and Japan to meet the increasing demand during the upcoming winter season as well as add convenient evening departure times in addition to the current morning departures.

This announcement follows United's recent reintroduction of the Boeing 777-200 aircraft on two of three daily flights between Guam and Tokyo's Narita International Airport beginning Oct. 28, 2018, through March 30, 2019, offering customers nearly 900 daily seats each way between Tokyo and Guam, an 80-percent increase in available seats.

"We are extremely pleased to offer our customers more opportunities to travel between Japan and Guam, and our additional four-times weekly service offers customers traveling from Nagoya more choice and convenient flight options to travel to Guam," said Sam Shinohara, United's managing director of Asia/Pacific Airport Operations, "Nagoya is one of the busiest airports connecting customers from Japan to Guam and these schedule enhancements are positive indicators for our island's tourism industry and economy."

United has also announced that it will operate eight extra flights, more than 2,000 seats, between Guam and Osaka, during November and December 2018 to meet the increasing demand. United currently operates one daily flight between Guam and Osaka, and the additional eight flights offer customers additional travel options including convenient evening departures from Guam and Osaka.

To help further meet the increasing demand for flights to Guam, United has increased flights for the 2018 summer peak season and will operate 20 additional flights between Aug. 2 through Aug. 27, including seven flights from Nagoya's Chubu Centrair International Airport and 13 flights from Tokyo/Narita. *(PR)*

Guam-Nagoya Winter 2018/2019 Schedule (Dec. 2, 2018-March 30, 2019)

Flight No.	Depart Time	Arrive Time	Aircraft	Days
UA171 (new)	Guam 5pm	Nagoya 7:55pm	Boeing 737	Tue/Thu/Sat/Sun
UA172 (new)	Nagoya 8:50pm	Guam 1:25am (next day)	Boeing 737	Tue/Thu/Sat/Sun
UA 137	Guam 7:25am	Nagoya 10:15am	Boeing 737	Daily
UA 138	Nagoya 11:30am	Guam 4pm	Boeing 737	Daily

Guam-Osaka Winter 2018/2019 Schedule (Nov. 1-Dec. 16, 2018)

Flight No.	Depart Time	Arrive Time	Aircraft	Days
UA 177 (new)	Guam 5pm	Osaka 8:05pm	Boeing 737	Nov. 1, 6, 13, and 29; Dec. 4, 13, 15, 16
UA 178 (new)	Osaka 9pm	Guam 1:35am (next day)	Boeing 737	Nov. 1, 6, 13, and 29; Dec. 4, 13, 15, 16
UA 151	Guam 7:10am	Osaka 10:10am	Boeing 737	Daily
UA 150	Osaka 11:05am	Guam 3:40pm	Boeing 737	Daily

Commonwealth of the Northern Mariana Islands
OFFICE OF THE GOVERNOR
Bureau of Environmental and Coastal Quality

PUBLIC NOTICE

BECQ RELEASES 2018 DRAFT INTEGRATED WATER QUALITY ASSESSMENT REPORT

The CNMI Bureau of Environmental and Coastal Quality (BECQ), under the Office of the Governor, hereby notifies the public that the Draft 2018 305(b) and 303(d) Water Quality Assessment Integrated Report has been made available for public review and comment on BECQ's web page, www.deq.gov.mp.

Sections 305(b) and 303(d) of the U.S. Clean Water Act require that all states and territories, including the CNMI, monitor and assess all waters within the state and report the results to the public, USEPA, and the U.S. Congress every two years. Prior to final submittal to USEPA and the U.S. Congress, public review is required and BECQ must address comments received by the public.

BECQ invites the public to review and comment on the Draft 305(b) and 303(d) Water Quality Assessment Integrated Report, which may be downloaded from: https://www.deq.gov.mp/reo.asp?reoID=71, or by bringing a flash drive to the BECQ office at the Gualo Rai Center on Middle Road (across from the Subway restaurant).

Comments may be submitted through mail to Mr. Eliseo D. Cabana, Administrator, Bureau of Environmental and Coastal Quality, P.O. Box 501304, Saipan, MP, 96950, or email to [illegible].

Comments should contain the subject line "2018 IR Comments" or similar. All comments must be received by BECQ no later than August 15th, 2018, in order for the comments to be considered by BECQ in the preparation of the final Integrated Report.

Commonwealth of the Northern Mariana Islands
HEALTH CARE PROFESSIONALS LICENSING BOARD

Pursuant to P.L. 8-41, Section 11, Governor Ralph DLG. Torres and Lt. Governor Victor B. Hocog, through the Health Care Professions Licensing Board (HCPLB) are hereby giving notice that it will hold its regular monthly board meeting on Thursday, July 26, 2018 at 9 am. at Saipan. The meeting will be held at the CHCC Conference Room #2, Lower Navy Hill.

AGENDA

I. Meeting Call to Order
II. Determination of Quorum
III. Review and Adoption of Agenda
IV. Review and Adoption of Minutes (06/28/18)
V. Public Comments
VI. Chairperson's Report.
VII. Executive's Report
- HCPLB Financial Report.
- Update reports on pending complaints

VIII. Investigator's Report
IX. Communications from the Governor's Office & Legislature
A. Governor's Office
B. Legislature
X. Old Business
- Substance Abuse Counselor Regulations

XI. New Business
- Hearing on the complaints against Taylor Ada, Rocky Molino and Alvin Tagabuel
- Proposed Amendment to the HCPLB Legislation

XII. Pending Applications for Board's Review
A. New Applications:
B. Renewal Applications:
XIII. Miscellaneous Business
XIV. Executive Session: The Board may vote to meet in executive session to consult with counsel with pending or anticipated legal matters.
XV. Announcements
A. Next Meeting Date
B. Adjournment of Meeting

/s/ Theodore R. Farkas, R.Ph., MPH
Chairman

Figure VIII-e. Public Notice of 30-day Comment Period in Local Newspapers Continued

Dance, music and the Pacific's cultural identity

By Christy Sakaziro
sakazirochristina@yahoo.com
Project Director
Micronesian Humanities

TRADITIONAL dance and music are part of a Pacific island's cultural identity. Although change has taken place and contemporary dance and music have become part of island life, many islanders are still proud of their traditional dance and music.

In the islands of Micronesia, the traditional performing arts also provide a means of communication.

In Palau, according to cultural musicologist Dr. Birgit Abels of Germany, "to dance is to take pride in one's culture; and to chant is to assert one's bonds with local history." She added, "As the waves of turbulent political history washed onto Palauan shores over the course of the 20th and 21st centuries, both music and dance came to symbolize this small island people's sense of cultural distinctiveness in the Pacific world."

Last week, Ngardmau State in Palau hosted a cultural celebration that featured many traditional performances.

Ongerung Kambes Kesolei, a photo-journalist, said a huge crowd showed up for the event which included a night market. The celebration was hosted by the Ngardmau State Government and the Ngirbelau Men's Health of the Ministry of Health.

A young Ngardmau traditional dancer.
Photo by Ongerung Kambes Kesolei

It was a fun-filled evening of live band and traditional dance performances as well as a fashion show.

The traditional dancers included the young boys and young women of Ngardmau.

Another talented performer, Brel Kodep, and a group of young women modeled cultural wear from other countries.

The night market is among the activities leading up to the male health conference scheduled for Aug. 14, 2018.

Latte Training Academy announces founders scholarship opening date

(LTA) — The Latte Training Academy's board of directors recently announced the opening date of its 2018-2019 founders scholarship funding round.

Since the inception of the program, LTA has provided more than $20,000 in college scholarships to its previous participants. This year's funding round will open on Aug. 1, 2018 and close on Sept. 30, 2018.

"We are extremely excited to announce this year's scholarship funding round. We are proud to continue to support our award recipients as they continue the pursuit of their educational and career goals. We believe that this year's funding round will be far more competitive as we have opened up the applications to many more LTA students in all of our course offerings," said LTA president Juan-Carlos Benitez.

The Latte Training Academy's founders scholarship program is open to all LTA participants who have successfully completed one of the organization's training certification program within the past three years. Historically, the program was open to students who participated in the program through the CNMI Public School System, however the organization has opened it up to all LTA participants who have completed one of their certification programs. Previous award winners include Eloise Lopez, Sam Esturas, Angel Mar Panimutan, You Na Lee, Renafe Aniga, Jewel Mae Antatico, Jezreelyn Bulaklak, Chenoa Bunts-Anderson, Melisha Lizama, Fritz Jan Manzano, Christian Lyle Motiveros, Janette Orosco and Kaila Marie Rubio.

"We are proud to support our participants in continuing their education. We understand the sacrifice it takes for an individual to prepare for a career, thus we don't shy away from the responsibility to continue to aid our participants after they complete one of our certification programs. Each one of these participants exemplifies the dedication to self-improvement and we are truly proud of their efforts," said LTA executive director Arielle Buyum.

Program information and applications are only available on-line by visiting www.lattetrainingacademy.com

Program information can be found on the organization's website, but applications will not be available until Aug. 1, 2018.

SHRM meeting to discuss State Directory of New Hires

(Press Release) — The Society for Human Resource Management-NMI chapter invites its members, associated HR and management staff, and interested members of the public to attend its next general membership meeting on Thursday, July 26, 2018. NMI SHRM is pleased to have Assistant Attorney General Bobbi Cepeda discuss employer obligations under the newly enacted CNMI Public Law 20-60 which establishes a "State Directory of New Hires." This presentation will provide information on reporting requirements and the processing of income withholding orders for child support under this new law which came into effect in June 2018.

SHRM
SOCIETY FOR HUMAN RESOURCE MANAGEMENT

This lunch meeting will be held at the Pacific Islands Club-Charley's Cabaret on Thursday, July 26, 2018, from 11:30 a.m. to 1:30 p.m.

The presentation is open to the public and will provide invaluable information for employers, managers, and HR professionals and staff. The presentation includes the PIC lunch buffet at the cost of $20 for SHRM members and $30 for non-members. Seats are limited, so reserve your seat by contacting Penny Jones by e-mail at penelope.jones@hyatt.com or Denise Montenegro at denise.montenegro@hyatt.com or by telephone at 323-5867/68.

For more information about the NMI chapter, you can visit http://nmi.chapter.shrm.org

Northern Marianas Humanities Council
Navigating the Human Experience

Employment Opportunity
EXECUTIVE DIRECTOR

The Northern Marianas Humanities Council (Council) is inviting dynamic, motivated, and self-driven individuals with strong interest and previous experience in the humanities to submit an employment application for the position of Executive Director.

The Executive Director is responsible for overseeing all aspects of the Council's administrative, financial, and program activities under the supervision of the Council's Executive Committee. A detailed description of the Executive Director's duties may be obtained from the Council's office in Springs Plaza, Gualo Rai or from the Council's website at www.northernmarianashumanities.org.

Applicants for this position must possess: (1). a Bachelor's degree (Master's degree preferred) in an area of the humanities from an accredited post-secondary institution; (2). supervisory experience of at least three years as a director of programs preferably relating to the humanities and at least three years of experience in Federal programs administration preferably in an area relating to the humanities; (3). a solid knowledge of accounting, budgeting, financial management, marketing and strategic planning; (4). demonstrated experience with resource development, fundraising strategies, and cultivating donor relations; (5). an in-depth knowledge of Northern Mariana Islands culture, history, political and social developments, current events, and he/she must have familiarity with the Pacific region as a whole; (6). an ability to work well in a multicultural setting and a high level of communication and leadership skills.

The salary range is from $50,000 to $55,000 depending on qualifications and experience. Benefits are set forth in the Council's Personnel Policy Manual.

Interested individuals are invited to send an application package including (1). letter of interest; (2). detailed resume with proof of educational attainment; and (3). the names and addresses of three references to:

Polly DLG. Masga
Board Chairperson, Northern Marianas Humanities Council
P.O. Box 506437, Saipan, MP, 96950

Complete application packages must be received by the Council on or before **4:00 p.m. on Tuesday, July 31, 2018.** The Council reserves the right to extend the submission deadline at its convenience. For more information about this employment opportunity, please contact Council staff at 235-4785.

The Northern Marianas Humanities Council is an equal opportunity employer.

Commonwealth of the Northern Mariana Islands
OFFICE OF THE GOVERNOR
Bureau of Environmental and Coastal Quality

PUBLIC NOTICE
BECQ RELEASES 2018 DRAFT
INTEGRATED WATER QUALITY ASSESSMENT REPORT

The CNMI Bureau of Environmental and Coastal Quality (BECQ), under the Office of the Governor, hereby notifies the public that the Draft 2018 305(b) and 303(d) Water Quality Assessment Integrated Report has been made available for public review and comment on BECQ's web page, www.deq.gov.mp.

Sections 303(d) and 305(b) of the U.S. Clean Water Act require that all states and territories, including the CNMI, monitor and assess all waters within the state and report the results to the public, USEPA, and the U.S. Congress every two years. Prior to final submittal to USEPA and the U.S. Congress, public review is required and DEQ must address comments received by the public.

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Comments may be submitted through mail to Mr. Elicio D. Cabrera, Administrator, Bureau of Environmental and Coastal Quality, P.O. Box 501304, Saipan, MP, 96950, or email to: kathyyuknavage@deq.gov.mp.

Comments should contain the subject line "2018 IR Comments" or similar. All comments must be received by BECQ no later than **August 19th, 2018,** in order for the comments to be considered by BECQ in the preparation of the final Integrated Report.

Figure VIII-e. Public Notice of 30-day Comment Period in Local Newspapers Continued

Friendship no more: How Russian gas is a problem for Germany

BERLIN (Reuters) — For decades, the Friendship pipeline has delivered oil from Russia to Europe, heating German homes even in the darkest days of the Cold War.

But a new pipeline that will carry gas direct from Russia under the Baltic Sea to Germany is doing rather less for friendship, driving a wedge between Germany and its allies and giving Chancellor Angela Merkel a headache.

For President Donald Trump, Nord Stream 2 is a "horrific" pipeline that will increase Germany's dependence on Russian energy. Ukraine, fighting Russian-backed separatists, fears the new pipeline will allow Moscow to cut it out of the lucrative and strategically crucial gas transit business.

It comes at an awkward time for Merkel. With the fraying of the transatlantic alliance and an assertive Russia and China, she has acknowledged that Germany must take more of a political leadership role in Europe.

"The global order is under pressure," Merkel said last month. "That's a challenge for us.... Germany's responsibility is growing; Germany has more work to do."

In April she accepted for the first time that there were "political considerations" to Nord Stream 2, a project she had until then described as a commercial venture.

Most European countries want Germany to do more to project European influence and protect eastern neighbors that are nervous of Russian encroachment.

Angela Merkel

But letting Russia sell gas to Germany while avoiding Ukraine does the opposite, depriving Kiev of transit revenues and making it, Poland and the Baltic states more vulnerable to cuts in gas supplies.

"The price would be an even greater loss of trust from the Baltics, Poland and Ukraine," said Roderich Kiesewetter, a Merkel ally on the parliamentary foreign affairs committee.

"We Germans always say that holding the West together is our 'center of gravity,' but the Russian approach has succeeded in dragging Germany, at least in terms of energy policy, out of this western solidarity."

Many analysts say the business case for Nord Stream 2 is thin. Another pipeline already links Russia and Germany under the Baltic. Nord Stream 2 will double capacity but future demand is uncertain.

On the flip side, German industry likes anything that will provide energy more cheaply.

Merkel's Social Democrat coalition partners, the leading voices in Germany calling for a conciliatory approach towards Russia, are also in favor.

The issue has divided Berlin's political class. The parties agreed in their coalition talks earlier this year to make a commitment to the pipeline, but did not put it in writing.

According to Margarita Assenova, an analyst at the Centre for European Policy Analysis who is critical of Nord Stream 2, Russia can double gas exports to Europe via existing Ukrainian pipelines without building the new conduit.

But despite opposition from European partners, from Washington and from within Merkel's party, Nord Stream 2 continues. Germany's diplomatic ambitions are being thwarted by the project's brutal business logic.

On the other hand, it has the strong backing of Gazprom, Russia's state-owned energy giant which owns Nord Stream 2 AG, the project company. Its boss Matthias Warnig, once an East German spy tasked with reporting on West German business, is seen as one of Berlin's most formidable lobbyists.

The pipeline is one of a network of Kremlin-sponsored projects seemingly designed to circumvent Ukraine, the largest and most troublesome of the countries once ruled from Moscow. They include Turk Stream, which crosses the Black Sea to bypass Ukraine to the south.

Lawmakers say Warnig has responded to their skeptical queries about the project by promising to take their concerns direct to Russian President Vladimir Putin, adding to the sense that the pipeline serves the Kremlin's strategic interests.

But, for Gazprom, it makes sense: transit across a country with which Russia is in an undeclared war is risky and increasingly unreliable as Ukraine's Soviet-era pipelines grow older.

Floating excavators prepare an underwater trench for the North Stream 2 pipeline close to Lubmin, Germany on May 15, 2018. REUTERS

Mattress Firm explores bankruptcy to close stores: sources

HOUSTON (Reuters) — Mattress Firm Inc., the largest U.S. mattress retailer, is considering a potential bankruptcy filing as it seeks ways to get out of costly store leases and shut some of its 3,000 locations that are losing money, people familiar with the matter said.

Mattress Firm's deliberations offer the latest example of a U.S. brick-and-mortar retailer struggling financially amid competition from e-commerce firms such as Amazon.com Inc. Shares of Mattress Firm competitor Tempur Sealy International Inc. jumped on the news and ended trading on Monday up 5.2 percent at $52.64.

Mattress Firm's South African parent, Steinhoff International Holdings NV, has been working on a deal to restructure the debt of some subsidiaries with its creditors, following an accounting scandal. Creditors agreed last month to hold off on their debt claims for three years.

Steinhoff acquired Mattress Firm for $3.8 billion in 2016.

Both Houston-headquartered Mattress Firm and Steinhoff are working with consulting firm AlixPartners LLP, the two sources said this week. AlixPartners helps companies plan and execute turnaround strategies, and is often brought in to lay the ground for bankruptcy.

The sources, who requested not to be identified because the plans are private, cautioned that Mattress Firm has not made any final decisions and its plans could change.

Representatives for Mattress Firm and AlixPartners declined to comment. Steinhoff did not respond to requests for comment.

Filing for bankruptcy would allow Mattress Firm to clean up its real estate portfolio and improve cash flow and profitability, analysts at Piper Jaffray Companies wrote in a research note last week.

Many retailers pursue bankruptcy to reject leases, a move to slim their store count, cut their costs and reorganize to continue their business. U.S. discount footwear retailer Payless ShoeSource Inc., for example, closed roughly 700 mall-based stores in bankruptcy last year, while children's clothing shop Gymboree Corp closed about 300.

To be sure, some retailers shut huge swaths of their store base outside of bankruptcy. Bebe stores Inc. closed nearly all its retail locations without filing for bankruptcy last year, negotiating a deal with its landlords instead.

Mattress Firm lost Tempur Sealy International Inc., the maker of popular mattress brand Tempur-Pedic, as a supplier last year, limiting its offerings. Mattress Firm secured a $225 million asset-backed revolving loan last year.

Steinhoff booked a $12 billion write-down earlier this year relating to accounting irregularities.

Steinhoff also owns discount chains Poundland in the United Kingdom and Ackermans in South Africa.

Mattress Firm acquired HMK Mattress Holdings LLC, the parent company of competitor Sleepy's, in 2016 for $780 million and then rebranded the shops. Sleepy's had [illegible] 1,050 stores on the U.S. East Coast and Illinois.

Commonwealth of the Northern Mariana Islands
PUBLIC SCHOOL SYSTEM

PUBLIC NOTICE

In accordance with the "Open Government Act", the Public School System State Board of Education, through their Interagency Coordinating Council (ICC), is hereby serving notice to the general public that it will hold its ICC meeting on **Friday, August 10, 2018,** from **9:00 am to 11:30 am,** at the **Pacific Islands Club, Annex Room.** This meeting is open to the public. Interested individuals are welcome to attend.

AGENDA

I. **Call to Order**
   a. Roll Call
   b. Presence of a Quorum
   c. Adoption of Agenda
   d. Adoption of Minutes
II. **New Members Orientation**
III. **Open Discussion**
IV. **Meeting Adjournment**

In compliance with the Americans with Disabilities (ADA), individuals who wish to attend this meeting, but require accessibility such as large print, sign language or interpreter, must call 664-4641. Several days' notice is necessary to allow organizers ample time to make necessary arrangements.

/s/ Margaret Alden
Chairwoman

/s/ Robin L. Palacios
Director
Early Intervention Program

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Commonwealth of the Northern Mariana Islands
OFFICE OF THE GOVERNOR
Bureau of Environmental and Coastal Quality

PUBLIC NOTICE
BECQ RELEASES 2018 DRAFT INTEGRATED WATER QUALITY ASSESSMENT REPORT

The CNMI Bureau of Environmental and Coastal Quality (BECQ), under the Office of the Governor, hereby notifies the public that the Draft 2018 305(b) and 303(d) Water Quality Assessment Integrated Report has been made available for public review and comment on BEEQ's web page, www.deq.gov.mp.

Sections 303(d) and 305(b) of the U.S. Clean Water Act require that all states and territories, including the CNMI, monitor and assess all waters within the state and report the results to the public, USEPA, and the U.S. Congress every two years. Prior to final submittal to USEPA and the U.S. Congress, public review is required and DEQ must address comments received by the public.

BECQ invites the public to review and comment on the Draft 305(b) and 303(d) Water Quality Assessment Integrated Report, which may be downloaded from http://www.deq.gov.mp/wic.asp?secID=71, or by bringing a flash drive to the BECQ office at the Gualo Rai Center on Middle Road (across from the Subway restaurant).

Comments may be submitted through mail to Mr. Eliceo D. Cabrera, Administrator, Bureau of Environmental and Coastal Quality, P.O. Box 501304, Saipan, MP, 96950, or email to: kathyyuknavage@becq.gov.mp.

Comments should contain the subject line "2018 IR Comments" or similar. All comments must be received by BECQ no later than August 19th, 2018, in order for the comments to be considered by BECQ in the preparation of the final Integrated Report.