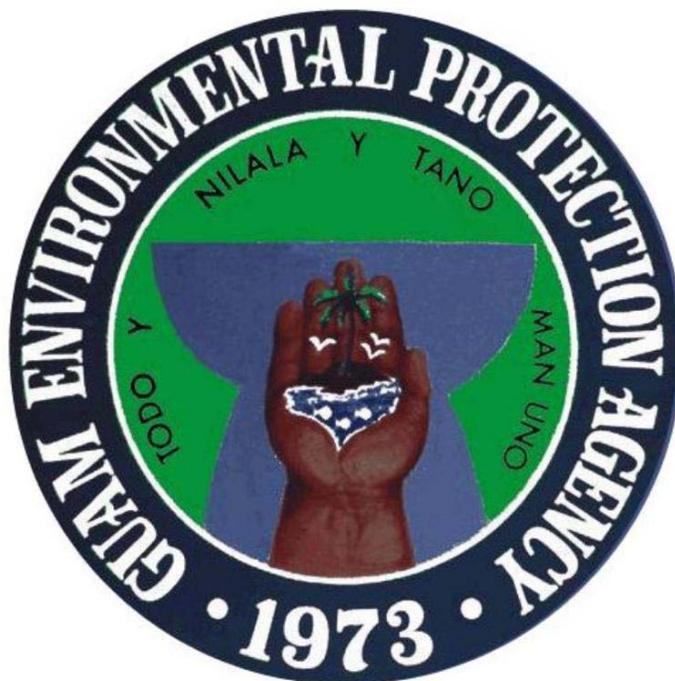


Recreational Beach Monitoring Plan:

Guam Coastal Waters



Submitted by

Recreational Beach Monitoring Program
Environmental Monitoring and Assessment Services Division
Guam Environmental Protection Agency

GUAM ENVIRONMENTAL PROTECTION AGENCY
P.O. Box 22439 GMF
BARRIGADA, GUAM 96931
(671) 475-1658/9

Table of Contents

SECTION	PAGE
TABLES.....	ii
APPENDICES.....	ii
DEFINITIONS.....	iii
ACRONYMS, ABBREVIATIONS AND MEASUREMENT UNITS.....	iv
I. PROGRAM IMPLEMENTATION AND OVERSIGHT.....	1
I.A. NATIONAL MICROBIOLOGICAL INDICATOR HISTORY.....	1
I.B. GUAM’S MICROBIOLOGICAL INDICATOR HISTORY.....	2
II. GUAM’S BEACHES.....	3
II.A. EXISTING MONITORING DATA.....	3
II.B. BEACH LIST FOR MONITORING.....	4
III. RBMP DATA QUALITY OBJECTIVES (DQOs).....	6
IV. QUALITY CONTROL.....	7
V. MONITORING DESIGN CONSIDERATIONS FOR ADDITIONAL REPORTING.....	7
V.A. BEACH WATCH SURVEY.....	7
V.B. 305(b) REPORTING.....	7
VI. SAMPLING DESIGN.....	7
VI.A. WHEN TO CONDUCT BASIC SAMPLING.....	7
VI.B. WHEN TO CONDUCT ADDITIONAL SAMPLING.....	8
VI.C. SPATIAL BOUNDARIES OF SAMPLE COLLECTION.....	10
VI.D. DEPTH OF SAMPLE.....	11
VI.E. ADAPTIVE SAMPLING APPROACH.....	11
VII. ASSESSMENT METHODS AND PROCEDURES.....	11
VII.A. FIELD ASSESSMENT.....	11
VII.B. LABORATORY ASSESSMENT.....	12
VIII. ASSESSMENT CRITERIA.....	12
VIII.A. BASIC SAMPLING CRITERIA.....	12
VIII.B. BEACH WATCH CRITERIA.....	13
VIII.C 305(b) CRITERIA.....	14
1. CRITERIA FOR WHOLE BODY CONTACT RECREATION (M-1, M-2 & S-2 WATERS).....	14
2. CRITERIA FOR MODERATE FULL BODY CONTACT RECREATION (M-3 & S-3 WATERS).....	16
IX. PUBLIC NOTIFICATION AND RISK COMMUNICATION.....	17
IX.A. MEASURES TO NOTIFY THE PUBLIC AND EPA.....	17
1. PROBLEM ASSESSMENT AND AUDIENCE IDENTIFICATION.....	17
2. TYPES OF NOTIFICATIONS, WHEN TO NOTIFY AND HOW TO NOTIFY.....	18
a. BASIC SAMPLING NOTIFICATION.....	18
b. SEWAGE SPILL OR POLLUTION EVENT.....	19
c. HEAVY RAINFALL EVENT.....	19
3. WHEN TO REMOVE NOTIFICATIONS.....	20
4. EVALUATION OF NOTIFICATION PROGRAM EFFECTIVENESS.....	20
IX.B. MEASURES TO NOTIFY GUAM EPA PROGRAMS (POINT AND NONPOINT SOURCE PROGRAMS).....	22
IX.C. NOTIFICATION REPORT SUBMISSION AND DELEGATION.....	22
X. PUBLIC REVIEW AND COMMENT.....	22
XI. EDUCATIONAL OUTREACH FOR BEACH PROGRAM.....	22
XII. REFERENCES.....	23

TABLES

Table 1. Tier 1: Guam’s Monitored Beaches5
Table 2. Sampling Sites Designated for Monitoring after Heavy Rainfall8
Table 3. Approved Methods for the Determination of Bacteria Concentrations12
Table 4. Designated Uses of Guam’s Categorized Waterbodies12
Table 5. Whole Body Contact Recreation Use Support Criteria14
Table 6. Moderate Full Body Contact Recreation Use Support Criteria16

APPENDICES

Appendix 1. Table of Guam’s Beaches & Map of Recreational Beach Monitoring Program Sites
Appendix 2. Draft Data Elements
Appendix 3. SOP#GEPAMP017: For the Collection of Wadeable and Nonwadeable Surface Water for Microbiological Examination
Appendix 4. RBMP Field Sheets
Appendix 5. SOPs of Approved Methods for the Determination of Bacteria Concentrations
Appendix 6. RBMP Recreational Waters Pollution Report
Appendix 7. RBMP Beach Posting Sign
Appendix 8. Beach Closure Sign
Appendix 9. Storm Drain Warning Sign

DEFINITIONS

Bacterial: of, like or caused by bacteria.

Microbes: microorganisms, especially a bacterium that causes disease or fermentation.

Microbial: of or having to do with or caused by microbes.

Microbiological: dealing with microorganisms.

Microorganisms: microscopic or submicroscopic organisms including bacteria, pathogens and algae.

ACRONYMS, ABBREVIATIONS AND MEASUREMENT UNITS

Acronyms and Abbreviations:

aka	Also known as
BSP	Bureau of Statistics and Plans (Guam)
CSO	Combined Sewer Overflow
DPHSS	Department of Public Health and Social Services (Guam)
DPR	Department of Parks and Recreation (Guam)
DQO	Data Quality Objectives
E. coli	<i>Escherichia coli</i>
EMAS	Environmental Monitoring and Analytical Services
EPA	Environmental Protection Agency
GIS	Geographical Information System
GPS	Global Positioning System
GSA	Guam Code Annotated
GWQS	Guam Water Quality Standards
ID	Identification
IT	Information Technology
MS	Microsoft
NOAA	National Oceanographic and Atmospheric Administration
NRDC	National Resources Defense Council
PDN	Pacific Daily News
PIO	Public Information Officer
POTW	Publicly Owned Treatment
QAPP	Quality Assessment Project Plan
QC	Quality control
QMP	Quality Management Plan
RBMP	Recreational Beach Monitoring Program
SSO	Sanitary Sewer Overflow
US	United States
USEPA	United States Environmental Protection Agency

Measurement Units:

“	Inches
>	Greater than
cfu	Colony forming units
mi	Mile
mL	Milliliter

I. PROGRAM IMPLEMENTATION AND OVERSIGHT

Monitoring marine recreational waters for microbiological organisms is important in that consistent monitoring ensures the protection of public health. Microbial organisms, particularly pathogenic organisms, can be introduced into recreational beaches through a variety of ways. First, feces from animals (including humans) may be washed directly into surface waters by natural and urban runoff. Second, shortfalls in man-made wastewater collection systems (i.e. sewage treatment facilities, combined sewers, storm water systems, and septic tank-leaching fields) contribute untreated sewage to beaches. And third, swimmers themselves may carry microbes into the water on their bodies. People who swim and recreate in water contaminated with fecal pollution are at an increased risk of becoming ill because of pathogens from the fecal matter. This is because the primary route of exposure to these pathogens is contact with polluted water while swimming, including accidental ingestion of contaminated water.

Certain microbial organisms can cause a variety of diseases, ranging from respiratory, ear, eye, and skin infections to gastroenteritis, hepatitis and cholera. Of these, the most common swimming-associated disease is gastroenteritis (NRDC, 1996). Symptoms of this disease include vomiting, diarrhea, headache, and fever - basic flu-like symptoms and those at greatest risk are young and older swimmers and swimmers with compromised immune systems.

The purpose of this monitoring plan is to guide the Recreational Beach Monitoring Program (RBMP), a program of Guam Environmental Protection Agency's (Guam EPA) Environmental Monitoring and Analytical Services (EMAS), in adequately monitoring and assessing Guam's recreational waters for microbiological contamination and advising the public against swimming in contaminated waters.

Data collected from this program is submitted annually to United States Environmental Protection Agency's (USEPA) BEACH Watch program and used for local reporting requirements. In addition, the Guam Department of Public Health and Social Services (DPHSS), in conjunction with Guam EPA, have the joint authority to close beaches exposed to bacteria contamination from sewage. DPHSS is involved in this aspect of beach monitoring.

In 2002, USEPA has provided additional grant money to expand and enhance Guam's existing recreational beach monitoring program. In fulfillment of grant requirements, the RBMP further refined the monitoring program and established a risk communication plan. Guam EPA is dedicated to the implementation of this final plan and the enhancement of the program in the future. Any changes to this plan will be forwarded in a timely manner to USEPA in fulfillment of grant requirements.

I.A. NATIONAL MICROBIOLOGICAL INDICATOR HISTORY

Based on studies conducted during the late 1940's and early 1950's by the United States Public Health Service, *fecal coliform* counts were the regulatory standard to determine the extent of marine water microbiological pollution by human and/or animal feces contamination. This microbial group encompasses dozens of species "that, themselves, may

not be disease causing but their presence indicates that disease causing pathogens are present” (NRDC, July 1996).

Prior to 1972, the *fecal coliform* criterion was questioned and federal authorities determined deficiencies in the earlier fecal coliform studies. As a result, USEPA initiated a series of studies in 1972 to determine if, in fact, a correlation between swimming-associated illnesses and specific microbial organisms exists. These studies concluded that “*enterococci* (a group of different microbes from those that make up *fecal coliform*) showed the strongest relationship to gastroenteritis” (USEPA, Ambient Water Quality Criteria for Bacteria – 1986 (EPA440/8-84-002) January 1986). *Enterococcus* is made up of a number of microbes that are more human specific than *fecal coliform* and they are found in the gastrointestinal tract of warm-blooded animals (Standard Methods for the Examination of Water and Wastewater 19th edition, 1995). The results of the 1972 studies prompted the release of the Ambient Water Quality Criteria for Bacteria – 1986. In this 1986 document, USEPA recommends the adoption of criteria based on *enterococci* and continues to support its use as an effective indicator of water quality.¹

I.B. GUAM’S MICROBIOLOGICAL INDICATOR HISTORY

10 Guam Code Annotated (GCA) Chapter 47 – Water Pollution Control mandates the monitoring of Guam’s recreational beaches in order to protect public health from the adverse effects of swimming in polluted waters. Prior to 1993, RBMP primarily used the *fecal coliform* indicator and associated standard to determine the microbiological water quality of Guam’s recreational beaches. Upon the release of USEPA’s 1986 guidance document and recommendation of using *enterococci* for assessing recreational water quality, the Water Resources Research Center at the University of Hawaii, in conjunction with Guam EPA and USEPA, produced a study to assess the applicability of the new *enterococci* standard for Guam. This research determined that it was “feasible for Guam to accept the new USEPA marine recreational water quality standard of 35 *enterococci*/100mL using 5 sample per month geometric mean” (R. Fujioka. Applicability of New Marine Recreational Water Quality Standards in Guam”, prepared for USEPA. August 1996).

There is debate over the applicability of *enterococci* and *fecal coliform* indicators to tropical environments when assessing water quality for recreational use; specifically their potential to survive free-living in the soil and sediments of tropical environments as reported by a study conducted in Hawaii (Hardina and Fujioka 1991). Criteria for applying acceptable indicators are that the indicator(s) are not ubiquitous and do not remain free-living in the environment. If this occurs, as is suggested in the case of *enterococci* and *fecal coliform*,

¹ Some states have studied the usefulness of adopting the enterococci indicator in lieu of the fecal coliform indicator for marine recreational surface waters. New York State, for example, has not yet accepted the newly recommended indicator for many reasons. For instance, first, the use of enterococci would increase the amount of beach closures “without a clear public health benefit” (R. Nuzzi and R. Burhans. The Use of Enterococci and Coliform in Characterizing Bathing-Beach Waters. Environmental Health. July/August 1997). Second, historical data has been collected using total and fecal coliform as indicators and beach closures depend highly on trends, so to change the indicator would be counterproductive.

the use of the indicator(s) is not effective in assessing the potential risk to public health. Currently, research is being conducted by USEPA and the University of Hawaii to confirm reported findings in Hawaii and to determine if other microbes are better suited as indicators of surface water quality in tropical environments. In addition, Guam will undergo similar studies to determine the efficacy of the use of enterococci and fecal coliform as indicators of pollution. Until such time, RBMP will continue to use *enterococci* as an indicator as it is well developed for trend analysis at fixed sampling sites.

II. GUAM'S BEACHES

Guam has a tropical oceanic climate, with warm temperatures and high humidity. Daily year-round temperatures consist of highs in the middle eighties (degrees Fahrenheit) and daily lows in the low seventies. Relative humidity ranges between 65 and 75% in the afternoon to between 85 and 90% at night. Seasonal changes relate to amounts of rainfall. The wet season normally extends from July to November and dry season from January to May, with transitional periods between. Annual average rainfall varies from about 110 inches in the higher areas to about 80 inches along the shores. These subtropical temperatures allow for year-round recreation to occur at all beaches.

The entire island of Guam is classified as a coastal zone. The island is comprised of 212 square miles of land surrounded by 116.5 miles of shoreline. Guam's shoreline is divided into three distinct physical classifications, rocky coastline, sandy beaches, and mangrove mud flats. The rocky coastline classification surrounds the northern end of the island with a few isolated stretches in the south. Rocky coastline accounts for approximately 72.5 miles or 62% of the total shoreline. Sandy beaches are scattered intermittently around the island and comprise 35.9 miles of shoreline or 31% of the total. The remaining 8.1 miles or 7% of the total shoreline are classified as mangrove mud flats and are located mainly within Apra Harbor and Merizo. Guam's marine waters are further classified for water quality as Excellent/M-1 (Whole Body Contact), Good/M-2 (Whole Body Contact), or Fair/M-3 (Limited Body Contact) by the Guam Water Quality Standards (GWQS, 2001). However, the majority of recreational activity occurs along stretches of sandy beaches or limestone plateaus easily accessible from the shore and classified as Good/M-2 waters.

An inventory of Guam's 112 beaches was compiled using various data sources and is included in Appendix 1. Table of Guam's Beaches. Of the 112 beaches identified, seventy-three (73) beaches were categorized as accessible and warrant inclusion into the RBMP.

II.A. EXISTING MONITORING DATA

Bacteriological data has been collected by the RBMP for over 20 years. Data is collected weekly from fixed sampling sites along selected stretches of coastline. The data is used to advise the public against swimming in waters that have exceeded microbiological standards. Press releases are sent weekly to print, radio and television media, appropriate government agencies, and to concerned private organizations and individuals, identifying and listing beaches where the weekly samples have exceeded water quality standards.

Trend analysis is conducted using the weekly data and is used to characterize risks of exposure to contaminated waters. Beaches may be ranked using these trends to determine the need to alter the sampling frequency at existing stations or include additional unmonitored beaches to the list.

II.B. BEACH LIST FOR MONITORING

The seventy-three (73) accessible beaches identified in the beach inventory were further prioritized into tiers, using the following criteria to identify the final list of tiered beaches to be monitored under the RBMP.

Beaches classified as Tier 1, are beaches that are highly frequented beaches, with a high number of possible pollution sources, easily accessible and require frequent monitoring. Tier 2 beaches are less frequented beaches with restricted accessibility and has few pollution sources. Tier 2 beaches require less frequent monitoring. Tier 3 beaches are classified as very infrequently visited, remote, and/or very inaccessible and not monitored routinely.

Of the seventy-three (73) accessible beaches, thirty-nine (39) were further classified as Tier 1 beaches and the remaining thirty-four (34) classified as Tier 3. See Appendix 1 for a map of Recreational Beach Monitoring Program Sites. Due to small number of Tier 2 beaches during the classification, all Tier 2 beaches were placed into the Tier 1 classification.

Annually RBMP personnel conduct reviews of all prioritized and monitored beaches for their continued inclusion in their original RBMP tier. All reprioritization information is forwarded to USEPA's BEACH Watch Program during annual BEACH surveys.

The annual prioritizing criteria are:

- 1) Proximity to potential pollution sources.
- 2) Intensity of use of the site by the public
- 3) Ease of Accessibility by public
- 4) Public input
- 5) Best professional judgment of staff of Guam EPA.

All Tier 1 beaches are located in waters that are classified in the GWQS as Good/M-2 (Whole Body Contact), with the exception of two (Outhouse Beach/N18 and Port Authority Beach/N-20) which are located in Fair/M-3 (Limited Body Contact) waters. Excellent/M-1 (Whole Body Contact) waters are located along the northern coast of the island of Guam. The northern coast of Guam is accessed mainly through military and privately owned lands. Recreational activity is limited by permission from the military and private land owners. Access to the beaches in the northern coast is also limited by its physical environment. This area is made up of cliff features and is remote. Access to beach shoreline by boat is limited as the entire coast is terraced and high surf occurs year round. Monitoring and inspection occurs in this area by the US Air Force who may conduct beach monitoring near military lands. Also, the US Fish and Wildlife and the local Department of Agriculture monitors the

area for activity because the northwest coast is designated a preserve area. Due to these factors, M-1 waters are not monitored under this program.

The following table lists the thirty-nine (39) fixed Tier 1 recreational beach monitoring sites for 2003. The data collected, and any associated advisory, applies only to the geographical areas and shoreline miles listed.

Table 1. Tier 1: Guam's Monitored Beaches

Beach Name	Beach size (sandy shoreline miles)	RBMP Beach Name/USEPA BEACH SURVEY Name	GIS ID/RBMP Field ID	Shoreline miles Represented by Site	GWQS Class
NCS Beach AKA Tanguisson Beach	0.25	Tanguisson Beach	N-01	0.37	M-2
Naton Beach, Tumon Bay	1.10	Naton Beach - San Vitores	N-02	0.39	M-2
Naton Beach, Tumon Bay		Naton Beach - Fujita	N-23	0.29	M-2
Naton Beach, Tumon Bay		Naton Beach - Matapang Beach Park	N-03	0.3	M-2
Naton Beach, Tumon Bay		Naton Beach - Guma Trankilidat	N-04	0.4	M-2
Ypao Beach, Tumon Bay	0.42	Ypao Beach	N-05	0.46	M-2
Dungca's Beach	0.99	Dungca's Beach - Sleepy Lagoon	N-06	0.46	M-2
Dungca's Beach		Dungca's Beach	N-07	0.46	M-2
Trinchera Beach	1.11	East Hagåtña Bay - Trinchera Beach	N-08	0.46	M-2
Trinchera Beach & East Hagåtña Beach		Padre Palomo	N-09	0.46	M-2
Hagåtña Marina	0	Hagåtña Channel	N-10	0.15	M-2
Hagåtña Marina	0	Hagåtña Channel - Outrigger Ramp	N-11	0.15	M-2
Hagåtña Marina	0	Hagåtña Boat Basin	N-12	0.12	M-2
West Hagåtña Beach	1.11	Hagåtña Bayside Park	N-13	0.31	M-2
Beach at Fonte River	0.13	Adelup Beach Park	N-21	0.46	M-2
West of Adelup Point	0.41	Adelup Point Beach (West)	N-22	0.46	M-2
ASAN MEMORIAL BEACH, Head of Asan Bay	0.53	Asan Bay Beach	N-14	0.46	M-2
Beach at Piti Bay	1.08	Piti Bay	N-15	0.46	M-2

Beach Name	Beach size (sandy shoreline miles)	RBMP Beach Name/USEPA BEACH SURVEY Name	GIS ID/RBMP Field ID	Shoreline miles Represented by Site	GWQS Class
<i>TEPUNGAN BEACH (part of Beach at Piti Bay)</i>		Santos Memorial	N-16	0.39	M-2
United Seamen's Service	0.52	United Seamen's Service	N-17	0.37	M-2
Outhouse Beach	0.46	Outhouse Beach	N-18	0.46	M-3
Family Beach	0.15	Family Beach	N-19	0.46	M-2
Port Authority Beach	0.46	Port Authority Beach	N-20	0.46	M-3
Rizal Beach	0.26	Rizal Beach	S-01	0.46	M-2
Togcha Beach aka Agat Beach	0.79	Togcha Beach - Namo	S-02	0.33	M-2
Togcha Beach aka Agat Beach		Togcha Beach - Agat	S-03	0.15	M-2
Togcha Beach aka Agat Beach		Togcha Beach - SCA	S-17	0.31	M-2
Beach South of Finile River	1.17	Bangi Beach	S-04	0.46	M-2
Nimitz Beach	0.49	Nimitz Beach	S-05	0.46	M-2
Head of Umatac Bay	0.14	Umatac Bay	S-06	0.46	M-2
Toguan Bay	0	Toguan Bay	S-07	0.46	M-2
Merizo Public Pier Park	0	Merizo Pier - Mamaon Channel	S-08	0.46	M-2
Inarajan Pools	0.07	Inarajan Pool	S-09	0.1	M-2
Beach at Inarajan Bay	0.42	Inarajan Bay	S-10	0.46	M-2
Head of Talofof Bay	0.21	Talofof Bay	S-11	0.46	M-2
Ipan Park Beach	0.30	Ipan Public Beach	S-12	0.46	M-2
Beach north of Togcha River	0.27	Togcha Bay	S-13	0.46	M-2
Tagachang Beach Park	0.07	Tagachang Beach	S-14	0.46	M-2
Beach at Pago Bay	0.96	Pago Bay	S-15	0.46	M-2

III. RBMP DATA QUALITY OBJECTIVES (DQOs)

The Data Quality Objectives process is an iterative process used to develop qualitative and quantitative statements that clarify study objectives, define the appropriate data types and specify tolerable levels of potential decision errors that will be used as a basis for establishing the quality and quantity of data needed to support decisions (USEPA, 2000a).

The Draft DQOs for the RBMP are currently under review by USEPA. The DQOs will be finalized according to USEPA comments and will be available upon completion.

IV. QUALITY CONTROL

Guam EPA's Quality Management Plan (QMP) is currently under review by USEPA. Once the QMP is finalized, RBMP/EMAS will complete a Quality Assurance Project Plan (QAPP) for the Recreational Beach Monitoring Program based upon the approved QMP. In the interim, both field and laboratory standard methods are followed and are mentioned in this document.

V. MONITORING DESIGN CONSIDERATIONS FOR ADDITIONAL REPORTING

V.A. BEACH WATCH SURVEY

USEPA's BEACH Watch conducts annual surveys on the recreational quality of beach waters nation-wide. Information collected from the surveys is posted on the USEPA web page to ensure public accessibility. To support the USEPA database, RBMP formally submits information to the survey annually and electronically submits microbiological data (raw data) quarterly. More information on the BEACH WATCH program can be found at <http://www.epa.gov/waterscience/beaches/>.

Appendix 2, Draft Data Elements, lists guidance by USEPA to use in developing database and electronic data reporting system. This information is updated weekly using computerized spreadsheet software. Reports are submitted annually.

V.B. 305(b) REPORTING

Recreational beach water quality summaries are submitted biennially to USEPA in the Section 305(b), Federal Water Pollution Control Act (PL92-500), U.S. congressional report on the state of United States (US) waters.

USEPA requires the following information for 305(b) Reporting:

1. Total number of "beach" miles.
2. Number of shoreline miles fully, partially or not meeting its designated use of swimming – primary and secondary contact.

VI. SAMPLING DESIGN

A grab sample from fixed sites will be collected by RBMP personnel and analyzed by Guam EPA chemists. Data will be reported to RBMP where it will undergo strict QC and precision checks before being compared to approved standards. If data does not pass QC checks, re-sampling is required (See "Additional Sampling" section that follows). The GWQS requires that both instantaneous and geometric mean characteristics be determined at each site. Exceedances of either or both standards will result in the release of a public advisory that will be in effect until the next sampling event. Public notification procedures (release of advisory and posting signs) are discussed in detail in section VIII below.

VIA. WHEN TO CONDUCT BASIC SAMPLING

The data collected will be used to reflect the condition of bacterial concentrations at listed recreational marine beaches over a period of one week on a year-round basis. For scheduling purposes, basic sample collection will occur during the weekday, typically

closest to the weekend (taking into account holidays). Wednesdays are targeted for sampling to allow for laboratory analysis and re-sampling if required. Samples will be collected in the morning hours to obtain bacterial concentrations prior to prolonged exposure to sunlight. This allows for a more conservative approach to public health protection.

VI.B. WHEN TO CONDUCT ADDITIONAL SAMPLING

1. **AFTER A WATER QUALITY STANDARD IS EXCEEDED:** Additional sampling is not automatic, unless directed by senior management of Guam EPA or if QA/QC protocols are violated. Beach CLOSURES will be in effect only after a sewage spill or determined pollution event (see #2 below and Section IX.A.2. Types of Notifications).
2. **AFTER A SEWAGE SPILL OR POLLUTION EVENT:** In the event of a sewage spill which impacts a beach, an evaluation of a public health threat will be conducted by Guam EPA and DPHSS. If the spill is deemed a public health threat to swimmers and waders, a beach closure will be in effect without sampling. The responsible party(ies) is required to immediately release a public notice with the concurrence of Guam EPA and DPHSS and post closure signs. The area of closure will initially be determined upon best professional judgment by DPHSS and Guam EPA until immediate sampling can identify the spatial extent of the contamination. To determine the spatial extent of the contamination, sampling locations will be placed at the initial point of the spill and then every 200 meters (0.12mi) in all directions not to exceed 1500 meters (approx. 1 mi), or as determined by the regulatory agencies and the responsible party(ies). Frequency of sampling will be determined by the regulatory agencies. See section IX.A.2a and b for more.
3. **REOPENING AFTER A CLOSURE:** Confirmatory sampling will be conducted at additional monitoring sites once the spill/break is reported to be contained and before a closure is rescinded. Health standards are to be met to ensure the spill/break has been mitigated before reopening a beach.
4. **AFTER A HEAVY RAINFALL EVENT:** If a rainfall event of greater than two inches (>2”) in a 24-hour period occurs, additional samples will be collected immediately at the following beaches:

Table 2. Sampling Sites Designated for Monitoring after Heavy Rainfall

	Beach Name	RBMP Beach Name/USEPA BEACH SURVEY Name	GIS ID/RBMP Field ID
1.	Naton Beach	Naton Beach - Matapang Beach Park	N-03
2.	Dungca's Beach	Dungca's Beach	N-07

3.	Trinchera Beach	East Hagåtña Bay - Trinchera Beach	N-08
4.	East Hagåtña Beach/Trinchera Beach	Padre Palomo	N-09
5.	Hagåtña Channel/Hagåtña Marina	Hagåtña Channel	N-10
6.	Hagåtña Channel/Hagåtña Marina	Hagåtña Channel - Outrigger Ramp	N-11
7.	Hagåtña Marina	Hagåtña Boat Basin	N-12
8.	West Hagåtña Beach	Hagåtña Bayside Park	N-13
9.	<i>TEPUNGAN BEACH (part of Beach at Piti Bay)</i>	Santos Memorial	N-16
10.	(Toguan Bay)	Toguan Bay	S-07
11.	Beach at Inarajan Bay	Inarajan Bay	S-10
12.	Head of Talofofu Bay	Talofofu Bay	S-11

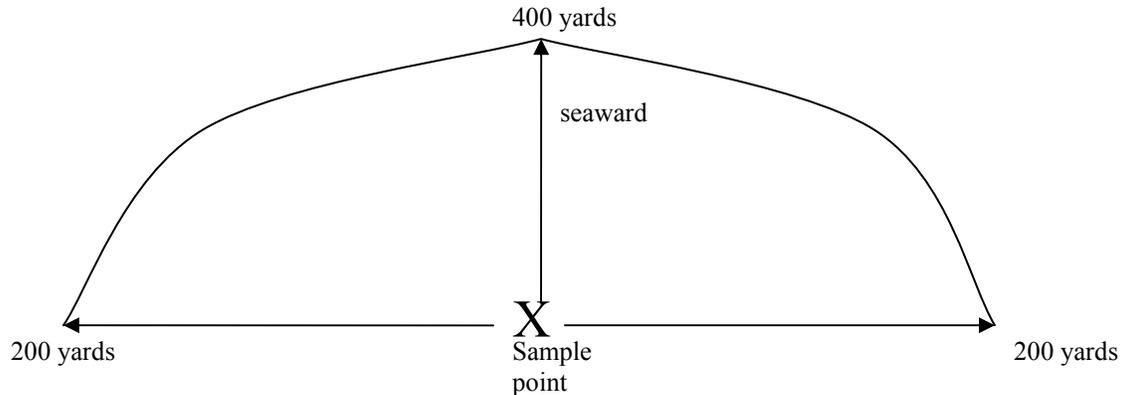
Existing data from sites listed in Table 2 shows frequent exceedances of standards following a heavy rainfall. Site number 1 is located at Matapang Beach Park at Naton Beach, Tumon Bay. The park acts as a ponding basin for runoff water in the area. Sites 2 through 8 are located in bays with permitted storm drains. Sites 9 through 12 are located at the mouths of river bodies.

Upon review of National Oceanographic and Atmospheric Administration's (NOAA) 2002 rainfall data for Guam, the average 24-hour rainfall maximum is 2 inches. This number is derived from taking an average of the recorded maximum rainfall in a 24 hour period during each month in 2002 calendar year (excluding rainfall data during typhoons). The RBMP has selected this average maximum rainfall of 2 inches in a 24-hour period as an interim 'heavy rainfall event' threshold and will issue automatic swimming and wading advisories for the beaches listed in Table 2. Immediate re-sampling at these sites is then initiated. Guam RBMP will use the interim threshold value until additional research (e.g. studies at sites influenced by freshwater runoff) and re-sampling data are collected to make a sound estimation of a 'heavy rainfall event' that affects a beach.

Data from these additional samples will be collected and evaluated to support the development of a Preemptive Rainfall Standard for Guam. The preemptive standard will be evaluated by Guam EPA and USEPA for inclusion into the next revision of the GWQS.

VI.C. SPATIAL BOUNDARIES OF SAMPLE COLLECTION

RBMP fixed sites assess the quality of water in a 200 yard radius left and right of the sample site. Signs are placed above the high water mark but in line with the sample sites. Specifically, from where a fixed site is located the assessed area of beach is 200 yards of shoreline (0.23 miles) going left and right along the shoreline from the sample point and 400 yards seaward. A diagram follows:



*diagram not to scale

Regardless of the total length of a beach, assessed shoreline miles will not exceed 400 yards total (0.46 miles) per sample site. Any area of beach outside the 200 yards left or right or 400 yards seaward of the sample point is not under a swimming advisory. Long beaches may include more than one site thus providing a comprehensive assessment. If two sites are closer than 400 yards, the shoreline distance between the two sites is divided equally and each fixed site will assess those portions. The number of miles monitored for all tier 1 beaches are listed in Tables 1 and 2.

Grab samples are collected at fixed sites. The locations of fixed sites are determined using the criteria in outlined in Section II.B. For the past several reporting years, site selection was based primarily on the criteria to protect public health. Sites were located in close proximity to known or potential pollution sources. This allows for the most conservative approach in protecting public health from swimming in contaminated waters.

Guam's Beaches are relatively short in length, but these beaches may have several known or potential pollution sources associated with them. Therefore, a majority of sites are located along these beaches and in close proximity to the pollution source. The geographic spatial location (latitude and longitude) of each fixed site is recorded using a Global Positioning System (GPS). In addition, a physical description of the site location is supplied to ensure sampling reproducibility.

VI.D. DEPTH OF SAMPLE

Marine water samples from each site are collected according to Section 8.1 of Standard Operating Procedure #GEPAMP017: For the Collection of Wadeable and Nonwadeable Surface Water for Microbiological Examination (Appendix 3). Samples are collected at sampler's knee depth (approximately 0.5 meters) with the sampling container submerged approximately 0.3 meters, or to the depth of the sampler's elbow. During low tide events, when depth is less than 0.5 meters, the sample will be collected at an alternate location, following sample collection procedures. The sampler will then record this new GPS location, new site description and note tidal characteristics on the field sheet.

VI.E. ADAPTIVE SAMPLING APPROACH

This monitoring plan will be flexible to accommodate demands for new information, addition of monitoring sites, change in location of monitoring sites, increase in sampling frequency and other factors as the need arises.

VII. ASSESSMENT METHODS AND PROCEDURES

VII.A. FIELD ASSESSMENT

Marine water samples from each site are collected according to Section 8.1 of Standard Operating Procedure #GEPAMP017: For the Collection of Wadeable and Nonwadeable Surface Water for Microbiological Examination (Appendix 3).

Additional parameters on physical properties and conditions of the site will be collected during each sampling event. These parameters are:

- Weather during sampling
- Weather in the past 24 hours of sample collection
- Weekly rainfall in inches
- 24 hour rainfall prior to sample collection
- Air temperature
- Tidal Stage
- Wind velocity and direction
- Water surface conditions
- Water color
- Presence of suspended solids (turbid?)
- Smell
- Other (sewer line break, dead fish, dead crabs, jelly fish, algal bloom, litter/trash)

Climate information, weekly rainfall and 24 hour rainfall information are found at the National Weather Service Forecast Office (NOAA, Tiyan, Guam) web page. Tidal stage information for Apra Harbor is found at NOAA's/NOS CO-OPS web page. Air temperature, wind speed and direction, and site climate data are collecting using approved field instruments (i.e. Kestrel instruments). The RBMP Field Sheets, in Appendix 4, provide choices for the subjective site parameters, e.g. water color and smell.

These physical properties and conditions will be checked for correlation to bacteria levels.

VII.B. LABORATORY ASSESSMENT

Table 3 below provides method numbers for specific bacteriological analyses. All methods are approved EPA methods and satisfy the requirements of the GWQS and the RBMP.

Table 3. Approved Methods for the Determination of Bacteria Concentrations

<i>Enterococcus</i>	<i>Escherichia coli</i>
Enterolert® (SM 9223B)	Colilert® & Colilert-18® (SM 9223B)
mEI (Indoxyl) EPA Method 1600	mTEC/Urea (SM 9213D) (EPA Method 1103.1)
mE/EIA (SM 9230C) (EPA Method 1600.1)	mTEC Modified (EPA Method 1103.1)

Guam EPA’s primary laboratory method for enumeration of bacterial concentrations of recreational marine waters is Enterolert® (SM 9223B). The SOP document for this approved analytical method is provided in Appendix 5.

VIII. ASSESSMENT CRITERIA

VIII.A. BASIC SAMPLING CRITERIA

Guam’s waterbodies are classified into categories based on designated uses. These categories are M-1/Excellent, M-2/Good and M-3/Fair. Categories and associated uses are shown in the following table:

Table 4. Designated Uses of Guam’s Categorized Waterbodies

Category	Quality	Description	Primary Designated Uses
M-1	Excellent	Marine Waters	whole body contact recreation, aquatic life, consumption
M-2	Good	Marine Waters	whole body contact recreation, aquatic life, consumption
M-3	Fair	Marine Waters	limited body contact recreation, aquatic life, consumption

TABLE FROM GUAM WATER QUALITY REPORT 2000: FEDERAL WATER POLLUTION CONTROL ACT SECTION 305(B) 4/12/01 PAGE 17.

The GWQS category of each of the thirty-nine (39) monitoring sites is listed in Table 1, Tier 1: Guam’s Monitored Beaches, in section II.B. as M-2 or M-3.

The designated use of “whole-body contact/primary contact” means the use of surface water for swimming or other recreational activity that causes the human body to come into direct contact with the water to the point of complete submergence. The use is such that ingestion of the water is likely and sensitive body organs, such as the eyes, ears, or nose, may be exposed to direct contact with the water. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, motorized water sport activities, and fishing.

The designated use of “limited-body contact/secondary contact” means the recreational use of a surface water that may cause the human body to come into direct contact with the water, but normally not to the point of complete submergence (for example, wading or

boating). The use is such that ingestion of the water is not likely and sensitive body organs, such as eyes, ears, or nose, will not normally be exposed to direct contact with the water.

The bacteriological standards recommended in USEPA's, Ambient Water Quality Criteria for Bacteria – 1986 (EPA440/8-84-002 January 1986) has been adopted by Guam EPA and is included in GWQS (2001 revision). Marine waters designated for Whole Body Contact Recreation (M-1 & M-2) incorporate the “Designated Beach Area” assignments from the 1986 criteria; Limited Contact Recreation (M-3 sites) incorporates “Moderate Full Body Contact Recreation” allowable densities from the 1986 criteria. Thus, numerical standards for *Enterococci* for these categories are as follows:

- M-1, M-2:** Instantaneous – 104/100mL
Geometric Mean - 35/100mL based on 5 sequential samples taken over a 30 day period
- M-3:** Instantaneous - 276/100mL
Geometric Mean - 35/100mL based on 5 sequential samples taken over a 30day period

If samples collected at monitoring sites do not meet instantaneous and geometric mean *Enterococci* criteria, an advisory is released against swimming and wading at the beach and signs are posted at the beach.

VIII.B. BEACH WATCH CRITERIA

The following ‘Individual Beach’ information must be compiled and submitted to Beach Watch annually or as needed:

1. Beach Location and characteristics,
2. Beach Use (number of swimming months, usage),
3. Beach Pollution (sources),
4. Water Quality Monitoring (bacteriological monitoring, miles monitored, monitoring responsibility, monitoring frequency),
5. Basis of Advisories/Closures

Each week, the public advisory (posting)/closing information is recorded onto spreadsheets for each established site:

1. Details on full year closures if applicable,
2. Advisories (posting)/closing based on violations of standards,
3. Start and End date of advisories (posting)/closures,
4. Total number of days posted
5. Percent of the beach affected,
6. Reason(s) for advisory (posting)/closure:
 - Choose all that apply:
 - a) Monitoring that revealed elevated bacteria levels,
 - b) Preemptive – Rainfall,
 - c) Preemptive – Sewage discharge or spill,
 - d) Preemptive – Chemical or oil discharge/spill,

- e) other
7. Source(s) responsible for advisory (posting)/closure:
Choose all that apply:
- a) CSO (not applicable to Guam),
 - b) SSO (not applicable to Guam),
 - c) POTW,
 - d) Septic systems,
 - e) Sewer line/blockage/break,
 - f) Storm water runoff,
 - g) Wildlife,
 - h) Unknown,
 - i) other
8. Indicator used to issue advisory (posting)/closure:
Choose all that apply:
- a) Preemptive,
 - b) Enterococci,
 - c) Total coliform,
 - d) Fecal coliform,
 - e) *E. coli*,
 - f) Total/Fecal ratio,
 - g) other

In addition to these items, program information must be updated and submitted when needed. Beach Watch personnel send surveys at the end of the calendar year. In addition, online reporting can be conducted at the end of the calendar year at <http://www.epa.gov/OST/beaches/>. More information can be found at that web site as well.

VIII.C 305(b) CRITERIA

Section 305(b) of the CWA, requires the status of Guam's waters be reported every two years. The status of Guam's recreational beaches are reported as shoreline miles that are either 'fully', 'partially' or 'not' supporting assigned designated-uses.

The following Guam EPA criteria are consistent with recommendations from the Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305b Reports) and Electronic Updates: Supplement EPA-841-B-97-002B (September 1997 USEPA Office of Water).

1. CRITERIA FOR WHOLE BODY CONTACT RECREATION (M-1, M-2 & S-2 WATERS)

Criteria used to determine use-support for waters designated for 'whole body' contact recreation (M-1, M-2 & S-2), are depicted in the following table:

Table 5. Whole Body Contact Recreation Use Support Criteria

Level of Use Support	Criteria	
	Marine Water: M-1 and M-2	Fresh Water: S-2
Fully Supporting	<p><u>Enterococci:</u> A geometric mean of 35 <i>enterococci</i> per 100mL (based on 5 sequential samples) is not exceeded AND the single sample density does not exceed 104 <i>enterococci</i> per 100mL.</p> <p><u>Fecal coliform:</u> The single sample density does not exceed 200 cfu/100mL AND an arithmetic mean of effluent samples taken during 30-consecutive days does not exceed 200 cfu/100mL AND an arithmetic mean of effluent samples taken during 7-consecutive days does not exceed 400 cfu/100mL.</p>	<p><u>Escherichia coli:</u> A geometric mean of 126 <i>e. coli</i> per 100mL (based on 5 samples taken sequentially) is not exceeded AND the single sample density does not exceed 235 <i>e. coli</i> per 100mL.</p> <p><u>Enterococci:</u> A geometric mean of 33 <i>enterococci</i>/100mL (based on 5 sequential samples) is not exceeded AND the single sample density does not exceed 61 <i>enterococci</i> per 100mL.</p> <p><u>Fecal coliform:</u> The single sample density does not exceed 200 cfu/100mL AND An arithmetic mean of effluent samples taken during 30-consecutive days does not exceed 200 cfu/100mL AND an arithmetic mean of effluent samples taken during 7-consecutive days does not exceed 400 cfu/100mL</p>
Partially Supporting	<p><u>Enterococci:</u> Geometric mean of 35 <i>enterococci</i> per 100mL (based on 5 sequential samples) is met AND the single-sample criterion of 104 <i>enterococci</i> per 100mL is exceeded during the year.</p> <p><u>Fecal coliform:</u> The single sample density of 200 cfu/100mL is exceeded during the year AND the arithmetic mean of effluent samples taken during 30-days consecutive does not exceed 200 cfu/100mL during the year AND an arithmetic mean of effluent samples taken during 7-days consecutive does not exceed 400 cfu/100mL during the year.</p>	<p><u>Escherichia coli:</u> Geometric mean of 126 <i>e. coli</i> per 100mL (based on 5 sequential samples) is met AND single-sample criterion of 235 <i>enterococci</i> per 100mL is exceeded during the year.</p> <p><u>Enterococci:</u> A geometric mean of 33 <i>enterococci</i>/100mL (based on 5 sequential samples) is met during the year AND the single-sample density of 61 <i>enterococci</i> per 100mL is exceeded during the year.</p> <p><u>Fecal coliform:</u> The single sample density of 200 cfu/100mL is exceeded during the year AND the arithmetic mean of effluent samples taken during 30-days consecutive does not exceed 200 cfu/100mL during the year AND the arithmetic mean of effluent samples taken during 7-days consecutive does not exceed 400 cfu/100mL during the year.</p>

Level of Use Support	Criteria	
	Marine Water: M-1 and M-2	Fresh Water: S-2
Not Supporting	<p><u>Enterococci</u>: Geometric mean standard of 35 <i>enterococci</i> per 100mL is not met.</p> <p><u>Fecal coliform</u>: Arithmetic mean standard of 200 cfu per 100mL from 30-consecutive days is not met during the year AND the arithmetic mean standard of 400 cfu per 100mL from 7 consecutive days is not met during the year</p>	<p><u>Escherichia coli</u>: Geometric mean standard of 126 <i>E.coli</i> per 100mL is not met.</p> <p><u>Enterococci</u>: Geometric mean standard of 35 <i>enterococci</i> per 100mL is not met.</p> <p><u>Fecal coliform</u>: Arithmetic mean standard of 200 cfu per 100mL from 30-consecutive days is not met during the year AND arithmetic mean standard of 400 cfu per 100mL from 7 consecutive days is not met during the year.</p>

TABLE FROM GUAM WATER QUALITY REPORT 2000: FEDERAL WATER POLLUTION CONTROL ACT SECTION 305(B) 4/12/01 PAGE 20.

2. CRITERIA FOR MODERATE FULL BODY CONTACT RECREATION (M-3 & S-3 WATERS)

Criteria used to determine use-support for waters designated for limited (secondary) contact recreation use (S-3 and M-3) are in the following table:

Table 6. Moderate Full Body Contact Recreation Use Support Criteria

Degree of Recreation Use Support	Criteria	
	Marine Water M-3	Fresh Water S-3
Fully Supporting	<p><u>Enterococci</u>: A geometric mean of 35 <i>enterococci</i> per 100mL (based on 5 sequential samples) is not exceeded AND the single sample density does not exceed 276 <i>enterococci</i> per 100mL.</p> <p><u>Fecal coliform</u>: The single sample density does not exceed 200 cfu/100mL AND An arithmetic mean of effluent samples taken during 30-consecutive days does not exceed 200 cfu/100mL AND an arithmetic mean of effluent samples taken during 7-consecutive days does not exceed 400 cfu/100mL.</p>	<p><u>Escherichia coli</u>: A geometric mean of 126 <i>e. coli</i> per 100mL (based on 5 samples taken sequentially) is not exceeded AND the single sample density does not exceed 298 <i>e. coli</i> per 100mL</p> <p><u>Enterococci</u>: A geometric mean of 33 <i>enterococci</i>/100mL (based on 5 sequential samples) is not exceeded AND the single sample density does not exceed 89 <i>enterococci</i> per 100mL.</p> <p><u>Fecal coliform</u>: The single sample density does not exceed 200 cfu/100mL AND An arithmetic mean of effluent samples taken during 30-consecutive days does not exceed 200 cfu/100mL AND an arithmetic mean of effluent samples taken during 7-consecutive days does not exceed 400 cfu/100mL.</p>

Degree of Recreation Use Support	Criteria	
	Marine Water M-3	Fresh Water S-3
Partially Supporting	<p><u>Enterococci:</u> Geometric mean of 35 <i>enterococci</i> per 100mL (based on 5 sequential samples) is met AND the single-sample criterion of 276 <i>enterococci</i> per 100mL is exceeded during the year.</p> <p><u>Fecal coliform:</u> The single sample density of 200 cfu/100mL is exceeded during the year AND the arithmetic mean of effluent samples taken during 30-days consecutive does not exceed 200 cfu/100mL during the year AND an arithmetic mean of effluent samples taken during 7-days consecutive does not exceed 400 cfu/100mL during the year.</p>	<p><u>Escherichia coli:</u> Geometric mean of 126 <i>e. coli</i> per 100mL (based on 5 sequential samples) is met AND single-sample criterion of 298 <i>enterococci</i> per 100mL is exceeded during the year.</p> <p><u>Enterococci:</u> A geometric mean of 33 <i>enterococci</i>/100mL (based on 5 sequential samples) is met during the year AND the single-sample density of 89 <i>enterococci</i> per 100mL is exceeded during the year.</p> <p><u>Fecal coliform:</u> The single sample density of 200 cfu/100mL is exceeded during the year AND the arithmetic mean of effluent samples taken during 30-days consecutive does not exceed 200 cfu/100mL during the year AND the arithmetic mean of effluent samples taken during 7-days consecutive does not exceed 400 cfu/100mL during the year.</p>
Not Supporting	<p><u>Enterococci:</u> Geometric mean standard of 35 <i>enterococci</i> per 100mL is not met.</p> <p><u>Fecal coliform:</u> Arithmetic mean standard of 200 cfu per 100mL from 30-consecutive days is not met during the year AND the arithmetic mean standard of 400 cfu per 100mL from 7 consecutive days is not met during the year.</p>	<p><u>Escherichia coli:</u> Geometric mean standard of 126 <i>E.coli</i> per 100mL is not met.</p> <p><u>Enterococci:</u> Geometric mean standard of 35 <i>enterococci</i> per 100mL is not met.</p> <p><u>Fecal coliform:</u> Arithmetic mean standard of 200 cfu per 100mL from 30-consecutive days is not met during the year AND arithmetic mean standard of 400 cfu per 100mL from 7 consecutive days is not met during the year.</p>

TABLE FROM TABLE FROM GUAM WATER QUALITY REPORT 2000: FEDERAL WATER POLLUTION CONTROL ACT SECTION 305(B) 4/12/01 PAGE 21.

IX. PUBLIC NOTIFICATION AND RISK COMMUNICATION

IX.A. MEASURES TO NOTIFY THE PUBLIC AND EPA

1. PROBLEM ASSESSMENT AND AUDIENCE IDENTIFICATION

Recreational swimming and wading occurs year round on Guam’s beaches and the general public swims and wades indiscriminately. As previously stated the marine water surrounding the island of Guam is designated for whole body/primary and limited body/secondary contact; all of Guam’s marine waters must be “of good quality for swimming and wading”.

The general public frequents popular public and private beaches around Guam everyday, with the highest activity occurring on weekends and holidays. Children and elderly adults swim and wade in the shallow waters near shore. For the most part, recreational swimming and wading occurs at easily accessible spots. In addition, local fishermen, using a variety of methods, fish from the shoreline at many locations around the island that are easily accessible or not easily accessible.

Guam is a popular destination for tourists originating from Asia (Japan and Korea), with arrivals peaking at about one million tourist a year. Many of these tourists swim within Tumon Bay, the primary tourist destination on Guam. However, many optional tours exist, that are taken all over the island for more scenic water related activities. Swimming and wading related businesses conduct activities close to shore or at easily accessible beaches. Most of these water related business are permitted (if required) and must maintain proper business licenses.

Guam also sees many visitors or transients from within the pacific region (e.g. Federated States of Micronesia). Many visitors from this group swim at popular beaches and harvest a variety of marine organisms for consumption from the reef flats surrounding Guam.

2. TYPES OF NOTIFICATIONS, WHEN TO NOTIFY AND HOW TO NOTIFY

a. BASIC SAMPLING NOTIFICATION

When recreational beach waters do not meet the water quality criteria outlined earlier, Guam EPA will release a public advisory recommending against swimming in contaminated areas. Posting of advisory signs at contaminated beaches will be implemented during the next year. GEPA is currently researching a new "CLOSURE" procedure for beaches that are under an "ADVISORY" for extended periods with no known sources. This new closure procedure will be available for public review in the next Beach Plan review scheduled for 2004. At this time, a "CLOSURE" is immediately issued at beaches affected directly by an untreated sewage release or when a known pollution event has occurred. Conditions are specified in Section VI.B.2. Closures will be removed once data supports no impact to the beach. See Section VI.B.2 and VI.B.3. and Section b below for more information on beach closures.

Appendix 6. Recreational Waters Pollution Report is an example of the advisory released weekly to TV and print media (Pacific Daily News), various Government agencies (including the Guam Department of Parks and Recreation - DPR), village Mayors, dive shops and other interested individuals. RBMP maintains a fax and email contact list. The current advisory and past advisories are archived at Guam EPA's web page (<http://www.guamepa.govguam.net>). These advisories are released and posted on Guam EPA's web page in English only.

The Recreational Waters Pollution Report weekly lists beaches not meeting water quality standards. A major revision to this format that is being considered by the RBMP is to also list those beaches that meet water quality criteria. A second revision to the current public notification is the possibility of the RBMP purchasing advertising space in newspaper to print the weekly advisory as a whole. Currently, as a public service announcement, the local newspaper releases

weekly RBMP advisory information based on available space, leaving out pertinent program information.

A third revision, that will be implemented this coming year, is the placement of advisory signs at all monitored beaches. When results are released and an advisory list is obtained, RBMP personnel will post signs at beaches under advisory. RBMP advisory signs are permanent signs that will be printed in four languages, Chamorro, English, Japanese and Korean, showing the current status of each particular beach. An example of the proposed beach posting sign is illustrated in Appendix 7. When a warning/advisory is in effect, the sign is flipped opened, showing a yellow colored background and the no swimming icon. When the warning/advisory is rescinded, the sign is flipped closed again to the original layout with a green background. This method allows for the best public exposure, by being visual with no chance of a misunderstanding due to language barriers. All signs will be properly secure to prevent vandalism or tampering with the signs.

b. SEWAGE SPILL OR POLLUTION EVENT

Guam EPA with DPHSS has joint authority to close beaches. Guam EPA, DPHSS and the responsible party will release a beach CLOSURE according to conditions of Section VI.B.2 and 3.

Beach closure information will be incorporated into the Recreational Waters Pollution Report (Appendix 6) and will be sent (fax or email) to contacts on the RBMP contact list. Also, signs will be posted at the impacted area. Appendix 8 shows an example of an acceptable beach closure sign. These signs will be printed in Chamorro, English, Japanese and Korean. The responsible party will be required to post and maintain these signs during the containment and remediation process. Guam EPA, DPHSS and the responsible party will work closely together. All information pertinent to RBMP scope will be forwarded by the Point-source Pollution Program Manager or person(s) directed by him/her or the Administrator of Guam EPA.

c. HEAVY RAINFALL EVENT

Upon review of National Oceanographic and Atmospheric Administration's (NOAA) rainfall data for Guam, the average 24-hour rainfall maximum is 2 inches. This number is derived from taking an average of the recorded maximum rainfall in a 24 hour period during each month in 2002 calendar year (excluding rainfall data during typhoons). The RBMP has selected 2 inches of rainfall in a 24-hour period as an interim 'heavy rainfall event' standard and will issue automatic swimming and wading advisories for the beaches listed in Table 2 Sampling Sites Designated for Monitoring after Heavy Rainfall in Section VI.B.4. As explained in Section VI.B.4, these beaches are severely influenced during heavy rainfall events by either excessive runoff from land, storm drains or a river

mouth. Additional data will be collected to develop and support the inclusion of a preemptive heavy rainfall standard in the next revision of the GWQS.

Advisories after heavy rainfall will be incorporated into the Recreational Waters Pollution Report (Appendix 6) and will be sent (fax or email) to contacts on the RBMP contact list.

In an effort to communicate to the public the risk of swimming at beaches near flowing storm drains, RBMP will place permanent signs at beaches receiving storm drain effluent. Appendix 9 provides an example of this sign. These signs will be printed in Chamorro, English, Japanese and Korean and permanently placed at the following beaches:

- Dungca's Beach
- Trinchera Beach
- East Hagåtña Beach/Trinchera Beach
- Hagåtña Channel/Hagåtña Marina
- Hagåtña Marina
- West Hagåtña Beach

3. WHEN TO REMOVE NOTIFICATIONS

Removal of an advisory notification will be initiated only if the following requirements are met:

- a) Subsequent weekly sampling shows a beach meeting water quality criteria outlined in section VIII.A.
- b) Sewage release or pollution event has been contained and affected area remediated AND subsequent samples show a site to meet meeting water quality criteria outlined in section VIII.A.
- c) Subsequent samples after heavy rainfall (>2" in a 24-hour period) show a site to meet meeting water quality criteria outlined in section VIII.A.

4. EVALUATION OF NOTIFICATION PROGRAM EFFECTIVENESS

RBMP is subject to public and government evaluation. All notices and signs contain contact numbers for RBMP. Guam EPA's Web page also provides for this process as well. Any comments and suggestions are highly encouraged.

The RBMP staff and Division Coordinator for EMAS will evaluate program effectiveness to determine the following:

- *Whether the process evaluations occur as the communication strategy is implemented.*
 - a) A Public Information Officer (PIO), Information Technology (IT) staff and the webmaster of Guam EPA's Web Page are on staff at Guam EPA and provide the necessary evaluations during the communication process. In the event that these people are not

available, the division coordinator of EMAS and the Administrator of Guam EPA provides the evaluations. Evaluations are conducted during the course of the communication process and are used to modify the communication strategy during implementation.

- b) Interviews/discussions with focus groups is conducted during the communication process to determine if the advisory information released is reaching the target audience and how receptive they are to that information.
- *Whether the needs of the public and the agency's objectives have been met.*
 - a) Conducting annual feed back/evaluation surveys is currently being discussed by RBMP. Survey activities shall be contracted and conducted through a professional third party company. Information collected shall include the public's knowledge on the following:
 - Human health risks of swimming in contaminated water
 - Specific advisory recommendations
 - The advisory process
 - The public's reaction to advisories and closings
 - The public's willingness to adhere to advisory and closing recommendations
 - The public's suggestions for better communication methods
 - b) The Guam EPA web page is monitored on a continuous basis and 'visits' to the Beach Advisory/Closure page is compiled and reported to RBMP.
 - c) A communications focus group will be made up of staff from the beach risk communication program, the non-point source pollution program, the webmaster of Guam EPA's Web Page, IT staff and the Guam EPA PIO. The focus group will determine the following:
 - What agency objectives did the advisory help achieve?
 - What objectives were not accomplished?
 - What positive reactions have you heard from or observed in target audiences?
 - What is working in the advisory materials?
 - What negative reactions have you heard from or observed in target audiences? Which methods of communication need improvement?
 - What changes do we need to make in our advisory communication program?

IX.B. MEASURES TO NOTIFY GUAM EPA PROGRAMS (POINT AND NONPOINT SOURCE PROGRAMS)

Weekly reports (interagency memorandum from the EMAS Division Coordinator) shall be submitted to the Chief Engineer of Guam EPA's Water Program. The report will include the following information:

1. Name of beach listed on the advisory,
2. Geometric mean value for that week,
3. Number of days under advisory (based on calendar year).

When determined, sources of bacteriological contamination are recorded by the RBMP. This data is compiled and reported to USEPA annually through BEACH Watch surveys.

IX.C. NOTIFICATION REPORT SUBMISSION AND DELEGATION

Data is submitted to USEPA's BEACH Watch program annually via their survey. One-time station and beach description data will be submitted to USEPA's BEACH Watch program for new beaches, if needed, during this annual submittal.

An annual report will be submitted to USEPA describing any changes made to RBMP's notification plan (described in this section), delegation of responsibilities and RBMP Monitoring Plan (this document).

X. PUBLIC REVIEW AND COMMENT

The public will be given an opportunity to review this recreational beach monitoring plan and any future revisions. Before being finalized by Guam EPA and approved by USEPA, a public comment period will be available and announced in the local newspaper(s) and on Guam EPA's web page. Copies of the recreational beach monitoring plan will be made available for review at Guam EPA's Administrative office and the plan will be loaded onto Guam EPA's web page. Public Comment periods shall be 4 weeks or 30 days in duration. All comments or suggestions must be submitted to the Agency in writing.

The document that will be available to the public for review will include the following:

1. Beach evaluation and classification process, including a list of waters to be monitored and beach ranking (if applicable).
2. Sampling design and monitoring plan, including sampling location and sampling frequency.
3. Public notification and risk communication plan, including methods to notify the public of a swimming advisory.

XI. EDUCATIONAL OUTREACH FOR BEACH PROGRAM

Guam EPA RBMP is involved frequently in educational outreach activities. These activities include presentations at conferences and workshops, annual involvement in EARTHWEEK activities, school presentations, and responses to inquires by students researching beach quality.

RBMP is currently evaluating the following to further enhance public outreach activities:

1. Annual brochure in several languages to disseminate Program information including:
 - a. risks of swimming in polluted waters,
 - b. map of monitored sites,
 - c. possible sources,
 - d. RBMP's plan and bacteria standards,
 - e. reducing exposure,
 - f. statistical trends at select beaches.

These brochures will be disseminated to local hotels, supermarkets, gas stations, for example, in attempts to reach more of the general public.

2. Paid monthly informational advertisements in local newspaper(s) (PDN, Marianas Variety) to include the following information:
 - a. risks of swimming in polluted waters,
 - b. map of monitored sites,
 - c. possible sources,
 - d. RBMP's plan and bacteria standards,
 - e. how to reduce exposure.
 - f. statistical trends at select beaches.

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