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

Bureau of Environmental and Coastal Quality
September, 2014

Old Man by the Sea– Talofofo Watershed
Photo by Kathy Yuknavage

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ACKNOWLEDGEMENTS

The Fiscal Year 2014 Integrated 305(b) and 303(d) Water Quality Assessment Report was prepared by a number of Bureau of Environmental and Coastal Quality staff, all credited on the cover page. Dr. Ryan Okano updated the sections covering the CNMI's Biological Monitoring Assessment Program. Surface water quality data was analyzed and compiled by Clarissa T. Bearden, Department of Coastal Resources Management's Water Quality Surveillance and Non-Point Source Program Manager and Kathy Yuknavage, MS., Technical Advisor. Capt. Derek Chambers, PE, MPH, U.S. Public Health Service, prepared all sections covering groundwater quality.

The authors of this report would also like to thank Lt. Commander Brian G. Bearden, PE, US Public Health Service, for his tremendous assistance with formatting content and creating the initial tables detailing shoreline miles in the 2010 Integrated Report from which the present document is based.

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A. EXECUTIVE SUMMARY

The Governor of the Commonwealth of the Mariana Islands (CNMI), Eloy Inos, proposed the merger of the Division of Environmental Quality (DEQ) and the Coastal Resources Management Office (CRMO) into the Bureau of Environmental and Coastal Quality (BECQ) in 2013. The Bureau was officially established through legislation in 2014. BECQ is responsible for monitoring, assessing, and protecting water quality within the CNMI. This responsibility is mandated by both U.S. federal and Commonwealth legislation and regulation.

This integrated report and the enclosed list of impaired waters were prepared to satisfy the requirements of Sections 303(d), 305(b), and 314 of the Clean Water Act (CWA). The 305(b) integrated report and the 303(d) list are prepared every two years, in which the assessment of the previous two fiscal years' monitoring data is summarized. In this report, monitoring data collected from October 1, 2011 through September 30, 2013 is analyzed and compared to assessments published in previous CNMI 305(b) reports. This report is the principal means by which the CNMI BECQ, Congress, and the public evaluate whether Commonwealth waters are meeting Water Quality Standards (WQS), the purpose of which is to ensure that all designated uses of these waters are attained. Designated uses are defined in detail in the CNMI WQS regulations, but in short include: recreation in and on the water; the support of aquatic life and coral reef conservation; fishing and the consumption of fish and shellfish; aesthetic enjoyment; and in the case of fresh waters, availability as a potable water supply.

As in previous years, the most common sources of water quality degradation are from: 1) Point sources such as failing sewer lines and other wastewater collection and treatment systems; and 2) Non-point sources (NPS) such as: sedimentation from secondary coral roads, uncontrolled erosion from construction sites; and livestock overgrazing; other pollutants carried in stormwater from paved roads and other developments; and fecal bacteria from livestock. Unsurprisingly, most microbiological violations for this reporting cycle are in areas in close proximity to large, heavily populated drainages. This is especially true during rain events.

However, water quality problems caused by stormwater runoff from Saipan's existing developed areas are more difficult to address. BECQ has made significant strides in the regulation of new developments through its One-Start permitting program and implementation of new design standards. Runoff from older developments, in particular paved road systems and unpaved coral roads, remains difficult to address and requires attention. BECQ continues to address this problem in two ways: 1) on-going training of local road crews to use better grading techniques; and 2) assisting with planning larger improvement projects such as regional sedimentation basins and other best management practices (BMP). Aside from funding, convincing the public, business community, and political leadership of the value of dedicating land for BMPs has been the primary obstacle in implementing major improvements.

For this reporting cycle, 84.9 miles of Commonwealth coastline assessed were found to be impaired for various reasons (Table C-20). This includes impairment of 32.2 miles of Saipan's, 17.8 miles of Rota's, and 24.3 miles of Tinian's shoreline for the *Recreational Use designation* due to microbiological contamination as measured by the presence of Enterococci bacteria (

Table C-8). This reporting cycle the Chaliat/Talo Watershed on Rota, and the Masalok and Puntan Tahgong Watersheds on Tinian were added as impaired for this use designation, as was Lake Susupe in the South Susupe Watershed on Saipan.

However, there has been some improvement to two water segments on Saipan and one on Rota due to considerable enhancement of bacteriological water quality there. These are the Susupe North and Achugao North Watersheds and the Ulya Uyulanhulo/Teteto respectively, which have not had Enterococci exceedences this reporting cycle. Therefore they have been removed from the impairment list for that contaminant.

Reasons for these improvements, along with new information about *Aquatic Life and Propagation*, *Fish and Shellfish Consumption,* and *Aesthetic Enjoyment* use designations have also become available for assessing impairment. These will be discussed in further detail in Section C.3. 305(b) Assessment Results for All CNMI Waters, and later subsections of this report.

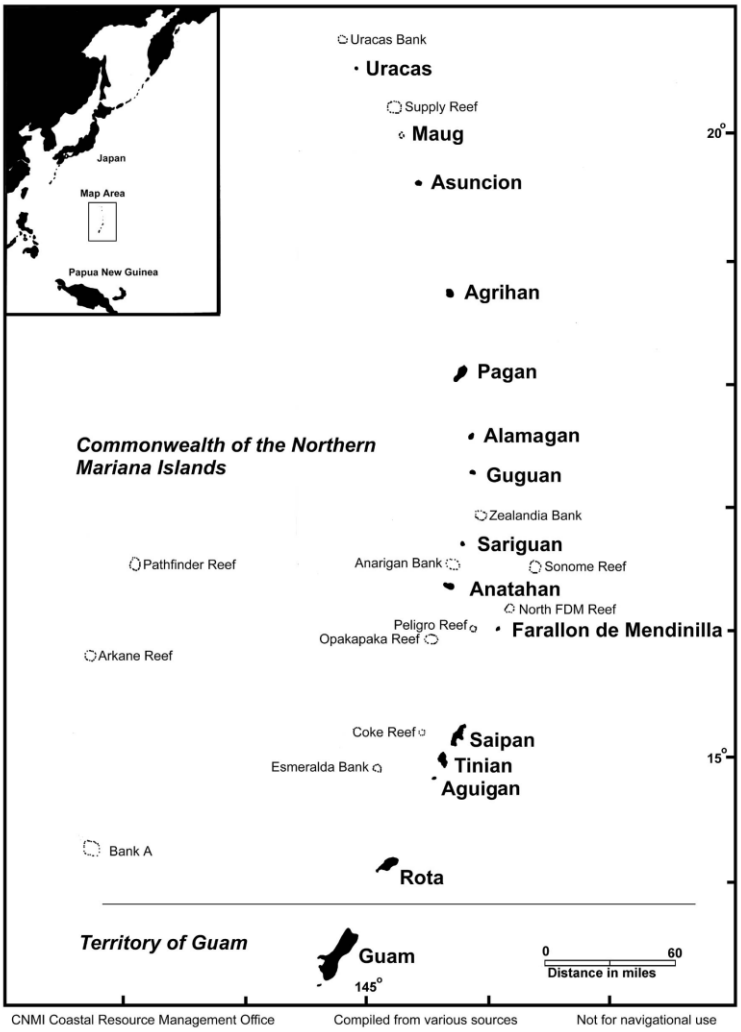
In regards to ground water, it is the primary source of potable water in the CNMI. In general the quality of the groundwater used by the Public Water Systems (PWS) meets EPA Primary Drinking Water Standards. Although there are a few isolated incidents of groundwater contamination from underground/aboveground storage tanks, or small manufacturing or repair shops, the threat of contaminants entering the general PWSs is minimized due to the large number of production wells producing relatively low flows spread out over the island's entire land surface. With that said, salt water intrusion though not an EPA Primary Drinking Water concern remains a significant issue on Saipan in regards to the general palatability of drinking water.

B. BACKGROUND

B.1. Scope of Waters in the Integrated Report

The CNMI consists of two geologically distinct island chains located at 145º E, between 14º – 21º N (Figure B-1). The Southern Mariana Islands are around 41 million years old and were formed initially 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 active Mariana Ridge.

Figure B-1 The Commonwealth of the Northern Marianas Islands



This report contains information primarily for the three southern islands, Saipan, Tinian, and Rota, where the vast majority of the population lives (Table B-1). Saipan is the capital of CNMI,

and the largest and most populated of the islands. Therefore, threats to water quality are greatest on Saipan. This and the fact that BECQ does not have dedicated staff on the other inhabited islands of Rota and Tinian, resulted in more resources being dedicated to monitoring and analyzing the impairments on Saipan. Marine and fresh surface water samples are only collected on Rota and Tinian on an eight (8) week sampling interval, ensuring that waters there are monitored for contaminants on at least a quarterly basis.

Table B-1 Atlas Description of the Commonwealth of the Northern Mariana Islands

Topic	Value
Surface area of CNMI	182.9 sq. mi.
Population of CNMI	53,883[1]
Total Miles of Streams	73.4[2]
Miles of Ocean Coast	235.3
Acres of Lakes	255.2[3]
Acres of Wetlands	681.0

[1] From 2010 Census
[2] Stream length does not include Northern Islands streams, based on current GIS layers
[3] Lake length includes Northern Islands lakes, based on current GIS layers. Three lakes are known to exist in the Northern Islands: two on Pagan, and one on Anatahan.

The other 10 northernmost islands, commonly referred to as the northern islands, are not routinely monitored as they are only occasionally inhabited by a handful of individuals on the three islands of Agrihan, Pagan, and Alamagan. The 2010 integrated report, for the first time included an assessment of water quality there, but based on considerably less data than is available for the southern islands. This reporting cycle, a re-evaluation of the northern islands streams resulted in their being considered as fully supportive of their use designations based on their remoteness, and their lack of development making any anthropogenic source of pollutants highly unlikely. However, it is important to note that the present frequency of inhabitants and their population size could change in the future should the US expand military training exercises to these islands.

CNMI Marine Water Classes

The CNMI WQS defines two classes of marine water uses, Class AA, and A. The majority of which are Class AA meaning that these waters should 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. The uses protected in these waters are the support and propagation of marine life, conservation of coral reefs and wilderness areas, oceanographic research, and aesthetic enjoyment and compatible recreation inclusive of whole body contact (e.g. swimming and snorkeling) and related activities.

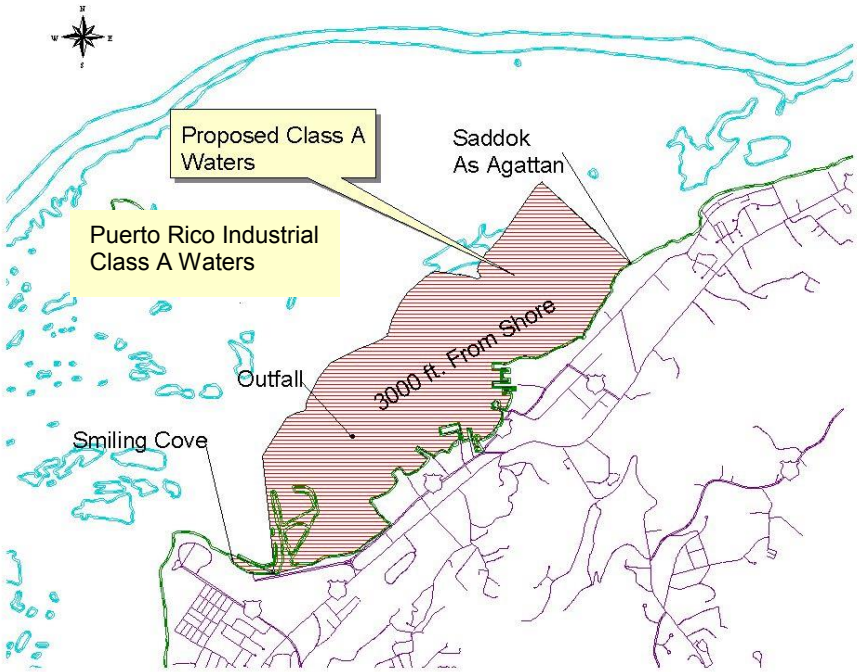
Class A waters in the CNMI are limited to the existing harbors. Two areas of Class A waters exist on Saipan including an area around the commercial seaport and an area centered on the outfall for the Agingan Point municipal wastewater treatment plant (Table B-2).

Table B-2 Class A Marine Waters in CNMI

Water Body	Island	Reason for Class A designation
Puerto Rico Industrial	Saipan	Commercial port and municipal waste outfall
Agingan Point	Saipan	Municipal waste outfall
East Harbor	Rota	Commercial port
West Harbor	Rota	Commercial port
San Jose Harbor	Tinian	Commercial port

Class A waters are protected for their *Recreational Use* and *Aesthetic Enjoyment*. Other uses are allowed as long as they are compatible with the *protection and propagation of fish, shellfish*, and wildlife, and *recreation* in and on the water with limited body contact.

Figure B-2 Class A Marine Waters of Tanapag Harbor, Saipan



CNMI Fresh Water Classes

The CNMI WQS also defines two classes of fresh water uses, Class 1 and 2. However, there are no Class 2 fresh surface waters in the CNMI. All fresh surface water bodies including, intermittent streams, perennial streams, and wetlands are Class 1 (see Table C-1). Therefore, all fresh waters should 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 use designation.

Saipan has one lake, several isolated wetland regions, and numerous intermittent streams, some with segments which are perennially wet, but none which flow all year for their entire length. Many of the islands' intermittent streams are used for aesthetic enjoyment and recreation.

Rota has no lakes or wetlands, but has several streams. Tinian has a wetland in the northern military lease area, but no lakes or streams. Some of these resources on Tinian and Rota are used as a potable water source, but none of Saipan's fresh waters are used in such a manner.

The raised limestone bedrock of the southern Mariana Islands is extremely permeable. Therefore, most rainfall that does not directly run off to the ocean percolates readily into the ground. Streams occur mostly in limited areas where less permeable volcanic basement materials have been exposed. Wetlands occur primarily at low elevations where the water table intersects with the land's surface. Wetlands and perennial streams together comprise less than 5% of the land (based on current CNMI GIS data layers). Wetlands alone cover a mere 2% of the CNMI, the majority of which are patchily distributed around the islands of Saipan and Tinian with some isolated wetlands found on Rota and Pagan. The majority of these fresh water bodies are not tested by the DEQ Laboratory on a regular basis due to their low abundance and use.

Nearshore Marine Communities - Biomonitoring

In the case of the CNMI, as with all island nations, discussions about surface water quality must include information regarding the status of nearshore marine communities. Marine communities can shift in response to nutrient enrichment, e.g. water quality impairment (Littler and Littler, 1985, Lapointe, 1997, Fabricius and De'ath, 2001). Similarly, changes in temperature, salinity, pH, Dissolved Oxygen, and other water quality criteria will also affect coral reef environments (Valiela, 1995). At any particular time water quality values are affected by rainfall or storm events, tidal fluctuations, and other atmospheric 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 water body; or a pollutant source without appropriate sample sizes. It is much more efficient for island nations to use bio-criteria data coupled with water quality measurements to help assess water bodies.

B.2. Water Pollution Control Program

B.2.1. Water Quality Surveillance/Nonpoint Source Program

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The BECQ Water Quality Surveillance Branch was established in 2013 and merged with the NPS Control Program under the Division of Coastal Resources Management (DCRM) in January 2014. Its new acronym is WQS/NPS. The WQS/NPS administers several programs, the first being the collection, monitoring, and assessment of CNMI marine waters and fresh water lakes and streams.

The WQS/NPS Program receives funding from the CWA Section 319 NPS and US Coral Reef Initiative Grant programs to reduce the impact of NPS pollution on waters of the CNMI. These funds have been used to provide numerous educational and outreach activities to: reduce human contribution to land-based sources of pollution; assess watershed health; produce the

CNMI/Guam Stormwater Management Manual; and inventory and inspect septic systems throughout Saipan.

WQS/NPS conducts watershed sanitary surveys in conjunction with sampling to identify chronic sources of pollution and residual waste sites. Monitoring and Survey data together with data collected from other branches within BECQ and other government and non-government agencies are used to assess watershed health, identify sites for remediation, and compile the EPA 305(b) Integrated Report. The report and the subsequent 303(d) list are used to plan restoration activities and steer policy decisions for better environmental resources management.

B.2.2. DEQ Wastewater and Erosion Control Program

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Earthmoving and Erosion Control Permitting Program

The DEQ Earthmoving and Erosion Control Permitting Program provides the overarching permitting structure for the CNMI's "One-Start" permitting program. Nearly all forms of development or construction within the CNMI are required to obtain a One-Start Permit prior to commencing the activity. One-Start Permits include approvals and conditions from four regulatory agencies, including DEQ, DCRM, Division of Fish and Wildlife, and Historic Preservation Office.

The One-Start Permit review assures compliance with the DEQ Earthmoving and Erosion Control 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 stormwater quantity and quality. The Earthmoving and Erosion Control Regulations dates back from 1993, but DEQ substantially updated the program in 2006 with the adoption of new site design and construction standards in the form of the joint CNMI/Guam Stormwater Management Manual. This manual added up-to-date standards for both construction and post-construction stormwater treatment and BMPs design. Additional material was added in 2009 with the addition of a field manual and training program aimed at educating construction field staff and erosion control inspectors. The improvements have so far proven a success. Both American Samoa and the Republic of Palau have adapted the CNMI/Guam Stormwater Management Manual and incorporated it into their regulations in 2010.

Individual Wastewater Disposal Systems Program

The DEQ Wastewater Treatment and Disposal (WTD) Regulations require permits for all new septic systems and "other" small wastewater treatment systems in the CNMI. The WTD regulations also cover certain types of animal feed operations and sets limitations on, and prohibitions to, 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.

DEQ administer a prescriptive septic system construction and operation permitting program which specifies septic system sizes based on percolation rates measured for each individual site.

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

Wastewater Treatment Systems *which discharge directly to waters of the CNMI*, or which are directly hydrologically connected to surface waters (such as the Managaha Island treatment system), are regulated by the US EPA through the National Pollutant Discharge Elimination System (NPDES) program.

Land Disposal of Wastewater Program

Part 11 of the CNMI WQS establishes a permitting program for various types of wastewater generation and disposal activities that are not covered by the WTD regulations described above. This includes discharges of brine from reverse-osmosis desalination equipment, discharges from oil/water separators, and anything else that may create a liquid waste stream that is not covered by the WTD regulations.

B.2.3. DEQ Safe Drinking Water Quality Program

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Section 401 Water Quality Certification Program

The CNMI administers a CWA Section 401 Water Quality Certification Program through provisions contained within the WQS Regulations. A Section 401 certification is required for every federal permit which may result in a discharge of pollutants to waters of the CNMI. This includes: NPDES permits for Saipan's municipal separate storm sewer system; the municipal Commonwealth Utility Corporation (CUC) wastewater treatment plants on Saipan; the package treatment plant on Managaha Island; and for EPA General NPDES Permits, such as that for discharges from construction sites larger than 1 acre.

A Section 401 Certification is also required for any activity requiring a Army Corps of Engineers 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.3. Special State Concerns and Recommendations

As in previous years, the most common sources of water quality degradation remain: 1) Stormwater runoff from existing roads and development; and 2) failing wastewater infrastructure.

BECQ has made significant strides in the regulation of new development through its One-Start permitting program and new design standards, but the problem of how to address older development, in particular road systems and unpaved coral roads, requires further attention.

BECQ continues to address this problem by educating road crews how to use better grading techniques, and assisting with larger improvement plans such as regional sedimentation basins and other BMPs. Convincing the public, the business community, and political leadership of the value of dedicating land for BMPs has been the primary obstacle, aside from funding, in implementing major improvements.

The rehabilitation of Saipan's wastewater infrastructure is progressing under the auspices of Stipulated Orders entered into by the CNMI and EPA in 2009, and is well underway. BECQ continues to use the water quality data presented in these biennial integrated reports to focus CUCs efforts on a handful of severely degraded beach sites that appear to be impaired primarily due to sewer problems. The first being the sewer line near the Sugar Dock beach area which was repaired in late 2013. Currently, the lift station at DPW Bridge is under repair. Only San Antonio Lift Station still needs to be addressed.

Mercury levels in fish tissues collected near Garapan and other biota around the island and Managaha has focused attention on the lack of a Fish Monitoring and Advisory Program within BECQ to appropriately advise the public about fish consumption. This has highlighted the need to retain dedicated staff to take charge of the development and implementation of various water quality surveillance programs. A Probabilistic Monitoring plan was developed in 2010 and is now being implemented to fill data gaps in CNMI water quality data. The sustainability of such a plan, and more importantly, the utilization and interpretation of the data collected depends entirely on the capability and availability of BECQ's professional staff. In response, a total of three additional full time staff were hired into the WQS/NPS Program in 2013 and another will be hired early next fiscal year.

Semi-annual ground water monitoring, especially for nitrate and salinity indicators, has been required by the CNMI for years. The Safe Drinking Water Information System database is now used to store and retrieve ground water quality information. Methods for analyzing the collected data and actions to be taken based upon the data, including a comprehensive ground water management plan are still lacking.

C. SURFACE WATER MONITORING AND ASSESSMENT

C1. Monitoring Programs

BECQ maintains monitoring programs for Drinking Water Quality, Surface Water Quality, and Biological Monitoring to evaluate ecosystem health.

The Safe Drinking Water Monitoring Program is described in the Groundwater Quality section as the monitoring is a requirement of that branch's CNMI Well Drilling and Well Operation Operations Regulations. A description of the Surface Water Monitoring and Biological Monitoring Programs follows.

C.1.1. Surface Water Monitoring Program

The goal of the BECQ Surface Water Monitoring Program is to assess CNMI water bodies for compliance with *Aesthetic Enjoyment, Recreational Uses,* and *Aquatic Life and Propagation* uses, which support *Fish and Shellfish Consumption*. In the past surface water quality was limited to coastal waters and one lake. However, since a Surface Water Quality Monitoring Plan for CNMI Watersheds was completed in 2013, stream and stormwater monitoring has been initiated. This has allowed for a re-evaluation of some stream water use designations. The new fresh water data collected under the plan will be used in earnest next reporting cycle.

CNMI surface water monitoring sites are shown in APPENDIX I: Water Body Information for Commonwealth of the Northern Marianas Islands. On a weekly basis, 38 fixed beach sites are sampled along Saipan's most used west coast. During this reporting cycle six (6) sites on the northeast coast, and six (6) sites on the southeast coast, are monitored each week using an 8-week rotational schedule between the two locations. The locations are monitored only once monthly when off their 8-week schedule. This is primarily due to the smaller number of beach users for the northeast and southeast coasts. Similarly, 11 sites on Managaha, a sand cay in the Saipan lagoon, are also monitored weekly on an 8-week schedule, then only once monthly when off the schedule. This is to meet boat availability for transport there, staffing, and other budgetary constraints.

Tinian and Rota beaches are monitored at 10 and 12 sites respectively. Many of these sites are frequently used by the community so they are monitored at similar intervals described above.

Samples are given to the DEQ Environmental Laboratory for testing. The Laboratory maintains, and rigorously follows, a Quality Assurance Plan (QAP) which includes Standard Operating Procedures (SOP) for sampling, testing, and reporting. The QAP has two primary functions: 1) to assure that proper quality control practices are implemented in day-to-day laboratory tasks; and 2) to assure that the reported data are valid, and are of known precision and accuracy.

The microbiological, chemical and physical parameters include: Enterococci bacteria (CFU/100ml); salinity (‰), Dissolved Oxygen (DO%); Temperature (°C), pH, and Turbidity (NTU).

Orthophosphate (PO4) and Nitrate (NO3) levels have been tested in drinking water since 2007 using a Flow Injection Analyzer method. The method for testing marine water using the analyzer was just established in 2013. Therefore, data are very limited as testing was only carried out as

staffing, and resources for reagents allowed. Nutrient data will be included for marine waters next reporting cycle.

C.1.2. Biological Monitoring Program

Monitoring Programs that only use water quality data to assess ecological health may not be statistically rigorous enough to detect change over time due to low sample number compared with the high rates of change in pertinent water quality parameters. 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 high number of water bodies 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. For tropical marine waters, near shore coral reef assemblages 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 community as biological criteria for water body evaluation and is described herein.

The CNMI marine monitoring team (MMT) was initially established in 1996 to help understand the current conditions of jurisdictional coral reef and seagrass assemblages. It has expanded over the years to improve data collection techniques, data accuracy, staff training, and spatial coverage (Houk and Van Woesik, 2006, Houk and Starmer, 2008, www.cnmicoralreef.net/monitoring.htm). It is the goal of the MMT to continually assess the CNMI's reefs and lagoons, as the human population grows and development continues, and to provide pertinent data to trigger appropriate management action. BECQ plays a major role in the MMT through its marine biologist, WQS/NPS Program, and DEQ laboratory. Data from two monitoring efforts are used in this report to evaluate water body health in accordance with EPA guidance materials: 1) Saipan Lagoon seagrass monitoring; and 2) CNMI reef slope coral reef monitoring. Lagoon surveys are carried out via snorkel for depths of less than 2m, and SCUBA for reef slope monitoring at the 7-8m contour. Currently, a description of the use of biological criteria exists in CNMI's WQSs:

> *"The health and life history characteristics of aquatic organisms in waters affected by controllable water quality factors shall not differ significantly from those for the same waters in areas unaffected by controllable water quality factors."*

BECQ standards further protect successful annual coral reproduction events by requiring certain permitted dredging and fill activities to cease work during a *"period not to exceed 3 weeks centered around the largest annual coral spawning month"*.

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 (CNMI's 2012, 305(b) and 303(d) report). 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 (i.e., watersheds), 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 the 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); successfully out-competing 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. In accordance with these findings, seagrass assemblages surveyed between October 2011 and September 2013 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 between October 2011 and September 2013.

"***Fair***" – Natural seasonal changes are apparent, existing assemblage has statistically similar abundances of *H. uninervis* and macroalgae based upon average of estimates between October 2011 and September 2013.

"***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.

Coral reef assemblages were initially evaluated by calculating a ratio of coral/crustose coralline algae (CCA)/branching coralline algae, which are favorable attributes for sustainable coral assemblages, to turf/macroalgae/fleshy crustose algae, which are unfavorable attributes (CNMI's 2008 305(b) and 303(d) report; 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 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 integrated report, CNMI benthic assemblage ratio's and coral richness estimates were compared to global mean values to come up with a final ALUS evaluation status.

For this reporting period, the knowledge-base presented above is utilized in conjunction with recent analyses of the 13 year monitoring dataset for the southern islands to make ALUS assessments. CNMI-wide, natural disturbances were evident in the CNMI from 2003-2006 (high populations of the coral eating starfish, *Acanthaster planci*, reported in Houk et al., 2007). Large declines in coral cover were universally noted, and impacts to the two metrics discussed above (benthic substrate ratio and coral richness) were also apparent, although less severe. Golbuu, et al., wrote in a 2007 report, that recovery from similar large-scale impacts was evident within five (5) years in Palau, thus agreeing with yet unpublished data from numerous MMT sites. However, where water quality is poor, and/or herbivory rates are low, slowed or halted recovery has been

noted, and is expected (Hughes et al. 2007). In accordance with these findings coral assemblages surveyed between October 2011 and September 2013 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 2012 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 2012 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 2012 reporting and *found to be lower than the mean average.*

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.

C.1.3. Other Information and Data Used

In addition to using the regular monitoring data provided by the WQS/NPS and Safe Drinking Water Quality Programs, the DEQ Laboratory, and the MMT, data from other sources have also been used in the assessments for the present Integrated Report: 1) Data collected on fish tissue and biota contaminants by Dr. Gary Denton of the University of Guam, Water and Environment Research Institute (UOG-WERI); 2) Reports by Dr. Peter Houk of the Pacific Marine Resources Institute (PMRI) and the National Oceanic and Atmospheric Administration Coral Reef Ecosystem Division (NOAA-CRED) summarizing their findings on the remote volcanic northern islands; 3) Water quality data collected by the MMT for the LaoLao Bay watershed restoration project; 4) The newly established Probabilistic Reef Flat Monitoring Program; and 5) a Steam Aquatic Survey conducted by the CNMI Division of Environmental Quality.

C.1.3.1. UOG-WERI Fish Tissue and Biota Contaminant Studies:

UOG-WERI has collaborated with CNMI agencies to investigate contaminant levels in sediments and marine life found in portions of the Saipan Lagoon, and to attempt to identify sources of these contaminants since 2000. Data summarized in a 2008 report by Denton, 2008 indicated that most species sampled in most locations throughout the Saipan lagoon were free of contaminants at any levels of concern, although some species of bivalves in the Puerto Rico

Dump area (coastal water segment 19A – W. Takpochau (North)) had levels of lead that exceeded US FDA standards. However, the use of these bivalves as an edible species is unlikely.

Fish tissue contaminant data was used in making fish consumption determinations. UOG-WERI found elevated levels of mercury (Hg) in more commonly consumed fish species that exceeded US EPA limits for unrestricted fish consumption from Hafa Adai Beach and Micro Beach area (coastal water segment 19B – Central W. Takpochau) located some distance from known sources of Hg contamination. A follow up investigation aimed at identifying additional land-based sources of Hg identified the former site of Commonwealth Health Center's medical waste incinerator as the primary source of Hg enrichment. The incinerator was used for the destruction of medical waste from the hospital and other medical clinics on island for about 20 years before it was closed down in January 2006. Stormwater runoff from the facility entered a drainage network that discharged into the ocean at the southern end of Hafa Adai Beach. More recently published data from fish species analyzed in 2007 revealed that mercury concentrations in fish tissues from Hafa Adai Beach area are significantly lower than those determined in fish species analyzed in 2004-2005.

A more recent study by UOG-WERI on the Environmental Impacts of Formerly Used Defense Sites and Brownfield Sites on Aquatic Resources (Denton, et al, 2014) found that "Agingan Point is clearly a 'hot spot' that requires additional research on metal uptake in resident biota. Local people frequently harvest seaweeds and mollusks for food from the adjacent back reef area. 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. Other such submerged dumpsites exist around the island and likewise encourage fish to congregate. Considering the impact of such submerged sites on the edible quality of these fish is clearly of major importance from a public health standpoint. Denton will be completing future fish tissue studies as funding is secured.

C.1.3.2. PMRI and NOAA-CRED Surveys of the Northern Islands

Ecological surveys and limited water quality sampling were conducted on three occasions in the remote, volcanic northern islands during the past decade. This research was conducted using a federal research vessel from the NOAA-CRED program and included both local and federal scientists and resource managers. The scientific cruises took place in the spring of 2003, fall of 2005, and spring of 2007. Each lasted approximately 30 days. Generally, the data summaries show that fish populations surrounding the remote islands are much larger compared with the populated southern islands (Starmer et al. 2008). 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 watersheds, 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 the classification of the water bodies, both marine and fresh, in the northern islands to be considered fully supportive of the *Aquatic Life and Propagation* criteria for use designation.

These monitoring cruises will continue during the summer of 2014. Water samples will be collected throughout the northern islands and tested on ship for salinity, pH, temperature, DO, turbidity, nutrients, and Enterococci. This will be the most robust water quality sampling effort carried out in the Northern Islands by BECQ to date.

C.1.3.3. MMT LaoLao Bay Watershed Restoration Project

The Laolao Bay Watershed Restoration Project began in 2010 with the objective of reducing sedimentation in the lower near shore marine environment. Activities taken to meet this objective included upland reforestation of bare soil and grasslands, paving coral roads, constructing culverts and concrete stream crossings, augmented by community outreach and education. Baseline water quality data was collected at six reef flat sites so comparisons could be made to assess the effectiveness of these activities overtime.

Monitoring from November 2010 to May 2012 included monthly testing for salinity, pH, temperature, DO, and turbidity. Nutrient testing was conducted from March 2011 through May 2012 and included Nitrate + nitrite, ammonia, and total nitrogen.

C.1.3.4. MMT Reef Flat Probabilistic Monitoring Program

In 2010, the CNMI partnered with US EPA Region 9 Water Quality Office, Guam EPA, and American Samoa EPA to carry out the first Reef Flat Probabilistic Monitoring as part of the Environmental Monitoring and Assessment Program (EMAP) for the Pacific Territories. Each Pacific 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 the remaining 16 to Saipan. Given that the assessment was done only once, no determinations to the condition of the CNMIs reef flat sampling locations were made for this report.

Each site is tested for pH, temperature, DO, salinity, turbidity, depth, light attenuation, chlorophyll-a, dissolved nutrients (ortho-phosphates, nitrites, nitrates, ammonia), total phosphorus, total nitrogen, total suspended solids, *Enterococci,* and the floral and faunal composition of the reef flat habitats, or benthic assessment.

C.1.3.5. CNMI Division of Fish & Wildlife Fresh Aquatic Survey

The CNMI Division of Fish and Wildlife conducted a fresh water aquatic survey in August of 2008. Specimens from various stream systems at 12 sites in eight watersheds on Saipan were collected using dip net, trap and electrofishing during the course of the survey. This 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 Aquatic Life and Propagation use designations for the sampled watersheds. Details may be found under each watershed heading in Section C.3.1. 305(b) Assessment Results for Saipan.

C.2. Assessment Methodology

C.2.1. Water Body Segmentation - Watershed Approach

Since 2010 CNMI water quality is assessed in terms of water body segments based on established watershed units. Streams, lakes, and wetlands are reported solely by watershed. Coastal water segments are also reported by watershed, but some coastal waters on Saipan have been split into two or more sub-segments, in order to take better advantage of the larger quantity of data and to better differentiate between areas with known sources of pollutants. Aguigan and each of the northern islands are assigned only one watershed. APPENDIX I: Water Body Information for Commonwealth of the Northern Marianas Islands contains detailed maps showing all assigned watersheds and water body segments used in this report.

Table C-1 Designated Use terminology as used in this report

Designated Use Categories used in this report	Designated Uses in CNMI Water Quality Standards	
COASTAL WATERS	**Class AA**	**Class A**
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	No specific CNMI language
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**
Aquatic Life	"The support and propagation of aquatic life"	(not applicable – no class 2 waters in CNMI)
Fish Consumption	No specific CNMI language	(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, groundwater recharge"	(not applicable – no class 2 waters in CNMI)
Aesthetic Enjoyment/Others	"Aesthetic enjoyment"	(not applicable – no class 2 waters in CNMI)
WETLANDS		
Support and Propagation of Aquatic and Terrestrial Life	"shall be protected to support the propagation of aquatic and terrestrial life"	

C.2.2. CNMI Designated Uses

Although the language of the CNMI WQSs differs somewhat from the terminology used in the CWA the basic guaranteed use designations are the same. The previous 305(b) report stated that the "fish consumption" designation was not clearly stipulated in the CNMI WQS and that this would be addressed during the next triennial review cycle. This reporting cycle US EPA Region IV was asked to review the designated use language of the CNMI WQS that reads, "support/protection and propagation of shellfish and other marine life" to see if further fish consumption language was needed (CNMI WQS 2013 Triennial review, 2013). US EPA determined that the present wording incorporated "fish consumption" by the fact that the fish consumption criteria are included in the list of Priority Toxic Pollutants (CNMI WQS, Part 8.11). However, for the purpose of this report, and in the interest of both simplicity and maintaining consistency with other states, the more standard CWA terminology is used.

The CNMI WQS establish criteria designed to protect the designated uses for each Class of waters. Select criteria are shown in Table C-1 and Table C-2. The manner in which water quality data are used to assess attainment of each designated use is discussed in more detail below.

Table C-2 Selected CNMI Water Quality Criteria

PARAMETER	CLASS AA Marine Waters	CLASS A Marine Waters	CLASS 1 Fresh Waters	CLASS 2 Fresh Waters
Fecal Coliform (CFU/100 ml)	GM[1]< 200 < 400 Single Sample	GM[1]< 200 < 400 Single Sample	GM[1]< 200 <400 Single Sample	GM[1]< 200 < 400 Single Sample
Enterococci (CFU/ 100 ml)	GM[1] < 35 ‹ 104 Single Sample	GM[1] <35 < 276 Single Sample	GM[1] < 33 < 61 Single Sample	GM[1] < 33 < 108 Single Sample
E. coli (CFU/100 ml)			GM[1] < 126 < 235 Single Sample	GM[1] < 126 < 406 Single Sample
pH	7.5 – 8.6	7.5 – 8.6	6.50-8.50	6.50 - 8.50
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 Phosphate (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	20‰ or above 250 mg/L
Total Dissolved Solids (mg/L)			500 mg/L	500 mg/L
Temperature (°C)[2]	1.0	1.0	1.0	1.0
Turbidity (NTU)[2]	0.5	1.0	0.5	1.0
Radioactive Materials	Discharge prohibited	Discharge prohibited	Discharge prohibited	Discharge prohibited
Oil & Petroleum	ND[3]	ND[3]	ND[3]	ND[3]

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

Of note is the lack of specific numeric biological indices in the CNMI WQS. However, numeric biocriteria are being used and the methodology will be made available for use in an Implementation Guidance Manual to be finalized the first quarter of 2014. These methods are described in Section C.1.2 of this report, and were used to determine compliance with designated uses.

C.2.3. Criteria and Assessment of Coastal Waters Designated Uses

Attainment or impairment of each designated use were determined for CNMI Waters based on available data from the CNMI WQS/NPS and Biological Monitoring Programs, in addition to other available study data as indicated in C.1.3. Other Information and Data Used. The data assessed was collected during fiscal years 2012 and 2013.

At present CNMI coastal waters receive by far the greatest attention from the Monitoring Programs and has the most data. Therefore, BECQ has high confidence in these assessments.

Table C-3 summarizes the criteria used to assess attainment of a Coastal Water's designated uses. A discussion of each use and the water quality parameters associated with it follows.

Table C-3 Assessment Criteria for Coastal Waters

Designated Use	Criteria for Attainment
Aquatic life	• Habitat suitability: biocriteria (ALUS) score of "fair" or "good" for all sites within segment and other study results • Dissolved oxygen: less than 10% of samples exceeding criteria for all sites within segment • Nutrients (Nitrate and/or Orthophosphate): less than 10% of samples exceeding criteria 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 sample events resulting 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, editorials, etc.

C.2.3.1. Support and Propagation of Aquatic Life

Biocriteria and Dissolve Oxygen

DO results are used along with biological monitoring studies to assess whether a water body supports *Aquatic Life and its Propagation*. BECQ measures DO in-situ with a portable meter. The accuracy of the portable meter depends on a number of factors, including proper calibration of the instrument, and following SOPs according to the DEQ Laboratory's QAP to obtain accurate and scientifically defensible results. In the past reporting cycle it was noted that staff collecting data on the islands of Rota and Tinian had provided inaccurate DO results which were not reflective of water body health. In response, BECQ successfully conducted staff training in 2011 and all DO measurements since that time are accurate and have been used for making assessments in this reporting cycle. Results for DO monitoring are provided in APPENDIX IV: Selected Marine Monitoring Data Used in 2014 Listing Determinations, by Water Segment.

Nutrients (Orthophosphate and Nitrate)

Orthophosphate (PO4) was last monitored in 2004 and found to exceed CNMI WQS in all waters which were assessed. However, BECQ simply adopted its nutrient WQS from another state. Therefore, it may not be representative of natural conditions for CNMI waters. Some data collected in the past from sites which have no known anthropogenic sources of PO4 could be considered as ambient for CNMI coastal waters. The fact that PO4 concentrations found at these sites exceeded the current WQS makes the present concentration somewhat suspect.

Moreover, the spectrophotometer method used during the last reporting cycle is known to be inaccurate when used for marine water. Without a new method in place for nutrient testing an accurate assessment could not be made.

The DEQ Laboratory is making progress. A new flow injection auto analyzer is being used to accurately test fresh water for nutrients. BECQ hired additional laboratory staff in 2012 to establish its use for marine quality monitoring. Although waters have been tested for nutrient concentrations this reporting cycle, there is currently an insufficient number of data to determine compliance with WQS at the time of this writing. The analyzer will be available for nutrient testing of coastal water next reporting cycle.

General Provisions

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

Radioactive substances are also an obvious health risk to most designated uses and no level of radioactivity is allowed in CNMI WQS.

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, collected data show little variance from the allowable levels set forth in the CNMI WQS. Thus, no coastal waters have been shown to be impaired for either from exceedences of these "General Provision" parameters (see C.2.3.3. Recreational Use below).

C.2.3.2. Fish and Shellfish Consumption

Mercury contamination of fish tissue has been associated with Saipan's Central W. Takpochau water body segment 19b, and other metals with the Agingan outfall in the West Isley Watershed. Previous studies raise the possibility that fish tissue and other biota contamination may exist in other water bodies as well. However, there is not sufficient data available at this time to assess other water bodies. Fish tissue monitoring is being scheduled given available funding next reporting cycle.

C.2.3.3. Recreational Use

Enterococci

Enterococci concentrations exceeding CNMI WQSs pose a public health threat for individuals fishing or swimming in effected waters. Thus, an advisory is issued each week as necessary. The public is advised not to swim or fish within 300 feet of these coastal waters.

Two levels of criteria have been established by USEPA and adopted by BECQ for determining when an advisory should be issued, the single sample maximum limit, and the geometric mean of samples taken over a 30 day period. BECQ uses both to determine when a coastal water should be "red flagged" to alert the public of potential hazards associated with its *Recreational Use*. It is as follows:

1. An exceedence of the single-sample WQS maximum limit for the specific Class of Waters: Marine AA (104 CFU/100ml), and A (276 CFU/100ml), or Fresh 1 (61 CFU/100ml); or
2. Both the moving geometric mean for the most recent sampling events over a 30 day period exceeds 35 CFU/100ml, AND the single sample result also exceeds this lower concentration trigger.

BECQ has elected to take a conservative approach to determine whether a water body attains its recreations use designation, by counting all beach advisories issued, including advisories triggered by both geometric mean and single-sample exceedences. Although a case could be made for using only the geometric mean for assessment, BECQ believes that the issuance of an advisory better represents the true measure of whether or not recreational uses are being attained. This is particularly true for Tinian, Rota, Managaha, and some of Saipan's eastern beaches where weekly data do not exist, and the single-sample maximum must be used to gage the suitability of water quality for safe recreation.

An entire segment is listed as impaired for *Recreational Use* if advisories are issued for more than 10% of all sampling events in a given year, for any single monitoring site within the segment. Tables containing determination results and CALM assessments are contained in Appendix II: Detailed 305 b Listing of CNMI Waters. Enterococci results are provided in Appendix IV.A.: Selected Monitoring Data Used in 2014 Listing Determinations by Water Segment.

General Provisions

See General Provisions on page 19 Section C.2.3.1.

C.2.3.4. Aesthetic Enjoyment and Other Uses

The attainment of *Aesthetic Enjoyment and Other Uses* of a water body is not systematically defined in the CWA, but by anecdotally applying the general definition of *Aesthetic Enjoyment* as "appreciation of beauty" one may draw a conclusion as to whether or not this designated use has been attained for each waterbody based on reported uses and surveys.

The Marianas Visitor Authority conducted tourist exit surveys in 2011. Their survey results show the percent of visitors reporting satisfaction with CNMI coastal waters, which has been used along with other information this reporting cycle to assess whether or not *Aesthetic Enjoyment* has been attained.

As to *Other Uses*, which refers to oceanographic research, the many white papers, research documents and publications available to assess its attainment in CNMI waters is a testament onto itself.

C.2.4. Criteria and Assessment of Fresh Waters & Streams Designated Uses

Table C-4 below summarizes the criteria used to assess attainment of a fresh surface water's designated uses. Although, a Surface Water Quality Monitoring Plan for fresh water, lakes and streams was established in late 2013, the plan had not been implemented during this data collection period. Therefore, there is insufficient data for assessing all fresh surface water bodies for every use designation, aside from Lake Susupe, which is tested for bacteriological, chemical and physical parameters on a regular basis. A discussion of each Use Designation and the water quality parameters associated with it follows.

C.2.4.1. Support and Propagation of Aquatic Life

At the time of data collection for this integrated report there was not an established monitoring program for aquatic life in fresh water bodies. However, in 2008, a two week survey was conducted by the CNMI Division of Fish and Wildlife on Saipan (McKagan, et al, 2008). Eight different watersheds were studied to assess native and introduced freshwater species using a dip net, and where possible, electrofishing to collect samples for identification and to access aquatic life. Although, this study provides pertinent data on some streams within Saipan's watersheds there is insufficient data on the remaining stream systems to determine if all are supporting aquatic life.

Table C-4 Assessment Criteria for Fresh Surface Waters

Designated Use	Criteria for Attainment
Aquatic life	• Dissolved oxygen: less than 10% of samples exceeding criteria for all sites within segment • General provisions met: floating/settleable solids, pH, radioactive substances • Habitat suitability: biocriteria (ALUS) score of "fair" or "good" for all sites within segment and other study results
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 bacteria: less than 10% of sample events resulting in exceedence of criteria • General provisions met: floating/settleable solids, pH, radioactive substances
Potable Water Supply	• E. coli bacteria: less than 10% of sample events resulting in exceedence of criteria • 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, studies, etc.

C.2.4.2 Fish/Shellfish Consumption

At present no contaminants have been tested in fresh water fish tissue or other biota to determine if our fresh waters are attaining the fish consumption use designation. However, in the case of the northern islands where data is lacking, their remoteness from any potential anthropogenic sources of pollution is taken into consideration for assessment purposes.

C.2.4.3. Recreational Use

There has been no data collected systematically concerning visitor or residents recreational use of freshwater surface waters. However, professional judgment and anecdotal information are used to assess whether or not fresh surface waters support recreational use.

C.2.4.4. Potable Water Supply

Surface fresh water streams are not used as a potable water supply for Saipan residents. At present there is not enough data available to assess whether streams are impaired or have attained the Potable Water Supply Use designation. However, with the implementation of the Surface Water Quality Plan, initial data will have been collected for the next reporting cycle.

C.2.4.5. Aesthetic Enjoyment/Other Uses

As stated for the Recreational Use designation, there has been no data collected systematically concerning visitor or residents aesthetic enjoyment of fresh surface waters. However,

professional judgment and anecdotal information are used to assess whether or not a fresh surface waters provide aesthetic enjoyment to users.

C.2.5 USEPA's CALM Assessment Categories

The Consolidated Assessment and Listing Methodology (CALM) Categories were utilized as described in the Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the CWA (USEPA 2005). Each water body type has been assigned a CALM Category (Table C-5 below).

Table C-5 EPA "CALM" Reporting Categories

EPA CALM CATEGORY:	DESCRIPTION
1	All designated uses are supported, no use is threatened
2	Available data and/or information indicate that some, but not all of the designated uses are supported
3	There is insufficient available data and/or information to make a use support determination
4a	A TMDL to address a specific segment/pollutant combination has been approved or established by EPA
4b	A use impairment caused by a pollutant is being addressed by the state through other pollution control requirements
4c	A use is impaired, but the impairment is not caused by a pollutant
5	Available data and/or information indicate that at least one designated use is not being supported or is threatened, and a TMDL is needed (a use is threatened if a waterbody is currently attaining WQS, but is expected to not meet WQS by the next listing cycle)

Based on the descriptions in the above table each class of coastal and fresh surface waters were assessed and assigned a CALM Category. It is discussed in detail below.

C.2.5.1. *Category 1*: Attaining all designated uses and water quality standards, and no use is threatened.

Category 1 represents the highest level of attainment. A water body classified as Category 1 attains all applicable standards throughout the entire water body. Assessment is based on combined evaluation of the following information:

1. Current data (collected within five years) indicates attainment, with no trend toward expected non-attainment within the listing period. Greater weight is placed on more recent water quality and biocriteria data (< 2 years) if improvement is shown;
2. Old data (greater than five 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. However, this may change in later integrated reporting cycles for the islands of Farallon de Mendinilla and Pagan should the currently proposed US military training exercises be expanded on these islands in the future.

C.2.5.2. *Category 2*: Attains some of the designated uses; no use is threatened or impaired; and insufficient data or no data and information is available to determine if the remaining uses are attained, threatened, or impaired (with presumption that all uses are attained).

Assessment is based on combined evaluation of the following information:

1. Current data (collected within five 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 (greater than 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. *Category 3*: Insufficient data and information to determine if designated uses are attained.

Water body segments assigned to Category 3 have both insufficient, or no data available, and there is reasonable potential that one or more uses are not being attained. Category 3 water body 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 designated uses;
2. Qualitative data or information from professional sources showing the potential presence of stressors that may cause impairment of one or more uses; however, no quantitative water quality information confirms the presence of impairment-causing stressors. For example, fish tissue data is not available for most water body segments of the CNMI, but the contamination that has been found in other biota has occurred only in water bodies where either current or previous land uses include potential sources of contaminants. Therefore, most CNMI water bodies that have been contaminated from war time ammunitions, dumps, or abandoned equipment, or are adjacent to current or previously developed areas, are listed as Category 3 for the fish consumption designated use;

3. 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. *Category 4*: Impaired or threatened for one or more designated uses, but does not require development of a TMDL.

A water body is listed as Category 4 when impairment is not caused by a pollutant; 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 standard 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 predicted impaired use under loading for some standard, also predict attainment when required controls are in place; or,
3. Quantitative or qualitative data/information from professional sources indicates that the cause of impaired use is not from a pollutant(s) (e.g. habitat modification or over-fishing).

Waters are listed in one of the following Category 4 sub-lists when:

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

4b: *Other pollution control requirements are reasonably expected to result in attainment of standards in the near future***.** Water bodies where enforceable controls have a reasonable expectation of attaining standards, 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, or contracts for hazardous waste remediation projects.

4c: *Impairment is not caused by a pollutant.* Waters or biological communities impaired by habitat modification or over harvesting that is a result of human activity.

C.2.5.5. *Category 5*: Waters impaired or threatened for one or more designated uses by a pollutant(s) and a TMDL is required.

Waters are listed as Category 5 when:

1. Current data (collected within five years) for a standard 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 standard, 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 waters 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 use.

C.3. 305(b) Assessment Results for All CNMI Waters

This section gives a general overview of the assessment results for all waters of the Commonwealth. The following sections discuss findings based on each type of water body.

Coastal Marine Waters

Almost all coastal marine waters for the southern inhabited islands are not attaining at least one designated use, and therefore are listed as CALM Category 5. The exceptions to this are Aguigan island (Tinian), and Banaderu Watershed on Saipan which are listed as Category 1 as fully supporting all uses and unthreatened.

The Dugi/Gampapa/Chencon Watershed on Rota, Carolinas on Tinian, and the DanDan Watershed on Saipan are listed as CALM Category 2 because some uses are met but not all are fully supported.

Based on available studies, and professional judgment, the northern islands are listed as attaining all of their designated uses, CALM Category 1, due to their remoteness and lack of any consistent anthropogenic stressors or pollutants.

As was reported in the previous reporting cycle there has been some interference problems encountered with the testing method for nutrients. Therefore, data was not available this reporting cycle or last to assess actual nutrient levels or their potential impact on the *Aquatic Life* use designation for any watershed. However, biological monitoring data on the three inhabited southern islands generally receive a "fair" or "good" ranking when situated some distance away from large, populated watersheds. 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 maintenance or improvement in coral metrics since the 2003 through 2006 natural disturbance event (i.e., coral eating starfish predation). The ecological resilience of CNMI's coral reef is further exhibited by the realization that no site has received a reduction in ALUS ranking during this time period.

Although, there has been no decline in rankings, a few sites have consistently received poor ratings over time. Biological monitoring 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 and cattle near streams and shorelines.

In an effort to restore resiliency at other sites which have received a consistently poor ranking, it is BECQ's goal to establish enhanced water quality monitoring efforts at these sites to better understand the detrimental factors driving these poor rankings. This information will then be used to allocate the appropriate resources to remedy these degraded coral reefs.

It is the continued goal of BECQ to utilize coral and seagrass trend data to provide estimates of the direction (positive or negative) biological assemblages are headed, and ranking the associated water bodies in accordance with trends, instead of single assessment data.

This is the first report to assess *Aesthetic Enjoyment* using survey data collected by the Marianas Visitor Authority. An exit survey was given to tourists in 2011. Their results show that no matter the visitor's home of origin, "tropical climate, sea, and beach" were listed as their number one reason for visiting the CNMI followed by "nature activities" (CNMI Marianas Visitor Authority, 2011). When asked to rate their satisfaction with beaches 74% to 87% reported being "extremely" or "very satisfied" as shown in Table C-6 below.

Table C-6 2011 Tourist Exit Survey of CNMI Beaches

Beaches			
Nationality	Extremely/very satisfied	So-So	Very Dissatisfied
Japanese	86.70%	13.10%	0.20%
Korean	82.60%	17.40%	0%
Chinese	84.80%	14.80%	0.40%
Russian	73.50%	26.50%	0%

Given these results, and the fact that island residents use these same beaches consistently each week and especially on weekends, it is assumed that all coastal waters of the CNMI are presently attaining the *Aesthetic Enjoyment* use designation.

The "*Other Uses*" of this designation includes oceanographic research. Students, scientists and hobbyists have been allowed to study CNMI coastal waters, coral reefs, fishes and other marine life for decades as proven by the many school assignments, and published scientific papers referenced herein, and editorials elsewhere. Therefore, it is assumed that all waters of the CNMI are presently attaining the "*Other Use*s" designation as well.

Tables C-7 through C-9 provide the total miles of coastal marine waters attaining, not attaining, or in need of further data to make a determination as to whether or not each use designation is supported.

Table C-7 Ocean coasts - Designated Use Support Summary

Designated Use	Total in State (miles)	Total Assessed (miles)	Size of Surface Waters Supporting – Attaining WQ Standards (miles)	Not Supporting- Not Attaining WQ Standards (miles)	Insufficient Data and Information (miles)
ALL WATERS: (Class A & AA)					
Support and propagation of shellfish and other marine life	235.3	208.4	123.5	84.9	26.9
Fish/shellfish consumption	235.3	126.5	123.5	3.0	108.8
Recreation with risk of water ingestion	235.3	197.8	123.5	74.3	37.5
Aesthetic enjoyment/other uses	235.3	235.3	235.3	0.0	0.0

Table C-8 Size of Ocean Coast Waters Impaired by Causes

Cause/Impairment Type	EPA Cause ID	Size of Waters Impaired (miles)
Orthophosphate	340	84.9
Enterococci	215	74.3
Dissolved Oxygen	205	21.8
Bio-indicators of nutrient enrichment	448	30.4
Mercury in fish tissue	467	3.0

Table C-9 Size of Coastal Waters Impaired by Sources

Source Category	EPA Source ID	Size of Waters Impaired (miles)
Upland Erosion/Sedimentation	21	32.6
Unknown Source	140	35.8
On-site treatment systems	92	25.0
Urban Runoff/Storm Sewers	177	25.0
Livestock (grazing or feeding operation)	143	16.8
Sanitary Sewer Overflows	115	12.6
Unspecified non-point source	141	10.8
Municipal Point Sources	85	5.7
Landfills	69	4.1

Fresh Surface Waters – Rivers and Streams

At the time of this writing the Surface Water Quality Monitoring Program has collected insufficient data to make a scientifically defensible assessment of all the uses for the streams of the southern inhabited islands. An assessment of some stream systems for *Aquatic Life and Propagation* support was possible this reporting cycle using the McKagan 2008 study. A re-evaluation of the *Aesthetic Enjoyment/Other Uses* designation was also conducted this reporting cycle based on anecdotal self-reporting by island residents (See C.3. 305(b) Assessment Results for All CNMI Waters below for a detailed discussion).

Therefore, most of the streams in the southern inhabited islands are now upgraded and listed as CALM Category 2, except for Saipan's West Takpochao watershed, which has a CALM category of 4c for known impairment of most all uses, and Isley Watershed which has retained a CALM Category of 3.

As stated above for CNMI Coastal Waters, once again, the northern islands are listed as CALM Category 1, due to their remoteness and lack of any consistent anthropogenic stressors or pollutants.

At present no contaminants have been tested in fresh water fish tissue or other biota to determine if our fresh waters are attaining the *Fish and Shellfish Consumption* use designation.

Table C-10 provides the total miles of fresh surface waters attaining, not attaining, or needing further data to make a determination as to whether or not each use designation is being met.

Table C-10 Rivers and streams Designated Use Support Summary

Designated Use	Size of Surface Waters				
	Total in State (miles)	Total Assessed (miles)	Supporting – Attaining WQ Standards (miles)	Not Supporting- Not Attaining WQ Standards (miles)	Insufficient Data and Information (miles)
CLASS 1 WATERS (All CNMI Fresh Waters)					
Support and propagation of aquatic life	73.4	9.2		9.2	64.2
Fish/shellfish consumption	73.4	0.0			73.4
Recreation with risk of water ingestion	73.4	0.0			73.4
Domestic water supplies & food processing	73.4	0.0			73.4
Groundwater recharge	73.4	0.0			73.4
Aesthetic enjoyment	73.4	9.2		9.2	64.2

Fresh Surface Waters - Wetlands, Lakes and Ponds

The CNMI WQS states that all wetlands are subject to the provisions of the standards, but does not provide dedicated wetland water quality criteria beyond a brief narrative statement and inclusion in the anti-degradation policy implementation rules. The narrative simply states that "point or non-point sources of pollution shall not cause destruction or impairment of wetlands" and "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 anti-degradation policy implementation rules 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.

Since there is no regular monitoring of wetlands, implementation of the WQS for wetlands is currently limited to permitting provisions through the Section 401 water quality certification program, and enforcement of the anti-degradation policy implementation requirements described above.

Wetlands are found on the islands of Saipan, Tinian, Rota, and Pagan. However based on current CNMI GIS layers they cover less than 2% of the CNMI. The CNMI's "National Wetland Inventory" document states that wetlands comprise a total land area of approximately 600 acres (US Fish and Wildlife, 1989) more recent measures using DCRM 2004 GIS database layers support this finding. The "Commonwealth of the Northern Mariana Islands Wetlands Conservation Plan" states that only 36% of the original wetland acreage still exists (DCRM Office).

Although no current monitoring data exists, previous efforts have resulted in limited assessment of individual wetlands. A draft CNMI Hydrogeomorphic ("HGM") Functional Assessment manual was developed in 2001. The HGM method evaluates wetlands against a "reference" wetland that has had very little impact from development or pollution. The reference wetland for the CNMI is the "Hagoi" wetland on Tinian. The draft manual included functional assessments for eight major wetlands on Saipan.

A Wetland Task Force was created in 2004. The Task Force reviewed the draft HGM manual in workshop in 2005 and provided recommendations for future refinements for its finalization. Participants determined that the HGM method could be a valuable tool with further revision (Davis, M.M., (2005). DCRM (nee CRMO) attempted to finalize the manual or develop a similar rapid assessment method for the CNMI in 2007. However, by this time the HGM method had fallen out of favor with US EPA and the project was cancelled. Resource managers felt that the remaining wetlands in the CNMI would be protected from any further degradation by improving CRM Regulatory protection (CRMO monthly report, March, 2007)

In the 2006, Section 309 Program Improvements Assessment and Strategy Report calculated acres of wetlands based on both the 2001 HGM assessments and the 2004 GIS data layers for remaining wetlands. The report also evaluated the threats to the wetlands on each island based on a scale of low to high significance (Table C-11 below). The report concluded that there has been some loss of wetlands since 2001 and risk of further loss remained high due to public demand for homesteads, private demand for new businesses and expansion, and the necessary easements associated with each.

Table C-11 Threats to CNMI Coastal Wetlands (Section Report, 2006)

Threat	Significance (Low – Med – High)			
	Saipan	Tinian	Rota	Pagan
Development/fill	High	Low	Low	Low
Alteration of hydrology	High	Medium	Medium	Low
Erosion	High	Medium	Low	Low
Pollution	High	Medium	Low	Low
Channelization	Low	Medium	Medium	Low
Nuisance or exotic species	High	Medium	low	Medium
Freshwater input	Low	Low	Low	Low
Sea/Lake level rise	Low	Low	Low	Low
Other				

BECQ considers both the 2001 draft HGM Manual assessments and the CRM 309 report to be of high quality and to still be valid representations of conditions during this reporting cycle.
Although, no overall assessment of a wetland's attainment of CWA designated uses for wetlands is provided in the HGM assessment method, or the CRMO 309 Report, their findings were used for purposes of 303(d) listing. For example, invasive species that are of high significance to wildlife habitat, for example the widespread overgrowth of the reed *phragmites* throughout most CNMI wetlands, may rate a lower score in terms of plant community and wildlife habitat, but is most likely unrelated to recreation. 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 hydrology of the wetland.

CNMI hopes to add more detail to its wetland monitoring and assessment program in the future, but for now, Tables C-12 through C-15 on the following pages provide the total miles of wetlands attaining, not attaining, or needing further data to make a determination as to whether or not each use designation is being met, CALM Category assessment methodology, Wetlands 303(d) listing, and the Lake and pond Designated Use Support Summary.

Table C-12 Wetland Designated Use Support Summary

Designated Use	Size of Surface Waters				
	Total in State (acres)	Total Assessed (acres)	Supporting – Attaining WQ Standards (acres)	Not Supporting- Not Attaining WQ Standards (acres)	Insufficient Data and Information (acres)
CLASS 1 WATERS (All CNMI Fresh Waters)					
Support and propagation of aquatic and terrestrial life	669.7	620.6	43.3	577.3	49.1

Table C-13 Assessment Methodology for Wetlands, using HGM Functions and 309 reporting

EPA CALM CATEGORY:	DESCRIPTION	HGM Functional Values
1	All designated uses are supported, no use is threatened	All Functions ≥ 0.7
3	There is insufficient available data and/or information to make a use support determination	[No HGM assessment or other data]
4c	Some functions are impaired, but not due to a pollutant, for example hydrological modification, invasive species, low veg. diversity. Based on professional judgment.	Some functions < 0.7, due to non-pollutant causes
5	Available data and/or information indicate that at least one designated use is not being 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-14. 303(d) Listing for Select Wetlands, based on 2001 HGM Assessment & 2004 CRM GIS

Segment ID	Wetland Name	Area (acres)	HGM Function				CALM Class
			Hydro	Bio Chem	Veg	Wild	
SAIPAN							
19WET West Takpochau	American Memorial Park	22.2	*0.2*	*0.6*	*0.3*	*0.4*	4c
20WET Achugao	Falig Mitigation	14.1	*0.5*	*0.7*	*0.7*	*0.6*	4c
14WET Kagman	Kagman South	0.60	*1.0*	*0.9*	*0.9*	*0.8*	1
18WET Susupe	McDonalds	35.4	*0.8*	*0.8*	*0.7*	*0.7*	1
18WET Susupe	Power Center mitigation	3.7	*0.7*	*0.3*	*0.8*	*0.5*	4c
18WET Susupe	Susupe North	257.0	*0.7*	*0.8*	*0.7*	*0.8*	1
18WET Susupe	Susupe Potholes	106.1	*0.4*	*0.7*	*0.6*	*0.6*	4c
18WET Susupe	Susupe South	53.2	*0.6*	*0.8*	*0.7*	*0.7*	4c
TINIAN							
11 Puntan Tahgong	Hagoi	42.0	*1.0*	*1.0*	*1.0*	*1.0*	1
	TOTAL	534.3					

Table C-15 Lake and pond Designated Use Support Summary

Designated Use	Size of Surface Waters				
	Total in State (acres)	Total Assessed (acres)	Supporting – Attaining WQ Standards (acres)	Not Supporting- Not Attaining WQ Standards (acres)	Insufficient Data and Information (acres)
CLASS 1 WATERS (All CNMI Fresh Waters)					
Support and propagation of aquatic life	255.2	0.0			255.2
Fish/shellfish consumption	255.2	0.0			255.2
Recreation with risk of water ingestion	255.2	106.2	61.0	45.2	149.0
Domestic water supplies & food processing	255.2	0.0			255.2
Groundwater recharge	255.2	0.0			255.2
Aesthetic enjoyment	255.2	45.2		45.2	210.0

The following subsections will go into further detail about each island's attainment of their *designated uses* for marine and fresh surface waters starting with the island of Saipan.

C.3.1. 305(b) Assessment Results for Saipan

Coastal Waters

Presently, the only coastal waters surrounding the island of Saipan that fully support *all* designated uses belong to the Banaderu Watershed, which is the northernmost watershed, the least developed, and the most remote.

Outside of the DanDan Watershed, where there is insufficient data to determine whether it supports the *Aquatic Life and Propagation* use designation, all other of Saipan's Watershed were determined to be impaired. Notably, the quality of "health" is lowest for the central, western part of Saipan, watershed segment 19, in the West Takpochao Watershed. This is based upon the contemporary and previous seagrass assemblage rankings for Aquatic Life Use Support (ALUS). Detailed biological monitoring results for each watershed is contained below and in APPENDIX IV: Selected Marine Monitoring Data Used in 2014 Listing Determinations, by Water Segment.

As to *Fish and Shellfish Consumption* use, there is insufficient fish tissue and biota data to determine whether or not it is attained for most of Saipan save for the West Isley and Central W. Takpochao Watersheds where elevated levels of some heavy metals have been detected.

Several segments of the western shoreline of Saipan consistently show non-attainment of *Recreational Use* due to Enterococci contamination, the source of which is suspected to be contamination from human waste. Known sources of the bacterial contamination are overflows and leaks from sewage collection systems, and runoff from densely populated areas. These degraded areas most often surround major storm drains, which continue to be used by the unwary public as recreational areas.

Portions of the eastern coastline of Saipan also show consistent non-attainment for *recreational use* due to Enterococci contamination. This includes all the beaches from Kalabera in the farthest north watershed (segment 12) down to LaoLao watershed (segment 15) into which the eastern stream systems and neighboring watersheds drain. Qualitative watershed surveys indicate that Enterococci contamination within the less developed watersheds of Bird Island, Jeffrey's, Hidden, Marine, Tank, Obyan and Ladder beaches is caused almost solely by uncontrolled livestock grazing.

LaoLao Bay and Unai Dangkulu, also remain impaired due to Enterococci though the source has not yet been identified. Implementation of the Surface Water Quality Monitoring Plan should give a better indication of the source(s) in the next reporting cycle. Sedimentation has also been an issue in LaoLao which is being carried down in stormwater from the recently completed Isla Road construction, Phase IIa, in the upper watershed. Even with the use of prescribed BMPs, Phase IIb of the roadway is expected to impact Kagman's coastal waters in the next reporting cycle (Dancoe, S., Department of Public Works Transportation Safety Division, email communication, 01/29/14).

However there were some improvements. Enterococci levels were greatly reduced in Susupe North and Achugao North coastal waters thus supporting their *Recreational Use* designation. Improvements in Susupe's water quality are suspected to be associated with the repair of sewer lines near the shore along with the major renovation and upgrade of Saipan World Resort and the Kanoa Resort. Closure of The Palms Resort in the Achugao watershed substantially decreased both the tourist and worker population impacting the area.

Interestingly, the only other centrally located watershed on Saipan's west coast that tested well for Enterococci is the South W. Takpochao Watershed (Chalan LaoLao Beach area) which does not contain a hotel complex or residential housing. The same can be said for As Matuis and Banaderu watersheds in the north, and Managaha island.

As mentioned above in Section C.3. **305(b) Assessment Results for All CNMI Waters**, all coastal waters of the CNMI have attained their *Aesthetic Enjoyment and Other Uses* designation based upon professional opinion and the MVA tourist exit survey results (see Table A-3 above).

Fresh Water Streams

There are no rivers within the CNMI, though there are several stream systems. Little water quality data is available to assess if the *Aquatic Life and Propagation* use designation has been attained, save for one study conducted by McKagan in 2008. This study was limited to Talofofo, Kagman, Susupe, West Takpochao and Achugao watersheds. All other watersheds have insufficient data to make a similar assessment.

No data has been collected on fish tissue or other biota contaminants within Saipan's fresh surface waters. Therefore, the attainment of the *Fish and Shellfish Consumption* use designation is unknown.

There also is insufficient bacteriological data to assess the attainment of the *Recreational Use* designation for the majority of Saipan's streams. More information will be available next reporting cycle when the Surface Water Monitoring Program is well established.

Likewise, there has been no systematic collection of data concerning visitor or resident's *aesthetic enjoyment* of streams. However, many residents on Saipan hike near, and around many of the islands' streambeds, as part of training for athletic competitions, exercise, or for general recreation in the tradition of the "Hash House Harriers". For over 30 years, Saipan residents have set a "Hash" trail every Saturday, and on other occasions (i.e. full moon events), for a non-competitive hiking/running event. Trails are made through various pristine forested areas and many times in intermittent streams due to the sheer beauty of these locations. Tourists have been known to take part in the "Hash" as well.

Based solely on this anecdotal evidence and professional judgment, the *Aesthetic Enjoyment* for the vast majority of Saipan's streams has been attained except where little is known, or there has been vast construction of concrete conveyances, which detract from their natural beauty.

Wetlands, Lakes and Ponds

The only lake which is monitored and discussed in this report is Lake Susupe in the Susupe Watershed on Saipan. Numerous small areas of open water exist within wetland areas of Saipan, but are not considered lakes or ponds.

Data is lacking for all fresh surface water bodies. Due to this insufficiency all wetlands in the CNMI have been assigned a CALM Category of 4c. For that matter several more years of data are needed for Lake Susupe in order to assess all its designated uses.

Wetlands now cover less than 2% of the CNMI based on current CNMI GIS layers. Historical (pre-CWA) losses are as follows: 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 filling for U.S. military development following the 1944 invasion probably accounts for some losses, as well as some more recent permitted fills.

There is vastly more information available about the island of Saipan than any other island in the CNMI. Therefore, the following subsections will discuss the use designations in each Watershed to paint a more comprehensive picture of the sources and causes for impairment, remediation efforts there, and their recoveries (see Table C-16, C-17, and Table II-c in Appendix II).

Table C-16 Assessment of Saipan's Watersheds Use Designations – Coastal Waters and Rivers and Streams

WATER BODY SEGMENT ID		12	13	14	15	16	17 Isley		18 Susupe		19 W. Takpochau			20 Achugao		21	22	23
Designated Use		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
Coastal Waters	Aquatic Life	No new Nutrient Data, Decline in habitat	No new Nutrient Data	No new Nutrient Data	Poor Habitat	i	Poor Habitat	No new Nutrient Data	Good Habitat DO Exceeds No new Nutrient data	Fair Habitat, ***DO improves***	Poor Habitat, No new Nutrient data, DO exceeds	No new Nutrient data, DO exceeds	No new Nutrient data, DO exceeds	Poor Habitat, No new Nutrient data, DO exceeds	Poor/fair Habitat, No new Nutrients	Poor Habitat	F	Good Habitat, No new Nutrient data
	Fish Consumption	i	i	i	i	i	i	***Heavy metals detected in biota***	i	i	i	Mercury in Fish tissue	i	i	i	i	F	i
	Recreation	Enterococci exceeds	Enterococci exceeds	Enterococci exceeds, Sedimentation	Enterococci exceeds, Sedimentation	i	Enterococci exceeds	Enterococci exceeds	Enterococci exceeds	***Enterococi improved***	F	Enterococci exceeds	Enterococci exceeds	Enterococci exceeds	***Enterococi improved***	F	F	F
	Aesthetic enjoyment/others	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	CALM Assessment Category	5	5	5	5	***2***	5	5	5	5	5	5	5	5	5	5	1	5
Rivers and Streams	Aquatic Life	i	***Habitat supports natives***	***Habitat supports natives***	i		i		i		**Introduced Species**			***Habitat supports natives***		i		
	Fish Consumption	i	i	i	i		i		i		i			i		i		
	Recreation	i	i	i	i		i		i		i			i		i		
	Potable Water Supply	i	i	i	i		i		i		i			i		i		
	Aesthetic Enjoyment/others	***F***	***F***	***F***	***F***		i		F		N			F		***F***		
	CALM Assessment Category	***2***	***2***	***2***	***2***		**3**		**2**		4c			**2**		***2***		

Not Attaining Use Designation | Insufficient Information | Fully supporting Use Designation | No fresh water streams (See Table C-17 for Susupe Lake) | Impairment due to non-pollutant | ***Changes in bold italics***

Table C-17 Assessment of Saipan's Watersheds Use Designations – Lakes and Wetlands

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

C.3.1.1 Kalabera Watershed – Bird Island

Kalabera, Saipan's northernmost and least developed watershed contains Bird Island Sanctuary, a rookery for nesting swiftlets. An outlook in the upper cliff line allows for panoramic scenic views of the clear coastal waters below, which is often used as a backdrop for tourist, and especially wedding photos. Both the coastal and fresh surface waters attain their *Aesthetic Enjoyment and Other* uses designation. However, this is the only use designation that was found to be fully supported in this watershed.

Although, the benthic habitat of Kalabera Watershed received a "fair" rating that is sufficient to support the *Aquatic Life Support and Propagation* use designation, the water quality is still considered impaired due to poor nutrient levels reported in previous integrated reports. As was mentioned, there has been insufficient new data collected to re-assess the nutrient water quality. Therefore, this use designation remains impaired for this reporting cycle.

There also has been insufficient data collected on fish tissue and/or biota contamination for either coastal or fresh water streams to be assessed for attaining the *Fish and Shellfish Consumption* use designation.

Kalabera's coastal waters remain impaired for the *Recreational Uses* designation due to Enterococci exceedences. The fecal contamination is most likely do to uncontrolled livestock grazing.

There is no data available for assessing the watershed's fresh waters streams for the *Recreational Use* or for the *Potable Water Supply* use designations.

These findings resulted in Kalabera's coastal waters retaining a CALM Category 5. However, the fresh surface waters have been upgraded to a Category 2 due to its streams attaining their *Aesthetic Enjoyment* use designation this reporting cycle based on anecdotal evidence of their use by "Hashers", hikers, and athletes (see the ***Fresh Water Streams*** Section in C.3.1. 305(b) Assessment Results for Saipan above).

C.3.1.2 Talofofo Watershed - Jeffrey's and Hidden Beaches

The Talofofo Watershed contains both Jeffrey's and Hidden Beaches, both of which are popular "off-road" tourist sites for visitors wishing to enjoy the ruggedness of this unspoiled terrain, running streams, and the isolation of its far-off beaches. Both the coastal and fresh surface waters attain their *Aesthetic Enjoyment and Other* uses designation.

There was insufficient biological data collected in Talafofo's coastal waters this reporting cycle. However, a survey of Saipan's fresh surface waters found 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 (McKagan, et al., 2008). The streams of the lower watershed had good species diversity as well and contain three shrimp species and two native fish, "fock flagtails (*Kuhlia rupestris*) and gobies (*Stiphodon elegans*). These streams flow into Jeffry's beach. Both are considered "pristine". Based on these new findings Talofofo's fresh surface waters are considered supportive of the *Aquatic Life and Propagation* use designation. However, its coastal waters remain impaired.

No data is available about fish tissue and/or biota contamination in either coastal or fresh surface waters. Therefore, no assessment could be made for Talofofo's *Fish and Shellfish Consumption* use designation. Data concerning the use of fresh water streams as a *Potable Water Supply* is also lacking.

Talofofo coastal waters again did not attain the *Recreational Use* designation due to Enterococci exceedences. There is no data available for assessing the watershed's fresh waters streams. These findings resulted in Talofofo's coastal waters remaining as a CALM Category 5. The fresh water streams have been upgraded to a Category 2 due to the new available biological study showing support for *Aquatic Life* and the anecdotal evidence supporting their *Aesthetic Enjoyment* use designation. See Table II-a in Appendix II.

C.3.1.3 Kagman Watershed - Marine and Tank Beaches

Kagman Watershed contains Marine Beach and the Tank Beach Conservation Area. It attains the *Aesthetic Enjoyment* use designation based on its dynamic shorelines, turtle nesting sites, sandy beaches and scenic views frequently visited by both tourists and residents.

Although, the biological monitoring data on Kagman watershed was rated as "good", it did not attain *Aquatic Life and Propagation* use designation for its coastal waters due to past nutrient exceedences. However, the streams in the upper watershed were considered "fairly pristine",

containing two species of shrimp, according to the 2008 McKagan study. Therefore, the fresh water streams of Kagman Watershed attained the *Aquatic Life and Propagation* use.

There has been insufficient data collected on fish tissue and/or biota contamination for either coastal or fresh water streams to be assessed for attaining the *Fish and Shellfish Consumption* use designation.

The Kagman Watershed remains impaired for *Recreation Use* due to Enterococci exceedences. There is also concern that Phase IIb of the Federal Highway Road construction currently underway may further impact this watershed with NPS sedimentation and other pollutants through next reporting cycle.

There is no data available for assessing the watershed's fresh waters streams for the *Recreational Use* or for the *Potable Water Supply* use designations.

These findings resulted in Kagman's coastal waters remaining as a CALM Category 5 and its fresh water streams being upgraded to a Category 2. The fresh water streams have been upgraded due to the new available biological study showing support for *Aquatic Life* and the anecdotal evidence supporting their *Aesthetic Enjoyment* use designation.

C.3.1.4 LaoLao Watershed - LaoLao Bay

LaoLao Watershed contains LaoLao Bay, home to two of Saipan's most popular snorkel and SCUBA dive sites. It attains the *Aesthetic Enjoyment* use designation for both its coastal and fresh waters based on it being a favorite dive destination and hike for tourists and residents alike.

The LaoLao Watershed did not attain the *Aquatic Life and Propagation* use designation due to a significant decline in biological monitoring data and no recovery from previous disturbances last reporting cycle. Degradation at biological monitoring site 2 in LaoLao Bay is likely due to a reduction in herbivory and water quality. The Laolao Bay study conducted in 2010 detected many exceedences of the CNMI WQS for ammonia, total filterable suspended solids, temperature, turbidity, and Enterococci.

Due to the Enterococci exceedences, LaoLao's coastal waters are not attaining their *Recreational Use* designation either. However, there is insufficient data to make a similar assessment of the watershed's fresh water streams.

It is thought that these WQS violations, except for temperature, were directly linked to anthropogenic impacts, in particular NPS pollution, from Phase IIa of the Federal Highway Road Construction Project of Isa Drive. The project began in 2009 and was completed in 2012. Stream beds were seen covered with really fine sediment during stream surveys conducted in 2012 and 2013. It is conceivable that anthropogenic factors could be indirectly influencing water temperature, but this would require further investigation.

To address the stressors of this watershed BECQ has enacted a number of remedial activities through the LaoLao Bay Watershed Restoration Project. The focus of this project is to reduce sedimentation in the near shore environment. Due to the lag time in coral reef recovery, it is likely that the benefits of the remedial activities will not be evident until the next reporting cycle.

There has been insufficient data collected on fish tissue and/or biota contamination for either coastal or fresh water streams to assess attainment of their *Fish and Shellfish Consumption* use designation. Data concerning the use of fresh water streams as a *Potable Water Supply* is also lacking.

These findings resulted in LaoLao's coastal waters remaining as a CALM Category 5 and its fresh water streams being upgraded to a Category 2. This upgrade is due to the streams attaining their *Aesthetic Enjoyment* use designation based on anecdotal evidence of their use by "Hashers", hikers, and athletes.

C.3.1.5 DanDan Watershed – Remote Private Beaches

DanDan Watershed contains small isolated private beaches that are difficult to access and require permission to enter by the upland land owners. It attains the *Aesthetic Enjoyment* use designation for both its coastal and fresh waters based on its unspoiled remote beauty.

Although, there is insufficient data to assess whether or not DanDan's coastal waters attain the *Aquatic Life and Propagation* use designation, the remoteness of this watershed from any potential anthropogenic impacts provides it with some level of protection.

There is insufficient data concerning fish tissue or biota contamination in DanDan's coastal waters to be able to assess attainment of the *Fish and Shellfish Consumption* use designation.

The water quality of DanDan's coastal waters met all CNMI WQSs during this reporting cycle, though there is not sufficient data to assess whether the *Recreational Use* designation has been attained.

These findings resulted in LaoLao coastal waters being assigned a CALM Category 2, up from Category 3 last reporting cycle, due to the favorable water quality data collect this reporting cycle.

There is no fresh surface water streams in the DanDan watershed.

C.3.1.6 Isley Watersheds - Obyan and Ladder Beaches

East Isley

East Isley Watershed contains Ladder beach a small isolated public beach with a cliff line overlook. It attains the Aesthetic Enjoyment use designation for its coastal waters based on its scenic views. However, little is known about Isley's fresh water streams.

The two biological monitoring sites in East Isley received one "good" and one "poor" rating resulting in the coastal waters being assessed as impaired for Aquatic Life and Propagation Uses. No biological data is available concerning East Isley's fresh water streams.

There has been insufficient data collected on fish tissue and/or biota contamination for either coastal or fresh water streams to be assessed for attaining the Fish and Shellfish Consumption use designation. Data concerning the use of fresh water streams as a Potable Water Supply is also lacking.

Although coastal waters did not attain a Recreational Use designation due to Enterococci exceedence, no data is available concerning fecal contamination in the fresh water streams.

West Isley

West Isley Watershed contains Obyan and Boyscout beaches. Obyan is a large public beach and popular dive site. Boyscout beach to the east is more remote and harder to access. This watershed attains the Aesthetic Enjoyment use designation for its coastal waters based on its scenic views and diving opportunities. However, little is known about Isley's fresh water streams.

No biological assessments were conducted this reporting cycle. So the Aquatic Use and Propagation use designation for its coastal waters remains as reported last cycle, impaired. No biological data is available about East Isley's fresh water streams.

A recent unpublished study by Denton, et al., (2013) reported copper and lead contamination of biota within the West Isley Watershed. This has resulted in the Fish and Shellfish Consumption use designation of its coastal waters being listed as impaired. The heavy metal contamination is thought to be associated with a former WWII debris dumpsite at Agingan point. Denton states that the former dump site "was extensively contaminated with several elements that could conceivably induce adverse biological effects in sensitive species."

There has been insufficient data collected on fish tissue and/or biota contamination for Isley's fresh water streams to be assessed for attaining the Fish and Shellfish Consumption use designation. Data concerning the use of fresh water streams as a Potable Water Supply is also lacking.

Although coastal waters did not attain a Recreational Use designation due to Enterococci exceedence, no data is available to make a similar assessment of Isley's fresh water streams. These findings resulted in both Isley Watersheds' coastal waters remaining as a CALM Category 5 and its fresh water streams as a Category 3.

C.3.1.7 Susupe Watersheds – San Antonio Beach and Susupe Lake

South Susupe

South Susupe Watershed contains Sugar Dock a popular swimming and dive site, several picnic beaches, and the Pacific Islands Club resort. The beach sites are used on a daily basis by tourists and residents. Saipan's only lake, Lake Susupe, is also located in this watershed. Based on the coasts breathtaking sunsets, and the beauty of Lake Susupe shores, it too attains the *Aesthetic Enjoyment* use designation for its coastal and fresh surface waters.

Although biological monitoring results rank South Susupe coastal waters as "good" it remains impaired for the *Aquatic Life and Propagation* Use designation due to DO exceedences of WQS and past reported nutrient levels. This is with the knowledge that nutrient testing was not conducted this reporting cycle due to lack or a reliable testing method.

Lake Susupe has had several non-native species introduced into the lake. Samples taken during the 2008 McKagan study captured three types of non-native snails, mangrove prawns, Tilapia, sailfin molleys, and mosquitofish. There is also a prevalence of introduced Red-eared slider turtles (anecdotal information from other resource managers). Therefore, although Susupe supports aquatic life, many are introduced, non-natives and therefore this water body is considered impaired for the *Aquatic Life and Propagation* use designation.

There has been insufficient data collected on fish tissue and/or biota contamination for either coastal or fresh water streams to be assessed for attainment of the *Fish and Shellfish Consumption* use designation.

The South Susupe coastal waters and Lake Susupe are tested regularly for bacteriological, chemical and physical parameters. On the basis of frequent microbiological exceedences, both coastal waters and fresh surface waters are considered impaired for *Recreational use.*

There is no data available for assessing Susupe's fresh surface waters as a *Potable Water Supply*.

These findings resulted in South Susupe's coastal waters remaining as a CALM Category 5 and its fresh surface waters have been downgraded to Category 5 due to introduced species and E.coli exceedences in Susupe Lake.

North Susupe

North Susupe Watershed on Saipan's western shore is home to several large resorts, hotels, and public beaches, which line Saipan's southern lagoon. Beaches are used frequently by tourists and residents. This watershed attains the *Aesthetic Enjoyment* use designation for both its coastal waters and fresh water streams based on its scenic views, marine sports, swimming, fishing, and breathtaking sunsets.

The benthic habitat of North Susupe's coastal waters received a "fair" rating this reporting cycle. The southern lagoon was reported to have improving water quality conditions in 2008 in comparison with previous years (2002 and 2004). Based on the two sites sampled this reporting period, water quality may have reached equilibrium, because there currently is no change to report in the status of seagrass assemblages.

Interestingly, DO concentrations improved for the North Susupe watershed with only two sites demonstrating over 10% exceedence in 2012 and none in 2013. This is a vast improvement from the last reporting cycle, however, not enough to remove it from its impaired status. The coastal waters remain impaired for the *Aquatic Life Support and Propagation* use designation due to the poor nutrient levels reported previously. No new data exists for nutrients this cycle due to problems with the previous testing methodology, nor is there data available for Susupe's fresh water streams.

There has been insufficient data collected on fish tissue and/or biota contamination for either coastal or fresh water streams to be assessed for attaining the *Fish and Shellfish Consumption* use designation.

Enterococci levels were greatly reduced in coastal waters thus supporting their *Recreational Use* designation this reporting cycle. This improvement in Susupe's water quality is suspected to be associated with the repair of sewer lines near the shore line along with the major renovation of both Saipan World Resort and the Kanoa Resort.

At this writing, no data is available for assessing Susupe's fresh waters streams for *Recreational Use* or as a *Potable Water Supply*.

These findings resulted in North Susupe's coastal waters remaining as a CALM Category 5 and its fresh water streams being upgraded to a Category 2. This upgrade is due to the streams attaining their *Aesthetic Enjoyment* use designation based on anecdotal evidence of their use by "Hashers", hikers, and athletes.

C.3.1.8 West Takpochao Watersheds – Micro Beach

South W. Takpochao

South W. Takpochao Watershed contains Chalan LauLau Beach. Currently no hotels or homes occupy the shoreline. However, the Saipan Beach Pathway begins here and runs north up to American Memorial Park. Walkers, bikers, joggers, and dog walkers can be seen enjoying the path every morning and evening taking advantage of the cooling ocean breeze while capturing a sunrise or sunset. For this reason South W. Takpochao attains the *Aesthetic Enjoyment* use designation.

The ALUS rankings on coastal waters, based upon seagrass assemblage rankings, indicate that Segment 19c has poor *Aquatic Life* health. This Segment is where sub-watersheds are largest and human population/urbanization is greatest. Although there is only one site sampled from watershed segment 19c during this reporting period its ranking continues to be poor. It is likely that surrounding sites in West Takpochao have similar trends. This water body is associated with a large paved populated area which is degraded by runoff that passes through these watersheds and drains into the lagoon during storm events. The runoff transports a variety of pollutants that contribute to poor water quality. For this reason and the number of DO exceedences, the South W. Takpochao coastal waters remain impaired for the *Aquatic Life Support and Propagation* use designation.

It is thought that diminished DO levels throughout the Takpochao coastal waters are likely caused by an excess of aerobic bacteriological activity, the source being runoff from failing wastewater systems, and the outhouses, and piggeries seen in the upper watersheds. There is insufficient data to make an assessment of the fresh water streams here.

There is also insufficient data about fish tissue and/or biota contamination for either coastal or fresh water streams to be assessed for attainment of the *Fish and Shellfish Consumption* use designation.

Enterococci levels remain acceptable in South W. Takpochao coastal waters thus attaining the *Recreational Use* designation. This is most likely due to the lack of development near shore.

At this writing, no data is available for assessing fresh waters streams for *Recreational Use* or as a *Potable Water Supply*.

These findings resulted in South W. Takpochao's coastal waters remaining as a CALM Category 5 and its fresh water streams being upgraded to a Category 2. This upgrade is due to streams attaining the *Aesthetic Enjoyment* use designation based on anecdotal evidence of their use by "Hashers", hikers, and athletes.

Central W. Takpochao

Central W. Takpochao Watershed contains Micro Beach, American Memorial Park, and the Garapan Tourist District, Saipan's busiest shopping and dining district. Many large scale resort hotels, night clubs, restaurants and the Duty Free Shoppers arcade is located here. Tourists and residents are a constant fixture on Micro Beach's sandy shore sunbathing, swimming, wind and kite surfing, and jogging along Saipan's Beach Pathway. For this reason Central W. Takpochao attains the *Aesthetic Enjoyment* use designation for its coastal waters. However, the fresh waters streams are considered impaired for this use designation due to stormwater being directed into constructed concrete conveyances from ridge to reef.

Although the biological monitoring result for one coastal site, Segment 19b, was ranked as "good" for near shore coral reefs, the other site was not sampled during this reporting cycle. The DO level was also diminished in this water segment. Therefore, it remains impaired for the *Aquatic Life and Propagation* use designation.

As to the fresh water streams, McKagan's 2008 study did not survey the upper Central W. Takpochao for aquatic life. However, in the lower part of the watershed fishermen living nearby have reported the presence of fresh water shrimp, Tilapia, and eels to resource professionals. These streams drain into constructed concrete conveyances and eventually to Garapan Drainage number 1, which was found to contain Thiarid snails and Sailfin Molleys (*Poecilia latipinna*) as the predominant species, with juvenile milk fish, and one Tilipia specimen. This resulted in the Central W. Takpochao Watershed streams having the most introduced and disturbed systems surveyed. However, there is insufficient water quality data at this time to assess whether or not the *Aquatic Life and Propagation* use designation is impaired.

In 2004-2005 fish samples from the outlet of Garapan Drainage 3, Segment 19b, was found to have elevated levels of Mercury. The contamination source was traced back up the drainage to the Commonwealth Hospital "a few meters down gradient of an old incinerator site", which was subsequently closed. For this reason Central W. Takpochao's coastal waters are listed as impaired for the *Fish and Shellfish Consumption* use designation. There is not sufficient data available for assessing the fresh surface waters here.

Although coastal waters did not attain a *Recreational Use* designation due to Enterococci exceedence, no data is available to make a similar assessment of Central W. Takpochao fresh water streams.

No data is available to assess the fresh waters streams as a *Potable Water Supply* either.

These findings resulted in Central W. Takpochao's coastal waters remaining as a CALM Category 5 and its fresh water streams being downgraded from Category 3 to 5. This downgrade is due to impaired *Aquatic Life and Propagation* in streams from introduced species, and non-attainment of the *Aesthetic Enjoyment* use designation.

Watershed management plans associated with inter-agency efforts continue to focus on this area as a priority in their 1-5 year project plans. Last reporting period the NPS Pollution Control Program initiated the Garapan's Conservation Action Plan.

North W. Takpochao

The North W. Takpochao Watershed contains Saipan's Harbor, Smiling Cove Marina, Seaplane Ramp, DPW Channel Bridge, and the closed municipal dump; all are Class A Waters. It is the most industrialized water segment in the CNMI. However, it still attains the *Aesthetic Enjoyment* use designation for its coastal waters due to its scenic views, and for its fresh water streams based on their use by "hashers", and recreational and professional athletes.

No biological assessments were carried out in the North W. Takpochao watershed. However, the water quality was found to be diminished due to the DO level exceeding the CNMI WQS. Therefore, the *Aquatic Life and Propagation* use designation for coastal waters remains as reported last cycle, impaired. No biological data is available concerning North W. Takpochao fresh water streams.

There has been insufficient data collected on fish tissue and/or biota contamination for either coastal or fresh water streams to be assessed for attainment of the *Fish and Shellfish Consumption* use designation.

North W. Takpachao's coastal waters did not attain the *Recreational Use* designation due to Enterococci exceedence. No data is available to make an assessment of fresh water streams here.

No data is available to assess the fresh waters streams as a *Potable Water Supply* either.

These findings resulted in North W. Takpochao's coastal waters remaining as a CALM Category 5 and its fresh water streams being upgraded to a Category 2. This upgrade is due to streams attaining the *Aesthetic Enjoyment* use designation based on anecdotal evidence of their use by "Hashers", hikers, and athletes.

C.3.1.9 Achugao Watersheds – Tanapag Lagoon

South Achugao

South Achugao Watershed contains intermittent streams that run from Wireless Ridge through Tanapag village down to Tanapag Lagoon. The shore of Tanapag Lagoon is sandy and has many weekend campsites used regularly by nearby residents to enjoy fishing, swimming, and spectacular sunrises and sunsets. The stream systems in the upper watersheds have small pristine waterfalls, and beautiful bamboo stands. For this reason South Achugao attains the *Aesthetic Enjoyment* use designation for both its coastal and fresh surface waters.

There was no new biological monitoring data collected this reporting cycle to upgrade the "poor" ranking received last cycle. Therefore, South Achugao coastal waters remains impaired for the *Aquatic Life and Propagation* use designation due to this and diminished DO water quality resulting in exceedences.

It is thought that the diminished DO levels are likely caused by an excess of aerobic bacteriological activity, the source being runoff from failing wastewater systems, outhouses, and piggeries seen in the upland watershed.

McKagan's 2008 study took samples from the Bobo stream. It was found to be relatively pristine upland. Downstream *Macrobrachium lar* shrimp were found, although no eels were observed,

but have been reported anecdotally by people using trails nearby. Therefore, South Achugao's fresh water attains the *Aquatic Life and Propagation* use designation this reporting cycle.

There has been insufficient data collected on fish tissue and/or biota contamination for either coastal or fresh water streams to be assessed for attainment of the *Fish and Shellfish Consumption* use designation.

South Achugao's coastal waters did not attain the *Recreational Use* designation due to Enterococci exceedence. However, no data is available to make a similar assessment of fresh water streams here.

No data is available to assess the fresh waters streams as a *Potable Water Supply* either.

These findings resulted in South Achugao coastal waters remaining as a CALM Category 5 and its fresh water streams being upgraded to a Category 2. This upgrade is due to streams attaining the *Aesthetic Enjoyment* use designation based on anecdotal evidence of their use by "Hashers", hikers, and athletes.

North Achugao

North Achugao Watershed contains two hotels that are still in operation, and the large Palms Resort which recently closed. It also contains intermittent streams that run from Wireless Ridge through Tanapag village down to Tanapag Lagoon. For the same reasons stated for South Achugao, the Northern watershed also attains the *Aesthetic Enjoyment* use designations for both its coastal and fresh surface waters.

The only changes in the biological ALUS rankings, based upon metrics of seagrass assemblages, was a healthier ranking in the northern Saipan Lagoon at site 48, Segment 20, where improving conditions may be due to a halt in development and a mass vacancy in resorts from this area and closure of The Palms Resort. The closure substantially decreased both the tourist and worker population impacting the area.

Localized factors may also be playing a major role in this watershed because other sites within this segment did not improve and sustained poor rankings. However, throughout much of the northern lagoon, temporal trends show a slow increase of persistent macroalgae growth that is periodically removed by disturbance events (Houk and Camacho 2010). These dynamics may be also contributing to the low ranking. For this reason North Achugao remains impaired for the *Aquatic Life and Propagation* use designation. There is insufficient data available for fresh water streams to make a similar assessment of this use designation.

There has been insufficient data collected on fish tissue and/or biota contamination for either coastal or fresh water streams to be assessed for attainment of the *Fish and Shellfish Consumption* use designation.

North Achugao watershed did see improvement in its Enterococci water quality. Coastal waters there now attain the *Recreational Use* designation. This is thought to be connected to the decrease in the population living and working there with the closure of The Palms Resort. However, no data is available to make a similar assessment of fresh water streams here.

No data is available to assess the fresh waters streams as a *Potable Water Supply* either.

These findings resulted in South Achugao coastal waters remaining as a CALM Category 5 and its fresh water streams being upgraded to a Category 2. This upgrade is due to streams attaining the *Aesthetic Enjoyment* use designation based on anecdotal evidence of their use by "Hashers", hikers, and athletes.

C.3.1.10 As Matuis Watershed – Pau Pau and Wing Beach

The As Matuis Watershed contains PauPau Beach which is a very popular swimming area, especially for aspiring athletes. It is also home to Wing Beach, a popular camping and SCUBA dive site better known for its green sea turtle nesting sites, which resulted in it being closed off to vehicular traffic in 2004. This closure resulted in the return of the shorelines natural beach profile and vegetation. It has been called the "Jewel of Saipan", by divers and bloggers alike. For this reason As Matuis attains the *Aesthetic Enjoyment* use designations for both its coastal and fresh surface waters.

Although biological data continues to rank As Matuis coral reefs as "good", the seagrass abundance was significantly less than algae and received a "poor" ranking this reporting cycle. Therefore, the *Aquatic Life and Propagation* use designation remains impaired. There is insufficient data to make a similar assessment of As Matuis' fresh surface waters.

There also is insufficient data collected on fish tissue and/or biota contamination for either coastal or fresh water streams to be assessed for attainment of the *Fish and Shellfish Consumption* use designation.

As Matuis continues to have good water quality and therefore maintains its attainment of the *Recreational Use* designation. However, no data is available to make a similar assessment of fresh water streams here.

No data is available to assess the fresh waters streams as a *Potable Water Supply* either.

These findings resulted in As Matuis coastal waters remaining as a CALM Category 5 and its fresh water streams being upgraded to a Category 2. This upgrade is due to streams attaining the *Aesthetic Enjoyment* use designation based on anecdotal evidence of their use by "Hashers", hikers, and athletes.

C.3.1.11 Banaderu Watershed – Grotto Cave and Bird Island

The Banaderu Watershed contains the Grotto Cave. The Grotto Cave is appropriately named as it is a natural grotto with deep clear waters for cliff diving, snorkeling and SCUBA diving. It is often featured in various international dive publications. It is for this reason that Banaderu attains the *Aesthetic Enjoyment* use designations for its coastal waters. There are no fresh surface waters in this watershed.

During this reporting cycle, as in last, only the Banaderu Watershed's coastal waters fully supported all designated uses.

Although, there is no data collected on fish tissue and/or biota contamination for coastal waters in the Banaderu Watershed , due to its remote location, lack of anthropogenic sources of toxins,

and poor accessibility, it attains the *Fish and Shellfish Consumption* use designation based on professional judgment.

These findings resulted in Banaderu coastal waters remaining as a CALM Category 1.

C.3.1.12 Managaha Watershed

Managaha Watershed contains Managaha Island, a small sand cay in the Saipan Lagoon which is a conservation area and a shearwater bird nesting site. Its wide sandy beaches, panoramic views, and recreational activities draw the largest number of tourists than any other tourist site in the CNMI. For this reason, Managaha Watershed attains the *Aesthetic Enjoyment* use designations for its coastal waters. There are no fresh surface waters on this small sand cay.

Although biological monitoring results ranked Managaha as "good", there is no new nutrient data available to re-assess its water quality. Therefore, Managaha remains as impaired for the *Aquatic Life and Propagation* use designation.

There is insufficient data collected on fish tissue and/or biota contamination to assess attainment of the *Fish and Shellfish Consumption* use designation.

Managaha continues to have good bacteriological water quality and therefore maintains its attainment of the *Recreational Use* designation.

These findings resulted in Managaha's coastal waters remaining as a CALM Category 5.

C.3.2. 305(b) Assessment Results for Rota

Due to the limited availability of information about the island of Rota, the following section will discuss assessments of use designations for each type of water body, rather than for each watershed as was done for the island of Saipan.

Coastal Marine Waters

Rota is developed to a far lesser degree than any of the other islands of the CNMI. Its flora was also much less severally altered during the WWII conflict and has vast canopies in the upper and lower watersheds. Rota's coastlines are relatively untouched and provide tourists and visitors with beautiful vistas to enjoy, thus attaining the *Aesthetic Enjoyment and Other Uses* designation for all coastal waters and fresh water streams.

Biological monitoring data for all of Rota's coastal waters, except Chaliat/Talo which ranked as "poor", were sufficient ("Fair" to "Good") to support the *Aquatic Life and Propagation* use designation. However, there are an insufficient number of years that water quality data for nutrients and DO have been collected to upgrade the *Aquatic Life and Propagation* use designation to attainment.

Although, there is no data collected on fish tissue and/or biota contamination for any of Rota's coastal waters, the Dugi/Gampapa/Chenchon Watershed, due to its remote location, lack of anthropogenic sources of toxins, and difficulty in accessibility, attains the *Fish and Shellfish Consumption* use designation based on professional judgment.

This reporting cycle there was an increase in the number of water segments impaired by Enterococci exceedences compared to last reporting cycle. The Swimming Hole in the Chailiat/Talo watershed was added as impaired for the *Recreational Use* designation this cycle. It is thought that the source of the Enterococci maybe fresh water seeps carrying human waste from failing septic systems. However, Uyulanhulo/Teteto bacteriological quality had improved, thus is the only watershed that has attained its *Recreational Use* designation. There is still insufficient data to assess the Dugi/GAmpapa/Chenchon watershed for this use designation.

Table C-18 Assessment of Rota's Use Designations

		Rota				
WATER BODY SEGMENT ID		1	2	3	4	5
	Designated Use	Dugi/Gampapa/ Chenchon	Sabana/ Talakaya/ Palie	Songsong	Uyulanhulo/ Teteto	Chaliat/Talo
Coastal Waters	Aquatic Life	Fair Habitat	Fair/Good Habitat, ***Good DO***	Fair/Good Habitat, ***Good DO***	Fair/Good Habitat, ***Good DO***	Poor Habitat, ***Good DO***
	Fish Consumption	***Remote locale***	i	i	i	i
	Recreation	i	Enterococi exceeds	Enterococi exceeds	***Enterococi Improved***	***Enterococi exceeds***
	Aesthetic enjoyment/others	F	F	F	F	F
	CALM Assessment Category	**2**	**5**	**5**	**5**	**5**
Streams	Aquatic Life		i			
	Fish Consumption		i			
	Recreation		i			
	Potable Water Supply		i			
	Aesthetic Enjoyment/others		***F***			
	CALM Assessment Category		***2***			
Not Attaining Use Designation		Insufficient Information		Fully supporting Use Design		No fresh surf

These findings resulted in all of Rota's coastal waters to remain a CALM Category 5, except for Dugi/Gampapa/ Chenchon that was upgraded to Category 2. The upgrade is due to the re-evaluation of the *Fish and Shellfish Consumption*. Based on professional judgment, it is believed that there is sufficient evidence that this use designation is attained.

Fresh Surface Waters – Rivers and Streams

A hike to Rota's "Water Cave" within the Sabana/Talakaya/Palie Watershed provides residents, "Hashers", and those training for athletic competitions, a glimpse of several small but beautiful waterfalls, thus attaining the *Aesthetic Enjoyment and Other Uses* designation for fresh surface waters. This is the only fresh surface water on Rota.

There is insufficient data collected about biological conditions, fish tissue and/or biota contamination, and general water quality parameters of Rota's fresh water streams to assess attainment of the *Aquatic Life and Propagation, Fish and Shellfish Consumption, Recreational Uses, and Potable Water Supply* use designations.

These findings resulted in Sabana/Talakaya/Palie fresh surface waters to upgrade to a CALM Category of 2, due to the inclusion of anecdotal information providing an attainment of the *Aesthetic Enjoyment and Other Uses* designation this reporting cycle.

C.3.3. 305(b) Assessment Results for Tinian

Due to the limited availability of information about the island of Tinian, the following section will discuss assessments of use designations for each type of water body, rather than for each watershed as was done for the island of Saipan.

Coastal Marine Waters

Tinian has the lowest population of the three southern islands of the CNMI providing tourists with lots of space to enjoy isolated views and small hidden beaches. Tinian Harbor is particularly popular for residents and tourists alike to jump into the ocean, explore the reefs and near shore shipwrecks, glimpse turtles, or recline and watch the sunset. For this reason, it was attained the *Aesthetic Enjoyment and Other Uses* designation for all coastal waters. Tinian does not have fresh surface waters.

There was limited biological monitoring data collected about Tinian's coastal waters this reporting cycle. Aguigan, a small islet designated as a conservation area, ranked as "fair", thereby maintaining its attainment of the *Aquatic Life and Propagation* use designation. Masalok and Puntan Diaplomanibot Watersheds ranked "Good" and "fair" respectively. However, there are an insufficient number of years that water quality data for nutrients and DO have been collected to re-evaluate the *Aquatic Life and Propagation* use designation. Therefore, both remain impaired for the *Aquatic Life and Propagation* use designation as does the Makpo Watershed.

Although, there is no data collected on fish tissue and/or biota contamination for any of Tinian's coastal waters, the Carolinas Watershed, due to its remote location, lack of potential anthropogenic sources of toxins, and difficult accessibility, attains the *Fish and Shellfish Consumption* use designation based on professional judgment.

This reporting cycle there was an increase in the number of water segments impaired by Enterococci exceedences compared to last reporting cycle. Unai Masalok and Unai Bangkolo Beaches in the Masalok Watershed, and Unai Babui and Unai Chulu beaches in the Puntan Tahgong Watersheds were added to the coastal waters impaired for the *Recreational Use* designation. The exact source of the Enterococci contamination remains unknown. There is insufficient data available to assess the Carolinas Watershed. Therefore, only Aguigan retains its *Recreational Use* designation.

These findings resulted in only Aguigan attaining all use designations. All of Tinian's other coastal waters remain as a CALM Category 5, except for the Carolina's Watershed that was

upgraded to Category 2 due to its attainment of the *Fish and Shellfish Consumption* use designation this reporting cycle.

Fresh Surface Waters – Rivers and Streams

Tinian lacks fresh waters streams in general, so no determination was made was made for any of the designated uses.

Table C-19 Assessment of Tinian's Use Designations Based on Type of Water Body

		Tinian					
WATER BODY SEGMENT ID		6	7	8	9	10	11
	Designated Use	Aguigan	Masalok	Carolinas	Makpo	Puntan Daipola manibot	Puntan Tahgong
Coastal Waters	Aquatic Life	Fair Habitat	Good Habitat	i	Poor Habitat, ***DO Exceeds***	Fair Habitat	Fair Habitat
	Fish Consumption	F	i	***Remote Locale***	i	i	i
	Recreation	F	***Enterococci Exceeds***	i	N	N	***Enterococci Exceeds***
	Aesthetic enjoyment/others	F	F	F	F	F	F
	CALM Assessment Category	1	5	***2***	5	5	5
Streams	Aquatic Life						
	Fish Consumption						
	Recreation						
	Potable Water Supply						
	Aesthetic Enjoyment/others						
	CALM Assessment Category						
Not attaining use designation			Insufficient data		Fully supporting		No fresh wate

Wetlands, Lakes and Ponds

Numerous small areas of open water exist within wetland areas of Tinian, but are not considered lakes or ponds.

"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 HGM Assessment manual as the "reference" wetland. After reviewing all available references, "Lake Hagoi" was removed from consideration as a lake, and returned to the wetland category, to be consistent with previous reports and evaluations. Refer to section C.3., subsection *Fresh Surface Waters - Wetlands, Lakes and Ponds* for the discussion about its use designations.

C.3.4. 305(b) Assessment Results for the Northern Islands

Due to the limited availability of information about the northern islands, the following section will discuss assessments of use designations for each type of water body, rather than for each watershed as was done for the island of Saipan.

Coastal Marine Waters

The uninhabited northern islands, due to their lack of development, or when inhabited having less-developed watersheds with minimal anthropogenic impacts, it is unlikely that contaminants or other pollutants pose a threat to coastal waters. Their remoteness, lack of accessibility, and the recent listing of the three northern most islands as a US National Monument, make them fully supportive of all coastal water use designations based on professional judgment.

These water bodies therefore remain as CALM Category 1, in accordance with the categorization rationale explained in Section C.2.3

Fresh Surface Waters – Rivers and Streams

Little is known of the northern islands stream systems. However, due to their remoteness from any potential anthropogenic impacts, the, are listed as fully supporting all designated uses, the exception being Farallon De Medinilla (FDM). In general, FDM lacks fresh surface waters. Therefore, no determination was made for any of the designated uses for the FDM stream system.

Two lakes on Pagan and one lake within the active volcanic crater on Anatahan are known, but have never been assessed due to the remoteness of the islands, and in the case of Anatahan, the hazard to safety and life caused by the ongoing volcanic activity. However, professional judgment dictates that these remote areas support all fresh surface water use designations.

These water bodies therefore remain as CALM Category 1.

C.4. Cumulative 305(b) Assessment Results for All CNMI Waters

Taking into account all the information discussed in Section C.3. above, for this reporting period 84.9 miles of Commonwealth coastline assessed were found to be impaired for various reasons. This includes impairment of 32.2 miles of Saipan's shoreline, 17.8 of Rota's shoreline and 24.3 of Tinian's shorelines for *Recreation Use* due to microbiological contamination as measured by the presence of the indicator bacteria Enterococci.

C.4.1. Cumulative Coastal Marine Water Quality

Table C-20 Length of All CNMI Waters Assigned CALM Categories

Water body Type	Category 1	2	3	4a	4b	4c	5	Total in State	Total Assessed
River/stream miles			64.2				9.2	73.4	9.2
Lake/pond acres			210				45.2	255.2	45.2
Ocean coast miles	123.5		26.9				84.9	235.3	208.4
Wetland acres	43.3		49.1			577.3		669.7	620.6

A total of 14 years of monitoring data were reviewed in the preparation of the 2014 assessment, including monitoring data from previous Integrated Reports prepared in years 2002, 2004, 2006, 2008, 2010, and 2012. On the basis of available data, professional judgment, and using the methodology described in the previous sections, the CNMI's waters were assessed and categorized as shown in Table C-20 above.

C.4.2. TMDL Development Status

Based on the present assessment, CNMI is responsible for 59 individual water body/pollutant Total Maximum Daily Load assessments (TMDLs). The TMDL list, ranked by priority, is contained in Appendix III.

The CNMI has not completed any TMDLs to date. A TMDL study was initiated in 1999 for a portion of what is now called the Central W. Takpochau coastal water body segment (19b). The Load was for bacterial contamination only, but was never completed. The TMDL was canceled shortly after it was initiated due to plans to install a major stormwater treatment BMP which would have treated runoff from the source watershed. This project, the Garapan Water Quality Restoration Project, was canceled in 2006 shortly after the completion of the design and permitting stage. The project was revived in late 2009, although as a conceptual design only. The land that had been designated for the BMP was no longer available so further work on the project was suspended indefinitely.

Water bodies included in the proposed TMDL schedule were ranked using professional judgment on the basis of the following criteria:

HIGH Priority:

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

- known sources of pollutants.

MEDIUM Priority:

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

LOW Priority:

- isolated location and/or very infrequent recreation use;
- Impaired for only PO4 (suspected data quality issues – see Section C.1.1.);
- few or unknown sources of pollutants.

Given available funding all High priority TMDLs are scheduled to be completed in 2015, all Medium priority TMDLs in 2018, and all Low priority TMDLs in 2019.

C.4.3. Removal of Waters from the 303(d) List

Last reporting period, waterbody segment 11, in the Puntan Tahgong Watershed, was removed from the 303(d) list based on improved bacteriological water quality, specifically for Enterococci. It is placed on the list again this reporting cycle for Enterococci exceedences.

On the Island of Saipan, although both segment 18A, Susupe North, and segment 20A, Achugao North, had a considerable drop in Enterococci violations and they both supported their *Recreational Use* designation, there were still many DO exceedences for the *Aquatic Life and Propagation* use designation to be supported. Therefore, these segments were not removed from the 303(d) listing.

CNMI continues to evaluate these and the remaining water bodies removed from the list to ensure that water quality criterions are continually met (see Tables C-3 and C-4).

De-listing decisions are made using criteria developed by American Samoa. They are as follows:

C4.3.1. Criteria for Removal of Water Segment/Pollutant Combinations from the 303(d) List

DEQ shall remove a pollutant of a surface water from the 303(d) list 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 designated use 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.

CNMI DEQ shall remove a surface water from the 303(d) List if all pollutants for the surface water or segment are removed from the list.

Table C-20 lists all water body segment/pollutant combinations which are being delisted as a result of the 2014 assessment, along with the rationale for each delisting, using USEPA's terminology.

Table C-21 Segment/Pollutant Combinations Removed from CNMI's Previous Section 303(d) List

Segment/ Pollutant Combination On Previous CNMI Section 303(d) List					Summary Rationale for Delisting of Segment/Pollutant Combinations *(identify number of reason)* 3 TMDL Alternative (4B) 4 Not caused by a pollutant (4C) 5 TMDL approved or established by EPA (4A) 8 Applicable WQS attained; due to restoration activities 9 Applicable WQS attained; due to change in WQS 10 Applicable WQS attained; according to new assessment method 12 Applicable WQS attained; threatened water no longer threatened 13 Applicable WQS attained; reason for recovery unspecified 11 Applicable WQS attained; original basis for listing was incorrect 14 Data and/or information lacking to determine water quality status; original basis for listing was incorrect (Category 3)	
Seg. ID	Segment Name	Pollutant	Segment size	First year on list	Reason No.	Comments
DELISTINGS FOR:						
4	Uluyanhulo/ Teteto	enterococci (215)	3.5	2012	13	Improved water quality, cause unknown
18 A	North Achugao	enterococci (215)	1.5	2012	13	Improved water quality, perhaps due to sewer system improvements
20 A	North Achugao	enterococci (215)	1.7	2004	13	Improved water quality, perhaps due to sewer system improvements and reduction in population
TOTAL MILES REMOVED: **6.7 miles**						

C.5. Public Health Issues

C.5.1. Beach Water Quality Issues

Microbiological Contamination:

One of the primary purposes of the BECQ Surface Water Monitoring Program is to evaluate compliance with the *Recreational Use* Enterococci WQS criteria. Advisories are published and posted to the general public specifying not to swim within 300 feet of a sampling site for the next 48 hours whenever:

1. A single sample result exceeds the Enterococci criteria for that Class of waterbody; or
2. The geometric mean for Enterococci criteria over the past 30 days exceeds the criteria of 35 CFU/100 ml, unless the most recent single sample result at this site is 35 CFU/100ml of less, in which case an advisory is not issued.

Beach advisory signboards are posted at 10 sites on Saipan shoreline with internationally recognizable symbols for "no swimming" or "no fishing". Red Placards are posted at these locations whenever results call for a Public Advisory.

No advisory

Advisory

Due to the frequency with which some beaches exceed the *Recreational Use* criteria, an elevated risk to public health exists for several beaches within the CNMI, and many of BECQ's programs are aimed at reducing this risk. Along Saipan's western shoreline most of the Enterococci contamination is suspected to be indicative of contamination with human waste. 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 *Recreational Use*. These have been prioritized for TMDL development.

Enterococci contamination observed on some of Saipan's eastern beaches are likely due to livestock rather than human waste. Unrestricted cattle grazing has 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 not conducted any monitoring or detailed source assessment of these watersheds to date. However, the implementation of the CNMI Surface Water Quality Monitoring Plan (2013) is currently underway and sanitary survey data for Saipan watersheds will be available next reporting cycle.

The continued observance of Enterococci exceedences, along with a handful of suspected and highly publicized leptospirosis infections resulting in one death in 2000, has resulted in these eastern beaches being ranked as a priority for TMDL development. It is likely that restrictions on grazing in these watersheds could significantly reduce the problem, although the source of the leptospirosis remains unknown, and may be carried by wildlife in addition to livestock.

Mercury in Fish Tissue

The discovery of elevated levels of mercury in fish tissues harvested from the near shore Garapan region has highlighted the lack of a fish tissue monitoring and consumption advisory system within the BECQ Water Quality Monitoring Program. BECQ continues to work with University of Guam's WERI Lab to carrying out further testing in biota and fish over the next several years.

C.5.2. Public Water Supply/Drinking Water Use Reporting

The 1997 Guidelines for Preparation of the Comprehensive State Water Quality Assessments 305(b) Reports recommends that the use of surface water in public water supplies for drinking be discussed. The Guidelines recommend reporting three tables including:

1. A list of water bodies used as surface water sources (including a list of contaminants assessed for each water body);
2. a summary of drinking water use assessments for rivers and streams (including the total miles of rivers and streams designated for drinking water use); and
3. a summary of drinking water use assessments for lakes and reservoirs (including the total water body area designated for drinking water use).

In general, no surface water bodies are officially designated as water supplies for PWSs in the CNMI, so the three recommended tables to report for this section 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 is 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 a cave. The "Water 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. To date, the source water has not been assessed for contaminants other than the required

SDW Act monitoring requirements. No contaminants have been detected that would restrict the use of this surface water as a drinking water supply.

The second system is the Saipan CUC PWS, which has numerous groundwater 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. No surface water in the CNMI PWS is considered "navigable water". To date, there has been no assessment of the airport's catchment system water.

D. GROUND WATER MONITORING AND ASSESSMENT

This section describes known sources of ground water contamination, existing ground water protection programs, and summarizes the quality of the ground water in the CNMI.

D.1 Overview of Ground Water Contamination Sources

There have been only a few documented incidents of ground water contamination attributable to an identifiable source in the CNMI. There are no known groundwater 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. There are several locations with known groundwater contamination on Saipan, but most of the occurrences have not been linked to a specific identifiable source (although there are suspected sources of contamination).

EPA guidance for preparation of this document suggests using Table D-1 below, and checking off the 10 highest priority sources of ground water contamination from the list of contaminant sources in the first column. Since there are not 10 sources of known ground water contamination in the CNMI, only the confirmed sources and highly suspected sources (based on professional judgment) are checked off in the second column. The third column is used to identify the factors used in considering the selection of a contaminant source. The following codes are used in this column:

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. State findings, other findings
G. Documented from mandatory reporting
H. Geographic distribution/occurrence
I. Other criteria

The fourth column lists the contaminants/classes considered to be associated with each of the sources that were checked. Contaminants/classes are selected based on data indicating that certain chemicals or classes of chemicals may be originating from an identified source. The contaminants/classes of contaminants are denoted by the corresponding codes (A though M) listed below:

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

Table D-1 Major Sources of Ground Water Contamination

Contaminant Source	Confirmed or Highly Suspected Sources (X)	Factors Considered in Selecting a Contaminant Source	Contaminants
Agricultural Activities			
Agricultural chemical facilities			
Animal feedlots			
Drainage wells			
Fertilizer applications			
Irrigation practices			
Pesticide applications			
On-farm agricultural mixing and loading procedures			
Land application of manure unregulated			
Storage and Treatment Activities			
Land application (regulated or 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 and repair shops	X	A, C, D, E, H	C, D, H

A more detailed discussion of contamination sources is provided in section D.3 below.

D.2. Overview of State Ground Water Protection Programs

Although, there is no data collected on fish tissue and/or biota contamination for any of Tinian's coastal waters, the Carolinas Watershed, due to its remote location, lack of potential anthropogenic sources of toxins, and difficult accessibility, attains the *Fish and Shellfish Consumption* use designation based on professional judgment.

DEQ within the CNMI BECQ is the State agency with the primary responsibility for protecting and managing the ground water resources for the CNMI. DEQ operates under several sets of regulations that have the effect of protecting ground water resources, including the Well Drilling and Well Operation Regulations, the Wastewater Disposal Regulations, Underground Storage Tank Regulations, Underground Injection Control Regulations, and the Safe Drinking Water Regulations. Table D-2 below summarizes the State ground water protection programs.

D.2.1. Well Drilling and Well Operation Regulations

The Well Drilling and Well Operation Regulations define the qualifications of individuals and firms allowed to drills wells, designate set-back distances for potential sources of contamination, allows DEQ to set maximum pump withdrawal rates to minimize salt water intrusion, and 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 DEQ regulations to set additional restrictions on activities that may contaminate groundwater including wastewater disposal systems and above ground storage tanks.

In addition, the Ground Water Management Program maintains a database on wells in the CNMI. As of January 2014 the program has documented the locations of 619 wells in the CNMI (573 on Saipan, 27 on Tinian, 18 on Rota, and 1 on Pagan). The majority of these wells are used for drinking water sources (351), while some are used for irrigation (27). There are also monitoring wells (94), exploratory wells (15) which have not been designated for another use yet, injections wells (19), wells where the water is used for industrial purposes (11) and wells that have been destroyed (102).

D.2.2. Wastewater Disposal Regulations

The Wastewater Disposal Regulations describes how in-ground waste water disposal systems are to be constructed when no available community sewer collection system is available.

D.2.3 Underground Storage Tank Regulations

The Underground Storage Tank Regulations describe how underground storage tanks are to be constructed and monitored for integrity.

D.2.4 Underground Injection Control Regulations

The Underground Injection Control Regulations define under what conditions the injection of wastewater or other substances may be injected into the ground.

Table D-2 Summary of State Ground Water Protection Programs

Programs or Activities	Check (X)	Implementation Status	Responsible Agency
Active SARA Title III Program			
Ambient ground water monitoring system			
Aquifer vulnerability assessment			
Aquifer mapping			
Aquifer characterization			
Comprehensive data management system			
EPA-endorsed Core Comprehensive State Ground Water Protection Program (CSGWPP)			
Ground water discharge permits			
Ground water Best Management Practices			
Ground water legislation			
Ground water classification	X	continuing efforts	DEQ
Ground water quality standards			
Interagency coordination for ground water protection activities			
Nonpoint source controls	X	fully established	DEQ
Pesticide State Management Plan			
Pollution Prevention Program			
Public Water System Supervision Program	X	fully established	DEQ
Resource Conservation and Recovery Act (RCRA) Primacy	X	For RCRA-D (solid waste) only	DEQ
Source Water Assessment Program			
State Superfund			
State RCRA Program incorporating more stringent requirements than RCRA Primacy			
State septic system regulations	X	fully established	DEQ
Underground storage tank installation requirements	X	fully established	DEQ
Underground storage tank remediation fund			
Underground Storage Tank Permit Program	X	fully established	DEQ
Underground Injection Control Program	X	fully established	DEQ
Vulnerability assessment for drinking water/wellhead protection			
Well abandonment regulations	X	fully established	DEQ
Wellhead Protection Program (EPA-approved)	X	continuing efforts	DEQ
Well installation regulations	X	fully established	DEQ

D.2.5 Safe Drinking Water Regulations

The Safe Drinking Water Regulations require that PWSs conduct regular monitoring for potential contaminants based on a schedule set by DEQ. PWSs that use groundwater must monitor for any contaminant that may be present in their raw ground water as well if the system does not provide treatment for that specific contaminant at the entry point.

D.2.6. Other Monitoring Events/Programs

In addition to the regulatory Groundwater 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 on the island 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 public water supplies. The objective of the ground water study was to determine the extent of Volatile Organic Compound (VOC) contamination of ground water on the island of Saipan. 156 samples were analyzed for VOC and 34 of these samples detected VOCs. 11 of the 34 samples detected VOCs exceeding the Maximum Contaminant Level (MCL) for Trichloroethylene (TCE), Vinyl Chloride (VC), Dichloroethylene (DCE), and Tetrachloroethylene (PCE). The remaining 23 were below the MCL for a certain VOC. The samples that were detected to have VOCs over the MCL were localized in four areas of Saipan, namely, San Antonio, As Lito, Lower Base, and Puerto Rico.

In 2004, DEQ generated an inventory list of potential sites associated with the 34 samples with detected VOCs for preliminary assessment/site investigation activity. The list consisted of 28 sites, each of which was issued a joint DEQ and EPA Request for Information Letter pursuant to Section 104e of CERCLA. Based on the results of the May 2000 sampling event, and information provided by the 28 facilities, DEQ recommended 6 facilities for CERCLIS listing for potential investigation under the EPA Superfund program.

In 2009 DEQ conducted a ground water testing of 64 privately operated wells, and 12 publicly operated wells, within a 1 mile radius of the respective areas of San Antonio/Koblerville, Susupe, Gualo Rai, and Lower Base/Puerto Rico. The primary objective of the testing was to follow up the May 2000 testing to collect more current data on contaminants. Although the final validation of the data package was still under review by the US EPA at the time this report was prepared, it appears that there is no potential threat identified in the results, based on DEQ's preliminary review of the data package.

DEQ and CUC conducted a study on spatial and temporal nitrate variations in groundwater from southern Saipan from April 2008 through April 2009. DEQ and CUC collected groundwater samples from 20 wells every week and analyzed the samples for combined nitrate-nitrite, coliform/E/ Coli bacteria, turbidity, temperature, conductivity, pH, and hardness. DEQ and CUC also collected rainfall data from 4 rain gauges in the study area to compare variations in groundwater quality to rainfall events. DEQ and CUC 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, the nitrate concentrations at each well did not vary much over time or with rainfall. DEQ concluded that additional groundwater nitrate monitoring due to heavy rainstorms was probably not needed.

In 2010 through 2011 DEQ conducted a study on baseline groundwater quality for areas of Saipan that had high concentrations of homes, but did not have community sewer collection systems. Groundwater samples were collected quarterly from 16 wells in Kagman homestead and 30 wells near DanDan homestead for one year. The samples were analyzed for combined nitrate-nitrite, coliform and E. Coli, turbidity, temperature, conductivity, and pH. While the quality of the groundwater varied spatially across each of the two well fields the quality of the

groundwater at each particular well did not change very much during the course of the study (temporally). The bacterial quality of the groundwater in both homesteads was good with few to no detections, and the nitrate-nitrite concentration was below 10 mg/L for all but one of the wells. This data is available for decision makers, planners, and regulators to use when planning for changes in the infrastructure of these homesteads.

Between August 2012 and November 2013, the CUC conducted a study of groundwater under the direct influence of surface water on Saipan, Tinian and Rota. 11 sites on Saipan were selected, as well as one site each on Tinian and Rota respectively. Groundwater 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 under the influence of surface water. There were obvious changes in turbidity and conductivity immediately following rain events. That well was removed from service. The other sites did not have obvious influences from rain events, and no official determination has been made on their status as of the publishing date of this report.

D.3 Summary of Ground Water Contamination Sources (all CNMI)

There are no known groundwater contamination issues on the island of Rota. Table D-3 below summarizes ground water contamination sources on the islands of Saipan and Tinian.
Agricultural activity on Saipan is somewhat limited in scope except in central Kagman. There have been no inorganic or organic pesticides detected in samples tested per the Safe Drinking Water regulations. There are no large scale feed lots or land application of manure. However, there are many free grazing cattle in Marpi and on the eastern watersheds.

There are 17 underground injection wells on Saipan used for the disposal of reverse-osmosis (reject) brine water. The injection wells are primarily associated with tourist hotels located along the coast line. The wells terminate well below the freshwater/saltwater interface. The injection wells do not pose a contamination risk to the groundwater withdrawn for consumption. There are 20 shallow wastewater disposal leaching fields that serve more than 20 people, and are therefore considered underground injection wells. There have been no known contamination events from these sources.

D.4 Summary of Ground Water Quality

Table D-4 summarizes ground water quality monitoring results conducted as required under: the Well Drilling and Well Operation Regulations; Annual Well Operating Permit requirements for private wells; the Safe Drinking Water Regulations; required periodic monitoring for regulated contaminants; and special water quality studies for public wells of interest. Data for each of the three populated islands of Saipan, Tinian, and Rota are reported in separate rows in in the table. The islands themselves are not divided up into smaller aquifers for this report.

Table D-3 Ground Water Contamination Summary

Source Type	# of Sites	Number of sites that are listed and/or have confirmed releases	Number of sites with confirmed ground water contamination	Contaminant	# site investigations (optional)	Number of sites that have been stabilized or have had the source removed (optional)	Number of sites with corrective action plans (optional)	Number of sites with active remediation (optional)	Number of sites with cleanup complete (optional)
NPL	0								
CERCLIS	1	1	1	PCB					
DOD/DOE	13	13	2	SVOCs, VOCs, Metals, UXO	13	3	0	0	3
LUST[1]	0								
LAST[2]	0								
RCRA Corrective Action	2	2	0	Petroleum products	0	2	2	0	2
Underground Injection	37	0	0						
State Sites	0								
Non-Point Sources	0								

[2] For the reporting period of 2012-2013 there are no new leaking underground storage tank sites (LUSTs). There have been LUST sites in previous periods, but all sites have been cleaned up.

[3] For this reporting period of 2012-2013 there are no new leaking above ground storage tank sites.

21 PWSs in the CNMI (20 on Saipan, zero on Tinian, and one on Rota) tested their water for VOCs and Synthetic Organic Carbons (SOC) during this reporting period. PWSs do not test their raw untreated well water for VOCs and SOCs. They test the treated water that is being delivered to their customers. These systems collect the sample at what is called the entry point to the distribution system, which may combine water from many different sources including groundwater, rain water, or filtered sea water. For this reason, detection of VOCs in water from the entry point does not necessarily indicate contamination of the groundwater supply. The 1997 EPA Guidance recommends that constituents should only be considered in Table D-4 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.

Groundwater from 239 wells in the CNMI, 225 in Saipan, 13 Rota, and one on Tinian were analyzed for nitrates during this reporting period. Two 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. The breakdown of the number of wells that were sampled for nitrates is presented in Table D 4.

D.5. Summary of Ground Water-Surface Water Interactions

Ground water to surface water interactions, as well as surface water 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 in near shore underwater seeps in the Saipan lagoon is suspected of contributing to periodic algal blooms and DO deficits.

Salt water intrusion (upconing) is arguably the most significant ground water contamination issue on Saipan and the CNMI as a whole. Even though the water supplied by the large 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 wells affected. In years past the demand for water was 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 groundwater 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. Also the utility has given careful consideration to well depth relative to sea level, well spacing, and pumping rates for newer wells constructed since about the year 2000.

As mentioned above in Section D.2.6. Other, 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 groundwater from this well showed changes in turbidity and conductivity immediately following rain events.

Table D-4 Aquifer Monitoring Data - Saipan, Tinian and Rota 10/01/2009 to 09/30/2011

Monitoring Data Type	Total no. of wells Used in the Assessment	Parameter Groups	Number of Wells						
			No detections of parameters above the MDLs or background levels (ND)	Nitrate concentrations ranges from background levels to less than or equal to 5 mg/l No detections of parameters other than nitrate above MDLs or background levels.	Nitrate ranges from greater than 5 to less than or equal to 10 mg/l. Other parameters are detected at concentrations exceeding the MDL but are less than or equal to the MCLs.	Parameters are detected at concentrations exceeding the MCLs	Number of wells removed from service	Number of wells requiring special treatment	Background parameters exceed MCLs.
Untreated Water Quality Data from Wells (ROTA)	0	VOC							
	0	SOC							
	13	NO_3	0	13	0	0	0	0	0
		Other							
Untreated Water Quality Data from Wells (SAIPAN)		VOC							
		SOC							
	225	NO_3	20	147	56	2	0	0	0
		Other							
Untreated Water Quality Data from Wells (TINIAN)	0	VOC							
	0	SOC							
	1	NO_3	0	0	1	0	0	0	0
		Other							

E. PUBLIC PARTICIPATION

The draft 2014 Integrated Report was placed on the BECQ website on June 25, 2014 and announcements were released that public comments would be accepted until July 25, 2014. No comments were received during this period.

Changes to Final Integrated Report

The format of the 2014 Integrated Report has been revised since the last reporting cycle. Each of the inhabited islands and the northern islands are broken into Watersheds for discussion. The Watersheds are then broken down into coastal waters, fresh waters, then lakes and wetlands. A discussion of each watershed's attainment of its designated uses is also included therein. Designated uses include aesthetic enjoyment, aquatic life support and propagation, fish and shellfish consumption, recreational uses, and so forth. The reorganization was meant to create a more user friendly document for local residents, students, and other stakeholders to look up information about the status of their specific watershed of interest. In so doing, the reader can get a "snap shot" of their area of interest, rather than looking for a discussion of their watershed in each Use designation, as was done in previous reports.

In addition, the island of Saipan, as the most populated island in the archipelago, has had the most resources dedicated to its monitoring and notification. Therefore, Saipan's Watershed sections are further broken out into a discussion of each water body's attainment of its use designations.

Each Watershed section culminates with its CALM categorical ranking. These sections are then followed by the 305(b) assessment of each island with accompanying charts, and then their 303(d) listing status.

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APPENDIX I: Water Body Information for Commonwealth of the Northern Marianas Islands

Table I-a. Area and aquatic resources information for reporting segments (watersheds) of CNMI.

Watershed	Num.	WQ Sampling Stations	Watershed Area (mi2)	Stream Miles	Ocean Shoreline Miles	Beach Miles	Wetland Acres	Latitude	Longitude
ROTA:									
Dugi/Gampapa/Chenchon	1	none	7,886	0	11.1	2.1	0	14°11'57.65"N	145°15'25.29"E
Sabana/Talakaya/Palie	2	R1,R2, R15	4,903	6.1	7.3	1.4	0	14° 6'55.71"N	145°11'18.38"E
Songsong	3	R3, R4, R5, R6, R7, R8,R14	1,954	0	7.9	2.5	0	14° 8'16.98"N	145° 8'12.31"E
Uyulanhulo/Teteto	4	R9,R10, R11,R13	3,085	0	3.5	3.5	0	14°10'4.67"N	145°10'1.89"E
Chaliat/Talo	5	R12	3,223	0	2.6	1.5	0	14°11'33.80"N	145°13'32.69"E
Totals:			21,051	6.1	32.4	11.0	0.0		
AGUIGAN:									
Aguigan	6	AGU1,2	1,752	0	8.2	0	0	14°51'7.07"N	145°33'31.41"
TINIAN:									
Masalok	7	T1, T2	3,911	0	3.5	0.5	1.6	15° 2'4.71"N	145°38'55.28"E
Carolinas	8	none	2,871	0	10.4	0	0	14°56'18.83"N	145°39'8.49"E
Makpo	9	T7, T8, T9, T10	5,765	0	4.5	1.5	28.4	14°57'28.88"N	145°37'47.21"E
Puntan Diaplolamanibot	10	T5, T6	8,121	0	9.9	1.1	9.7	14°58'56.89"N	145°36'44.43"
Puntan Tahgong	11	T3, T4	4,381	0	6.4	0.5	38.2	15° 4'18.30"N	145°36'55.59"E
Totals:			25,049	0.0	34.7	3.6	77.9		

Table I-a. continued: Area and aquatic resources information for reporting segments (watersheds) of CNMI.

Watershed	Num.	WQ Sampling Stations	Watershed Area (mi2)	Stream Miles	Ocean Shoreline Miles	Beach Miles	Wetland Acres	Latitude	Longitude
SAIPAN:									
Kalabera	12	NEB02	1,636	5.1	3.7	0.3	0.0	15°15'38.32"N	145°48'50.78"E
Talofofo	13	NEB 03, NEB04, NEB07	4,436	31.1	4.6	0.2	2.6	15°12'35.88"N	145°46'42.31"E
Kagman	14	NEB05, NEB06,	3,546	8.3	5.2	0.8	5.1	15° 9'2.09"N	145°47'21.44"E
Lao Lao	15	SEB02, SEB03	1,043	4.6	2.1	1.2	0.0	15° 9'48.03"N	145°45'43.65"E
Dan Dan	16	none	1,499	0.0	5.4	0.2	2.8	15° 9'6.25"N	145°44'47.97"E
Isley	17		4,889	2.2			15.3		
Isley (West)	17A	SEB06			1.6	0.5		15° 6'47.94"N	145°42'12.81"E
Isley (East)	17B	SEB4-5, SEB08			3.6	1.0		15° 6'21.39"N	145°44'18.36"E
Susupe	18		3,632	2.1			454.8		
Susupe (North)	18A	WB25 - WB29			1.5	1.5		15° 9'48.03"N	145°42'25.30"E
Susupe (South)	18B	WB30 - WB37			3.1	2.7		15° 7'39.61"N	145°41'34.78"E
West Takpochau	19		4,204	7.1			61.4		
W. Takpochau (North)	19A	WB9-WB13			4.1	0.3		15°13'39.11"N	145°44'22.14"E
W. Takpochau (Central)	19B	WB14 - WB23			3.0	2.8		15°13'3.23"N	145°42'57.52"E
W. Takpochau (South)	19C	WB24			1.2	1.2		15°11'9.03"N	145°42'51.92"E

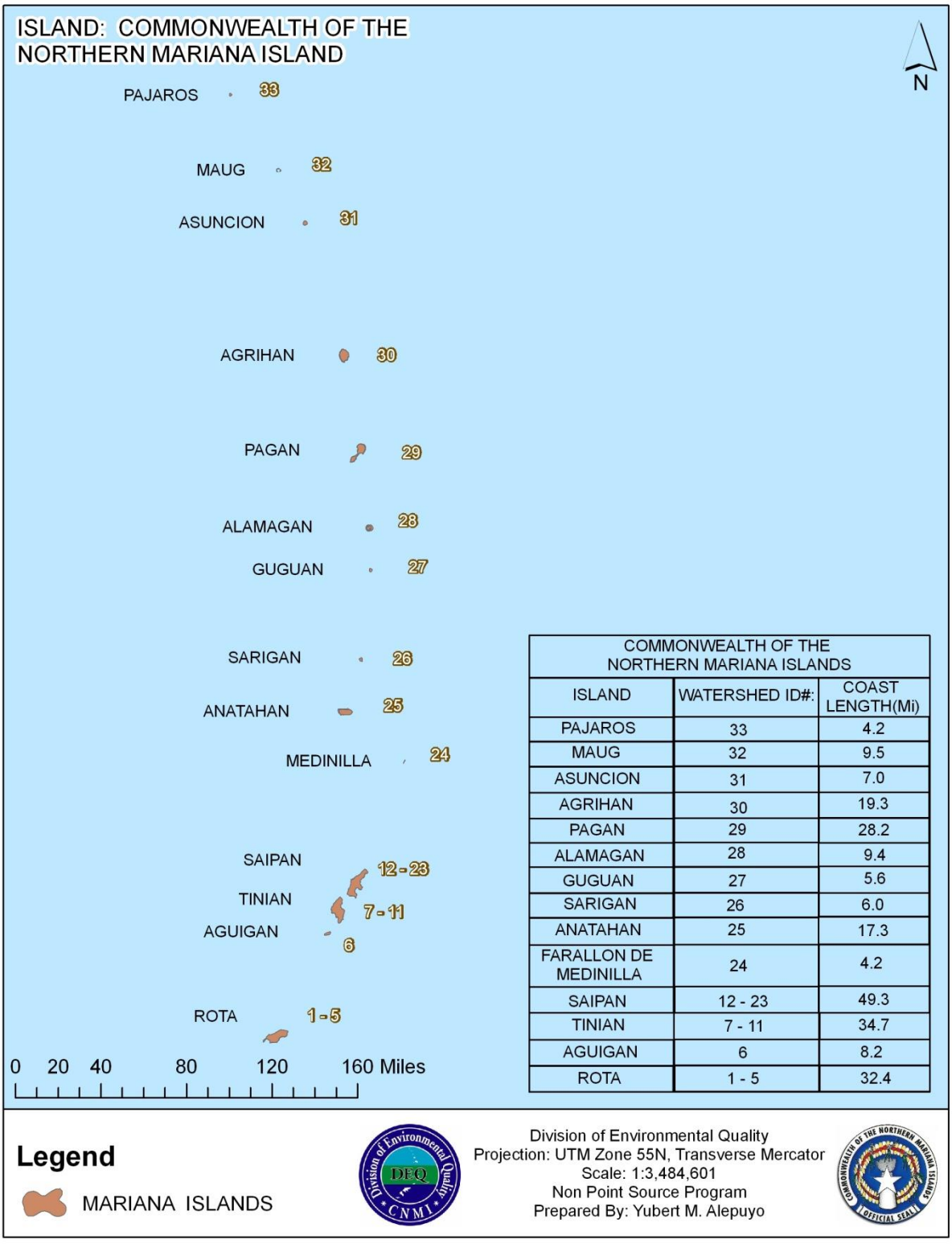
Table I-a. continued: Area and aquatic resources information for reporting segments (watersheds) of CNMI.

Watershed	Num.	WQ Sampling Stations	Watershed Area (mi2)	Stream Miles	Ocean Shoreline Miles	Beach Miles	Wetland Acres	Latitude	Longitude
SAIPAN continued:									
Achugao	20		1,748	6.3			61.1		
Achugao (North)	20A	WB3-6			1.7	1.5		15°14'48.69"N	145°45'58.96"E
Achugao (South)	20B	WB7-8			1.2	1.0		15°14'32.50"N	145°45'13.13"E
As Matuis	21	WB1, WB2	1,340	0.5	2.1	1.0	0.0	15°16'18.59"N	145°47'30.76"E
Banaderu	22	NEB01	1,435	0	4.6	0	0	15°16'25.63"N	145°49'40.56"E
Managaha	23	MG01 - MG11	16.5	0	0.6	0.6	0	15°14'28.59"N	145°42'44.64"E
Totals:			29,425	67.3	49.3	16.8	603.1		
NORTHERN ISLANDS:									
Farallon De Medinilla	24	none			4.2			16° 1'10.96"N	146° 3'34.61"E
Anatahan	25	none			17.3			16°21'5.04"N	145°41'3.42"E
Sarigan	26	none			6.0			16°42'12.38"N	145°46'46.90"
Guguan	27	none			5.6			17°18'32.51"N	145°50'33.47"E
Alamagan	28	none			9.4			17°35'54.81"N	145°50'3.59"E
Pagan	29	none			28.2			18° 7'16.62"N	145°45'49.20"E
Agrihan	30	none			19.3			18°46'2.86"N	145°40'18.73"E
Asuncion	31	none			7.0			19°41'26.38"N	145°24'13.47"E
Maug	32	none			9.5			20° 1'13.95"N	145°13'59.72"E
Farallon De Pajaros	33	none			4.2			20°32'42.64"N	144°53'34.04"E

Table I-a. continued: Area and aquatic resources information for reporting segments (watersheds) of CNMI.

Watershed	Num.	WQ Sampling Stations	Watershed Area (mi2)	Stream Miles	Ocean Shoreline Miles	Beach Miles	Wetland Acres	Latitude	Longitude
TOTALS,									
Commonwealth of the Northern Mariana Islands			**77,277**	**73.4**	**235.3**	**31.4**	**669.7**		

Figure I-b. Watershed (segment) numbers for all CNMI islands



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

Figure I-c. Watershed (segment) numbers, monitoring stations, and aquatic resources of Rota

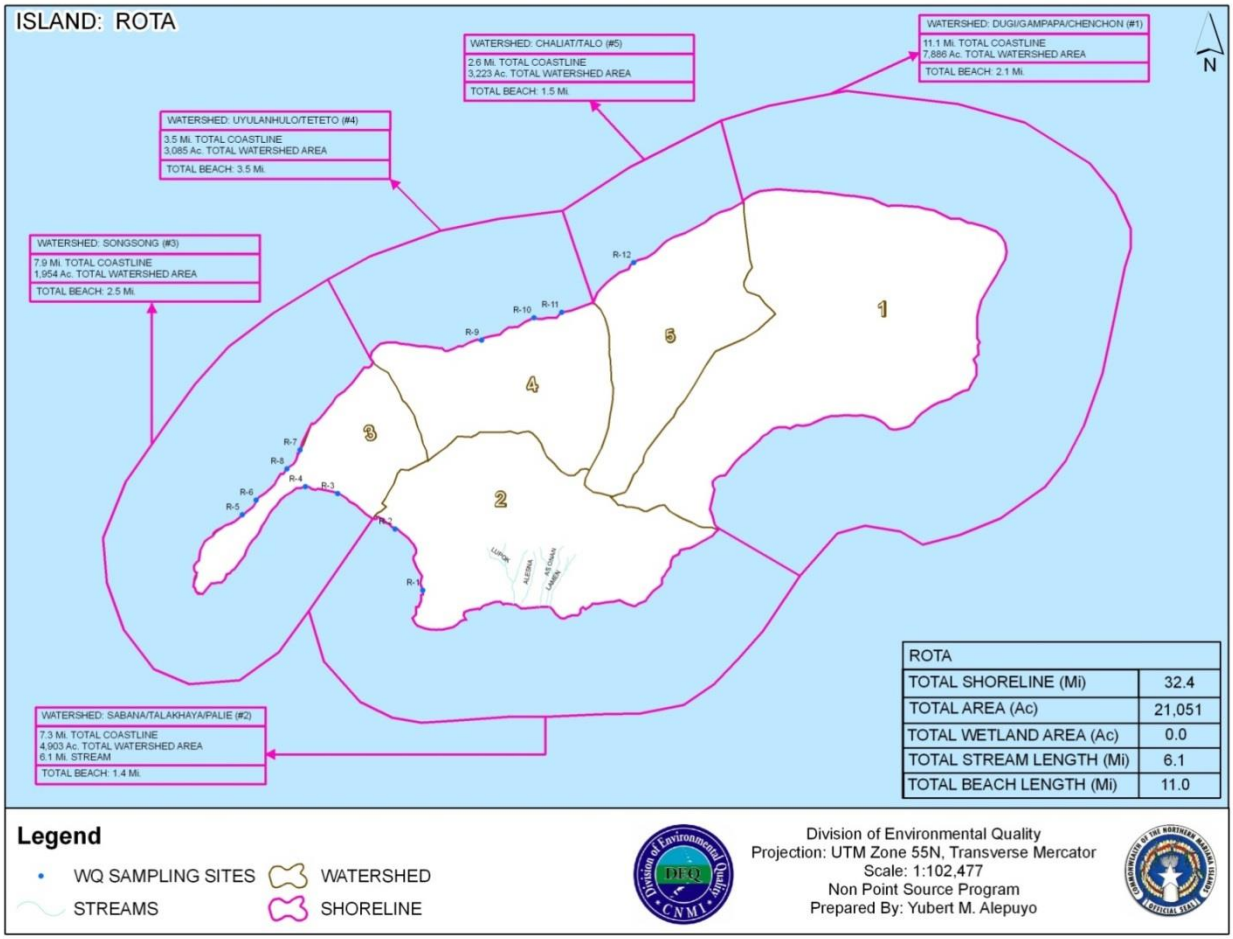


Figure I-d. Watershed (segment) numbers, monitoring stations, and aquatic resources of Tinian & Aguigan

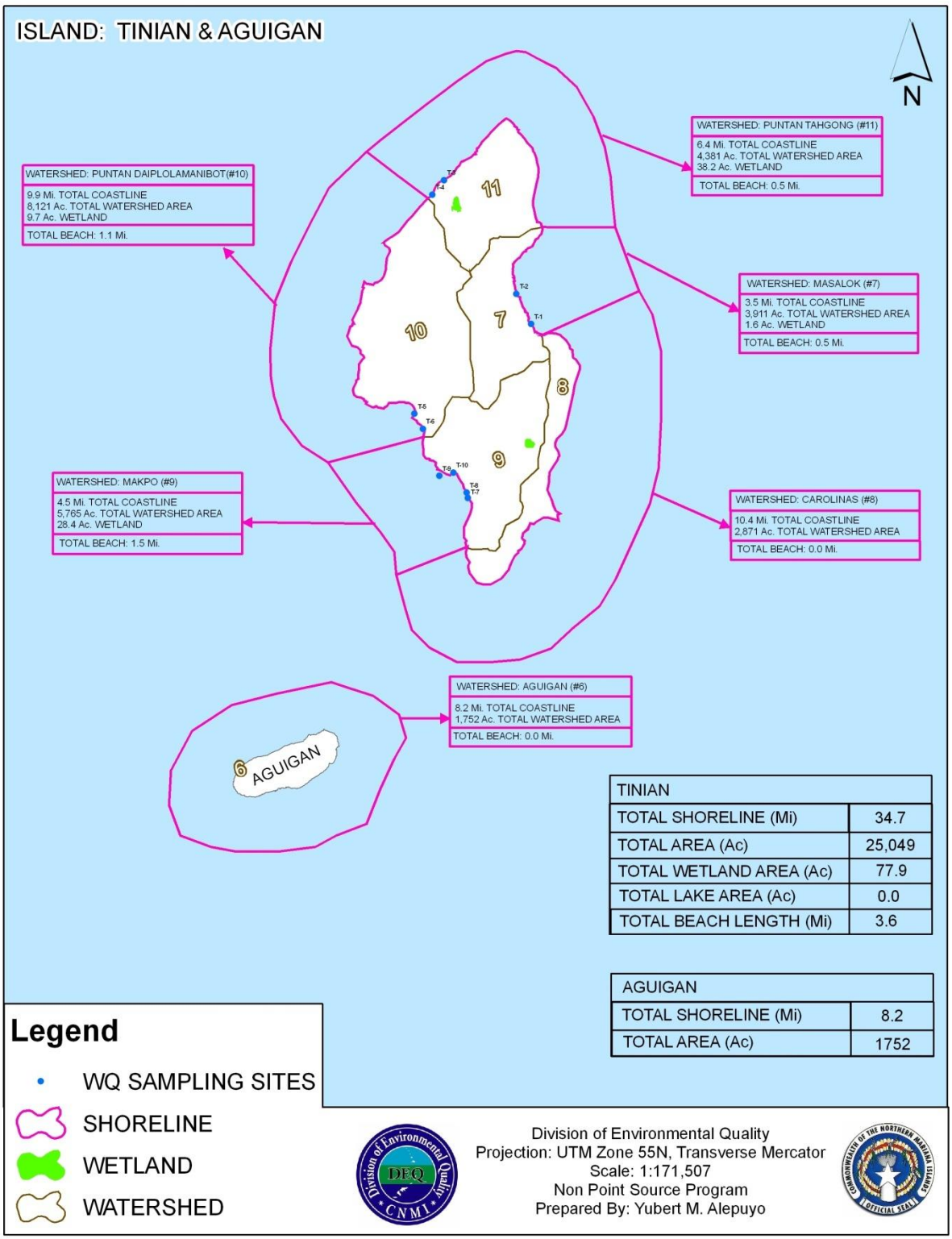


Figure I-e. Watershed (segment) numbers, monitoring stations, and aquatic resources of Saipan

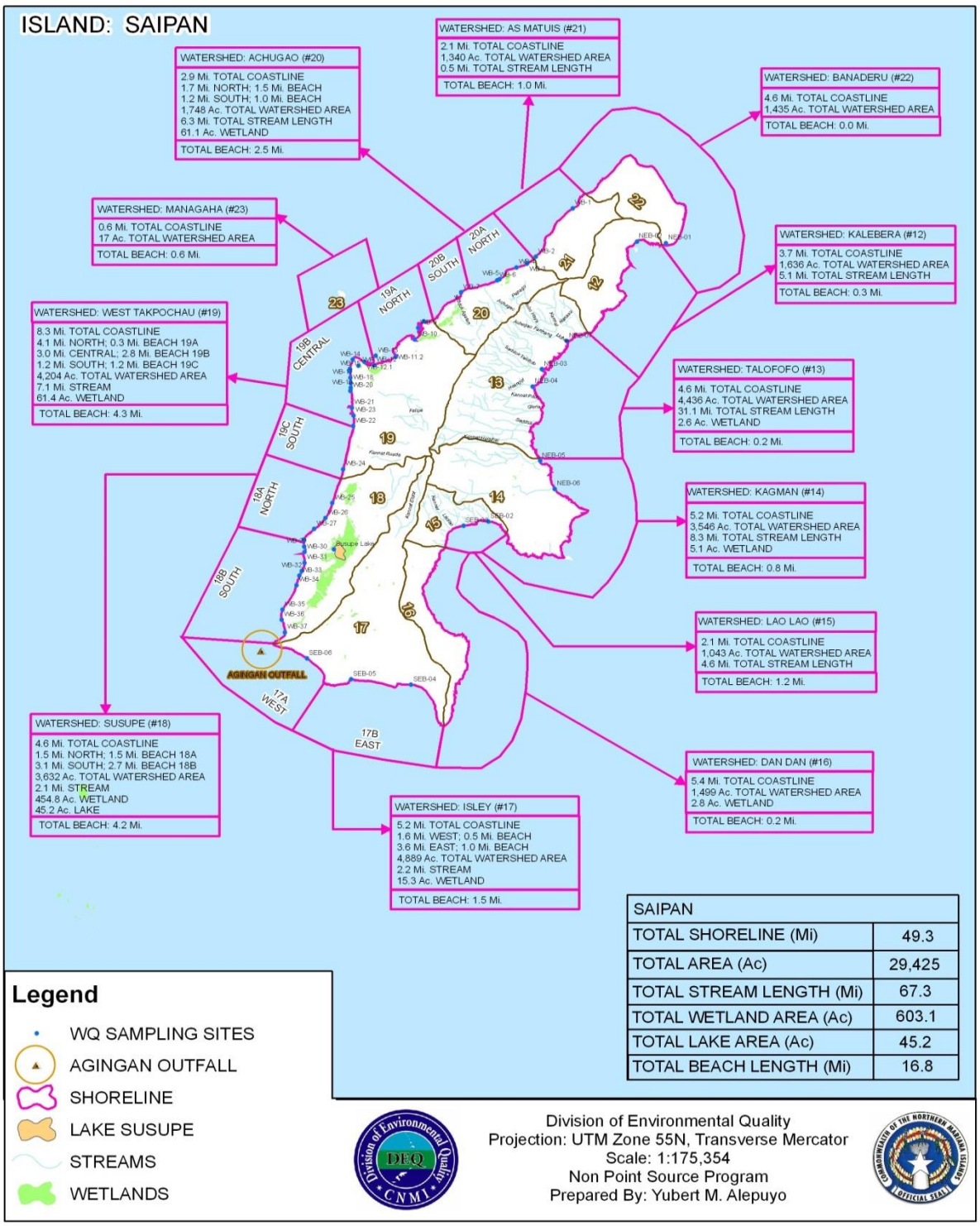


Figure I-f. Coral reef and seagrass biocritera monitoring stations for the island of Saipan

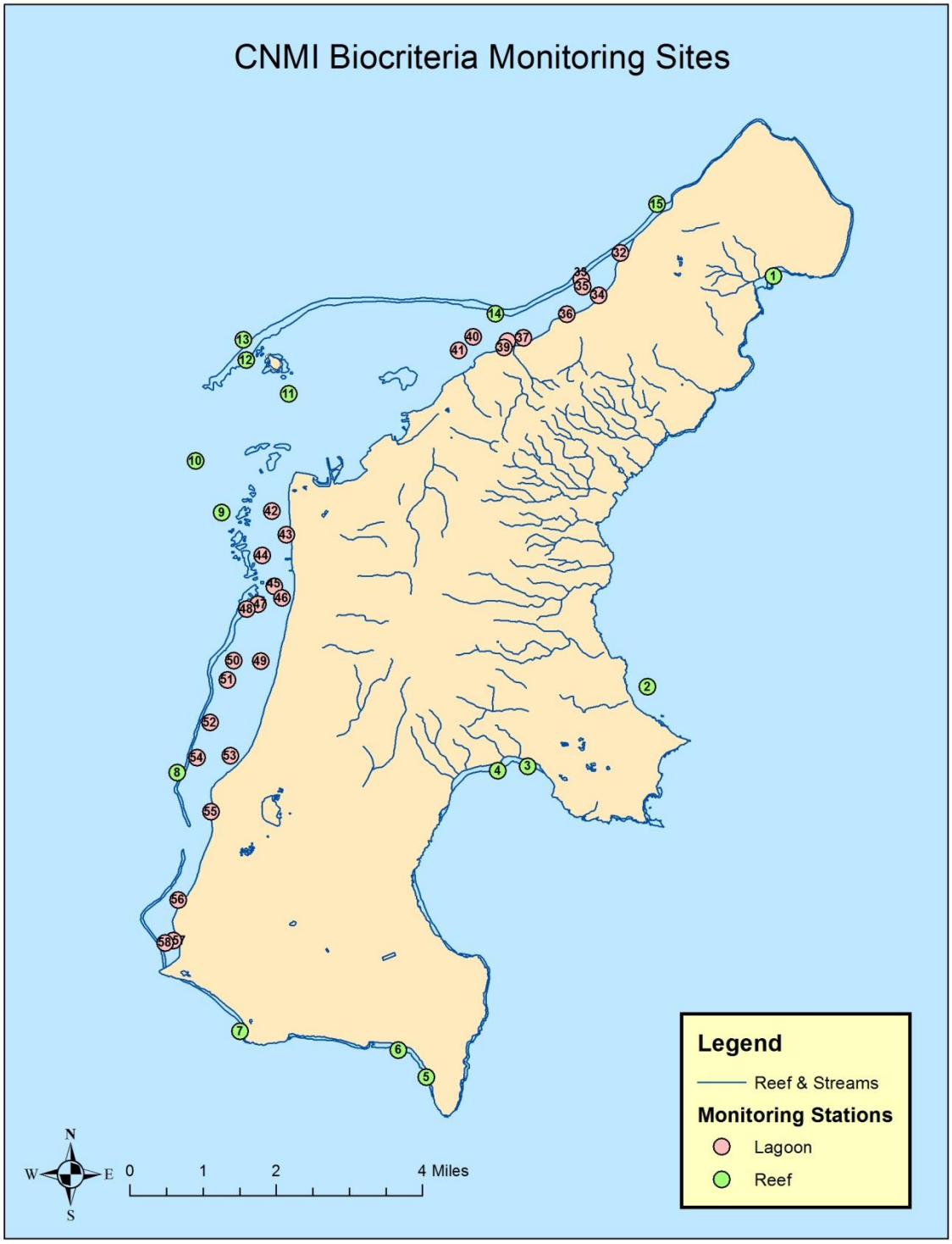


Figure I-g. Coral reef biocriteria monitoring sites for the island of Tinian (top) and Aguigan (bottom)

Figure I-h. Coral reef biocriteria monitoring sites for the island of Rota

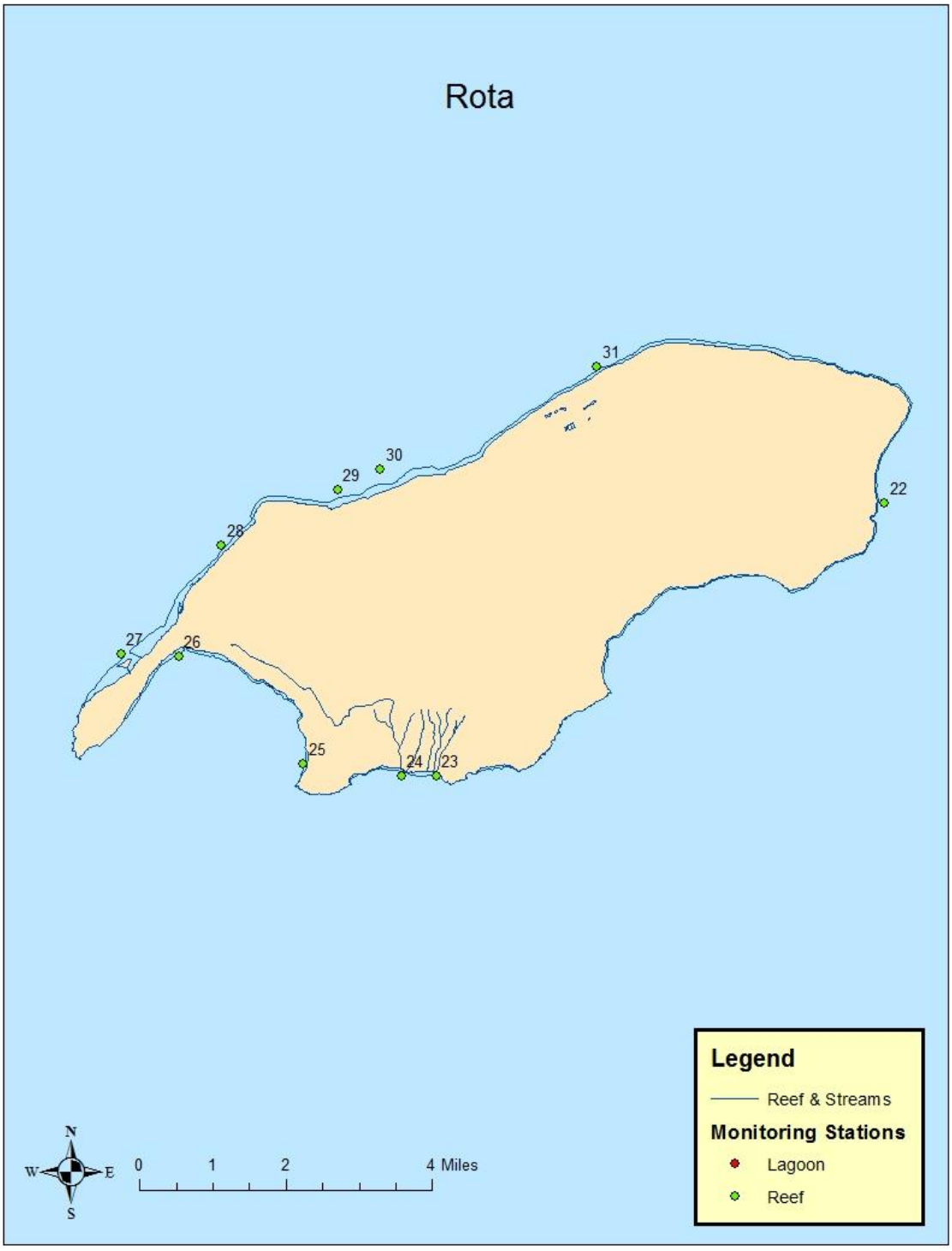


Figure I-i. Water Quality Monitoring sites for Laolao Bay

APPENDIX II: Detailed 305b Listing of CNMI Waters

Table II-a. 305b Use Support / CALM Assessment Category Summary for Saipan and the Northern Islands (Cumulative: Includes all FY1998 to FY2013 data)

		Saipan																Northern Islands									
WATER BODY SEGMENT ID		12	13	14	15	16	17 Isley		18 Susupe		19 W. Takpochau			20 Achugao		21	22	23	24	25	26	27	28	29	30	31	32	33
Designated Use		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	Farallon De Medinilla	Anatahan	Sarigan	Guguan	Alamagan	Pagan	Agrihan	Asumcion	Maug	Farallon De Pajaros
Coastal Waters	Aquatic Life	N	N	N	N	i	N	N	N	N	N	N	N	N	N	N	F	N	F	F	F	F	F	F	F	F	F	F
	Fish Consumption	i	i	i	i	i	i	***N***	i	i	i	N	i	i	i	i	F	i	F	F	F	F	F	F	F	F	F	F
	Recreation	N	N	N	N	i	N	N	N	***F***	F	N	N	N	***F***	F	F	F	F	F	F	F	F	F	F	F	F	F
	Aesthetic enjoyment/others	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	CALM Assessment Category	5	5	5	5	***2***	5	5	5	5	5	5	5	5	5	5	1	5	1	1	1	1	1	1	1	1	1	1
Streams	Aquatic Life	i	***F***	***F***	i		i		i		**N**			F		i				***F***	***F***	***F***	***F***	***F***	***F***	***F***	***F***	***F***
	Fish Consumption	i	i	i	i		i		i		i			i		i				***F***	***F***	***F***	***F***	***F***	***F***	***F***	***F***	***F***
	Recreation	i	i	i	i		i		i		i			i		i				***F***	***F***	***F***	***F***	***F***	***F***	***F***	***F***	***F***
	Potable Water Supply	i	i	i	i		i		i		i			i		i				***F***	***F***	***F***	***F***	***F***	***F***	***F***	***F***	***F***
	Aesthetic Enjoyment/others	***F***	***F***	***F***	***F***		i		**F**		**N**			**F**		***F***				***F***	***F***	***F***	***F***	***F***	***F***	***F***	***F***	***F***
	CALM Assessment Category	***2***	***2***	***2***	***2***		**3**		**2**		4c			**2**		***2***				***1***	***1***	***1***	***1***	***1***	***1***	***1***	***1***	***1***

Legend:

Designated Use Support Level	
F	Fully Supporting
N	Not Supporting (Impaired)
i	Insufficient data to evaluate use
	(no entry) Water body type does not exist within watershed

CALM Assessment Category	
1	All designated uses are supported, no use is threatened
2	Available data and/or information indicate that some, but not all of the designated uses are supported.
3	There is insufficient available data and/or information to make a use support determination
4a	A TMDL to address a specific segment/pollutant combination has been approved or established by EPA.
4b	A use impairment caused by a pollutant is being addressed by the state through other pollution control requirements.
4c	A use is impaired, but the impairment is not caused by a pollutant.
5	Available data and/or information indicate that at least one designated use is not being supported or is threatened, and a TMDL is needed. (A use is threatened if a waterbody is currently attaining WQSs, but is expected to not meet WQSs by the next listing cycle.)

Table II-b. 305b Use Support / CALM Assessment Category Summary for Tinian and Rota (Cumulative: Includes all FY1998 to FY2013 data)

		Rota					Tinian					
WATER BODY SEGMENT ID		1 Dugi/Gampapa/ Chenchon	2 Sabana/ Talakaya/ Palie	3 Songsong	4 Uyulanhulo/ Teteto	5 Chaliat/Talo	6 Aguigan	7 Masalok	8 Carolinas	9 Makpo	10 Puntan Daiplolamanibot	11 Puntan Tahgong
Designated Use												
Coastal Waters	Aquatic Life	i	N	N	N	N	F	N	i	N	N	N
	Fish Consumption	***F***	i	i	i	i	F	i	***F***	i	i	i
	Recreation	i	N	N	***F***	***N***	F	***N***	i	N	N	***N***
	Aesthetic enjoyment/others	F	F	F	F	F	F	F	F	F	F	F
	CALM Assessment Category	***2***	5	5	5	5	1	5	***2***	5	5	5
Streams	Aquatic Life		i									
	Fish Consumption		i									
	Recreation		i									
	Potable Water Supply		i									
	Aesthetic Enjoyment/others		***F***									
	CALM Assessment Category		***2***									

Table II-c. 305b Use Support / CALM Assessment Category Summary for Lakes and Wetlands (Cumulative: Includes all FY1998 to FY2013 data)

		Rota	Tinian						Saipan														Northern Islands									
WATER BODY SEGMENT ID			6	7	8	9	10	11	12	13	14	15	16	17 Isley		18 Susupe		19 W. Takpochau			20 Achugao		21	22	23	24	25	26	27	28	29	30	31	32	33
														A	B	A	B	A	B	C	A	B												
Water Body Type	*Designated Use*		Agiigan	Masalok	Carolinas	Makpo	Daipiolama nibot	Puntan Tahgong	Kalabera	Talofofo	Kagman	Lao Lao	Dan Dan	(West)	(East)	(North)	(South)	(North)	(Central)	(South)	(North)	(South)	As Matuis	Banaderu	Managaha	Farallon De Medinilla	Anatahan	Sarigan	Guguan	Alamagan	Pagan	Agrihan	Asumcion	Maug	Farallon De Pajaros
Lakes																																		
	Aquatic Life																N									F				F				
	Fish Consumption																i									F				F				
	Recreation																N									F				F				
	Potable Water Supply																N									F				F				
	Aesthetic Enjoyment/others																F									F				F				
	CALM Assessment Category																5									1				1				
Wetlands																																		
	Aquatic Life					i		F		i	F		i	i		N		N			N													
	CALM Assessment Category					3		1		3	1		3	3		4c		4c			4c													

Legend:

Designated Use Support Level	
F	Fully Supporting
N	Not Supporting (Impaired)
i	Insufficient data to evaluate use
	(no entry) Water body type does not exist within watershed

CALM Assessment Category	
1	All designated uses are supported, no use is threatened
2	Available data and/or information indicate that some, but not all of the designated uses are supported.
3	There is insufficient available data and/or information to make a use support determination
4a	A TMDL to address a specific segment/pollutant combination has been approved or established by EPA.
4b	A use impairment caused by a pollutant is being addressed by the state through other pollution control requirements.
4c	A use is impaired, but the impairment is not caused by a pollutant.
5	Available data and/or information indicate that at least one designated use is not being supported or is threatened, and a TMDL is needed. (A use is threatened if a waterbody is currently attaining WQSs, but is expected to not meet WQSs by the next listing cycle.)

II.A. COASTAL WATERS

Table II-d. Category 1 - Coastal Waters Attaining All Designated Uses

ID No.	SEGMENT NAME	ISLAND	SEG. CLASS	SEGMENT SIZE (miles)	COMMENTS
6	Aguigan	Aguigan	AA	8.2	All uses are attained
22	Banaderu	Saipan	AA	4.6	All uses are attained
24	Farallon De Medinilla	Farallon De Medinilla	AA	4.2	All uses are attained
25	Anatahan	Anatahan	AA	17.3	All uses are attained
26	Sarigan	Sarigan	AA	6.0	All uses are attained
27	Guguan	Guguan	AA	5.6	All uses are attained
28	Alamagan	Alamagan	AA	9.4	All uses are attained
29	Pagan	Pagan	AA	28.2	All uses are attained
30	Agrihan	Agrihan	AA	19.3	All uses are attained
31	Asuncion	Asuncion	AA	7.0	All uses are attained
32	Maug	Maug	AA	9.5	All uses are attained
33	Farallon De Pajaros	Farallon De Pajaros	AA	4.2	All uses are attained
			TOTAL:	123.5	

Table II-e. Category 2 - Coastal Waters Attaining some Designated Uses, insufficient data about remaining

ID No.	SEGMENT NAME	ISLAND	SEGMENT CLASS	SEGMENT SIZE (miles)	COMMENTS
1	Dugi/Gamppa/Chenchon	Rota	AA	11.1	Fish tissue data not available. However, very remote, lack of anthropogenic sources of toxins
8	Carolinas	Tinian	AA	10.4	Fish tissue data not available. However, very remote, lack of anthropogenic sources of toxins Recent water quality data meets criteria
16	Dan Dan	Saipan	AA	5.4	No available monitoring data of any type
			TOTAL:	26.9	

Table II-f. Category 5 - Coastal Waters Impaired by Pollutants (TMDL Required)

ID No.	SEGMENT NAME	ISLAND	SEG. CLASS	SIZE (miles)	CAUSE	CYCLE FIRST LISTED	SOURCE	COMMENTS	TMDL PRIORITY
2	Sabana/Talakaya/Palie	Rota	AA	7.3	enterococci, D.O., orthophos-phate	2004 2004 2010	sedimentation (21), non-point source (141)		H
3	Songsong	Rota	A, AA	7.9	enterococci, D.O., biocriteria, orthophos-phate	2004 2004 2006 2010	on-site treatment systems (92), urban runoff (177)		H
4	Uyulanhulo/Teteto	Rota	AA	3.5	orthophos-phate	2004	on-site treatment systems (92)		L
5	Chaliat/Talo	Rota	AA	2.6	enterococci biocriteria, orthophos-phate	2014 2006 2004	unknown (140)		L
7	Masalok	Tinian	AA	3.5	enterococci orthophos-phate	2014 2004	unknown (140)		L
9	Makpo	Tinian	A, AA	4.5	enterococci D.O., biocriteria, orthophos-phate	2012 2010 2006 2004	Unknown (140) on-site treatment systems (92), urban runoff (177)		M
10	Puntan Diaplolamanibot	Tinian	AA	9.9	enterococci orthophos-phate	2012 2004	unknown (140)		L
11	Puntan Tahgong	Tinian	AA	6.4	enterococci biocriteria, orthophos-phate	2014 2004 2006	unknown (140)		L
12	Kalabera	Saipan	AA	3.7	Enterococci orthophos-phate	2012 2004	unknown (140)		L
13	Talofofo	Saipan	AA	4.6	enterococci, orthophos-phate	2004 2004	livestock grazing or feeding (143), sedimentation (21)		H

Table II-g. Category 5 - Coastal Waters Impaired by Pollutants (TMDL Required)

ID No.	SEGMENT NAME	ISLAND	SEG. CLASS	SIZE (miles)	CAUSE	CYCLE FIRST LISTED	SOURCE	COMMENTS	TMDL PRIORITY
14	Kagman	Saipan	AA	5.2	enterococci, orthophos-phate	2004 2004	on-site treatment systems (92), sedimentation (21), livestock grazing or feeding (143)		H
15	Lao Lao	Saipan	AA	2.1	enterococci, biocriteria, orthophos-phate	2004 2006 2004	on-site treatment systems (92), sedimentation (21), livestock grazing or feeding (143)		H
17A	Isley (West)	Saipan	A, AA	1.6	enterococci, orthophos-phate	2008 2004	unknown (140), municipal point source (85)	Agingan WWTP outfall located in water segment	M
17B	Isley (East)	Saipan	AA	3.6	enterococci, orthophos-phate, biocriteria	2004 2004 2014	unknown (140), sedimentation (21)		M
18A	Susupe (North)	Saipan	AA	1.5	enterococci, D.O., orthophos-phate	2012 2004 2004	sanitary sewer overflows (115), urban runoff (177)		M
18B	Susupe (South)	Saipan	AA	3.1	enterococci, D.O., orthophos-phate	2004 2004 2005	sanitary sewer overflows (115), urban runoff (177)		M
19A	W. Takpochau (North)	Saipan	A	4.1	enterococci, D.O., biocriteria, orthophos-phate	1998 2004 2004 2004	sanitary sewer overflows (115), urban runoff (177), sedimentation (21), landfills (69), municipal point source (85)	Sadog Tasi WWTP outfall located within segment; Puerto Rico Dump also	H
19B	W. Takpochau (Central)	Saipan	AA	3.0	enterococci, mercury, D.O., biocriteria, orthophos-phate	1998 2010 2004 2004 2005	sanitary sewer overflows (115), urban runoff (177), sedimentation (21),		H
19C	W. Takpochau (South)	Saipan	AA	1.2	D.O., biocriteria, orthophos-phate	2004 2004 2004	sanitary sewer overflows (115), urban runoff (177), sedimentation (21),		M

Table II-g. cont'd: Category 5 - Coastal Waters Impaired by Pollutants (TMDL Required)

ID No.	SEGMENT NAME	ISLAND	SEG. CLASS	SIZE (miles)	CAUSE	CYCLE FIRST LISTED	SOURCE	COMMENTS	TMDL PRIORITY
20A	Achugao (North)	Saipan	AA	1.7	D.O., biocriteria, orthophos-phate	2006 2004	on-site treatment systems (92), sanitary sewer overflows (115), urban runoff (177), sedimentation (21), livestock grazing or feeding (143)		M
20B	Achugao (South)	Saipan	A, AA	1.2	enterococci, D.O., biocriteria, orthophos-phate	2004 2004 2006 2004	on-site treatment systems (92), sanitary sewer overflows (115), urban runoff (177), sedimentation (21), livestock grazing or feeding (143)		H
21	As Matuis	Saipan	AA	2.1	D.O., orthophos-phate	2004 2004	on-site treatment systems (92), sedimentation (21), livestock grazing or feeding (143)		L
23	Managaha	Saipan	AA	0.6	orthophos-phate	2004	on-site treatment systems (92)	Significant improvement noted since Package treatment plant installed in 2007	L
			TOTAL:	84.9					

II.B. LAKES AND PONDS

Table II-h. Category 1 - Lakes and Ponds Attaining All Designated Uses

ID No.	*SEGMENT NAME*	*ISLAND*	*SEGMENT CLASS*	*SIZE (acres)*	*COMMENTS*
25LAK	*Anatahan*	*Anatahan*	*1*	*149*	Fish tissue data not available. However, very remote, lack of anthropogenic sources of toxins
29LAK A	*Pagan*	*Pagan*	*1*	*34*	Fish tissue data not available. However, very remote, lack of anthropogenic sources of toxins
29LAK B	*Pagan*	*Pagan*	*1*	*27*	Fish tissue data not available. However, very remote, lack of anthropogenic sources of toxins

Table II-i. Category 5 - Lakes and Ponds Impaired by Pollutants (TMDL Required)

ID No.	SEGMENT NAME	ISLAND	SEGMENT CLASS	SIZE (acres)	CAUSE	CYCLE FIRST LISTED	SOURCE	COMMENTS	TMDL PRIORITY
18LAK	Susupe	Saipan	1	45.2	E. coli	2010	Unknown (140)	Lake Susupe	2018
18LAK	Susupe	Saipan	1	45.2	D.O.	2013	Urban runoff (177)	Lake Susupe	2018

II.C. WETLANDS

Table II-j. Category 1 - Wetlands Attaining All Designated Uses

ID No.	SEGMENT NAME	ISLAND	SEGMENT CLASS	SEGMENT SIZE (acres)	COMMENTS
11WET	Puntan Tahgong	Tinian	1	38.2	
14WET	Kagman	Saipan	1	5.1	
			TOTAL:	43.3	

Table II-k. Category 3 - Wetlands with Insufficient Data/Information to Determine Attainment of Designated Uses

ID No.	SEGMENT NAME	ISLAND	SEGMENT CLASS	SEGMENT SIZE (acres)	COMMENTS
9WET	Makpo	Tinian	1	28.4	
13WET	Talofofo	Saipan	1	2.6	
16WET	Dan Dan	Saipan	1	2.8	
17WET	Isley	Saipan	1	15.3	
			TOTAL	49.1	

Table II-l. Category 4c - Wetlands with Impairment, not Caused by a Pollutant (TMDL Not Required)

ID No.	SEGMENT NAME	ISLAND	SEGMENT CLASS	SIZE (acres)	CAUSE	CYCLE FIRST LISTED	COMMENTS
18WET	Susupe	Saipan	1	454.8			Alteration in Wetland Habitats (85), Non-Native Aquatic Plants (312), Other Flow Regime Alterations (319)
19WET	West Takpochau	Saipan	1	61.4			Alteration in Wetland Habitats (85), Non-Native Aquatic Plants (312), Other Flow Regime Alterations (319)
20WET	Achugao	Saipan	1	61.1			Alteration in Wetland Habitats (85), Non-Native Aquatic Plants (312), Other Flow Regime Alterations (319)
			TOTAL	577.3			

II.D. STREAMS

Table II-m. Category 1 - Streams Attaining All Designated Uses

ID No.	SEGMENT NAME	ISLAND	SEG. CLASS	SEGMENT SIZE (miles)	COMMENTS
25STR	Anatahan	Anatahan	1	unknown	Fish tissue data not available. However, very remote, lack of anthropogenic sources of toxins
26STR	Sarigan	Sarigan	1	unknown	Fish tissue data not available. However, very remote, lack of anthropogenic sources of toxins
27STR	Guguan	Guguan	1	unknown	Fish tissue data not available. However, very remote, lack of anthropogenic sources of toxins
28STR	Alamagan	Alamagan	1	unknown	Fish tissue data not available. However, very remote, lack of anthropogenic sources of toxins
29STR	Pagan	Pagan	1	unknown	Fish tissue data not available. However, very remote, lack of anthropogenic sources of toxins
30STR	Agrihan	Agrihan	1	unknown	Fish tissue data not available. However, very remote, lack of anthropogenic sources of toxins
31STR	Asuncion	Asuncion	1	unknown	Fish tissue data not available. However, very remote, lack of anthropogenic sources of toxins
32STR	Maug	Maug	1	unknown	Fish tissue data not available. However, very remote, lack of anthropogenic sources of toxins
33STR	Farallon De Pajaros	Farallon De Pajaros	1	unknown	Fish tissue data not available. However, very remote, lack of anthropogenic sources of toxins
			TOTAL:		

Table II-n. Category 2 - Streams Attaining some Designated Uses, insufficient data about remaining

ID No.	SEGMENT NAME	ISLAND	SEGMENT CLASS	SEGMENT SIZE (miles)	COMMENTS
2STR	Sabana/Talakaya/Palie	Rota	1	6.1	No available monitoring data of any type
12STR	Kalabera	Saipan	1	5.1	No available monitoring data of any type
13STR	Talofofo	Saipan	1	31.1	No available monitoring data of any type
14STR	Kagman	Saipan	1	8.3	No available monitoring data of any type
15STR	Lao Lao	Saipan	1	4.6	Insufficient data
18STR	Susupe	Saipan	1		No available monitoring data of any type
20STR	Achugao	Saipan	1	6.3	Limited biota data available indicating heavy metal contamination exists. More studies to follow
21STR	As Matuis	Saipan	1	0.5	No available monitoring data of any type
			TOTAL:		

Table II-o. Category 3 - Streams with Insufficient Data/Information to Determine Attainment of Designated Uses

ID No.	SEGMENT NAME	ISLAND	SEGMENT CLASS	SEGMENT SIZE (miles)	COMMENTS
17STR	Isley	Saipan	1	2.2	No available monitoring data of any type
			TOTAL:	2.2	

Table II-p. Category 4c - Streams with Impairment, not Caused by a Pollutant (TMDL Not Required)

ID No.	SEGMENT NAME	ISLAND	SEGMENT CLASS	SEGMENT SIZE (miles)	COMMENTS
19STR	W. Takpochau (Central)	Saipan	1	7.1	Nonnative species (313), Direct habitat alteration
			TOTAL:	7.1	

APPENDIX III: TMDL Priority Listing (303(d) List)

Table III-a. Category 5 - Waters (303(d)) High Priority List

TMDL No.	Seg. ID	Segment Name	Pollutant	Water Type	Year First Listed	Target TMDL Completion Date
HIGH PRIORITY:						
CN02-205	2	Sabana/Talakaya/Palie	D.O. (205)	COASTAL	2004	2019
CN02-215	2	Sabana/Talakaya/Palie	enterococci (215)	COASTAL	2004	2018
CN02-340	2	Sabana/Talakaya/Palie	PO4 (340)	COASTAL	2010	2018
CN03-205	3	Songsong	D.O. (205)	COASTAL	2004	2019
CN03-215	3	Songsong	enterococci (215)	COASTAL	2004	2018
CN03-448	3	Songsong	biocriteria (448)	COASTAL	2006	2018
CN03-340	3	Songsong	PO4 (340)	COASTAL	2010	2018
CN13-215	13	Talofofo	enterococci (215)	COASTAL	2004	2016
CN13-340	13	Talofofo	PO4 (340)	COASTAL	2004	2016
CN14-215	14	Kagman	enterococci (215)	COASTAL	2004	2016
CN14-340	14	Kagman	PO4 (340)	COASTAL	2004	2016
CN15-215	15	Lao Lao	enterococci (215)	COASTAL	2004	2016
CN15-448	15	Lao Lao	biocriteria (448)	COASTAL	2006	2016
CN15-340	15	Lao Lao	PO4 (340)	COASTAL	2004	2016
CN19A-215	19A	W. Takpochau (North)	enterococci (215)	COASTAL	1998	2016
CN19A-205	19A	W. Takpochau (North)	D.O. (205)	COASTAL	2004	2016
CN19A-448	19A	W. Takpochau (North)	biocriteria (448)	COASTAL	2004	2016
CN19A-340	19A	W. Takpochau (North)	PO4 (340)	COASTAL	2004	2016
CN19B-215	19B	W. Takpochau (Central)	enterococci (215)	COASTAL	1998	2016
CN19B-467	19B	W. Takpochau (Central)	mercury (467)	COASTAL	2010	2016
CN19B-205	19B	W. Takpochau (Central)	D.O. (205)	COASTAL	2004	2016
CN19B-448	19B	W. Takpochau (Central)	biocriteria (448)	COASTAL	2004	2016

Table III-a. cont'd. Category 5 - Waters (303(d)) High Priority List

TMDL No.	Seg. ID	Segment Name	Pollutant	Water Type	Year First Listed	Target TMDL Completion Date
HIGH PRIORITY:						
CN19B-340	19B	W. Takpochau (Central)	PO4 (340)	COASTAL	2005	2016
CN20B-215	20B	Achugao (South)	enterococci (215)	COASTAL	2004	2016
CN20B-205	20B	Achugao (South)	D.O. (205)	COASTAL	2004	2016
CN20B-448	20B	Achugao (South)	biocriteria (448)	COASTAL	2006	2016
CN20B-340	20B	Achugao (South)	PO4 (340)	COASTAL	2004	2016

Table III-b. Category 5 Waters - (303(d)) Medium Priority List

TMDL No.	Seg. ID	Segment Name	Pollutant	Water Type	Year First Listed	Target TMDL Completion Date
MEDIUM PRIORITY:						
CN09-215	9	Makpo	Enterococci (215)	COASTAL	2012	2018
CN09-205	9	Makpo	D.O. (205)	COASTAL	2010	2018
CN09-448	9	Makpo	biocriteria (448)	COASTAL	2006	2018
CN09-340	9	Makpo	PO4 (340)	COASTAL	2004	2018
CN17A-215	17A	Isley (West)	enterococci (215)	COASTAL	2008	2018
CN17A-340	17A	Isley (West)	PO4 (340)	COASTAL	2004	2018
CN17B-215	17B	Isley (East)	enterococci (215)	COASTAL	2004	2018
CN17B-340	17B	Isley (East)	PO4 (340)	COASTAL	2004	2018
CN17B-340	17B	Isley (East)	biocriteria (448)	COASTAL	2004	2018
CN18A-215	18A	Susupe (North)	Enterococci	COASTAL	2012	2018
CN18A-205	18A	Susupe (North)	D.O. (205)	COASTAL	2004	2018
CN18A-340	18A	Susupe (North)	PO4 (340)	COASTAL	2004	2018

Table III-b. cont'd. Category 5 - Waters (303(d)) Medium Priority List

TMDL No.	Seg. ID	Segment Name	Pollutant	Water Type	Year First Listed	Target TMDL Completion Date
MEDIUM PRIORITY:						
CN18B-215	18B	Susupe (South)	enterococci (215)	COASTAL	2004	2018
CN18B-205	18B	Susupe (South)	D.O. (205)	COASTAL	2004	2018
CN18B-340	18B	Susupe (South)	PO4 (340)	COASTAL	2005	2018
CN19C-205	19C	W. Takpochau (South)	D.O. (205)	COASTAL	2004	2018
CN19C-448	19C	W. Takpochau (South)	biocriteria (448)	COASTAL	2004	2018
CN19C-340	19C	W. Takpochau (South)	PO4 (340)	COASTAL	2004	2018
CN20A-205	20A	Achugao (North)	D.O. (205)	COASTAL	2004	2018
CN20A-215	20A	Achugao (North)	enterococci (215)	COASTAL	2006	2018
CN20A-448	20A	Achugao (North)	biocriteria (448)	COASTAL	2006	2018
CN20A-340	20A	Achugao (North)	PO4 (340)	COASTAL	2004	2018
CN18-217	18LAK	Susupe	E. coli (217)	LAKE	2010	2018
CN18-217	18LAK	Susupe	E. coli (217)	POTABLE WATER	2014	2018
CN18-217	18LAK	Susupe	D.O. (205)	LAKE	2014	2018

Table III-c. Category 5 - Waters (303(d)) Low Priority List

TMDL No.	Seg. ID	Segment Name	Pollutant	Water Type	Year First Listed	Target TMDL Completion Date
LOW PRIORITY:						
CN04-340	4	Uyulanhulo/Teteto	PO4 (340)	COASTAL	2004	2018
CN05-215	5	Chaliat/Talo	Enterococci (215)	COASTAL	2014	2019
CN05-448	5	Chaliat/Talo	biocriteria (448)	COASTAL	2006	2019
CN05-340	5	Chaliat/Talo	PO4 (340)	COASTAL	2004	2019
CN07-215	7	Masalok	Enterococci (215)	COASTAL	2014	2019
CN07-340	7	Masalok	PO4 (340)	COASTAL	2004	2019
CN10-215	10	Puntan Diaplolamanibot	Enterococci (215)	COASTAL	2004	2019
CN10-340	10	Puntan Diaplolamanibot	PO4 (340)	COASTAL	2004	2019
CN11-215	11	Puntan Tahgong	Enterococci (215)	COASTAL	2014	2019
CN11-448	11	Puntan Tahgong	biocriteria (448)	COASTAL	2004	2019
CN11-340	11	Puntan Tahgong	PO4 (340)	COASTAL	2006	2019
CN12-215	12	Kalabera	Enterococci	COASTAL	2012	2019
CN12-340	12	Kalabera	PO4 (340)	COASTAL	2004	2019
CN21-205	21	As Matuis	D.O. (205)	COASTAL	2004	2019
CN21-340	21	As Matuis	PO4 (340)	COASTAL	2004	2019
CN23-340	23	Managaha	PO4 (340)	COASTAL	2004	2019

APPENDIX IV: Selected Marine Monitoring Data Used in 2014 Listing Determinations, by Water Segment

IV.A. Microbiological Data

NOTES:

1. Contaminant: Enterococci
2. "% viol" means percent of samples which triggered DEQ Beach Advisories. DEQ Beach Advisories are triggered if a sample exceeds either the single sample maximum (SSM), or geometric mean in instances where sampling data exists for the four previous weeks.
3. "SSM" means Single Sample Maximum
4. "Geomean" means geometric mean of the most recent four (4) sampling events including the subject sampling event.
5. COLOR LEGEND: = impaired (>10-15); = severely impaired (>15); = No longer monitored, dangerous access

Table IV-a. TINIAN - Enterococci

Sample Station ID	Sampling Station Name	2004 Micro % viol	2005 Micro % viol	2006 Micro % viol	2007 Micro % viol	2008 Micro % viol	2009 Micro % viol	2010 Micro % viol	2011 Micro % viol	2012 Micro % viol	2013 Micro % viol	Segment Class
SEGMENT 7: MASALOK												
T1	Unai Masalok Beach	4	0	0	8	7	7	9	0	18	17	AA
T2	Unai Dangkolo	4	15	4	4	4	3	9	7	18	7	AA
SEGMENT 9: MAKPO												
T7	Tachogna Beach	8	4	4	0	4	0	0	11	11	10	AA
T8	Taga Beach	8	0	0	0	0	0	14	7	4	3	AA
T9	Harbor	4	19	7	0	7	0	0	4	0	17	A
T10	Kammer Beach	4	4	0	4	0	0	14	0	4	0	AA
SEGMENT 10: PUNTAN DIAPLOMANIBOT												
T5	Leprosarium I	4	4	0	12	7	7	10	4	11	21	AA
T6	Leprosarium II	0	12	0	15	4	7	20	7	4	7	AA
SEGMENT 11: PUNTAN TAHGONG												
T3	Unai Babui	4	15	7	4	18	7	0	4	11	3	AA
T4	Unai Chulu	4	19	0	0	7	0	0	7	14	3	AA

Table IV-b. ROTA - Enterococci

Sample Station ID	Sampling Station Name	2004 Micro % viol	2005 Micro % viol	2006 Micro % viol	2007 Micro % viol	2008 Micro % viol	2009 Micro % viol	2010 Micro % viol	2011 Micro % viol	2012 Micro % viol	2013 Micro % viol	Segment Class
SEGMENT 2: SABANA/TALAKAYA/PALIE												
R1	Coral Garden	8	4	0	5	17	19	26	0	NA	NA	AA
R2	Kokomo Beach Club	0	3	7	5	20	8	19	10	15	21	AA
SEGMENT 3: SONGSONG												
R3	Mobil Storm Drainage	0	10	0	0	7	12	19	5	19	50	A
R4	East Harbor Dock	4	4	0	0	0	5	4	0	7	21	A
R5	Tweksberry Beach	12	0	0	0	0	4	4	5	7	0	AA
R6	West Harbor Marina	12	10	0	0	7	12	0	14	15	29	A
R7	Dist #2 Storm Drain	42	17	4	14	27	12	4	4	19	43	AA
R8	Dist #1 Storm Drain	4	3	0	9	10	0	7	10	11	7	AA
SEGMENT 4: UYULANHULO/TETETO												
R9	Veterans Memorial	0	0	4	0	0	0	4	5	4	0	AA
R10	Teteto Beach	0	0	0	0	0	0	4	5	0	0	AA
R11	Guata Beach	19	14	4	5	0	0	4	14	7	0	AA
SEGMENT 5: CHAILIAT/TALO												
R12	Swimming Hole	19	7	7	0	0	0	0	9	7	29	AA

Table IV-c. SAIPAN - Enterococci

Sample Station ID	Sampling Station Name	2004 Micro % viol	2005 Micro % viol	2006 Micro % viol	2007 Micro % viol	2008 Micro % viol	2009 Micro % viol	2010 Micro % viol	2011 Micro % viol	2012 Micro % viol	2013 Micro % viol	Segment Class
SEGMENT 12: KALABERA												
NEB 02	Bird Island Beach	23	30	34	10	3	7	7	14	7	21	AA
SEGMENT 13: TALOFOFO												
NEB 03	Jeffrey's Beach	15	50	38	29	37	26	21	38	20	29	AA
NEB 07	Hidden Beach	38	30	31	24	30	22	18	24	13	50	AA
NEB 04	Old Man By the Sea	20	50	24	24	10	19	7	24	7	31	AA
SEGMENT 14: KAGMAN												
NEB 05	Marine Beach	15	15	3	14	13	11	11	0	10	29	AA
NEB 06	Tank Beach	23	5	3	19	10	4	7	10	3	13	AA
SEGMENT 15: LAO LAO												
SEB 02	North Laolao Beach	19	30	14	19	13	19	7	10	23	16	AA
SEB 03	South Laolao Beach	19	25	10	33	37	15	25	14	23	16	AA
SEGMENT 17A: ISLEY (WEST)												
SEB 06	Unai Dangkolo	46	35	14	33	13	37	43	19	37	16	AA
SEGMENT 17B: ISLEY (EAST)												
SEB 04	Obyan Beach	27	15	0	10	3	15	7	5	20	10	AA
SEB 05	Ladder Beach	12	20	10	5	0	7	21	33	17	10	AA

Table IV-c. SAIPAN - Enterococci Cont'd.

Sample Station ID	Sampling Station Name	2004 Micro % viol	2005 Micro % viol	2006 Micro % viol	2007 Micro % viol	2008 Micro % viol	2009 Micro % viol	2010 Micro % viol	2011 Micro % viol	2012 Micro % viol	2013 Micro % viol	Segment Class
	SEGMENT 18A: SUSUPE (NORTH)											
WB 25	San Jose Beach	6	2	6	9	0	8	8	12	2	0	AA
WB 26	Civic Center Beach	4	0	4	11	4	2	4	6	2	6	AA
WB 27	Diamond Hotel Beach	6	6	8	9	2	6	12	15	4	2	AA
WB 28	Grand Hotel	4	4	8	4	2	6	12	8	0	8	AA
WB 29	Community School Beach	8	8	8	6	2	4	8	2	0	10	AA
	SEGMENT 18B: SUSUPE (SOUTH)											
WB 30	Sugar Dock	52	14	19	19	66	37	19	29	21	29	AA
WB 31	CK Dist #2 Drainage	17	10	8	21	32	25	12	25	15	25	AA
WB 32	CK Dist #4 Lally Beach	10	6	6	6	6	6	8	19	11	12	AA
WB 33	Chalan Piao Beach	10	6	6	13	4	8	17	6	8	8	AA
WB 34	Hopwood School Beach	21	6	13	21	6	2	15	10	8	10	AA
WB 35	San Antonio Beach	19	6	6	0	4	6	8	6	4	6	AA
WB 36	PIC Beach	6	4	2	6	6	6	8	6	6	4	AA
WB 37	San Antonio Lift Stn.	33	6	4	13	22	10	12	10	6	4	AA

Table IV-c. SAIPAN - Enterococci Cont'd.

Sample Station ID	Sampling Station Name	2004 Micro % viol	2005 Micro % viol	2006 Micro % viol	2007 Micro % viol	2008 Micro % viol	2009 Micro % viol	2010 Micro % viol	2011 Micro % viol	2012 Micro % viol	2013 Micro % viol	Segment Class
SEGMENT 19A: WEST TAKPOCHAU (NORTH)												
WB 09	Sea Plane Ramp	0	4	2	15	0	0	0	2	2	2	A
WB 10	DPW Channel Bridge	33	67	77	66	86	79	75	88	69	67	A
WB 11.2	South Puerto Rico Dump	42	76	56	68	70	50	42	33	33	39	A
WB 12	Smiling Cove Marina	6	14	4	19	2	12	13	21	11	4	A
WB 12.1	American Memorial Park Drainage	25	39	29	32	40	50	27	48	20	21	A
WB 13	Outer Cove Marina	10	21	4	13	0	2	2	8	4	0	A
SEGMENT 19B: WEST TAKPOCHAU (CENTRAL)												
WB 14	Micro Beach	8	17	13	21	12	8	13	12	21	18	AA
WB 15	Hyatt Hotel	10	21	13	15	2	4	10	17	8	12	AA
WB 16	Dai-Ichi Hotel	17	25	17	17	0	8	12	4	6	8	AA
WB 17	Drainage #1 (Dai-ichi drainage)	54	37	31	36	20	10	25	17	8	12	AA
WB 18	Samoa Housing	17	17	12	15	8	2	2	12	8	10	AA
WB 19	Hafa-Adai Hotel	31	25	29	26	40	19	19	38	17	14	AA
WB 20	Drainage #2 (Hafa-Adai Hotel drainage)	33	31	38	32	46	17	25	29	13	24	AA
WB 21	Garapan Fishing Dock	56	35	33	36	50	63	56	69	55	31	AA
WB 22	Garapan Beach	21	17	12	23	6	10	21	31	17	16	AA
WB 23	Drainage #3 (Garapan Beach Drainage)	13	10	17	43	48	33	27	56	10	14	AA
SEGMENT 19C: WEST TAKPOCHAU (SOUTH)												
WB 24	Chalan Laulau Beach	17	4	6	6	2	4	0	6	2	6	AA

Table IV-c. SAIPAN - Enterococci Cont'd.

Sample Station ID	Sampling Station Name	2004 Micro % viol	2005 Micro % viol	2006 Micro % viol	2007 Micro % viol	2008 Micro % viol	2009 Micro % viol	2010 Micro % viol	2011 Micro % viol	2012 Micro % viol	2013 Micro % viol	Segment Class
	SEGMENT 20A: ACHUGAO (NORTH)											
WB 03	Nikko Hotel	21	8	6	19	4	6	0	10	8	8	AA
WB 04	San Roque School Beach	35	14	13	17	14	10	4	8	6	10	AA
WB 05	Plumeria Hotel	10	12	6	13	4	0	4	19	4	2	AA
WB 06	Aqua Resort Hotel	8	14	12	13	2	4	6	8	2	4	AA
	SEGMENT 20B: ACHUGAO (SOUTH)											
WB 07	Tanapag Meeting Hall	44	35	50	32	36	38	37	35	26	40	AA
WB 08	Central Repair Shop	33	35	35	34	34	56	23	38	39	37	A
	SEGMENT 21: AS MATUIS											
WB 01	Wing Beach	11	14	10	13	4	6	4	4	4	2	AA
WB 02	Pau-Pau Beach	25	6	6	15	2	10	0	0	4	10	AA
	SEGMENT 22: BANADERU											
NEB 01	Grotto Cave	27	10	0	5	0	4	7	0	3	10	AA

Table IV-c. SAIPAN - Enterococci Cont'd.

Sample Station ID	Sampling Station Name	2004 Micro % viol	2005 Micro % viol	2006 Micro % viol	2007 Micro % viol	2008 Micro % viol	2009 Micro % viol	2010 Micro % viol	2011 Micro % viol	2012 Micro % viol	2013 Micro % viol	Segment Class
SEGMENT 23: MANAGAHA												
MG 01	Dock	0	4	8	0	0	0	0	0	4	0	AA
MG 02	Swimming Area A	0	7	4	4	0	0	5	4	7	0	AA
MG 03	Swimming Area A	8	4	4	0	4	0	5	0	0	0	AA
MG 04	Swimming Area B	4	4	0	0	0	4	19*	0	15	0	AA
MG 05	Managaha Beach	4	4	0	0	0	0	5	4	11	0	AA
MG 06	Managaha Beach	8	0	4	4	0	0	5	7	7	3	AA
MG 07	Managaha Beach	0	4	7	0	0	7	5	4	4	0	AA
MG 08	Beach Near Statue	0	4	0	0	0	4	5	0	7	7	AA
MG 09	Managaha Beach	0	4	0	0	0	0	5	0	4	7	AA
MG 10	Managaha Beach	0	0	4	4	4	0	5	0	4	7	AA
MG 11	Next to Dock	15	4	4	0	4	0	10	0	7	3	AA

***Note: Only two of the 11 monitoring locations from Segment 23 had over 10% exceedance rate however, there is such a strong historical record of attainment for both enterococci and biocriteria that it was not placed on the impaired list.**

IV.B. Dissolved Oxygen Data

NOTES:

1. COLOR LEGEND: = impaired (>10-15%) ; = severely impaired (>15%); = No longer monitored, dangerous access

Table IV-d. ROTA - dissolved oxygen

Segment ID	Segment Name	Sampling Station ID	Sampling Station Name	2008 #D.O. Exceedence	2009 #D.O. Exceedence	2010 #D.O. Exceedence	2011 #D.O. Exceedence	2012 #D.O. Exceedence	2013 #D.O. Exceedence
2	Sabana/Talakaya/Palie	R1	Coral Garden	36*	19	0	0	NA	NA
2	Sabana/Talakaya/Palie	R2	Kokomo Beach Club	36*	20	0	0	0	0
3	Songsong	R3	Mobil Storm Drainage	0*	14	0	0	0	0
3	Songsong	R4	East Harbor Dock	0*	0	0	0	0	0
3	Songsong	R5	Teweksberry Beach	32*	24	0	0	0	0
3	Songsong	R6	West Harbor Marina	36*	14	0	0	0	0
3	Songsong	R7	Dist #2 Storm Drain	36*	19	0	0	0	0
3	Songsong	R8	Dist #1 Storm Drain	32*	19	0	0	0	0
4	Uyulanhulo/Teteto	R9	Veterans Memorial	32*	5	0	0	0	0
4	Uyulanhulo/Teteto	R10	Teteto Beach	36*	10	0	0	0	0
4	Uyulanhulo/Teteto	R11	Guata Beach	36*	10	0	0	0	0
5	Chaliat/Talo	R12	Swimming Hole	0*	0	0	0	0	0

*Note: 2008 Rota D.O. results are of suspect quality, potentially due to operator error, and are not used in impairment decisions.

Table IV-e. TINIAN - dissolved oxygen

Segment ID	Segment Name	Sampling Station ID	Sampling Station Name	2008 #D.O. Exceedence	2009 #D.O. Exceedence	2010 #D.O. Exceedence	2011 #D.O. Exceedence	2012 #D.O. Exceedence	2013 #D.O. Exceedence
7	Masalok	T1	Unai Masalok Beach	30*	0	0	0	0	7
7	Masalok	T2	Unai Dangkolo	30*	0	0	0	0	7
9	Makpo	T7	Tachogna Beach	30*	0	0	0	0	7
9	Makpo	T8	Taga Beach	33*	5	0	0	0	11
9	Makpo	T9	Harbor	33*	35	0	0	4	25
9	Makpo	T10	Kammer Beach	30*	0	0	0	0	4
10	Puntan Diaplomanibot	T5	Leprosarium I	30*	0	0	0	0	4
10	Puntan Diaplomanibot	T6	Leprosarium II	30*	0	0	0	0	7
11	Puntan Tahgong	T3	Unai Babui	30*	0	0	4	0	7

*Note: 2008 Tinian D.O. results are of suspect quality, potentially due to operator error, and are not used in impairment decisions

Table IV-f. SAIPAN - dissolved oxygen

Segment ID	Segment Name	Sampling Station ID	Sampling Station Name	2008 #D.O. Exceedence	2009 #D.O. Exceedence	2010 #D.O. Exceedence	2011 #D.O. Exceedence	2012 #D.O. Exceedence	2013 #D.O. Exceedence
12	Kalabera	NEB 02	Bird Island Beach	0	8	0	0	0	0
13	Talofofo	NEB 03	Jeffrey's Beach	0	4	0	0	0	0
13	Talofofo	NEB 07	Hidden Beach	0	4	0	0	0	0
13	Talofofo	NEB 04	Old Man By the Sea	0	4	0	0	0	0
14	Kagman	NEB 05	Marine Beach	0	0	0	0	0	0
14	Kagman	NEB 06	Tank Beach	0	0	0	0	0	0

Table IV-f. SAIPAN - dissolved oxygen cont'd.

Segment ID	Segment Name	Sampling Station ID	Sampling Station Name	2008 #D.O. Exceedence	2009 #D.O. Exceedence	2010 #D.O. Exceedence	2011 #D.O. Exceedence	2012 #D.O. Exceedence	2013 #D.O. Exceedence
15	Lao Lao	SEB 02	North Laolao Beach	7	0	0	0	0	0
15	Lao Lao	SEB 03	South Laolao Beach	0	4	0	0	3	0
17A	Isley (west)	SEB 06	Unai Dangkolo	0	0	0	0	0	0
17B	Isley (east)	SEB 04	Obyan Beach	0	0	0	0	0	0
17B	Isley (east)	SEB 05	Ladder Beach	0	0	0	0	0	0
18A	Susupe (North)	WB 25	San Jose Beach	7	15	10	19	13	8
18A	Susupe (North)	WB 26	Civic Center Beach	7	19	12	15	8	4
18A	Susupe (North)	WB 27	Diamond Hotel Beach	3	15	6	15	6	2
18A	Susupe (North)	WB 28	Grand Hotel	4	8	2	17	0	2
18A	Susupe (North)	WB 29	Community School Beach	4	13	4	13	2	0
18B	Susupe (South)	WB 30	Sugar Dock	7	15	4	13	15	2
18B	Susupe (South)	WB 31	CK Dist #2 Drainage	2	8	2	6	4	0
18B	Susupe (South)	WB 32	CK Dist #4 Lally Beach	2	8	4	4	0	0
18B	Susupe (South)	WB 33	Chalan Piao Beach	2	4	4	4	0	0
18B	Susupe (South)	WB 34	Hopwood School Beach	7	6	4	4	0	0
18B	Susupe (South)	WB 35	San Antonio Beach	4	8	5	6	0	0
18B	Susupe (South)	WB 36	PIC Beach	4	4	0	6	0	0
18B	Susupe (South)	WB 37	San Antonio Lift Stn.	4	6	0	10	0	0
19A	West Takpochau (North)	WB 09	Sea Plane Ramp	2	8	6	4	4	0
19A	West Takpochau (North)	WB 10	DPW Channel Bridge	4	8	6	6	10	0
19A	West Takpochau (North)	WB 11.2	South Puerto Rico Dump	8	18	12	10	14	10

Table IV-f. SAIPAN -dissolved oxygen cont'd.

Segment ID	Segment Name	Sampling Station ID	Sampling Station Name	2008 #D.O. Exceedence	2009 #D.O. Exceedence	2010 #D.O. Exceedence	2011 #D.O. Exceedence	2012 #D.O. Exceedence	2013 #D.O. Exceedence
19A	West Takpochau (North)	WB 12	Smiling Cove Marina	4	18	6	12	10	2
19A	West Takpochau (North)	WB 12.1	American Memorial Park Drainage	2	10	6	10	8	0
19A	West Takpochau (North)	WB 13	Outer Cove Marina	0	2	6	2	4	0
19B	West Takpochau (Central)	WB 14	Micro Beach	0	2	2	2	4	2
19B	West Takpochau (Central)	WB 15	Hyatt Hotel	2	6	2	2	4	0
19B	West Takpochau (Central)	WB 16	Dai-Ichi Hotel	0	6	2	0	4	0
19B	West Takpochau (Central)	WB 17	Drainage #1 (Dai-ichi drainage)	0	10	6	4	4	0
19B	West Takpochau (Central)	WB 18	Samoa Housing	2	4	4	6	4	0
19B	West Takpochau (Central)	WB 19	Hafa-Adai Hotel	11	19	15	29	30	21
19B	West Takpochau (Central)	WB 20	Drainage #2 (Hafa-Adai Hotel drainage)	9	13	19	29	31	19
19B	West Takpochau (Central)	WB 21	Garapan Fishing Dock	18	31	35	33	34	31
19B	West Takpochau (Central)	WB 22	Garapan Beach	11	29	17	19	28	25
19B	West Takpochau (Central)	WB 23	Drainage #3 (Garapan Beach Drainage)	13	21	12	25	21	17
19C	West Takpochau (South)	WB 24	Chalan Laulau Beach	13	33	27	33	34	35
20A	Achugao (North)	WB 03	Nikko Hotel	2	12	2	4	12	4
20A	Achugao (North)	WB 04	San Roque School Beach	2	6	8	4	10	2
20A	Achugao (North)	WB 05	Plumeria Hotel	10	8	6	2	6	0
20A	Achugao (North)	WB 06	Aqua Resort Hotel	2	6	4	4	8	0

Table IV-f. SAIPAN - dissolved oxygen cont'd.

Segment ID	Segment Name	Sampling Station ID	Sampling Station Name	2008 #D.O. Exceedence	2009 #D.O. Exceedence	2010 #D.O. Exceedence	2011 #D.O. Exceedence	2012 #D.O. Exceedence	2013 #D.O. Exceedence
20B	Achugao (South)	WB 07	Tanapag Meeting Hall	2	8	8	10	6	0
20B	Achugao (South)	WB 08	Central Repair Shop	4	16	13	21	19	16
21	As Matuis	WB 01	Wing Beach	0	2	0	0	0	0
21	As Matuis	WB 02	Pau-Pau Beach	6	18	10	10	10	8
22	Banaderu	NEB 01	Grotto Cave	0	8	0	0	0	0
23	Mangaha	MG 01	Dock	0	4	5	7	0	11
23	Mangaha	MG 02	Swimming Area A	0	4	0	0	0	4
23	Mangaha	MG 03	Swimming Area A	0	8	5	0	0	4
23	Mangaha	MG 04	Swimming Area B	0	0	0	0	0	4
23	Mangaha	MG 05	Managaha Beach	0	0	0	0	0	0
23	Mangaha	MG 06	Managaha Beach	0	0	0	4	0	0
23	Mangaha	MG 07	Managaha Beach	0	0	0	0	0	0
23	Mangaha	MG 08	Beach Near Statue	0	0	0	4	0	4
23	Mangaha	MG 09	Managaha Beach	0	0	0	0	0	0
23	Mangaha	MG 10	Managaha Beach	0	0	0	0	0	0
23	Mangaha	MG 11	Next to Dock	0	4	0	0	0	0

APPENDIX V: MMT Biological Monitoring

V.A. Laolao reef flat water quality violations.

This table presents the percentage of violations for select criteria. If a criteria was not violated it was not included in the table, n represents the number of times each criteria was sampled. Within the matrix the number of violation and the percentage of times violations occurred are during this study are presented.

Table V-a. LAOLAO REEF FLAT WATER QUALITY RESULTS

Laolao Reef Flat Water Quality Violations				
Enterococci (n=14)	Ammonia (n=12)	TSS (n=14)	Temperature (n=16)	Turbidity (n=16)
1 (7%)	1 (8%)	4 (29%)	9 (56%)	4 (25%)
2 (14%)	1 (8%)	7 (50%)	9 (56%)	7 (44%)
2 (7%)	2 (17%)	5 (36%)	7 (44%)	3 (19%)
0 (0%)	2 (17%)	3 (21%)	4 (25%)	0 (0%)
1 (7%)	3 (25%)	6 (43%)	8 (50%)	7 (44%)
2 (14%)	9 (75%)	10 (71%)	6 (38%)	7 (44%)

V.B. Biocriteria monitoring Results

NOTES:

1. "Poor" rankings flagged with a "[1]" are due to known water quality causes.
2. "Poor" rankings flagged with a "[2]" are due to non-water quality causes (low herbivory rates). Explanation: *Current analyses of CNMI's coral reef monitoring data show that widespread natural disturbance to most coral assemblages in the Commonwealth were evident from 2003 – 2005. During these year there were unusually high populations of Acanthaster planci (known as Crown-of-Thorn starfish), which prey upon corals. Since this time differential ecological recovery has become evident and forms the basis for our rankings, already described above. Here, we use footnotes to attribute cause for sites where a lack of recovery currently exists. Analyses confirm there are two main drivers of failed recovery, poor water quality and low herbivory rates. Poor water quality facilitates the growth of benthic substrates that are not conducive for normal coral reef recovery. Similarly, a lack of herbivory (low herbivorous fish abundances) has also been attributed to unfavorable benthic substrates, and is typically not related to water quality. While both local stressors can act synergistically, here we list the predominant cause of reduced coral reef resiliency for each site where recovery has yet to occur, and thus, waterbody impairment is noted.*

Table V-b. NEARSHORE CORAL REEFS, AGUIGAN

AGUIGAN								
Site No.	**Seg. No.**	**Segment Name**	**Benthic Substrate Ratio Trends**	**Coral Diversity Trends**	**2008 ALUS Rank**	**2010 ALUS Rank**	**2012 ALUS Rank**	**2014 ALUS Rank**
21	6	Aguigan	Significant decline from previous reporting period	No significant change during this reporting period	Good	Good	Not sampled during this reporting period	Fair

Table V-c. NEARSHORE CORAL REEFS, TINIAN

TINIAN								
Site No.	**Seg. No.**	**Segment Name**	**Benthic Substrate Ratio Trends**	**Coral Diversity Trends**	**2008 ALUS Rank**	**2010 ALUS Rank**	**2012 ALUS Rank**	**2014 ALUS Rank**
16	7	Masalok	No new data	No new data	Fair	Good	Good	Not sampled during this reporting period
17	9	Makpo	No significant change during this reporting period	No significant change during this reporting period	No ranking in previous reports	Fair	Poor[1]	Poor[1]
18	9	Makpo	No significant change during this reporting period	No significant change during this reporting period	Poor[1]	Poor[1]	Not sampled during this reporting period	Poor[1]
19	9	Puntan Diaplomani-bot	No significant change during this reporting period	No significant change during this reporting period	Fair	Fair	Not sampled during this reporting period	Fair
20	11	Puntan Tahgong	No new data	No new data	Poor[1]	Poor[1]	Poor[1]	Not sampled during this reporting period

Table V-d. NEARSHORE CORAL REEFS, ROTA:

ROTA								
Site No.	**Seg. No.**	**Segment Name**	**Benthic Substrate Ratio Trends**	**Coral Diversity Trends**	**2008 ALUS Rank**	**2010 ALUS Rank**	**2012 ALUS Rank**	**2014 ALUS Rank**
22	1	Dugi/ Gampapa/ Chenchon	Significant decline from disturbance years	Significant recovery from disturbance year	No ranking in previous reports	No ranking in previous reports	No ranking in previous reports	Fair
23	2	Sabana/ Talakaya/ Palie	Significant decline from disturbance years, no significant recovery	Significant decline from disturbance years, no significant recovery	Fair	Fair	Fair	Fair
24	2	Sabana/ Talakaya/ Palie	No significant change throughout	No significant change throughout	Fair	Fair	Fair	Fair
25	2	Sabana/ Talakaya/ Palie	No significant change throughout	No significant change throughout	Good	Good	Good	Good
26	3	Songsong	No significant change during this reporting period	No significant change during this reporting period	Fair	Fair	Good	Good
27	3	Songsong	No significant change during this reporting period	No significant change during this reporting period	Poor[1]	Poor[1]	Fair	Fair
28	3	Songsong	Significant recovery from disturbance year	No significant change throughout	No ranking in previous reports	Fair	Fair	Good
29	4	Uyulanhulo/ Teteto	Significant recovery from disturbance year	Significant recovery from disturbance year	No ranking in previous reports	No ranking in previous reports	No ranking in previous reports	Good
30	4	Uyulanhulo/ Teteto	No significant change during this reporting period	Significant decline from disturbance years	Fair	Fair	Good	Fair
31	5	Chaliat/ Talo	Significant decline from disturbance years	No significant change during this reporting period	No ranking in previous reports	No ranking in previous reports	No ranking in previous reports	Poor[1]

Table V-e. NEAR SHORE CORAL REEFS, SAIPAN

SAIPAN								
Site No.	**Seg. No.**	**Segment Name**	**Benthic Substrate Ratio Trends**	**Coral Diversity Trends**	**2008 ALUS Rank**	**2010 ALUS Rank**	**2012 ALUS Rank**	**2014 ALUS Rank**
1	12	Kalabera	Significant decline from previous reporting period	No significant change during this reporting period	Fair	Fair	Good	Fair
2	14	Kagman	No significant change during this reporting period	No significant change during this reporting period	No ranking in previous reports	No ranking in previous reports	No ranking in previous reports	Good
3	15	Laolao	Significant decline from disturbance years, no recovery	Significant decline from disturbance years, no recovery	Fair	Fair	Fair	Fair
4	15	Laolao	Significant decline from disturbance years, no recovery	Significant decline from disturbance years, no recovery	Poor[1,2]	Poor[1,2]	Poor[1,2]	Poor[1,2]
7	17a	Isley (west)	No new data	No new data	Fair	Poor[1,2]	Fair	Not sampled during this reporting period
5	17b	Isley (east)	No significant change during this reporting period	No significant change during this reporting period	Fair	Fair	Good	Good
6	17b	Isley (east)	No significant change during this reporting period	No significant change during this reporting period	Good	Poor[2]	Poor[2]	Poor[2]
8	18a	Susupe (north)	No significant change during this reporting period	No significant change during this reporting period	No ranking in previous reports	Good	Good	Good
9	19b	West Takpochau	No new data	No new data	No ranking in previous reports	Poor[1]	Fair	Not sampled during this reporting period
11	19b	West Takpochau	Significant recovery from disturbance year	No significant change during this reporting period	No ranking in previous reports	No ranking in previous reports	No ranking in previous reports	Good
15	21	As Matuis	No significant change during this reporting period	Continuous significant recovery from disturbance year		Good	Good	Good
12	23	Managaha	No significant change during this reporting period	No significant change during this reporting period	Good	Good	Good	Good
13	23	Managaha	No new data	No new data	No ranking in previous reports	Good	Good	Not sampled during this reporting period

Table V-f. NEARSHORE SEAGRASS ASSEMBLAGES:

SAIPAN							
Site No.	**Seg. No.**	**Segment Name**	**Description of Benthic Categories**	**2008 ALUS Rank**	**2010 ALUS Rank**	**2012 ALUS Rank**	**2014 ALUS Rank**
53	18a	Susupe (north)	Natural seasonal changes apparent, standing crop of algae and seagrass statistically similar	No ranking in previous reports	Fair	Fair	Fair
55	18b	Susupe (south)	Seagrass abundance significantly greater than algae	No ranking in previous reports	No ranking in previous reports	No ranking in previous reports	Fair
56	18b	Susupe (south)	Natural seasonal changes apparent, standing crop of algae and seagrass statistically similar	Good	Not sampled during this reporting period	Not sampled during this reporting period	Fair
57	18b	Susupe (south)	Natural seasonal changes apparent, standing crop of algae and seagrass statistically similar	Good	Not sampled during this reporting period	Good	Fair
46	19c	West Takpochau (south)	No new data	Poor[1]	Poor[1]	Poor[1]	Not sampled during this reporting period
49	19c	West Takpochau (south)	Seagrass abundance significantly less than algae	Good	Good	Not sampled during this reporting period	Poor[1]
36	20a	Achugao (north)	Natural seasonal changes apparent, standing crop of macro and seagrass statistically similar	Poor[1]	Fair	Good	Good
37	20a	Achugao (north)	Natural seasonal changes apparent, standing crop of algae and seagrass statistically similar	No ranking in previous reports	No ranking in previous reports	No ranking in previous reports	Fair
38	20a	Achugao (north)	Natural seasonal changes apparent, standing crop of algae and seagrass statistically similar	Poor[1]	Not sampled during this reporting period	Poor[1]	Fair
39	20a	Achugao (north)	Natural seasonal changes apparent, standing crop of algae and seagrass statistically similar	No ranking in previous reports	No ranking in previous reports	No ranking in previous reports	Fair
41	20b	Achugo (south)	No new data	Poor[1]	Poor[1]	Poor[1]	Not sampled during this reporting period
34	21	As Matuis	Seagrass abundance significantly less than algae	Good	Not sampled during this reporting period	Good	Poor[1]

APPENDIX VI: Lake Susupe (Segment 18LAK) Water Quality Monitoring Data

COLOR LEGEND: = impaired; = severely impaired

Table VI-a. Lake Susupe Bacteriological Data

Fiscal Year	Number of Samples	Number of Violations	Percent Violations (%)
2010	20	2	10
2011	19	3	16
2012	19	1	5
2013	16	3	19

Table VI-b. Lake Susupe DO Data

Fiscal Year	Number of Samples	Number DO <75%	Percent (%)
2010	20	11	55
2011	18	12	67
2012	18	15	83
2013	16	8	50