FINAL

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

Wing Beach, Saipan

Division of Environmental Quality
(revised) November, 2010

Editor: Brian Bearden

Authors: Brian Bearden, Peter Houk, Clarissa Bearden, Derek Chambers, Maximino Simian

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ACKNOWLEDGEMENTS

The 2010 Integrated 305(b) and 303(d) Water Quality Assessment Report was prepared by a number of staff of the CNMI Division of Environmental Quality, all credited on the cover page, as well as Dr. Peter Houk of the Pacific Marine Resources Institute, who wrote the sections covering the CNMI's biological monitoring program and biocriteria assessment. Surface water quality monitoring data was compiled by Mrs. Clarissa T. Bearden, DEQ Environmental Surveillance Laboratory Program Manager. CAPT Derek Chambers, PE, MPH, U.S. Public Health Service, prepared all sections covering groundwater quality. Maximino Simian compiled much of the information concerning LAST and LUST programs, and provided overall review and editing of the report. Yubert Alepuyo prepared all the maps, and Ken Cochrane fine-tuned them and created the metadata and GIS layers for the new water body atlas.

The preparers of this report would also like to thank Ms. Edna Buchan, who prepared the 2010 American Samoa Integrated Report, for her assistance and also provision of her draft report and data tables, all of which influenced the formatting and content of the CNMI Report and were of tremendous assistance.

Additionally, significant portions of this report borrow formatting and assessment methodology language from the Maine 2008 Integrated Report.

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A. EXECUTIVE SUMMARY

The Commonwealth of the Mariana Islands (CNMI) Division of Environmental Quality (DEQ) has a responsibility to monitor, assess, and protect water quality within the CNMI. This responsibility is defined by both U.S. federal and Commonwealth legislation and regulation.

This report has been prepared to satisfy the listing requirements of Section 303(d) and the reporting requirements of Section 305(b) and 314 of the Clean Water Act. Similar reports are prepared every two years, and summarize the results of the previous two fiscal years monitoring data. This 2010 report, for example, is based on monitoring data collected during fiscal years 2008 and 2009, or October 1, 2007 through September 30, 2009. It also compares results to data published in previous reports by the CNMI. This report is the principal means by which the CNMI DEQ, Congress, and the public evaluate whether Commonwealth waters are meeting water quality standards, 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 water quality standards 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 availability as potable water supplies in the case of fresh waters.

For the 2010 reporting cycle, DEQ has made significant changes in the way it assesses the state of the Commonwealth Waters. Primarily, the changes serve to organize the data into larger and better defined water body "segments", rather than assessing each individual monitoring station. This has resulted in the preparation of a new CNMI Water Resources Atlas, which is summarized in the following section and presented in full in Appendix I. Coastal water quality is now assessed and reported in terms of segments of shoreline, where each segment may contain multiple individual monitoring stations. For example, the island of Saipan is now comprised of 17 coastal segments, whereas in previous reports, 62 individual water quality monitoring sites and 27 individual biological monitoring sites were assessed and reported. For the first time, this report also includes the ten northern CNMI islands, as well as streams, wetlands, and lakes, although the CNMI has yet to institute an organized, regularly scheduled monitoring program for these classes of waters.

The 2010 reporting cycle has also witnessed significant improvements in water quality, particularly in Saipan. Five of Saipan's seventeen coastal segments, for a total of 12.2 miles, have been removed from the "impaired" list for recreational use (microbiological violations), and four segments totaling 13.6 miles have been removed from the aquatic life support impairment list due to improvements in water quality and biological indicator data. A combination of reduced population and on-going repairs and improvements to the sewage collection system are suspected to be among the causes of this observed improvement in water quality.

Despite this good news, 84.9 miles of Commonwealth coastline, or 36% overall, remains impaired for various reasons. This includes impairment of 30.2 miles, or 61%, of Saipan's shoreline for recreation use due to microbiological contamination (as measured by the presence

of the indicator bacteria enterococci). These areas of contamination include many of the Commonwealth's most commercially valuable tourist beaches, as well as those beaches most frequently used by residents. Tinian and Rota are not spared from the effects of land-based pollution, either, with several of their primary recreation and tourism beaches also remaining listed as impaired for this 2010 reporting cycle. Moreover, new, unpublished data collected by the University of Guam has revealed the presence of mercury in fish tissues recovered from the Garapan area of Saipan, at levels that may be of concern to public health. Much work lies ahead for the CNMI in addressing these problems and improving the quality of waters for residents and visitors alike.

This is also the first report prepared by the CNMI to comment significantly on the quality of the ground water. Groundwater is the primary source of potable water in the CNMI. In general, the quality of the groundwater used by the public water systems in the CNMI meets EPA primary drinking water standards. However, salt water intrusion is a significant groundwater quality issue on Saipan. Although there are isolated incidents of groundwater contamination from underground/aboveground storage tanks or small manufacturing or repair shops, the threat of contaminants entering public water supplies is minimized due to the large amount of production wells producing relatively low flows spread out over the island's land surface.

B. BACKGROUND

B.1. Scope of Waters in the Integrated Report

The Commonwealth of the Northern Mariana Islands (CNMI) consists of two geologically distinct island chains located at 145º E, between 14º – 21º N (Figure 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.

This report contains primarily information from the three southern islands of Saipan, Tinian, and Rota, where the vast majority of the population live (Table B-1). The 2010 report for the first time also includes an assessment of water quality in the Northern Islands, although this assessment is based on considerably less data than is available for the southern islands.

Saipan is the capital of CNMI, and the largest and most inhabited of the islands. Threats to water quality are greatest in Saipan, where DEQ operations are based, resulting in more resources being dedicated to understanding impaired waters. Rota and Tinian based DEQ staff monitor surface water quality on 8 week intervals, and ensure that public water systems are tested for contaminants on a quarterly basis. The 10 northernmost islands, commonly referred to as the Northern Islands, are not routinely monitored by DEQ and are only occasionally inhabited by a handful of individuals on three islands – Agrihan, Pagan, and Alamagan.

The CNMI Water Quality Standards defines two classes (AA and A) of marine water uses and two classes (1 and 2) of fresh surface water uses. All fresh surface water bodies in the CNMI (wetlands, intermittent streams, and perennial streams) are Class 1, meaning that these waters should remain in their natural state with an absolute minimum of pollution from any human-caused source. There are no Class 2 fresh surface waters. On Saipan there is 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. On Rota there are several streams, no lakes, and no wetlands. On Tinian there are wetlands, no lakes, and no streams. Some of these resources are used for drinking water and recreation. The raised limestone bedrock of the Southern Mariana Islands is extremely permeable, resulting in the percolation of most rainfall that does not directly run off to the ocean. Streams mostly occur in the limited areas where the 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 comprise less than 5% of the land, and are patchily distributed around Saipan and Tinian Island. The majority of these fresh water bodies are not tested by the DEQ

Lab on a regular basis due to their low abundance and use. Wetlands can be found on the islands of Saipan, Tinian, Rota, and Pagan, however they cover less than 2% of the CNMI at the present time (based on current CNMI GIS layers).

The majority of the coastal marine waters are Class AA, meaning that these waters should remain in their natural pristine state as nearly 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 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 of a limited body contact nature. On the islands of Tinian and Rota, Class A waters are limited to the existing harbors. Two areas of Class A waters exist on Saipan, including an area around the commercial seaport (Table B-2), and an area centered on the outfall for the Agingan Point municipal wastewater treatment plant.

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	69,221[1]
Total Miles of Streams	73.4[2]
Miles of Ocean Coast	235.3
Acres of Lakes	45.2[3]
Acres of Wetlands	681.0

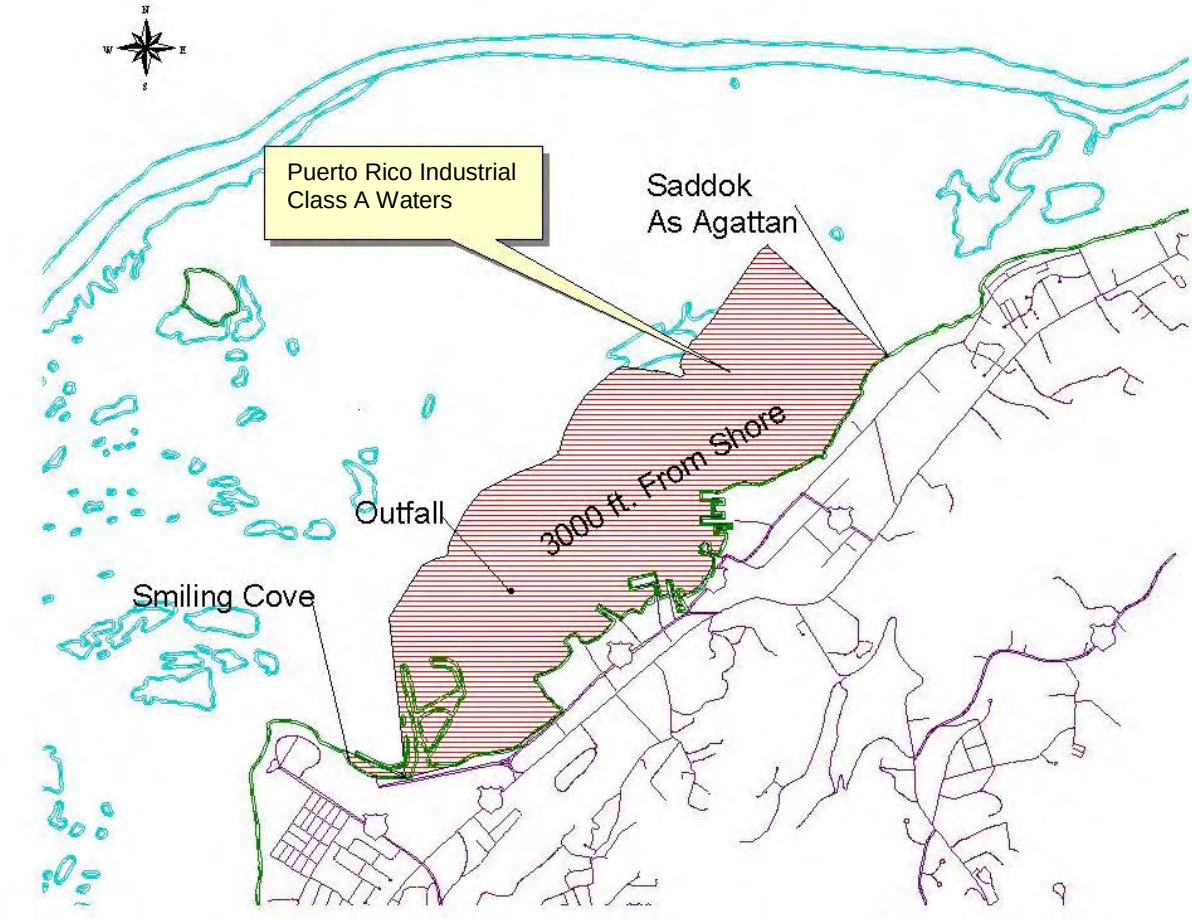
[1] From 2000 Census
[2] Stream length does not include Northern Islands streams, based on current GIS layers
[3] Does not include Northern Islands lakes, based on current GIS layers. 3 lakes are known to exist in the Northern Islands: two on Pagan, and one on Anatahan.

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, Dissolve Oxygen, and other water quality criteria will also affect coral reef environments (Valiela, 1995). At any particular time, water quality measurements 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 properly assess a region, project, or 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.

Table B-2. Class A Marine Waters in CNMI

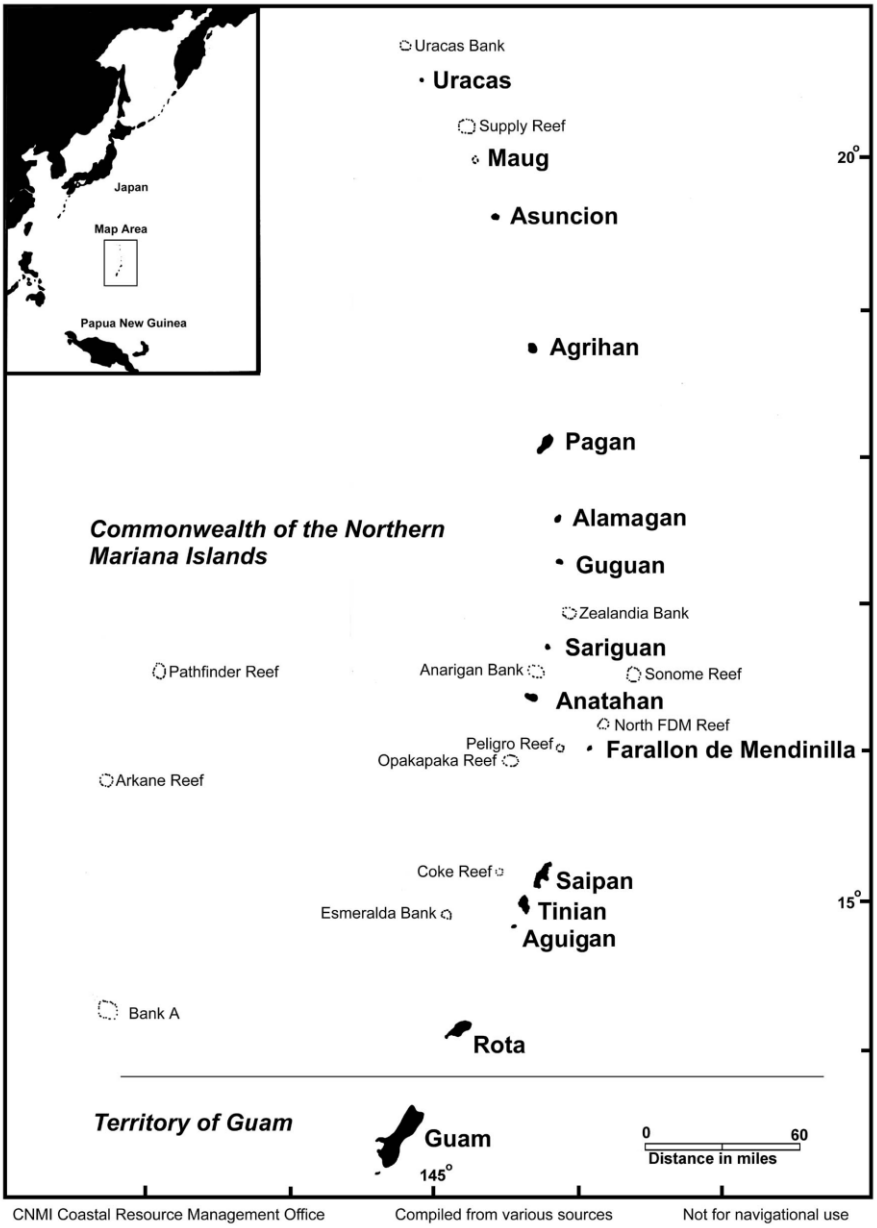
Water Body	Reason for Class A designation
Puerto Rico Industrial, Saipan	Commercial port and municipal waste outfall
Agingan Point, Saipan	Municipal waste outfall
East Harbor, Rota	Commercial port
West Harbor, Rota	Commercial port
San Jose Harbor, Tinian	Commercial port

Figure B-1. Class A Marine Waters of Tanapag Harbor, Saipan



Both point and non-point source pollution are responsible for lowering the quality of the CNMI's surface waters. Sewage outfalls, failed sewer collection facilities, sedimentation from unpaved roads and development, urban runoff, livestock grazing, and agriculture are the most significant stressors to surface and marine water quality.

Figure B-2. The Marianas Islands



B.2. Water Pollution Control Program

B.2.1. DEQ Wastewater and Erosion Control Program

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The DEQ Wastewater and Erosion Control Program administers several programs aimed at controlling water pollution:

Earthmoving and Erosion Control Permitting Program

The 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 CNMI regulatory agencies, including DEQ, the CNMI Division of Fish and Wildlife, the CNMI Historic Preservation Office, and the CNMI Coastal Resources Management Office.

The DEQ permit review program assures compliance with the DEQ Earthmoving and Erosion Control Regulations, which is the primary mechanism by which erosion and sedimentation from new construction sites is regulated within the CNMI, as well as post-construction stormwater quantity and quality. The E&EC Regulations date 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 best management practice design. Additional material was added in 2009 with the addition of a field manual and training program aimed at construction field staff and erosion control inspectors. The improvements have so far proven a success, and are in the process of being adopted by both American Samoa and the Republic of Palau at the time of this report (2010).

Individual Wastewater Disposal Systems Program

The CNMI Wastewater Treatment and Disposal Regulations require permits for all new septic systems and small "other" wastewater treatment systems in the CNMI. DEQ administers 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 these regulations 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,

which both re-use treated effluent for golf course irrigation, and the leachate treatment system operated at the Marpi Solid Waste Landfill Facility, among others. The WTD regulations also cover certain types of animal feed operations and sets limitations and prohibitions on grazing near streams and other CNMI waters. 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 Environmental Protection Agency (USEPA) through the National Pollutant Discharge Elimination System (NPDES) program.

In 2009 CNMI published amendments to the regulations which added a certification program for percolation testers, and adopted certification requirements for wastewater treatment and collection system operators, which enabled CNMI to administer standard, nationalized exams and issue operator certifications that are fully transferrable to other states.

Land Disposal of Wastewater Program

Part 11 of the CNMI Water Quality Standards 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.

Section 401 Water Quality Certification Program

The CNMI administers a CWA Section 401 Water Quality Certification Program through provisions contained within the CNMI Water Quality Standards. Section 401 certification by the CNMI is required for every federal permit which may result in a discharge of pollutants to waters of the CNMI. This has included NPDES permits for Saipan's municipal separate storm sewer system, the municipal (Commonwealth Utility Corporation) wastewater treatment plants on Saipan, the package treatment plant on Managaha Islands, as well as EPA General NPDES Permits such as the General Permit for Discharges from Construction Sites Larger than 1 Acre. Section 401 certification is also required for any activity requiring a Department of the Army Section 404 permit for discharge of fill, and for some activities regulated by the DA under Section 10 of the Rivers and Harbors Act.

B.2.2. DEQ Nonpoint Source Pollution Control Program

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The DEQ Nonpoint Source (NPS) Pollution Control Program administers several programs aimed at reducing the impact of nonpoint source pollution on waters of the CNMI. The NPS

Program administers the CWA Section 319 NPS Grant program, which pays for much of the program and in the past has funded numerous projects including the CNMI/Guam Stormwater Management Manual, and is presently funding an on-going inventory and inspection of septic systems throughout Saipan. The NPS Program also administers U.S. Coral Reef Initiative-funded programs aimed at reducing impacts from land-based pollutants, and jointly operates the CNMI Marine Monitoring Team, which monitors the health and condition of the CNMI's coral reefs and nearshore aquatic ecosystems, providing much of the data upon which this report is based. The NPS program also performs watershed management and restoration activities, numerous education and outreach events and publications, and provides geographical information (GIS) support for all branches of DEQ.

B3. Special State Concerns and Recommendations

As in previous years, the most common sources of water quality degradation remain stormwater from existing roads and development, and failing wastewater infrastructure. 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. Water quality improvements observed on Saipan's western beaches may partially be attributable to these improvements. DEQ hopes to utilize the water quality data presented in this report to help focus CUC's efforts on a handful of severely degraded beach sites, such as the Sugar Dock area, San Antonio Lift Station, and DPW Bridge that appear to be impaired primarily due to sewer problems.

Water quality problems caused by stormwater runoff from Saipan's existing developed areas, however, are more difficult to address. DEQ has made significant strides in the regulation of new development through its One-Stop permitting program and new design standards. But the problem of how to address runoff from older development, and in particular the road systems and unpaved coral roads, remains difficult to address and requires attention. DEQ is approaching this problem in two ways: education, as in the upcoming ARRA-funded training aimed at educating island road crews on better grading techniques, and assistance in planning larger improvements such as regional sedimentation basins and other best management practices. Convincing the public, the business community, and the political leadership of the value of dedicating land to such best management practices has been the primary obstacle, aside from funding, in implementing major improvements.

The discovery of mercury at elevated levels in fish tissues collected near Garapan has focused attention on the lack of a program within DEQ to both monitor for such contamination, and to advise the public when such contamination is found. Combined with the loss of DEQ's Marine Biologist in early 2009, this has highlighted the need for DEQ to retain a dedicated professional to be placed in overall charge of the development and implementation of the various water quality monitoring programs. The development and implementation of a Probabilistic Monitoring Program over the next two years will begin to address the problem of missing water quality data, however, the sustainability of such a program, and more importantly, the utilization

and interpretation of the data collected will depend entirely on the capability and availability of DEQ's professional staff.

Semi-annual ground water monitoring, especially for nitrate and salinity indicators, has been required by DEQ for years, but 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 Program

The CNMI DEQ maintains monitoring programs for surface water quality (limited to coastal waters and one lake at the present time), marine ecosystem health, and drinking water quality. A description of the surface water monitoring and biological monitoring programs follows. The drinking water monitoring program is described in the section of this report covering groundwater quality.

C1.1 Surface Water Quality Monitoring Programs

The goal of the DEQ Lab Surface Water Quality Monitoring Program is to assess CNMI's water bodies for compliance with recreational uses and aquatic life uses.

On a weekly basis, DEQ monitors 38 fixed stations along Saipan's most used west coast beaches for microbiological and chemical parameters. Six beaches on the Northeast coast and six beaches on the Southeast coast are monitored on an 8-week rotational basis, and monthly during the non 8-week cycle, primarily because a smaller population uses these waters. Eleven sites around Managaha Island, a small island located within the Saipan Lagoon, are also monitored on an 8-week rotational basis, and monthly during the non 8-week cycle.

Tinian and Rota monitor ten and twelve beach areas respectively. Many of these sites are frequently used by the community so they are now being monitored at similar intervals described above for Managaha Island. All monitoring sites are shown in the maps reproduced in Appendix I.

The microbiological and chemical parameters that the Division of Environmental Surveillance Laboratory currently monitors include: Salinity (‰), Dissolved Oxygen (% D.O.), Temperature (°C), pH, Turbidity (NTU), and Enterococci bacteria (cfu/100ml). These parameters are monitored on a weekly basis for Saipan West Beaches, and at other intervals as described above for other locations. The nutrients Orthophosphate (PO4) and Nitrate (NO3) have not been monitored in over six years because of known accuracy problems with the previous spectrophotometer method for marine waters, and unacceptable quality control samples. DEQ has been operating a Flow Injection Analyzer since 2007 to obtain nitrate data for drinking water samples, and plans to begin monitoring marine water using this instrument in the future, as resources allow.

The DEQ Environmental Surveillance Laboratory maintains a Quality Assurance Manual which includes Standard Operating Procedures (SOPs) for sampling, testing, reporting, and providing quality assurance for traditional water quality parameters. The laboratory quality assurance plan 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 a known precision and accuracy.

C1.2 Biological Monitoring Program

Monitoring programs that assess water body health using only water quality data may not be (statistically) sufficient to detect change over time due to low sample sizes compared with the high rates of change in pertinent water quality criteria. One obvious way to enhance the precision and accuracy of water quality data collection 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, nearshore 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 described herein.

The CNMI interagency marine monitoring team (MMT) was initially established in 1997 to help understand the current conditions of jurisdictional coral reef assemblages. It has expanded over the past 13 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 as human population grows and development continues, and to provide pertinent data to trigger management action. DEQ plays a major role in the MMT through its marine biologist, non-point source pollution program, and laboratory program. 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) nearshore coral reef monitoring. Currently, narrative language about biological criteria exists in CNMI's water quality standards:

> *"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."*

DEQ standards further protect successful annual coral reproduction events by requiring certain permitted dredge and fill activities to stop work during a *"period not to exceed 3 weeks centered around the largest, annual coral spawning month (typically June or July)".*

Saipan Lagoon *Halodule uninervis* assemblages were initially evaluated by calculating a ratio of seagrass to turf/macroalgae coverage based upon replicated benthic assessment transects during each year (CNMI's 2008 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. Since the 2008 report, Houk and Camacho (in press) have 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 temperature in the fall/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 outcompeting 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 2008-2009 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 2008-2009.
- "Fair" – Natural seasonal changes are apparent, existing assemblage has statistically similar abundances of *H. uninervis* and macroalgae based upon average of estimates between 2008-2009.
- "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), which are favorable attributes for sustainable coral assemblages, to turf/macroalgae, 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 in press). A second metric of the coral assemblages was simultaneously considered: coral species richness per unit area, which is supported by Houk and van Woesik (in press) who showed significant affinities between species richness and watershed population and development in the Southern Mariana Islands. In CNMI's 2008 report, benthic assemblage ratio's and coral richness estimates were compared to global mean values to come up with a final ALUS evaluation status.

For the 2010 report, the knowledge-base presented above is utilized in conjunction with recent analyses of the 10 years 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. (2007) report recovery from similar large-scale impacts to be evident within 5 years in Palau, agreeing with yet unpublished data from numerous of the 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 2008-2009 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 2008 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 2008 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 2008 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/if appropriate.

C1.3 Other Data Used

In addition to the monitoring data provided by the DEQ laboratory and the CNMI Marine Monitoring team, data from two other sources was used in the 2010 assessment. Fish tissue contaminant data collected by Dr. Gary Denton of the University of Guam, Water and Environment Research Institute (UOG-WERI) was used in making fish consumption determinations, and biological monitoring reports summarizing findings for the remote, volcanic northern island prepared by Dr. Peter Houk (Pacific Marine Resources Institute) and the NOAA Coral Reef Ecosystem Division (NOAA-CRED).

UOG-WERI Fish Tissue Contaminant Data:

UOG-WERI has cooperated with DEQ and other CNMI agencies since 2000 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. Data summarized in a 2008 report (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. The use of these bivalves as an edible species is unlikely.

More recent, unpublished data on levels of contaminants found in more commonly consumed fish species has revealed levels of mercury that exceed US EPA limits for unrestricted fish consumption. The contamination appears to be limited to the Garapan-Micro Beach area (coastal water segment 19B – W. Takpochau (Central)). This unpublished data is the basis for listing segment 19B as impaired for fish consumption. Additional, unpublished data by UOG-WERI for storm drain sediments suggests that a possible source of this mercury contamination is the former site of Commonwealth Health Center's (CHC's) medical waste incinerator, which despite removal, is still used for medical waste processing (via autoclave) and storage. Other sources of mercury are likely, but have not been found so far through sediment sampling conducted by UOG-WERI in the urban Garapan, Micro Beach, and Saipan Lagoon area.

Northern Islands Biological Surveys:

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, and lasted approximately 30 days each. Generally, the data summaries to date show that fish populations in 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 NMI; 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 in the northern islands to be considered fully supportive of aquatic life criteria.

C2. Assessment Methodology

C2.1 Designated Uses and CNMI Water Quality Standards

The Clean Water Act affirms the right of all Americans to waters that are, in common short-hand terminology, "fishable and swimmable". This commonly used, paraphrased term describes what the CWA calls "designated uses". Although the language of the CNMI Standards differs somewhat from the terminology used in the Clean Water Act, the basic designated uses guaranteed under the CWA are provided for, with the notable exception of fish consumption. This is an oversight in the CNMI Water Quality Standards, and will be corrected in the next triennial review cycle (currently scheduled for 2010). However, this oversight does not eliminate fish consumption as a designated use, because it is still protected under the CWA, and the basic water quality criteria meant to protect this use are provided in full in the CNMI Standards.

For the purpose of this report, in the interest of both simplicity and maintaining consistency with other states' listings, the more standard CWA terminology is used. Table C-1 compares the CNMI's designated uses to the use categories assessed in this report.

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

Of note is the lack of specific numeric biological criteria or "biocriteria" in the CNMI water quality standards. Until numeric biocriteria are developed, the methods described in Section C1.2 of this report concerning the CNMI's biological monitoring program will be used to determine compliance with the narrative criteria listed in Part 7 of the Standards.

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"	

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 < 35 ‹ 104 Single Sample	GM <125 < 276 Single Sample	GM < 33 < 61 Single Sample	GM < 90 < 108 Single Sample
E. coli (CFU/100 ml)			GM < 126 < 235 Single Sample	GM < 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 PO_4 (mg/L)	< 0.025	< 0.05	< 0.10	< 0.10
Total Phosphate PO_4 (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.

C2.2 Water Body Segmentation - Watershed Approach

Previous CNMI Integrated 305(b) and 303(d) Assessments have reported on every individual monitoring station as if it represented an individual, unique water body. For the 2010 report, CNMI has adopted a watershed approach. Water quality is now assessed and reported in terms of water body segments based on established, named CNMI 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 pollutant sources. Aguigan and each of the northern islands are assigned only one watershed. Appendix I contains detailed maps showing all assigned watersheds and water body segments used in this report.

C2.3 USEPA's CALM Assessment Categories

The Consolidated Assessment and Listing Methodology (CALM) categories for the 2010 report 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 Clean Water Act (USEPA 2005). Each water body type has been assigned a CALM category, based on the following descriptions.

Table C-3. 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 WQSs, but is expected to not meet WQSs by the next listing cycle)

The methodology used in determining whether or not a water body is impaired or fully attaining is discussed in more detail according to water body type. Assignment of a CALM Category for each water body is then applied as follows:

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 CNMI 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.

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 indicates 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).

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 the reasonable potential that of 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 has occurred only in water bodies where either current or previous land uses include potential sources of contaminants. Therefore, most CNMI water bodies that 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.

Category 4:

Impaired or threatened for one or more designated uses, but does not require development of a TMDL.

A water body is listed in 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. Waters are listed in one of the following Category 4 sub-lists when:

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).

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

4-B: 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, regulatory orders or contracts for hazardous waste remediation projects).

4-C: 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.

Category 5:

Waters impaired or threatened for one or more designated uses by a pollutant(s) and a TMDL is required.

Waters are listed in 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.

"Attainment" and "Impairment" are determined as follows, organized by water body type:

C2.4 Assessment Criteria – Coastal Waters

Attainment of designated uses for coastal waters is determined on the basis of available data from the CNMI Surface Water monitoring program and biological monitoring programs, in addition to other data as indicated in Table C-4, where available. For the 2010 reporting cycle, the data assessed was collected during fiscal years (FY) 2008 and 2009,or between October 1, 2007, and September 30, 2009.

The designated use "Aesthetic Enjoyment/Others" includes one use for which CNMI has not determined an assessment methodology: oceanographic research. For the 2010 listing, it is assumed that all waters are attaining this use, in the absence of any data or other information indicating that this use is impaired. It is also assumed, on the basis of professional judgment, that all CNMI waters are presently attaining the "aesthetic enjoyment" designated use.

The findings of mercury contamination in fish tissue within Saipan's West Takpochau (Central) water body segment (segment 19B), based on unpublished University of Guam-WERI research in that general area, has raised the possibility that fish tissue contamination may exist in other

waterbodies. Water body segment 19B has been listed as Category 5 - not attaining the fish consumption use on the basis of this unpublished data. Fish tissue monitoring has not been conducted in any other water bodies within the CNMI, and thus, certain other waterbodies are listed as Category 3 – lack of available data - for fish consumption. However, there are many water bodies within the CNMI where such contamination is very unlikely, e.g., the northern islands and certain remote and less-developed watersheds of the inhabited islands. These water bodies therefore remain listed as Category 1, in accordance with the categorization rationale explained in Section C2.3

The largest dataset available for use in assessing coastal water quality is the enterococci bacteria monitoring data. Enterococci sampling is conducted on a weekly basis for all western Saipan beaches, which constitute by far the most used recreational beaches in the CNMI, and on an 8-week rotational basis and monthly during the non 8-week cycle for all other Saipan beaches (including Managaha Island) and the islands of Tinian and Rota. This data is used to generate weekly beach advisories as follows: an advisory is issued when either the single-sample maximum is exceeded, or the geometric mean in instances where at least four weekly sample results are available.

In using the enterococci data for assessment of recreational use attainment, DEQ has elected to take a conservative approach by counting all beach advisories issued, including advisories triggered by both geometric mean and single sample exceedences. Although a case could be made for the use of only the geometric mean data for assessment of use attainment, DEQ believes that the issuance of public beach advisories better represents the true measure of whether or not recreational uses are being attained, particularly in areas such as Tinian, Rota, Managaha, and some of Saipan's eastern beaches where weekly data does not exist, and the single-sample maximum must be used to gage the suitability of water quality for safe recreation.

Using the new watershed-based waterbody segments, an entire segment is listed as impaired for recreational use if beach advisories are issued for more than 10% of all sampling events in a given year, for any single monitoring site within the segment.

Table C-4. 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 • 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 that 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 Uses	• General provisions met: floating/settleable solids, pH, radioactive substances

C2.5 Assessment Criteria – Fresh Surface waters (Streams and Lakes/Ponds)

Currently there is no monitoring program and no monitoring data available for streams within the CNMI. All streams in the southern CNMI Islands (Rota, Tinian, Aguigan, and Saipan) are being listed as CALM Category 3 – Insufficient Data. Streams in the Northern Islands are not mapped and are not assessed. Only one lake is monitored on a regular basis (Lake Susupe, water body segment ID 18). A handful of lakes exist in the Northern Islands which have not been mapped and are not assessed.

Attainment of designated uses for fresh surface waters is determined on the basis of available data from the CNMI Surface Water monitoring program and biological monitoring programs, in addition to other data as indicated in Table C-5, where available.

Table C-5. 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
Fish consumption	• Fish tissue data that 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, Others	• General provisions met: floating/settleable solids, pH, radioactive substances

C3. Assessment Results

On the basis of available data and professional judgment, using the methodology described in the previous sections, the CNMI's waters were assessed and categorized as shown in Table C-6. A total of 10 years of monitoring data was reviewed in the preparation of the 2010 assessment, including monitoring data from the previous two fiscal years (Oct. 1, 2007 through Sept. 30, 2009), as well as assessment results and data from the previous Integrated Reports prepared in years 2002, 2004, 2006, and 2008. The following subsections contain more detailed analyses of the assessment results by water type, pollutant cause, and source, as well as some discussion of the 2010 findings.

Additionally, this section lists a number of waters which the CNMI is removing from the previous list of impaired waters. These de-listed waters are discussed in more detail in the following sections, along with the suspected reasons for the observed improvements in water quality.

Table C-6. Size of Surface Waters Assigned to Reporting Categories, 2010 Assessment Results

Water body Type	Category							Total in State	Total Assessed
	1	2	3	4a	4b	4c	5		
River/stream miles			73.4					73.4	0.0
Lake/pond acres							45.2	45.2	45.2
Ocean coast miles	123.5		26.9				84.9	235.3	208.4
Wetland acres	43.3		49.1			577.3		681.0	631.9

C3.1 TMDL Development Status

Based on the 2010 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. One TMDL was initiated in 1999, but never completed, for a portion of what is now called the W. Takpochau (Central) coastal water body segment (19B), for bacterial contamination only. The TMDL was canceled shortly after it was initiated due to plans to install a major stormwater treatment best management practice (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 project only, because the original land designated for the BMP has become unavailable.

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 orthophosphate (suspected data quality issues – see section 3.3.1) - few or unknown sources of pollutants

All High priority TMDLs are to be completed in 2013, all Medium priority TMDLs in 2016, and all Low priority TMDLs in 2019.

C3.2 Removal of Waters from the 303(d) List

The 2010 Report marks the first instance where CNMI has proposed to remove waters previously listed as impaired from its 303(d) listing. Many of the proposed de-listings are because of documented water quality improvements. Of particular note is the 12.2 miles of Saipan's coastal waters which are being de-listed due to enterococci contamination. This is a significant improvement, as it represents 25% of Saipan's overall coastline, and includes some of Saipan's most valuable recreational and economic resources, including Managaha Island, Bird Island Beach, the Grotto, Pau Pau Beach, Wing Beach, and portions of southern Garapan. Improvements to water quality were also noted on several other beaches on western Saipan, although not to the degree for which they can be de-listed yet. The reasons for this observed improvement appear to be a combination of factors including declining population and on-going improvements to the sewer collection system. The installation of a new package sewage treatment plant on Managaha Island in 2007 is responsible for its delisting, and the delisting of the Banaderu watershed is most likely due to the improvements made to the Grotto parking lot and restroom in 2006, serving one of Saipan's most popular dive attractions.

Improvements in enterococci data were also observed for the islands of Tinian and Rota. The reasons for this improvement are not known, however it is worth noting that the Tinian and Rota water body segments that are being removed from the 303(d) list had been previously listed for brief periods of exceedences recorded several years previously, and that water quality in these segments was consistently better both before and after the period of exceedences. In other

words, these may be less a case of "improvement" than a case of a return to normal, after a brief period of degradation. As an example, within Tinian's Makpo water body (segment #9), which includes both Tinian's commercial harbor and its densest population center (San Jose), the only monitoring location meeting the criteria for non-attainment was the harbor site (sampling station T10), and then only once during the ten year time frame covered by this report, during fiscal year 2005. Water quality within the harbor, both before and after this period, has consistently met all applicable criteria.

The remaining de-listings are due to increased temporal data from bioassessment monitoring programs. At the time of previous rankings the program only had 1-2 years of data, enough for an assessment but not enough to understand ecological trends, or to attribute cause to the ecological trends. Our current assessment benefits from updated datasets (4 to 5 years depending on the specific sampling location). Naturally, each monitoring station and water body is unique to some extent and comparing rates of change, rather than absolute values, provides a better assessment of ecological health. All monitoring stations were subjected to major natural disturbances at the time of the previous reporting. These included: 1) climate induced coral bleaching, and 2) outbreak of coral eating seastar populations (*Acanthaster planci*). Since then, our data serve as a basis to understand differential recovery and examine what amount of the statistical variance is accounted for by localized stressors; notably water quality and herbivory. Using this as the basis for the present report, the terminology used for biocriteria ALUS rankings have been revised to "good/fair/poor", and our summaries include better (statistical) explanations of the rankings. Only an ALUS ranking of "poor" will warrant listing a water body as impaired.

De-listing decisions are made using the following criteria (adopted from that used by American Samoa):

C3.2.1 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 water quality standards.

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-7 lists all water body segment/pollutant combinations which are being delisted as a result of the 2010 assessment, along with the rationale for each delisting, using USEPA's terminology.

Table C-7. Segment/Pollutant Combinations Removed from CNMI's Previous Section 303(d) Lists

Segment/ Pollutant Combination On Previous CNMI Section 303(d) List[1]					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**	**Seg-ment size**	**Year first listed**	Reason No.	Comments
DELISTINGS FOR ENTEROCOCCI:						
4	Uluyanhulo/ Teteto	enterococci (215)	3.5	2008	11	Incorrectly listed, not impaired
5	Chaliat/Talo	enterococci (215)	2.6	2006	13	Improved water quality, cause unknown
7	Masalok	enterococci (215)	3.5	2006	13	Improved water quality, cause unknown
9	Makpo	enterococci (215)	4.5	2006	13	Improved water quality, cause unknown
10	Puntan Diaplolamanibot	enterococci (215)	9.9	2006	13	Improved water quality, cause unknown
12	Kalabera	enterococci (215)	3.7	2006	13	Improved water quality, perhaps due to closure of farm above Bird Island Lagoon
19C	W. Takpochau (South)	enterococci (215)	1.2	2004	13	Improved water quality, perhaps due to sewer system improvements and reduction in population
21	As Matuis	enterococci (215)	2.1	2004	13	Improved water quality, cause unknown
22	Banaderu	enterococci (215)	4.6	2008	8	Improvements to Grotto parking lot stormwater system and restroom holding tank
23	Managaha	enterococci (215)	0.6	2004	8	Installation of new sewage treatment package plant
TOTAL MILES REMOVED:			***36.2***			

[1] Some listings were inadvertently left out of the 2008 report, but had appeared in previous reports, and thus remained listed despite not appearing in the 2008 report.

Table C-7 Cont'd: 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**	**Seg-ment size**	**Year first listed**	Reason No.	Comments
DELISTINGS FOR BIOCRITERIA:						
2	Sabana/ Talakaya/Palie	biocriteria (448)	7.3	2006	11,8	Incorrectly listed, not impaired. Slight recovery observed, possibly due to DEQ-led revegetation projects (on-going, 2006-present) (Note – segment remains listed for other pollutants including enterococci, D.O., and orthophosphate.)
4	Uluyanhulo/ Teteto	biocriteria (448)	3.5	2004	11	Incorrectly listed, not impaired. Initial ranking due to insufficient data, extensive trend data now available clearly supporting attainment.
7	Masalok	biocriteria (448)	3.5	2008	13	Initial surveys conducted during major natural disturbance years (crown-of-thorns starfish predation), trend data clearly shows significant recovery.
10	Puntan Diaplolamanibot	biocriteria (448)	9.9	2004	11	Initial ranking due to insufficient data, extensive trend data now available clearly supporting attainment.
12	Kalabera	biocriteria (448)	3.7	2008	8	Initial surveys conducted during major natural disturbance years (crown-of-thorns starfish predation), additionally, herbivorous fish populations have increased due to establishment and enforcement of marine protected area. Trend data clearly shows significant recovery.
14	Kagman	biocriteria (448)	5.2	2004	11	Initial ranking due to insufficient data, extensive trend data now available clearly supporting attainment.
17A	Isley (West)	biocriteria (448)	1.6	2008	4	Observed impairment not caused by a pollutant (low herbivory rates)

Table C-7 Cont'd: 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**	**Seg-ment size**	**Year first listed**	Reason No.	Comments
DELISTINGS FOR BIOCRITERIA (continued):						
18B	Susupe (South)	biocriteria (448)	3.1	2004	13	Recovery observed, reason not known.
		TOTAL MILES REMOVED:	***37.8***			
DELISTINGS FOR DISSOLVED OXYGEN (D.O.):						
23	Managaha	D.O. (205)	0.6	2004	8	Installation of new sewage treatment package plant

C3.3 Coastal Water Quality

At the present time, coastal waters receive by far the greatest attention from the CNMI's water quality monitoring programs. A great deal of monitoring data exists for coastal waters, and CNMI DEQ therefore places high confidence in its assessment results, with the exception of nutrient data, as discussed below.

Summary tables below list the overall findings of the 2010 assessment. Narrative summaries of the results of the 2010 assessment follow the summary tables. Detailed water quality monitoring results for individual monitoring stations are included for certain pollutants in Appendix IV of this report.

Table C-8. Ocean coasts - 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)
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	208.4	153.3	51.8	26.9
Aesthetic enjoyment/other uses	235.3	235.3	235.3	0.0	0.0

Table C-9. 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	51.8
Dissolved Oxygen	205	37.6
Bio-indicators of nutrient enrichment	448	34.7
Mercury in fish tissue	467	3.0

Table C-10. Size of Coastal Waters Impaired by Sources

Source Category	EPA Source ID	Size of Waters Impaired (miles)
Upland Erosion/Sedimentation	21	36.1
Unknown Source	140	31.3
On-site treatment systems	92	28.8
Urban Runoff/Storm Sewers	177	28.2
Livestock (grazing or feeding operation)	143	16.9
Sanitary Sewer Overflows	115	15.8
Unspecified non-point source	141	10.8
Municipal Point Sources	85	5.7
Landfills	69	4.1

C3.3.1: Surface Water Quality monitoring Results

Enterococci

The core parameter for assessing attainment of recreational uses is enterococci monitoring results. DEQ has a high level of confidence in the quality of its enterococci monitoring data. For the purposes of assessing attainment or impairment, DEQ uses this data in terms of total beach advisories issued. Two levels of criteria have been established for enterococci monitoring by USEPA, and adopted by DEQ: The single sample maximum, and the geometric mean. DEQ uses both to determine issuance of beach advisories as follows: An exceedence of either the single-sample maximum or the geometric mean for the most recent four sampling events, including the current results, triggers a public notice that the beach waters within 300 feet of the sampling point are not safe for swimming. If more than 10% of the sampling events at any single sampling site within a water body segment result in a beach advisory, the entire water body segment is listed as impaired for recreational use in this report. The results for enterococci monitoring are provided in Appendix IV.1.

For the 2010 assessment, significant improvement in water quality results for enterococci was observed at several locations throughout the CNMI, particularly in Saipan, where 6 coastal water segments were removed from the impaired water bodies list, or "de-listed". These water bodies are listed and discussed in more detail under Section C3.2 above. This trend in water quality improvement was also noted at several other beach areas on Saipan, but did not result in additional de-listings because of one or two sites within those water bodies which either did not improve, or did not improve to the extent that the water body could be removed from the "impaired" listing. For example, nearly all of the southern Saipan Lagoon beaches met recreational attainment criteria with the exception of the areas immediately surrounding Sugar Dock, the major storm drain just south of Sugar Dock, and the sewer lift station (A-16) just south of the Pacific Islands Club, which prevented the removal of these segments from the "impaired" list. An important portion of the Garapan beaches fronting the Hyatt and Fiesta resorts also met recreational attainment criteria, but could not be de-listed because of nearby areas which continue to suffer from water quality degradation. These degraded areas most often surround major storm drains and continue to be used by the public as recreational areas contiguous with the cleaner adjacent areas, thus preventing the segments from being classified on the wholeas full attainment areas.

Portions of eastern Saipan continue to show consistent non-attainment for recreational enterococci criteria. This includes all the beaches to which the eastern stream systems of the Talofofo and neighboring watersheds drain to. Qualitative watershed surveys indicate that this degradation is being caused almost solely by uncontrolled livestock grazing within the watersheds. Marine beach in Kagman and the Lao Lao Bay beaches continue to remain degraded, and Obyan beach has also recorded enough enterococci exceedences to earn a listing as "impaired" for recreation uses, though the source is not known.

Tinian's beaches remain remarkably free of bacterial contamination, with the exception of Unai Babui (known also as Invasion Beach), which is isolated from nearly any development and for which DEQ cannot identify any obvious source of contamination. Improvements in enterococci data earned three "de-listings" for Tinian. The reasons for these observed improvements are not known, however it is worth noting that the water body segments that are being de-listed had been previously listed for brief periods of exceedences recorded several years previously, and that water quality in these segments was consistently better both before and after the period of exceedences. In other words, these may be less a case of "improvement" than a case of a return to normal, after a brief period of degradation. As an example, within Tinian's Makpo water body (segment #9), which includes both Tinian's commercial harbor and its densest population center (San Jose), only the harbor site (sampling station T10) met the criteria for non-attainment, and then for only one year (fiscal year 2005) during the ten year time frame covered by this report. With that one year time period as the only exception, water quality within the harbor, both before and after this period, has been consistently good.

On Rota, the remaining enterococci problems are primarily centered on the densely developed and un-sewered Songsong peninsula, although limited to the commercial port and areas surrounding major storm drainage outfalls. However, an alarming trend toward degradation has been noted at Coral Garden, near one of Rota's premier dive attractions. This may be caused by recent development and unpaved roads above the beach area. One water body segment, the Chaliat/Talo segment (#4), which contains the popular "Rota Swimming Hole", had been listed for enterococci exceedences recorded in 2004, and has since improved dramatically, with no exceedences at all since 2006. Though no explanation is currently available, the data certainly supports this water body being de-listed for this reporting cycle.

Dissolved Oxygen

DEQ measures dissolved oxygen (D.O.) in-situ with a portable meter. The accuracy of the portable meter depends on a number of factors, including calibration of the instrument and the methods used by the sample taker in obtaining the measurement. Some of the data collected by DEQ staff on the islands of Rota and Tinian in FY2008 appears to be invalid due to errors in one or both of these factors, and were not used in the 2010 assessment. DEQ is currently reviewing the methods used by sample takers in making measurements and calibrating the instruments, and has implemented changes in both the DEQ laboratory's quality assurance procedures and personnel training.

Nutrients (Orthophosphate and Nitrate)

Orthophosphate (PO4) was last monitored in 2004 and found to exceed CNMI water quality standards in all waters which were assessed. However, DEQ notes that its nutrient standards were simply adopted from another state, and may not represent natural conditions for the CNMI's waters. Some of the data collected in the past was from sites which have no known

anthropogenic sources of orthophosphate, and could be considered to be "reference" conditions. That fact that orthophosphate concentrations found at these sites exceeded the water quality criteria makes the criteria somewhat suspect. Moreover, the method used at the time is known to have accuracy problems when used for marine water.

The CNMI DEQ has acquired a new instrument which will provide much more accurate nutrient data, and has been using the instrument since 2007 for drinking water monitoring. Depending on the availability of resources, DEQ plans to hire an additional laboratory assistant to enable the use of this instrument for marine quality monitoring. After 2 years of marine water nutrient monitoring data has been collected, DEQ plans to re-assess its water quality criteria.

For the 2010 reporting cycle, however, CNMI is continuing to list waters which were previously listed as "impaired" for orthophosphate exceedences in the 2004 reporting cycle.

pH and Other Parameters

Data were also assessed for other parameters including pH, salinity, and temperature. These data were within the allowable range set by the criteria, and showed little variation over the past five years. Thus, no water body segments were listed on the basis of exceedences of these parameters.

C3.3.2 Biological Monitoring Results

Detailed biological monitoring results are contained in Appendix IV.3. Generally, the aquatic life use support (ALUS) rankings based upon the contemporary and previous (2008) seagrass assemblage rankings indicate that "health" is lowest for the central, western part of Saipan where watersheds are largest and human population/urbanization is greatest. Improvements are noted moving both north and south of Garapan, the central town of Saipan. The only changes in ALUS rankings based upon metrics of seagrass assemblages were in the northern Saipan Lagoon (site 48, Figure I-5), where improving conditions may be an artifact of increased data availability upon which rankings were made. Here, and 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, in press). However, abundances of macroalgae and seagrass were statistically undifferentiated, resulting in a "fair" ranking for the northern lagoon (water bodies 20 and 21, Figure I-4). In the southern lagoon our 2008 reporting highlighted improving conditions in comparison with previous years (2002 and 2004). The current trends agree, and indicate "fair" rankings based upon new data for two locations in these water bodies (sites 39 and 40, Figure I-5). This is encouraging and if positive trends continue we aim to request a de-listing of these waters from our 303(d) list for aquatic life support in 2012.

However, the remaining data available for the current analyses indicate "poor" water body health associated with the large, populated watersheds in central-western Saipan. Runoff that passes through these watersheds drains into the lagoon during storm events, carrying associated

pollutants. Watershed management plans associated with inter-agency efforts have highlighted these regions in their 1-5 year plans, in a prioritized manner.

Twenty-two coral reef surveys were conducted for water body evaluation during 2008-2009 (Appendix IV.3). Generally, "fair" and "good" rankings were noted for sites situated some distance away from large, populated watersheds. For instance, all sites on the outer barrier reef of Saipan have consistently high rankings. Similarly, most sites on the less populated islands of Tinian, Aguijan, and Rota also show ecologically resilient assemblages, with notable maintenance or improvement in coral metrics since the 2003-2006 natural disturbance event (i.e., coral eating starfish predation) described above.

Other notable findings include a decline in coral metrics at two of Saipan's southern coral reefs (sites 4 and 5, Figure I-5) The lack of any indication of recovery from the starfish predation is currently being examined for significance with water quality and herbivory data. Both low water quality and herbivory are known to reduce the ability of coral reef assemblages to recover following disturbance (Hughes et al. 2007). The yet unpublished data analyses suggest low herbivory is the major driver of reduced recovery for these two sites.

For the remaining sites the current data yielded the same rankings as in previous reports (Appendix IV.3). A final trend for Laolao Bay is discussed considering it is the focus of a major American Recovery and Reinvestment Act (ARRA) funded rehabilitation project. During all years benthic and coral data show lower rankings for the southern portion of the bay (site 2) compared with the northern (site 1) (Figure I-5). While water quality data show impairment for both portions, the reduced resiliency noted in southern Laolao may be attributed to the greater volume of stream discharge (i.e., more watersheds associated with this portion of the bay) and/or moderate sea urchin and herbivorous fish densities compared with the majority of other monitoring sites. Favorably, it is this section of Laolao Bay that will receive the bulk of watershed improvement best-management practice installations over the next 2 years.

It is the continued goal of DEQ to utilize coral and seagrass trend data in the future 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.

C3.4 Rivers/Streams Water Quality

Streams are not presently monitored as part of the CNMI Surface Water Quality Monitoring Program. Thus, for the 2010 reporting cycle, all streams are listed as CALM Category 3.

Table C-11. Rivers/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	0.0			73.4
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	0.0			73.4

C3.5 Lake/pond Water Quality

There are only four lakes in the CNMI. The only lake which is monitored and discussed in this report isLake Susupe on Saipan. Numerous small areas of open water exist within wetland areas of Saipan and Tinian, but are not considered lakes or ponds. 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 Antahan, the hazard to safety and life caused by the ongoing volcanic activity.

Lake Susupe on Saipan is subject to regular water quality monitoring for enterococci, E. coli, and general water quality parameters. On the basis of frequent microbiological exceedences, Lake Susupe is listed as impaired.

“Lake Hagoi” on Tinian is not considered a lake, but rather a small open water segment of the Hagoi wetland, which is used in the CNMI’s draft wetland hydrogeomorphic (HGM) assessment program as the “reference” wetland. “Lake Hagoi” was initially listed and evaluated as a lake in the draft version of this report (July, 2010), however, after reviewing all available references, it was removed from consideration as a lake, and returned to the wetland category only, to be consistent with previous reports and evaluations.

Table C-12. Lake/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	45.2	45.2			45.2
Fish/shellfish consumption	45.2	45.2			45.2
Recreation with risk of water ingestion	45.2	45.2	0.0	45.2	0.0
Domestic water supplies & food processing	45.2	45.2	0.0	45.2	0.0
Groundwater recharge	45.2	45.2			45.2
Aesthetic enjoyment	45.2	45.2			45.2

C4. Wetlands Program

Wetlands are found on the islands of Saipan, Tinian, Rota, and Pagan, however they cover less than 2% of the CNMI at the present time (based on current CNMI GIS layers). The CNMI's "National Wetland Inventory" document (Prepared by US Fish and Wildlife, 1989, CRM Office) states that wetlands comprise a total land area of approximately 600 acres. The "Commonwealth of the Northern Mariana Islands Wetlands Conservation Plan" states that only 36% of the original wetland acreage still exists (CRM Office). 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.

The CNMI Water Quality Standards defines wetlands as waters of the Commonwealth and 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 antidegradation policy implementation rules. The narrative states simply 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 antidegradation 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.

Table C-13. Freshwater Wetland Designated Use Support Summary

Designated Use	Size of Surface Waters				
	Total in State	Total Assessed	Supporting – Attaining WQ Standards	Not Supporting- Not Attaining WQ Standards	Insufficient Data and Information
CLASS 1 WATERS (All CNMI Fresh Waters)					
Support and propagation of aquatic and terrestrial life	681.0	620.6	43.3	577.3	49.1

The CNMI currently performs no regular monitoring of wetlands and maintains no regularly scheduled assessment program. Implementation of the water quality standards for wetlands is currently limited to permitting provisions as through the Section 401 water quality certification program, and enforcement of the antidegradation policy implementation requirements as described above.

Although no current monitoring data exists, previous efforts have resulted in limited assessment of individual wetlands. The assessment work done for the development of the CNMI Hydrogeomorphic ("HGM") Functional Assessment manual, which was halted in 2001 due to lack of continued funding, included full HGM functional assessments of eight major wetlands on Saipan, and one on Tinian (Hagoi). DEQ considers these assessments to be of high quality and to still be valid representations of conditions during this reporting period (2008-2009).

The HGM assessment method was developed for use with the CWA Section 404 permitting program, and evaluates wetlands against a "reference" wetland within the region which has had very little impact from development or pollution. For the CNMI, the reference wetland chosen was the "Hagoi" wetland in northern Tinian. All other wetlands are compared to the reference wetland and assigned a score, from 0 to 1.0, with a value of 1.0 reflecting a pristine condition equivalent to that of the reference wetland. Comparisons are made in each of following four functional categories: (1) maintenance of characteristic hydrologic regime ("Hydro" in the table); (2) maintenance of characteristic biological and chemical processes ("BioChem"); (3) maintenance of characteristic plant community ("Veg"); and (4) maintenance of characteristic wildlife habitat ("Wild").

No overall assessment of a wetland's attainment of CWA designated uses is provided for in the HGM assessment method. Its use in determining "impairment" for purposes of 303(d) listing is therefore open to considerable interpretation – not all causes of impairment, as gauged by HGM assessment, are water quality related. Invasive species, 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 water quality impairment. Similarly, wetlands scoring as "impaired" for hydrological reasons are often scored that way due to pre-CWA construction of roads 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, and for the purposes of this report, "impairment" is determined as shown in Table C-14 below:

Table C-14. Assessment Methodology for Wetlands, using HGM Functions

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-15. 303(d) Listing for Select CNMI Wetlands, based on 2001 HGM Assessment

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**					

C5. Public Health Issues

C5.1 Beach Water Quality Issues

Microbiological Contamination:

One of the primary purposes of the DEQ Surface Water Monitoring Program is to evaluate compliance with the recreational enterococci criteria. When a sample exceeds either the single sample maximum or geometric mean criteria, a public notice is issued advising the general public not to swim within 300 feet of the sampling site for the next 48 hours. DEQ also maintains beach advisory signboards at ten sites on Saipan with international "no swimming" symbols that are posted whenever an exceedences is recorded.

Due to the frequency with which some beaches exceed the recreational criteria, an elevated risk to public health exists for several beaches within the CNMI, and many of DEQ'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 wastes. Known sources of the bacterial contamination are overflows and leaks from sewage collection systems, and runoff from densely populated areas. Reduced population and improvements to the sewer system are believed to be responsible for the improved enterococci results observed at several sites in western Saipan, but other sites remain severely impaired. Any site which was listed as impaired for recreational uses in an area commonly used by the public has been prioritized for TMDL development.

Enterococci contamination observed on some of Saipan's eastern beaches is likely to be the result of livestock, rather than human wastes. Unrestricted cattle grazing has been observed in several of Saipan's eastern watersheds, resulting in moderate to severe erosion and likely transport of fecal matter to the eastern beach sites where these streams discharge. DEQ has not conducted any monitoring or detailed assessment of these watersheds. The continued observance of enterococci exceedences, along with a handful of suspected and highly publicized leptospirosis infections, including one death in 2000, has resulted in these eastern beaches being ranked as a priority of 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 nearshore Garapan region has highlighted the lack of a fish tissue monitoring and consumption advisory system within the DEQ water quality programs. DEQ plans to prioritize this issue over the next several years.

C5.2 Public Water Supply/Drinking Water Use Reporting

The Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305(b)) Reports), 1997, recommends that the use of surface water in public water supplies/drinking water be discussed in this section. 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, there are no surface water bodies officially designated as water supplies for public water systems 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 Information System (SDWIS), one would find two public water systems listed as having a surface water source. A brief discussion of these two public water systems and their sources is provided below.

The first system is the Rota Commonwealth Utilities Corporation (CUC) Public Water System on the island of Rota. The source of water for this system is a spring emerging into a cave. The water is collected at the mouth of the cave. The pool of water in the cave is open to the atmosphere, and potentially subject to contamination from the local fauna visiting or living in the cave, hence the classification as a surface water source. The source water has not been assessed for contaminants other than the required Safe Drinking Water 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 Public Water System, which has numerous groundwater sources, and one rain water source. Rainwater run-off is collected from the Saipan International Airport runway system and stored in a concrete reservoir. Since the rainwater travels across the surface of the ground, the source water is considered “surface water” for the purposes of the Safe Drinking Water Regulations, but no “navigable water” surface water body contributes to this source of water for the Public Water System. There has been no assessment of the airport runway rainwater catchment system.

D. GROUND WATER MONITORING AND ASSESSMENT

This section describes known contamination sources for ground water, describes 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 is one documented leaking above ground fuel storage tank on the island of Tinian. 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 ten highest priority sources of ground water contamination from the list of contaminant sources in the first column. Since there are not ten 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. Hydrogeologic 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 of contaminants considered to be associated with each of the sources that was checked. Contaminants/contaminant 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)[2]	Factors Considered in Selecting a Contaminant Source[3]	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

[2] The ten highest priority contaminant sources (unranked) for the CNMI based on either documented contamination or the professional judgment of the CNMI DEQ technical staff.
[3]

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 in provided in section D.3 below.

D.2 Overview of State Ground Water Protection Programs

The CNMI Division of Environmental Quality (DEQ) 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 the ground water resource, 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, allow DEQ to set maximum pump withdrawal rates (to minimize salt water intrusion), and require that semi-annual water quality analysis be conducted for 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 at DEQ maintains a database of wells for the CNMI. As of December 2009 the program has documented the locations of 534 wells in the CNMI (502 on Saipan, 17 on Tinian, 14 on Rota, and 1 on Pagan). The majority of these wells are used for drinking water sources (381), while some are used for irrigation (19). There are also

monitoring wells (32), exploratory wells (17) which have not been designated for another use yet, injections wells (17), and wells that have been destroyed (68).

D.2.2 Wastewater Disposal Regulations

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

D.2.3 Underground Storage Tank Regulations

The Underground Storage Tank Regulations direct 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 situations the injection of wastewater (or other substances) may be injected into the ground.

D.2.5 Safe Drinking Water Regulations

The Safe Drinking Water Regulations require that Public Water Systems conduct regular monitoring based on a schedule set by DEQ. The monitoring is for potential contaminants. For those Public Water Systems that use groundwater, the monitoring may detect contaminants that are present in their raw water ground water if the system does not provide treatment for that contaminant.

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.2.6 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 the CNMI 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 had detection for VOCs. 11 of the 34 samples had VOC detection exceeding the Maximum Contaminant Level (MCL) for Trichloroethylene (TCE), Vinyl Chloride (VC), Dichloroethylene (DCE), and Tetrachloroethylene (PCE). The remaining 23 were below MCL for a certain VOC. The samples with VOC detection 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 VOC detection for preliminary assessment/site investigation (PA/SI) activity. The list consisted of 28 sites, each of which was issued a Request for Information Letter pursuant to Section 104e of CERCLA ("Superfund"), jointly by DEQ and EPA Region 9. 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 sampling event to collect ground water samples from 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 sampling activity was to follow up the May 2000 sampling event to collect more current data. 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.

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.

Table D-3 Ground Water Contamination Summary

Source Type	Number of Sites	Number of sites that are listed and/or have confirmed releases	Number of sites with confirmed ground water contamination	Contaminants	Number of 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 completed (optional)
NPL	0								
CERCLIS	6	6	6	Solvents, inks, dyes, TCE, VC, PCE, DCE					
DOD/DOE	26	26	6	SVOCs, VOCs		5	0	21	5
LUST[4]	0								
LAST[5]	2								
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								

[4] For the reporting period of 2008-2009 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.

[5] For this reporting period of 2008-2009 there are two open leaking above ground storage tank sites one on Saipan and Tinian each that are currently being remediated.

Agricultural activity on Saipan is somewhat limited. There have been no inorganic or organic pesticides detected in sampling conducted per the Safe Drinking Water regulations. There are no large scale feed lots or land application of manure.

There are 17 underground injection wells on Saipan used for the disposal of reverse-osmosis (reject) brine water. The injection wells are primarily located along the coast line (associated with tourist hotels) and 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

The following table summarizes ground water quality monitoring results conducted under the Well Drilling and Well Operation Regulations, Annual Well Operating Permit requirements for private wells, and water quality data testing results conducted under a special study of public wells of interest. The data for the private wells is from calendar year 2008, and the data for the public wells is from April 2008 – April 2009. No raw groundwater water quality data is available for the island of Tinian (all active wells on Tinian are currently operated by the Public Utility, which did not conduct raw well water analysis for the annual operating well operating permit). Table D-4 contains monitoring data for the islands of Rota and Saipan (as indicated). Only nitrate data is presented for this monitoring period. No VOC or SOC sampling was conducting during this time.

Table D-4 Aquifer Monitoring Data - Rota and Saipan 2008

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 Private or Unregulated Wells (ROTA)		VOC							
		SOC							
	4	NO_3	0	4	0	0	0	0	0
		Other							
Untreated Water Quality Data from Public Wells (SAIPAN)		VOC							
		SOC							
	20	NO_3	0	6	13	1	0	0	0
		Other							
Untreated Water Quality Data from Private or Unregulated Wells (SAIPAN)		VOC							
		SOC							
	127	NO_3	26	84	16	1	0	0	0
		Other							

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 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 dissolved oxygen deficits.

Salt water intrusion (upconing) is arguably the most significant ground water contamination issue on Saipan (and even in 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, and instead rely on 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, were spaced relatively close together, and/or were pumped at relatively high rates. Due to these practices, the underlying salt water has been drawn upward in the vicinity of these wells, mixing with the fresher water at the ground water surface, and increasing the chloride concentration 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 primarily being addressed by the Commonwealth Utilities Corporation (CUC) which owns and operates most of the wells affected. Currently the demand for water is so great that the utility cannot produce enough to provide 24 hour service to all utility customers on Saipan. One of the reasons that the demand is so great is because there are significant leaks in the utility's distribution system. As leaks have been repaired in recent years, the demand for water has decreased, and the CUC has been able to take 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.

E. PUBLIC PARTICIPATION

The draft 2010 Integrated Report was placed on the DEQ website on July 7, 2010, and announcements were released that public comments would be accepted until August 23, 2010. No comments were received during this period.

Changes to Final Integrated Report

Although no comments were received, changes were made to the draft IR for this final report. The changes were limited to changes in the base water body maps, to provide more accurate geographical information system (GIS) layers to support this report. As a result, most coastal segment lengths, stream lengths, wetland areas, etc., were changed slightly from the Draft IR which was released in July, 2010.

Aside from these minor changes, the Lao Lao watershed was enlarged to include both Lao Lao Bay water quality monitoring stations (SEB 01 and SEB 02), resulting in an equal reduction in size of the Kagman watershed, which had originally included site SEB02, more commonly known as the Lao Lao Bay "dive beach."

"Lake Hagoi" on Tinian was removed from the category of lakes, and returned to the wetland category, in keeping with all previous reports and evaluations. The Hagoi wetland is used as the "reference" or pristine wetland for assessment purposes in the draft CNMI hydrogeomorphic (HGM) wetland functional assessment system. The Hagoi wetland contains some areas of open water, which vary in size from year to year due to vegetation cover, and is therefore not considered a lake, but simply a wetland with some open water segments.

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

Table I-1. 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-1 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

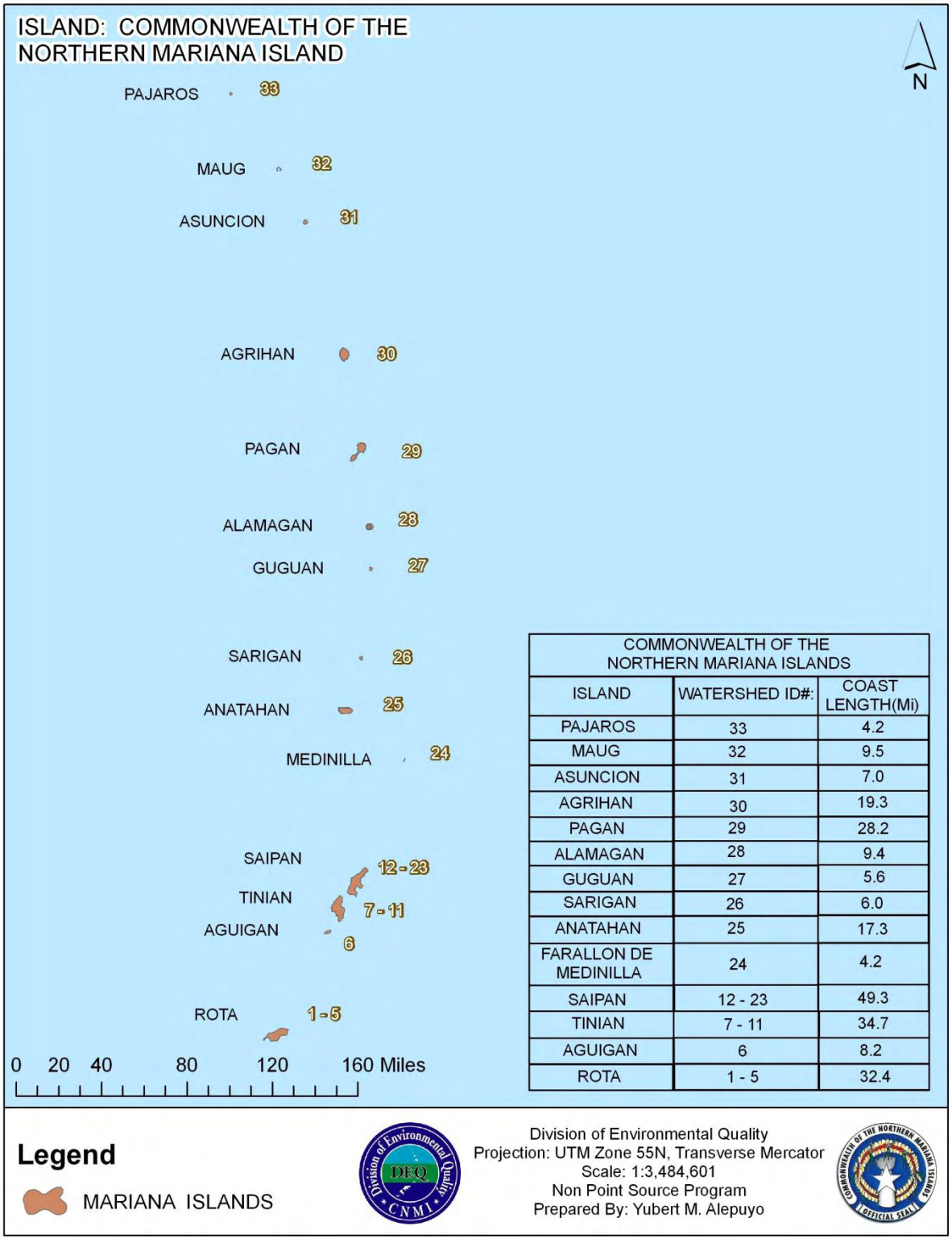
Table I-1 continued: Area and aquatic resources information for reporting segments (watersheds) of CNMI.

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-1 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**	**681.0**		

Figure I-1. 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-2. Watershed (segment) numbers, monitoring stations, and aquatic resources of Rota

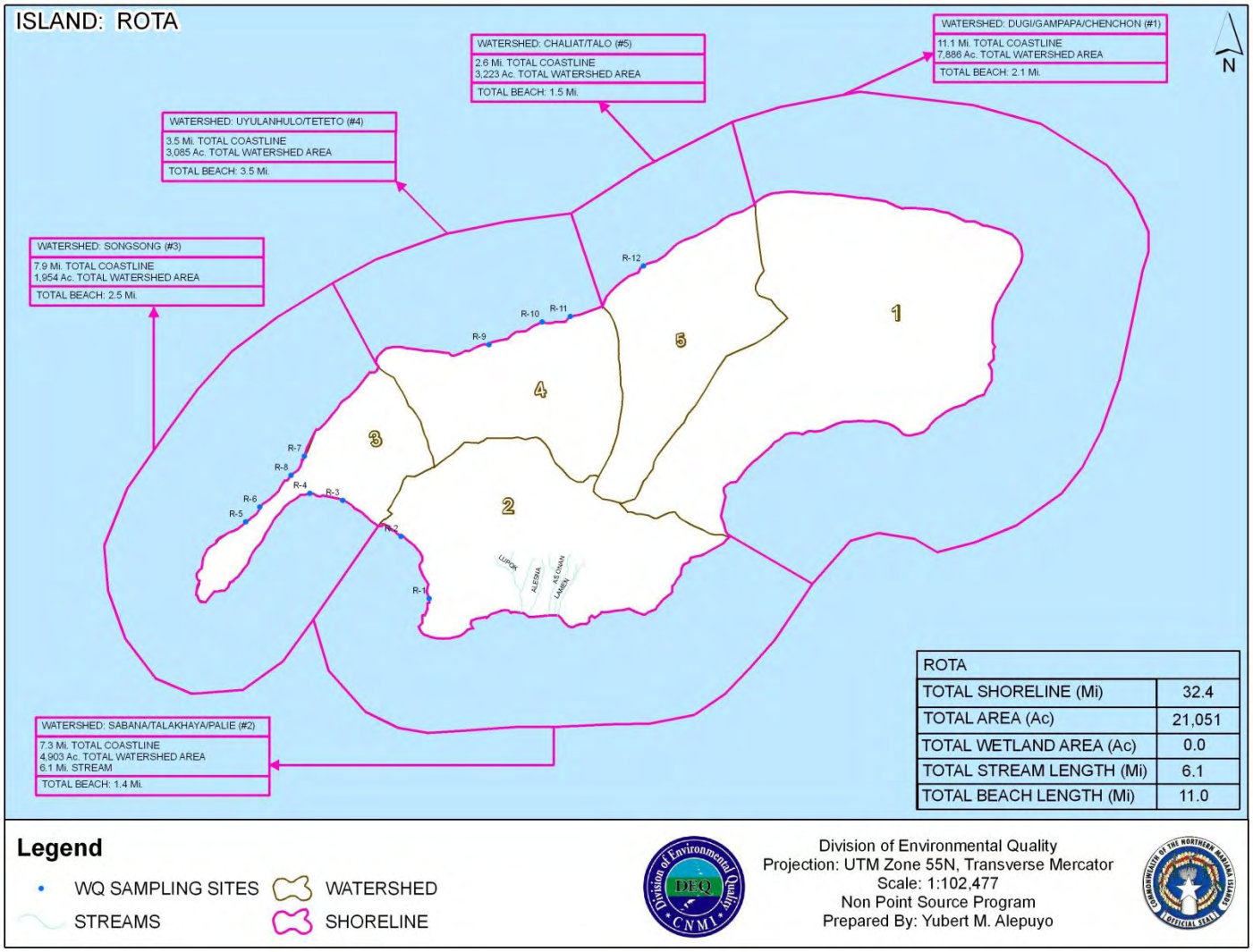


Figure I-3. Watershed (segment) numbers, monitoring stations, and aquatic resources of Tinian & Aguigan

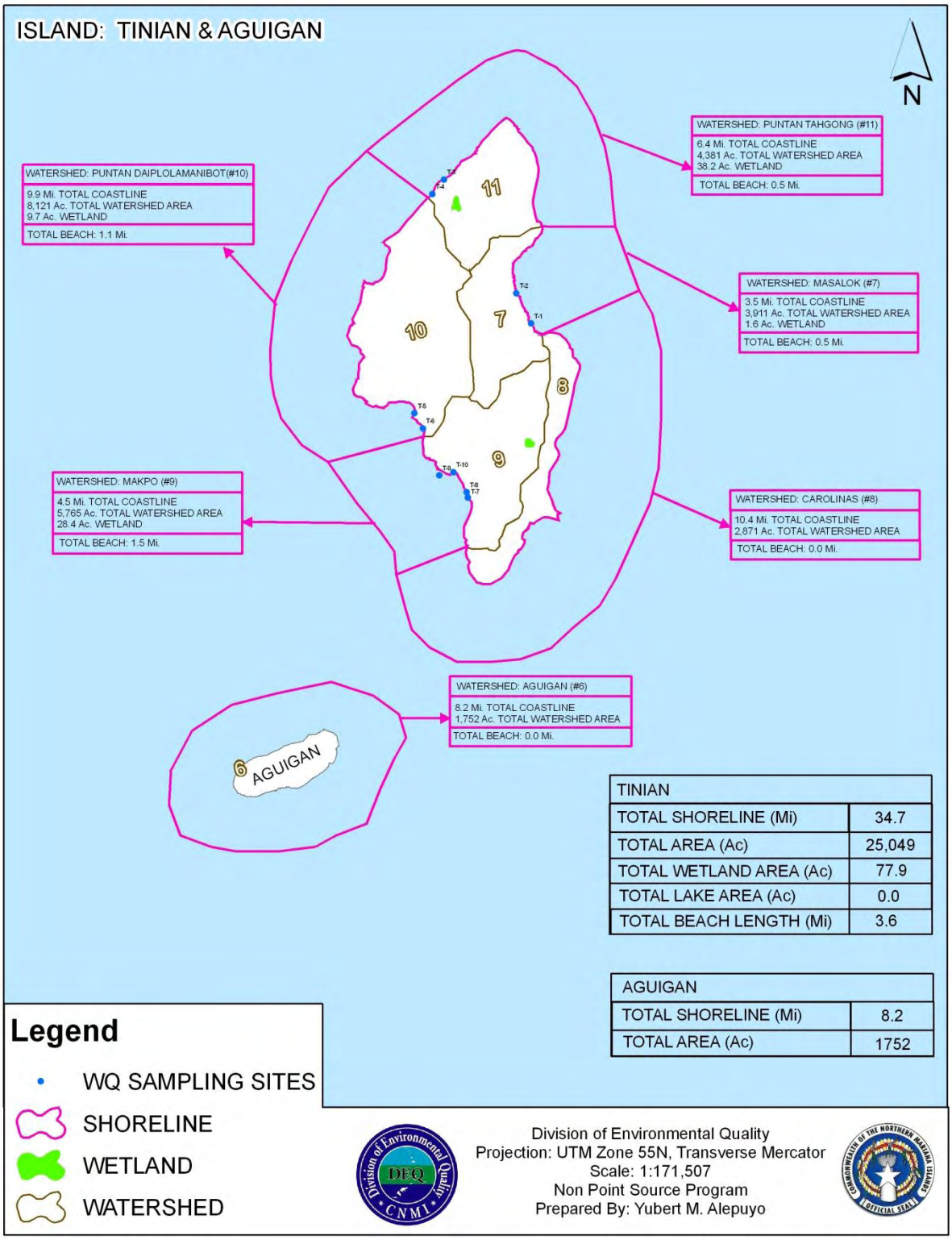


Figure I-4. Watershed (segment) numbers, monitoring stations, and aquatic resources of Saipan

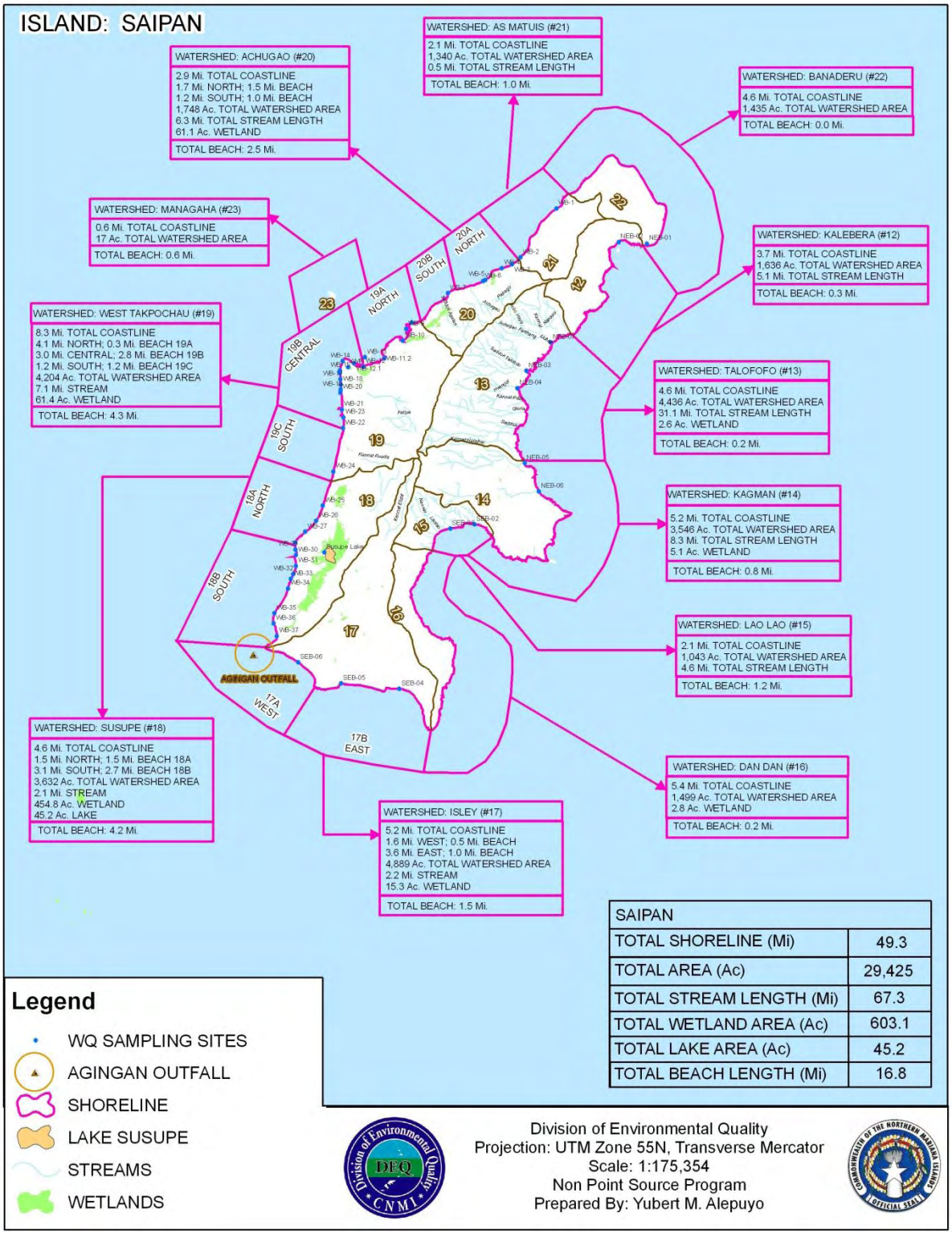


Figure I-5. Coral reef and seagrass biocritera monitoring stations for the island of Saipan

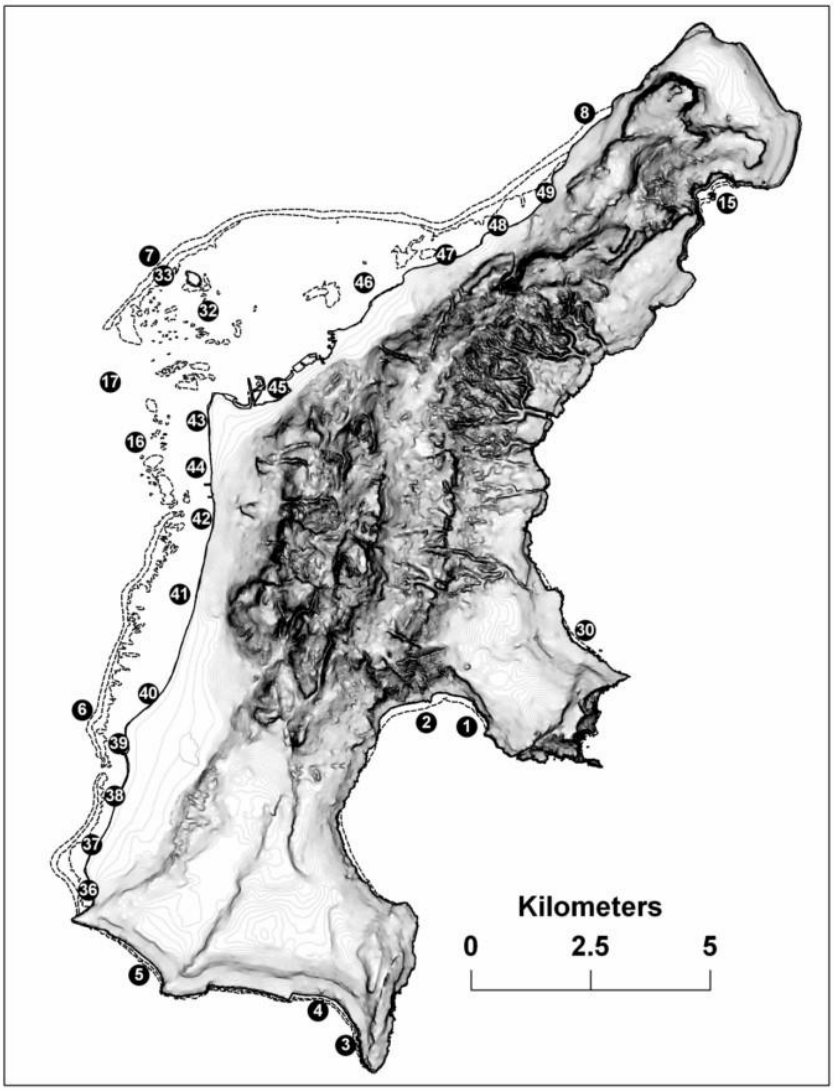


Figure I-6. Coral reef biocriteria monitoring sites for the island of Tinian (top) and Aguigan (bottom)

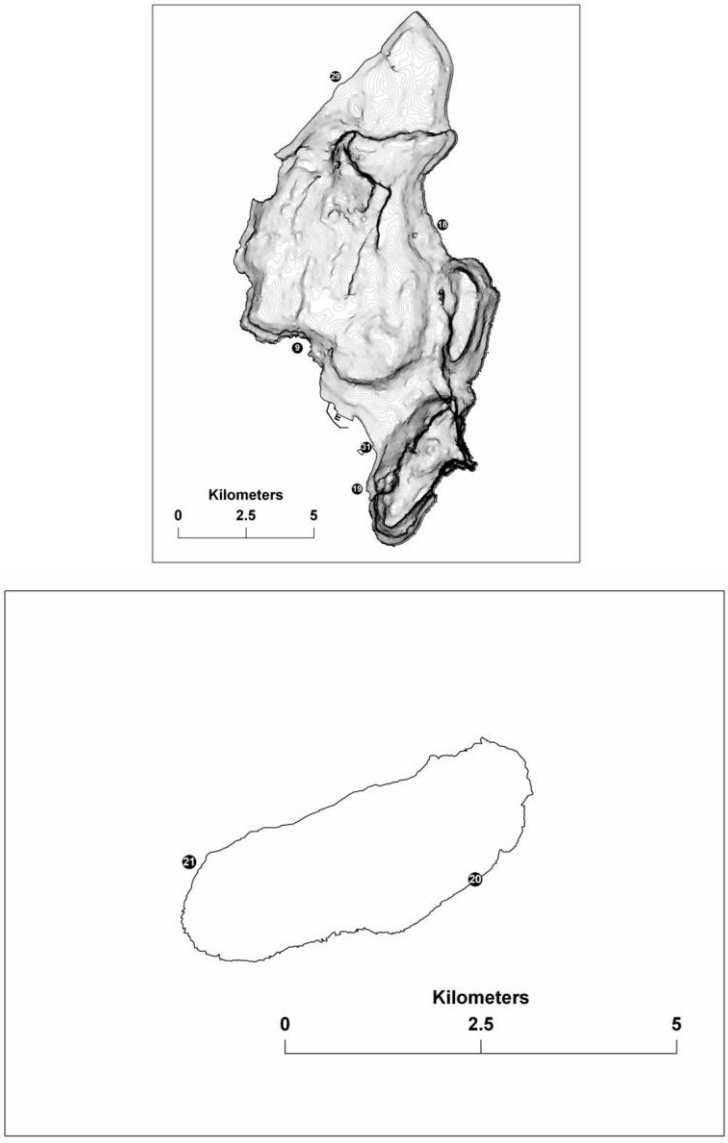
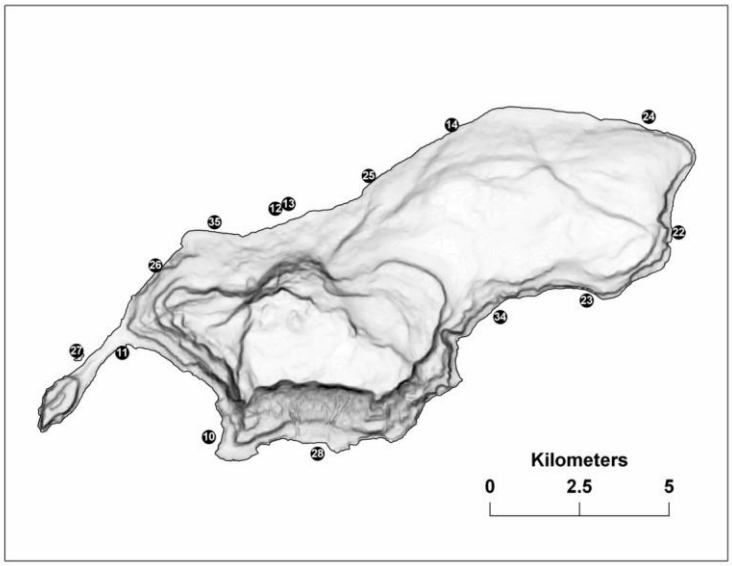


Figure I-7. Coral reef biocriteria monitoring sites for the island of Rota

d)



II. APPENDIX II: Detailed 305b Listing of CNMI Waters

Table II-1. 305b Use Support / CALM Assessment Category Summary (Cumulative: Includes all FY1998 to FY2009 data)

WATER BODY SEGMENT ID		1	2	3	4	5	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
Water Body Type	*Designated Use*	Dugi/Gampapa/ Chenchon	Sabana/ Talakaya/Palie	Songsong	Uyulanhulo/ Teteto	Chalat/Talo	Agugan	Masalok	Carolinas	Makpo	Puntan Daipolamanibot	Puntan Tahgong	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	Faralon De Medinilla	Anatahan	Sarigan	Guguan	Alamagan	Pagan	Agrihan	Asumcion	Maug	Faralon De Pajaros
Coastal Waters																																							
	Aquatic Life	i	N	N	N	N	F	N	i	N	N	N	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	F	i	i	i	i	i	i	i	i	i	i	i	i	i	i	i	N	i	i	i	i	F	i	F	F	F	F	F	F	F	F	F	F
	Recreation	i	N	N	F	F	F	F	i	F	F	N	F	N	N	N	i	N	N	F	N	N	N	F	N	N	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	F	F	F	F	F	F	F	F	F	F	F
	CALM Assessment Category	**3**	**5**	**5**	**5**	**5**	**1**	**5**	**3**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**3**	**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										i	i	i	i		i		i		i			i		i	i											
	Fish Consumption		i										i	i	i	i		i		i		i			i		i	i											
	Recreation		i										i	i	i	i		i		i		i			i		i	i											
	Potable Water Supply		i										i	i	i	i		i		i		i			i		i	i											
	Aesthetic Enjoyment/others		i										i	i	i	i		i		i		i			i		i	i											
	CALM Assessment Category		**3**										**3**	**3**	**3**	**3**		**3**		**3**		**3**			**3**		**3**	**3**											

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-1 cont'd. 305b Use Support / CALM Assessment Category Summary (Cumulative: Includes all FY1998 to FY2009 data)

WATER BODY SEGMENT ID		1 Dugi/Gampapa/ Chenchon	2 Sabana/ Talakaya/Palie	3 Songsong	4 Uyulanhulo/ Teteto	5 Chalan/Talo	6 Aguigan	7 Masalok	8 Carolinas	9 Makpo	10 Daipolamanibot Puntan	11 Puntan Tahgong	12 Kalabera	13 Talofofo	14 Kagman	15 Lao Lao	16 Dan Dan	17 Isley A (West)	17 Isley B (East)	18 Susupe A (North)	18 Susupe B (South)	19 W. Takpochau A (North)	19 W. Takpochau B (Central)	19 W. Takpochau C (South)	20 Achugao A (North)	20 Achugao B (South)	21 As Matuis	22 Banaderu	23 Managaha	24 Farallon De Medinilla	25 Anatahan	26 Sarigan	27 Guguan	28 Alamagan	29 Pagan	30 Agrihan	31 Asumcion	32 Maug	33 Farallon De Pajaros
Water Body Type	*Designated Use*																																						
Lakes																																							
	Aquatic Life																			F																			
	Fish Consumption																			i																			
	Recreation																			N																			
	Potable Water Supply																			N																			
	Aesthetic Enjoyment/others																			F																			
	CALM Assessment Category																			5																			
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.1. COASTAL WATERS

Table II-2. 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-3. Category 3: Coastal Waters with Insufficient Data or Information to Determine if Designated Uses are Attained

ID No.	SEGMENT NAME	ISLAND	SEGMENT CLASS	SEGMENT SIZE (miles)	COMMENTS
1	Dugi/Gampapa/Chenchon	Rota	AA	11.1	No available monitoring data of any type
2	Sabana/Talakaya/Palie	Rota	AA	7.3	Fish tissue data not available; possibility of contamination exists
3	Songsong	Rota	AA/A	7.9	Fish tissue data not available; possibility of contamination exists
4	Uyulanhulo/Teteto	Rota	AA	3.5	Fish tissue data not available; possibility of contamination exists
5	Chaliat/Talo	Rota	AA	2.6	Fish tissue data not available; possibility of contamination exists
7	Masalok	Tinian	AA	3.5	Fish tissue data not available; possibility of contamination exists
8	Carolinas	Tinian	AA	10.4	No available monitoring data of any type
9	Makpo	Tinian	AA/A	4.5	Fish tissue data not available; possibility of contamination exists
10	Puntan Diaplolamanibot	Tinian	AA	9.9	Fish tissue data not available; possibility of contamination exists
11	Puntan Tahgong	Tinian	AA	6.4	Fish tissue data not available; possibility of contamination exists
12	Kalabera	Saipan	AA	3.7	Fish tissue data not available; possibility of contamination exists
13	Talofofo	Saipan	AA	4.6	Fish tissue data not available; possibility of contamination exists

Table II-3 cont'd. Category 3: Coastal Waters with Insufficient Data or Information to Determine if Designated Uses are Attained

ID No.	SEGMENT NAME	ISLAND	SEGMENT CLASS	SEGMENT SIZE (miles)	COMMENTS
14	Kagman	Saipan	AA	5.2	Fish tissue data not available; possibility of contamination exists
15	Lao Lao	Saipan	AA	2.1	Fish tissue data not available; possibility of contamination exists
16	Dan Dan	Saipan	AA	5.4	No available monitoring data of any type
21	As Matuis	Saipan	AA	2.1	Fish tissue data not available; possibility of contamination exists
23	Managaha	Saipan	AA	0.6	Fish tissue data not available; possibility of contamination exists
17A	Isley (West)	Saipan	AA/A	1.6	Fish tissue data not available; possibility of contamination exists
17B	Isley (East)	Saipan	AA	3.6	Fish tissue data not available; possibility of contamination exists
18A	Susupe (North)	Saipan	AA	1.5	Fish tissue data not available; possibility of contamination exists
18B	Susupe (South)	Saipan	AA	3.1	Fish tissue data not available; possibility of contamination exists
19A	W. Takpochau (North)	Saipan	AA/A	4.1	Fish tissue data not available; possibility of contamination exists
19C	W. Takpochau (South)	Saipan	AA	1.2	Fish tissue data not available; possibility of contamination exists

Table II-3 cont'd. Category 3: Coastal Waters with Insufficient Data or Information to Determine if Designated Uses are Attained

ID No.	SEGMENT NAME	ISLAND	SEGMENT CLASS	SEGMENT SIZE (miles)	COMMENTS
20A	Achugao (North)	Saipan	AA	1.7	Fish tissue data not available; possibility of contamination exists
20B	Achugao (South)	Saipan	AA	1.2	Fish tissue data not available; possibility of contamination exists
			TOTAL:	108.8	

Table II-4. Category 4-C: Coastal Waters That Are Impaired, But Impairment Is Not Caused By a Pollutant (TMDL Not Required)

ID No.	SEGMENT NAME	ISLAND	SEG. CLASS	SIZE (miles)	CAUSE	CYCLE FIRST LISTED	SOURCE	COMMENTS
17A	Isley (West)	Saipan	A, AA	1.6	biocriteria,	2010	unknown (140),	Low herbivory rates
17B	Isley (East)	Saipan	AA	3.6	biocriteria,	2010	unknown (140),	Low herbivory rates
			TOTAL:	5.2				

Table II-5 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), non-point source (141)		M
5	Chaliat/Talo	Rota	AA	2.6	biocriteria, orthophos-phate	2006 2004	unknown (140)		L
7	Masalok	Tinian	AA	3.5	orthophos-phate	2004	unknown (140)		L
9	Makpo	Tinian	A, AA	4.5	D.O., biocriteria, orthophos-phate	2010 2006 2004	on-site treatment systems (92), urban runoff (177)		M
10	Puntan Diaplolamanibot	Tinian	AA	9.9	orthophos-phate	2004	unknown (140)		L
11	Puntan Tahgong	Tinian	AA	6.4	enterococci, biocriteria, orthophos-phate	2004 2004 2006	unknown (140)		L
12	Kalabera	Saipan	AA	3.7	orthophos-phate	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-5 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
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	2004 2004	unknown (140), sedimentation (21)		
18A	Susupe (North)	Saipan	AA	1.5	D.O., orthophos-phate	2004 2004	sanitary sewer overflows (115), urban runoff (177)		M
18B	Susupe (South)	Saipan	AA	3.1	enterococci, D.O., orthophos-phate	2004 2004 2004	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

Table II-5 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
19B	W. Takpochau (Central)	Saipan	AA	3.0	enterococci, mercury, D.O., biocriteria, orthophos-phate	1998 2010 2004 2004 2004	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
20A	Achugao (North)	Saipan	AA	1.7	Enterococci , D.O., biocriteria, orthophos-phate	2004 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.2. LAKES AND PONDS

Table II-6. 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	

II.3. WETLANDS

Table II-7. 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-8. Category 3: Wetlands with Insufficient Data or Information to Determine if Designated Uses are Attained

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-9. Category 4c: Wetlands with Impairment not Caused by a Pollutant

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.3. STREAMS

Table II-10. Category 3: Streams with Insufficient Data or Information to Determine if Designated Uses are Attained

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	No available monitoring data of any type
17STR	Isley	Saipan	1	2.2	No available monitoring data of any type
18STR	Susupe	Saipan	1	2.1	No available monitoring data of any type
19STR	West Takpochau	Saipan	1	7.1	No available monitoring data of any type
20STR	Achugao	Saipan	1	6.3	No available monitoring data of any type
21STR	As Matuis	Saipan	1	0.5	No available monitoring data of any type
			TOTAL:	73.4	

III. APPENDIX III: TMDL Priority Listing

Table III-1. 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:						
CN02-215	2	Sabana/Talakaya/Palie	enterococci (215)	COASTAL	2004	2013
CN02-340	2	Sabana/Talakaya/Palie	orthophosphate (340)	COASTAL	2010	2013
CN03-215	3	Songsong	enterococci (215)	COASTAL	2004	2013
CN03-448	3	Songsong	biocriteria (448)	COASTAL	2006	2013
CN03-340	3	Songsong	orthophosphate (340)	COASTAL	2010	2013
CN13-215	13	Talofofo	enterococci (215)	COASTAL	2004	2013
CN13-340	13	Talofofo	orthophosphate (340)	COASTAL	2004	2013
CN14-215	14	Kagman	enterococci (215)	COASTAL	2004	2013
CN14-340	14	Kagman	orthophosphate (340)	COASTAL	2004	2013
CN15-215	15	Lao Lao	enterococci (215)	COASTAL	2004	2013
CN15-448	15	Lao Lao	biocriteria (448)	COASTAL	2006	2013
CN15-340	15	Lao Lao	orthophosphate (340)	COASTAL	2004	2013
CN19A-215	19A	W. Takpochau (North)	enterococci (215)	COASTAL	1998	2013
CN19A-205	19A	W. Takpochau (North)	D.O. (205)	COASTAL	2004	2013

Table III-1. Category 5 Waters (303(d)) High Priority List continued

TMDL No.	Seg. ID	Segment Name	Pollutant	Water Type	Year First Listed	Target TMDL Completion Date
HIGH PRIORITY:						
CN19A-448	19A	W. Takpochau (North)	biocriteria (448)	COASTAL	2004	2013
CN19A-340	19A	W. Takpochau (North)	orthophosphate (340)	COASTAL	2004	2013
CN19B-215	19B	W. Takpochau (Central)	enterococci (215)	COASTAL	1998	2013
CN19B-467	19B	W. Takpochau (Central)	mercury (467)	COASTAL	2010	2013
CN19B-205	19B	W. Takpochau (Central)	D.O. (205)	COASTAL	2004	2013
CN19B-448	19B	W. Takpochau (Central)	biocriteria (448)	COASTAL	2004	2013
CN19B-340	19B	W. Takpochau (Central)	orthophosphate (340)	COASTAL	2005	2013
CN20B-215	20B	Achugao (South)	enterococci (215)	COASTAL	2004	2013
CN20B-205	20B	Achugao (South)	D.O. (205)	COASTAL	2004	2013
CN20B-448	20B	Achugao (South)	biocriteria (448)	COASTAL	2006	2013
CN20B-340	20B	Achugao (South)	orthophosphate (340)	COASTAL	2004	2013

Table III-2. 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:						
CN04-340	4	Uyulanhulo/Teteto	orthophosphate (340)	COASTAL	2004	2016
CN09-205	9	Makpo	D.O. (205)	COASTAL	2010	2016
CN09-448	9	Makpo	biocriteria (448)	COASTAL	2006	2016
CN09-340	9	Makpo	orthophosphate (340)	COASTAL	2004	2016
CN17A-215	17A	Isley (West)	enterococci (215)	COASTAL	2008	2016
CN17A-340	17A	Isley (West)	orthophosphate (340)	COASTAL	2004	2016
CN17B-215	17B	Isley (East)	enterococci (215)	COASTAL	2004	2016
CN17B-340	17B	Isley (East)	orthophosphate (340)	COASTAL	2004	2016
CN18A-205	18A	Susupe (North)	D.O. (205)	COASTAL	2004	2016
CN18A-340	18A	Susupe (North)	orthophosphate (340)	COASTAL	2004	2016
CN18B-215	18B	Susupe (South)	enterococci (215)	COASTAL	2004	2016
CN18B-205	18B	Susupe (South)	D.O. (205)	COASTAL	2004	2016
CN18B-340	18B	Susupe (South)	orthophosphate (340)	COASTAL	2005	2016
CN19C-205	19C	W. Takpochau (South)	D.O. (205)	COASTAL	2004	2016
CN19C-448	19C	W. Takpochau (South)	biocriteria (448)	COASTAL	2004	2016

Table III-2. Category 5 Waters (303(d)) Medium Priority List continued

TMDL No.	Seg. ID	Segment Name	Pollutant	Water Type	Year First Listed	Target TMDL Completion Date
MEDIUM PRIORITY:						
CN19C-340	19C	W. Takpochau (South)	orthophosphate (340)	COASTAL	2004	2016
CN20A-205	20A	Achugao (North)	D.O. (205)	COASTAL	2004	2016
CN20A-215	20A	Achugao (North)	enterococci (215)	COASTAL	2006	2016
CN20A-448	20A	Achugao (North)	biocriteria (448)	COASTAL	2006	2016
CN20A-340	20A	Achugao (North)	orthophosphate (340)	COASTAL	2004	2016
CN18-217	18LAK	Susupe	E. coli (217)	LAKE	2010	2016

Table III-3. 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:						
CN02-205	2	Sabana/Talakaya/Palie	D.O. (205)	COASTAL	2004	2019
CN03-205	3	Songsong	D.O. (205)	COASTAL	2004	2019
CN05-448	5	Chaliat/Talo	biocriteria (448)	COASTAL	2006	2019
CN05-340	5	Chaliat/Talo	orthophosphate (340)	COASTAL	2004	2019
CN07-340	7	Masalok	orthophosphate (340)	COASTAL	2004	2019
CN10-340	10	Puntan Diaplolamanibot	orthophosphate (340)	COASTAL	2004	2019
CN11-215	11	Puntan Tahgong	enterococci (215)	COASTAL	2004	2019
CN11-448	11	Puntan Tahgong	biocriteria (448)	COASTAL	2004	2019
CN11-340	11	Puntan Tahgong	orthophosphate (340)	COASTAL	2006	2019
CN12-340	12	Kalabera	orthophosphate (340)	COASTAL	2004	2019
CN21-205	21	As Matuis	D.O. (205)	COASTAL	2004	2019
CN21-340	21	As Matuis	orthophosphate (340)	COASTAL	2004	2019
CN23-340	23	Managaha	orthophosphate (340)	COASTAL	2004	2019

IV. APPENDIX IV: Selected Monitoring Data Used in 2010 Listing Determinations, by Water Segment

IV.1. 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; = severely impaired;

ROTA:

Sampl. Sta. ID	Sampling Station Name	2004 micro % viol	2005 micro % viol	2006 micro % viol	2007 micro % viol	2008 micro % viol	2009 micro % viol		Segment Class
SEGMENT 2: SABANA/TALAKAYA/PALIE									
R1	Coral Garden	8	4	0	5	17	19		AA
R2	Kokomo Beach Club	0	3	7	5	20	8		AA
SEGMENT 3: SONGSONG									
R3	Mobil Storm Drainage	0	10	0	0	7	12		A
R4	East Harbor Dock	4	4	0	0	0	5		A
R5	Tweksberry Beach	12	0	0	0	0	4		AA
R6	West Harbor Marina	12	10	0	0	7	12		A
R7	Dist #2 Storm Drain	42	17	4	14	27	12		AA
R8	Dist #1 Storm Drain	4	3	0	9	10	0		AA

ROTA continued:

Sampl. Sta. ID	Sampling Station Name	2004 micro % viol	2005 micro % viol	2006 micro % viol	2007 micro % viol	2008 micro % viol	2009 micro % viol		Segment Class
SEGMENT 4: UYULANHULO/TETETO									
R9	Veterans Memorial	0	0	4	0	0	0		AA
R10	Teteto Beach	0	0	0	0	0	0		AA
R11	Guata Beach	19	14	4	5	0	0		AA
SEGMENT 5: CHALIAT/TALO									
R12	Swimming Hole	19	7	7	0	0	0		AA

TINIAN:

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

SAIPAN:

Sampl. Sta. ID	Sampling Station Name	2004 micro % viol	2005 micro % viol	2006 micro % viol	2007 micro % viol	2008 micro % viol	2009 micro % viol		Segment Class
SEGMENT 12: KALABERA									
NEB 02	Bird Island Beach	23	30	34	10	3	7		AA
SEGMENT 13: TALOFOFO									
NEB 03	Jeffrey's Beach	15	50	38	29	37	26		AA
NEB 07	Hidden Beach	38	30	31	24	30	22		AA
NEB 04	Old Man By the Sea	20	50	24	24	10	19		AA
SEGMENT 14: KAGMAN									
NEB 05	Marine Beach	15	15	3	14	13	11		AA
NEB 06	Tank Beach	23	5	3	19	10	4		AA
SEGMENT 15: LAO LAO									
SEB 02	North Laolao Beach	19	30	14	19	13	19		AA
SEB 03	South Laolao Beach	19	25	10	33	37	15		AA
SEGMENT 17A: ISLEY (WEST)									
SEB 06	Unai Dangkolo	46	35	14	33	13	37		AA
SEGMENT 17B: ISLEY (EAST)									
SEB 04	Obyan Beach	27	15	0	10	3	15		AA
SEB 05	Ladder Beach	12	20	10	5	0	7		AA
SEGMENT 18A: SUSUPE (NORTH)									
WB 25	San Jose Beach	6	2	6	9	0	8		AA
WB 26	Civic Center Beach	4	0	4	11	4	2		AA
WB 27	Diamond Hotel Beach	6	6	8	9	2	6		AA
WB 28	Grand Hotel	4	4	8	4	2	6		AA
WB 29	Community School Beach	8	8	8	6	2	4		AA

SAIPAN continued:

Sampl. Sta. ID	Sampling Station Name	2004 micro % viol	2005 micro % viol	2006 micro % viol	2007 micro % viol	2008 micro % viol	2009 micro % viol		Segment Class
SEGMENT 18B: SUSUPE (SOUTH)									
WB 30	Sugar Dock	52	14	19	19	66	37		AA
WB 31	CK Dist #2 Drainage	17	10	8	21	32	25		AA
WB 32	CK Dist #4 Lally Beach	10	6	6	6	6	6		AA
WB 33	Chalan Piao Beach	10	6	6	13	4	8		AA
WB 34	Hopwood School Beach	21	6	13	21	6	2		AA
WB 35	San Antonio Beach	19	6	6	0	4	6		AA
WB 36	PIC Beach	6	4	2	6	6	6		AA
WB 37	San Antonio Lift Stn.	33	6	4	13	22	10		AA
SEGMENT 19A: WEST TAKPOCHAU (NORTH)									
WB 09	Sea Plane Ramp	0	4	2	15	0	0		A
WB 10	DPW Channel Bridge	33	67	77	66	86	79		A
WB 11.2	South Puerto Rico Dump	42	76	56	68	70	50		A
WB 12	Smiling Cove Marina	6	14	4	19	2	12		A
WB 12.1	American Memorial Park Drainage	25	39	29	32	40	50		A
WB 13	Outer Cove Marina	10	21	4	13	0	2		A

SAIPAN continued:

Sampl. Sta. ID	Sampling Station Name	2004 micro % viol	2005 micro % viol	2006 micro % viol	2007 micro % viol	2008 micro % viol	2009 micro % viol		Segment Class
SEGMENT 19B: WEST TAKPOCHAU (CENTRAL)									
WB 14	Micro Beach	8	17	13	21	12	8		AA
WB 15	Hyatt Hotel	10	21	13	15	2	4		AA
WB 16	Dai-Ichi Hotel	17	25	17	17	0	8		AA
WB 17	Drainage #1 (Dai-ichi drainage)	54	37	31	36	20	10		AA
WB 18	Samoa Housing	17	17	12	15	8	2		AA
WB 19	Hafa-Adai Hotel	31	25	29	26	40	19		AA
WB 20	Drainage #2 (Hafa-Adai Hotel drainage)	33	31	38	32	46	17		AA
WB 21	Garapan Fishing Dock	56	35	33	36	50	63		AA
WB 22	Garapan Beach	21	17	12	23	6	10		AA
WB 23	Drainage #3 (Garapan Beach Drainage)	13	10	17	43	48	33		AA
SEGMENT 19C: WEST TAKPOCHAU (SOUTH)									
WB 24	Chalan Laulau Beach	17	4	6	6	2	4		AA
SEGMENT 20A: ACHUGAO (NORTH)									
WB 03	Nikko Hotel	21	8	6	19	4	6		AA
WB 04	San Roque School Beach	35	14	13	17	14	10		AA
WB 05	Plumeria Hotel	10	12	6	13	4	0		AA
WB 06	Aqua Resort Hotel	8	14	12	13	2	4		AA
SEGMENT 20B: ACHUGAO (SOUTH)									
WB 07	Tanapag Meeting Hall	44	35	50	32	36	38		AA
WB 08	Central Repair Shop	33	35	35	34	34	56		A

SAIPAN continued

Sampl. Sta. ID	Sampling Station Name	2004 micro % viol	2005 micro % viol	2006 micro % viol	2007 micro % viol	2008 micro % viol	2009 micro % viol		Segment Class
SEGMENT 21: AS MATUIS									
WB 01	Wing Beach	11	14	10	13	4	6		AA
WB 02	Pau-Pau Beach	25	6	6	15	2	10		AA
SEGMENT 22: BANADERU									
NEB 01	Grotto Cave	27	10	0	5	0	4		AA
SEGMENT 23: MANAGAHA									
MG 01	Dock	0	4	8	0	0	0		AA
MG 02	Swimming Area A	0	7	4	4	0	0		AA
MG 03	Swimming Area A	8	4	4	0	4	0		AA
MG 04	Swimming Area B	4	4	0	0	0	4		AA
MG 05	Managaha Beach	4	4	0	0	0	0		AA
MG 06	Managaha Beach	8	0	4	4	0	0		AA
MG 07	Managaha Beach	0	4	7	0	0	7		AA
MG 08	Beach Near Statue	0	4	0	0	0	4		AA
MG 09	Managaha Beach	0	4	0	0	0	0		AA
MG 10	Managaha Beach	0	0	4	4	4	0		AA
MG 11	Next to Dock	15	4	4	0	4	0		AA

IV.2. Dissolved Oxygen Data

NOTES:

1. COLOR LEGEND: = impaired; = severely impaired

ROTA: (dissolved oxygen)

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

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

TINIAN: (dissolved oxygen)

Segment ID	Segment Name	Sampling Station ID	Sampling Station Name	2008 D.O. Exceedences (%)	2009 D.O. Exceedences (%)
7	Masalok	T1	Unai Masalok Beach	30*	0
7	Masalok	T2	Unai Dangkolo	30*	0
9	Makpo	T7	Tachogna Beach	30*	0
9	Makpo	T8	Taga Beach	33*	5
9	Makpo	T9	Harbor	33*	35
9	Makpo	T10	Kammer Beach	30*	0
10	Puntan Diaplomanibot	T5	Leprosarium I	30*	0
10	Puntan Diaplomanibot	T6	Leprosarium II	30*	0
11	Puntan Tahgong	T3	Unai Babui	30*	0
11	Puntan Tahgong	T4	Unai Chulu	30*	0

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

SAIPAN: (dissolved oxygen)

Segment ID	Segment Name	Sampling Station ID	Sampling Station Name	2008 D.O. Exceedences (%)	2009 D.O. Exceedences (%)
12	Kalabera	NEB 02	Bird Island Beach	0	8
13	Talofofo	NEB 03	Jeffrey's Beach	0	4
13	Talofofo	NEB 07	Hidden Beach	0	4
13	Talofofo	NEB 04	Old Man By the Sea	0	4
14	Kagman	NEB 05	Marine Beach	0	0
14	Kagman	NEB 06	Tank Beach	0	0
15	Lao Lao	SEB 02	North Laolao Beach	7	0
15	Lao Lao	SEB 03	South Laolao Beach	0	4

SAIPAN continued: (dissolved oxygen)

Segment ID	Segment Name	Sampling Station ID	Sampling Station Name	2008 D.O. Exceedences (%)	2009 D.O. Exceedences (%)
17A	Isley (west)	SEB 06	Unai Dangkolo	0	0
17B	Isley (east)	SEB 04	Obyan Beach	0	0
17B	Isley (east)	SEB 05	Ladder Beach	0	0
18A	Susupe (North)	WB 25	San Jose Beach	7	15
18A	Susupe (North)	WB 26	Civic Center Beach	7	19
18A	Susupe (North)	WB 27	Diamond Hotel Beach	3	15
18A	Susupe (North)	WB 28	Grand Hotel	4	8
18A	Susupe (North)	WB 29	Community School Beach	4	13
18B	Susupe (South)	WB 30	Sugar Dock	7	15
18B	Susupe (South)	WB 31	CK Dist #2 Drainage	2	8
18B	Susupe (South)	WB 32	CK Dist #4 Lally Beach	2	8
18B	Susupe (South)	WB 33	Chalan Piao Beach	2	4
18B	Susupe (South)	WB 34	Hopwood School Beach	7	6
18B	Susupe (South)	WB 35	San Antonio Beach	4	8
18B	Susupe (South)	WB 36	PIC Beach	4	4
18B	Susupe (South)	WB 37	San Antonio Lift Stn.	4	6
19A	West Takpochau (North)	WB 09	Sea Plane Ramp	2	8
19A	West Takpochau (North)	WB 10	DPW Channel Bridge	4	8
19A	West Takpochau (North)	WB 11.2	South Puerto Rico Dump	8	18
19A	West Takpochau (North)	WB 12	Smiling Cove Marina	4	18
19A	West Takpochau (North)	WB 12.1	American Memorial Park Drainage	2	10
19A	West Takpochau (North)	WB 13	Outer Cove Marina	0	2

SAIPAN continued: (dissolved oxygen)

Segment ID	Segment Name	Sampling Station ID	Sampling Station Name	2008 D.O. Exceedences (%)	2009 D.O. Exceedences (%)
19B	West Takpochau (Central)	WB 14	Micro Beach	0	2
19B	West Takpochau (Central)	WB 15	Hyatt Hotel	2	6
19B	West Takpochau (Central)	WB 16	Dai-Ichi Hotel	0	6
19B	West Takpochau (Central)	WB 17	Drainage #1 (Dai-ichi drainage)	0	10
19B	West Takpochau (Central)	WB 18	Samoa Housing	2	4
19B	West Takpochau (Central)	WB 19	Hafa-Adai Hotel	11	19
19B	West Takpochau (Central)	WB 20	Drainage #2 (Hafa-Adai Hotel drainage)	9	13
19B	West Takpochau (Central)	WB 21	Garapan Fishing Dock	18	31
19B	West Takpochau (Central)	WB 22	Garapan Beach	11	29
19B	West Takpochau (Central)	WB 23	Drainage #3 (Garapan Beach Drainage)	13	21
19C	West Takpochau (South)	WB 24	Chalan Laulau Beach	13	33
20A	Achugao (North)	WB 03	Nikko Hotel	2	12
20A	Achugao (North)	WB 04	San Roque School Beach	2	6
20A	Achugao (North)	WB 05	Plumeria Hotel	10	8
20A	Achugao (North)	WB 06	Aqua Resort Hotel	2	6
20B	Achugao (South)	WB 07	Tanapag Meeting Hall	2	8
20B	Achugao (South)	WB 08	Central Repair Shop	4	16
21	As Matuis	WB 01	Wing Beach	0	2
21	As Matuis	WB 02	Pau-Pau Beach	6	18
22	Banaderu	NEB 01	Grotto Cave	0	8

SAIPAN continued: (dissolved oxygen)

Segment ID	Segment Name	Sampling Station ID	Sampling Station Name	2008 D.O. Exceedences (%)	2009 D.O. Exceedences (%)
23	Mangaha	MG 01	Dock	0	4
23	Mangaha	MG 02	Swimming Area A	0	4
23	Mangaha	MG 03	Swimming Area A	0	8
23	Mangaha	MG 04	Swimming Area B	0	0
23	Mangaha	MG 05	Managaha Beach	0	0
23	Mangaha	MG 06	Managaha Beach	0	0
23	Mangaha	MG 07	Managaha Beach	0	0
23	Mangaha	MG 08	Beach Near Statue	0	0
23	Mangaha	MG 09	Managaha Beach	0	0
23	Mangaha	MG 10	Managaha Beach	0	0
23	Mangaha	MG 11	Next to Dock	0	4

IV.3. 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.*

NEARSHORE CORAL REEFS:

Site No.	Seg. ID	Segment Name	Benthic Substrate Ratio Trends	Coral Diversity Trends	2008 ALUS Rank	2010 ALUS Rank
ROTA						
10	2	Sabana/Talakaya/ Palie	Not-significant changes throughout	Not-significant changes throughout	**Good**	**Good**
28	2	Sabana/Talakaya/ Palie	Significant decline from disturbance years, non-significant, slight recovery	Significant decline from disturbance years, non-significant, slight recovery	**Fair**	**Fair**
11	3	Songsong	Significant decline from disturbance years, no recovery trends yet indicated	Not-significant changes throughout	**Fair**	**Fair**
26	3	Songsong	Significant decline from disturbance years, non-significant, slight recovery	Not-significant changes throughout	**No ranking in previous reports-**	**Fair**
27	3	Songsong	No new data	No new data	**Poor*1**	
12	4	Uyulanhulo/Teteto	Significant decline from disturbance years, non-significant, slight recovery	Not-significant changes throughout	**Fair**	**Fair**
35	4	Uyulanhulo/Teteto	No new data	Not-significant changes throughout	**Fair**	**Fair**

NEARSHORE CORAL REEFS continued:

Site No.	Seg. ID	Segment Name	Benthic Substrate Ratio Trends	Coral Diversity Trends	2008 ALUS Rank	2010 ALUS Rank
AGUIGAN						
20	6	Aguigan	No new data	No new data	**Good**	
21	6	Aguigan	No new data	No new data	**Good**	
TINIAN						
18	7	Masalok	Significant decline from disturbance years, significant recovery underway	Not-significant changes throughout	**Fair**	**Good**
19	9	Makpo	Significant decline from disturbance years, non-significant, slight recovery	Significant decline from disturbance years, non-significant, slight recovery	**----**	**Fair**
31	9	Makpo	Not-significant changes throughout	Declining trend, non-significant	**Poor**	**Poor**[*1]
9	10	Puntan Diaplomanibot	No new data	Not-significant changes throughout	**Fair**	**Fair**
29	11	Puntan Tahgong	Significant decline from disturbance years, non-significant, slight recovery	Not-significant changes throughout	**Poor**[*1]	**Poor**[*1]
SAIPAN						
15	12	Kalabera	No new data	Not-significant changes throughout	**Fair**	**Fair**
1	15	Lao Lao	Significant decline from disturbance years, significant recovery underway	Declining trend, non-significant	**Fair**	**Fair**
2	15	Lao Lao	Significant decline from disturbance years, no recovery trends yet indicated	Significant, declining trend and no recovery	**Poor**	**Poor**[*1, 2]
5	17A	Isley (West)	Significant decline from disturbance years, no recovery trends yet indicated	Declining trend, non-significant	**Fair**	**Poor**[*2]
3	17B	Isley (East)	Significant decline from disturbance years, non-significant, slight recovery	Not-significant changes throughout	**Fair**	**Fair**
4	17B	Isley (East)	Significant decline from disturbance years, no recovery trends yet indicated	Significant, declining trend and no recovery	**Good**	**Poor**[*2]

NEARSHORE CORAL REEFS continued:

Site No.	Seg. ID	Segment Name	Benthic Substrate Ratio Trends	Coral Diversity Trends	2008 ALUS Rank	2010 ALUS Rank
SAIPAN						
8	21	As Matuis	Not-significant changes throughout	Not-significant changes throughout	**----**	**Good**
7	23	Managaha	Not-significant changes throughout	Significant decline from disturbance years, significant recovery underway	**----**	**Good**
33	23	Managaha	Significant decline from disturbance years, significant recovery underway	Not-significant changes throughout	**Good**	**Good**
6	18A	Susupe (North)	Significant decline from disturbance years, significant recovery underway	Significant decline from disturbance years, significant recovery underway	**----**	**Good**
16	19B	West Takpochau (Central)	Not-significant changes throughout	Significant, declining trend and no recovery	**----**	**Poor**[*1]

NEARSHORE SEAGRASS ASSEMBLAGES:

Site No.	Seg. ID	Segment Name	Description of Benthic Categories	Previous ALUS ranking	Current ALUS ranking
SAIPAN					
40	18A	Susupe (north)	Natural seasonal changes apparent, standing crop of macroalgae and seagrass statistically similar	**Unknown**	**Fair**
36	18B	Susupe (south)	No data available this reporting period	**Good**	**----**
37	18B	Susupe (south)	No data available this reporting period	**Good**	**----**
38	18B	Susupe (south)	No data available this reporting period	**Good**	**----**
39	18B	Susupe (south)	Natural seasonal changes apparent, standing crop of macroalgae and seagrass statistically similar	**Unknown**	**Fair**
45	19A	West Takpochau (north)	No data available this reporting period	**Poor**[*1]	**----**
43	19B	West Takpochau (central)	No data available this reporting period	**Poor**[*1]	**----**
44	19B	West Takpochau (central)	No data available this reporting period	**Poor**[*1]	**----**
41	19C	West Takpochau (south)	Natural seasonal changes apparent and dominant drivers of change	**Good**	**Good**
42	19C	West Takpochau (south)	Persistent macroalgae abundance greater than seagrass	**Poor**[*1]	**Poor**[*1]
47	20A	Achugao (North)	No data available this reporting period	**Poor**[*1]	**----**
48	20A	Achugao (North)	Natural seasonal changes apparent, standing crop of macroalgae and seagrass statistically similar	**Poor**[*1]	**Fair**
46	20B	Achugao (South)	Persistent macroalgae abundance greater than seagrass, only disturbance regime removes macroalgae growth	**Poor**[*1]	**Poor**[*1]
49	21	As Matuis	No data available this reporting period	**Good**	**----**

IV.4. Lake Susupe monitoring data (Segment ID: 18LAK; Susupe)

NOTES:

2. COLOR LEGEND: = impaired; = severely impaired

E.coli 2008	Site ID Names	Total number of samples	Total number of Violations	Percent Violation (%)
LOCATION (Saipan)				
Susupe Lake	S1	25	13	**52**

E.coli 2009	Site ID Names	Total number of samples	Total number of Violations	Percent Violation (%)
LOCATION (Saipan)				
Susupe Lake	S1	25	2	8