

# SANITARY SURVEY PROGRAM FOR TEXAS BEACHES

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## **QUALITY ASSURANCE PROJECT PLAN**

**Prepared for:**

**US Environmental Protection Agency, Region 6  
Dallas, Texas**

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**Effective : \_\_\_\_\_**



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**MANAGEMENT’S STATEMENT OF APPROVAL**

This **Quality Assurance Project Plan (QAPP)** is specifically designed for the development and implementation of a Sanitary Survey Program for Texas Beaches to support the Texas Beach Watch Program that is required by the Beaches Environmental Assessment and Coastal Health Act of 2000. The QAPP specifies the overall project design and Quality Assurance (QA) objectives in sufficient detail to ensure program goals are accomplished in a timely, efficient, and cost-effective manner. The implementation of this QAPP will also ensure the environmental data collected is the appropriate type and quality for its intended use.

By our signatures below, we hereby approve this Quality Assurance Project Plan:

	Date
Texas General Land Office	

	Date
Texas General Land Office	

	Date
Texas General Land Office	

	Date
Texas General Land Office	

	Date

	Date

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## LIST OF ACRONYMS

Coordinator	Beach Watch Coordinator
CWSS	Center for Water Supply Studies
COC	Chain of Custody
DQI	Data Quality Indicators
EPA	U.S. Environmental Protection Agency
FIPS	Federal Information Processing Standard
GLO	Texas General Land Office
GM	Geometric Mean
QA/QC	Quality Assurance/Quality Control
QAO	Quality Assurance Officer
QAP	Quality Assurance Program
QAPP	Quality Assurance Project Plan
QMP	Quality Management Plan
SSMD	Single Sample Maximum Density
SOP	Standard Operating Procedure
TCEQ	Texas Commission on Environmental Quality

## **A. PROJECT MANAGEMENT**

### **1. Project/Task Organization**

#### ***Sanitary Survey Project***

This project proposes to initiate a standard sanitary survey program, currently lacking in Texas, to characterize and categorize Texas beaches, assess potential sources of pollution and predict water quality based on existing data. The surveys will provide information for coastal managers to assess their beaches and make decisions regarding water quality, modeling, beach categorizations and remediation plans to reduce potential health risks to the public. The project addresses the CMP funding category, Water Quantity and Quality Improvements, under the priority “development or implementation of watershed restoration plans/strategies to address nonpoint source pollution”. It also addresses the category, Information and Data Availability. The USEPA’s National Beach Guidance and Required Performance Criteria for Grants include the use of sanitary surveys as a tool for beach managers to meet grant performance criteria for the BEACH Act Grant Program.

Sanitary surveys are assessments that characterize an area, identify potential sources of pollution and predict water quality based on existing data and have been used to assess water quality since the 1920s. These surveys play a key role in beach classifications for the BEACH Act Grant Program under which beaches are to be classified in an appropriate tier based on the potential risk to human health presented by pathogens. (which can be assessed through a sanitary survey and monitoring) and the use of the beach. A beach sanitary survey covers a multitude of factors at the beach itself, including beach characteristics, number of bathers, amount of algae on beach, and wildlife present. Data is also gathered at the watershed level, including weather and rainfall data, storm water outfall locations, and land use data. The data is integrated to determine possible correlations with water quality measurements performed throughout the year. The surveys provide a basis for classifying beaches into tiers, identifying appropriate sampling locations and prioritizing monitoring needs. Recommendations can then be made on how best to allocate available resources.

Annual sanitary surveys are lacking for Texas beaches monitored through the Texas Beach Watch program, with field observation sheets completed at time of water sampling only containing a limited amount of routine information. Currently two beach segments monitored by the program are listed on the Texas 303 (d) list as impaired for bacteria and sanitary surveys will provide an additional assessment of pollution risks at area beaches that can be used to generate information for local government entities for mitigation and best management practices.

The purpose of this project is to initiate sanitary surveys at Coastal Bend beaches based on the annual sanitary survey template in the 2005 USEPA Great Lakes Beach Sanitary Survey User Manual, and incorporating guidance from other documents, to assess pollution risks, re-evaluate the current beach tier designations and determine the best course of action for future beach watch sampling at current and potential sites. A pilot program will be initiated for beaches in the Coastal Bend area of Texas to assess the effectiveness of the sanitary survey process, with plans in place to expand the survey program to all Texas Beach Watch monitored counties. This work will be coordinated with the support of state and regional agencies.

### ***Texas Beach Watch Project***

The Texas General Land Office (GLO) will contract with local governments, universities, and commercial laboratories (local contractors) to collect and analyze water samples. The results of these water samples will be reported to the GLO and the GLO will notify the local government contacts, identified in the QAPP and contracts, of the results.

The Texas Beach Watch Coordinator (Coordinator) will coordinate contracts between the GLO and local contractors, consolidate data submitted, provide program oversight, and maintain the Quality Assurance Project Plan (QAPP). The Texas General Land Office will maintain the Quality Management Plan (QMP) and ensure Quality Assurance/Quality Controls (QA/QC) are in place.

## **2. Problem Definition/Background**

### ***Sanitary Survey Project***

The USEPA developed the Beach Sanitary Survey Tool to help beach managers in the Great Lakes synthesize all contributing beach and watershed information—including water quality data, pollutant source data, and land use data—so that they can improve Great Lakes water quality for swimming. This beach sanitary survey tool is tailored to the beach environment in the Great Lakes. It has, however, been modified to perform sanitary surveys at Coastal Bend beaches currently being monitored for water quality. In addition, beach managers can use sanitary survey data (e.g., bacteria levels, source flow, turbidity, rainfall) to develop models to predict daily bathing beach water quality, if appropriate. State beach program managers can use the data collected and synthesized by means of a sanitary survey to prioritize which beaches to monitor as part of a BEACH Act monitoring and notification program. The USEPA BEACH Act Grant program provides grants to states, territories, and tribes for beach monitoring and notification programs. As part of the program, states are required to prioritize beaches for monitoring.

A beach sanitary survey provides a documented historical record of beach and watershed water quality. It serves as a baseline to which future beach and watershed assessments of the overall health of the beach and watershed can be compared, and it enables beach managers to perform long-range water quality and resource planning. The sanitary survey also provides support for enforcement actions by establishing a record of conditions and operations at a point in time. The information in the survey also benefits storm water program managers, wastewater facility managers, local elected officials, local planning authorities, academic researchers, and other beach and water quality professionals.

Local beach managers and public health officials can use the survey to identify bacterial sources of pollutants affecting beaches, assess beach health, share information, and conduct watershed planning. The Beach Sanitary Survey will help beach managers meet the requirements of the BEACH Act Grant Program, as described in the National Beach Guidance and Required Performance Criteria for Grants.



### ***Texas Beach Watch Project***

Growing concerns about the health risks posed by polluted bathing beaches, increased beach closures, and scientific evidence indicating an increase in infectious diseases caused by microbial organisms in recreational waters prompted the EPA to create the National Beaches Environmental Assessment, Closure, and Health (BEACH) Program. The goals of the BEACH Program are to protect public health at the nation's beaches and to ensure the public is notified when the risk for potential illness and disease is present.

Subsequently, on October 10, 2000, the Beaches Environmental Assessment and Coastal Health Act (BEACH Act), was passed to reduce the risk of disease to users of the nation's recreational waters. The BEACH Act authorizes EPA to award grants to eligible coastal and Great Lake states and tribes for the development and implementation of programs to monitor coastal recreational waters for disease-causing microorganisms, and to notify the public when monitoring indicates a public health hazard exists. EPA allocated funds in fiscal year 2001 and annually thereafter to help states develop their monitoring programs. To be eligible for implementation grants, states must establish and operate monitoring and notification programs consistent with performance criteria provided in the *National Beach Guidance and Required Performance Criteria for Grants* document (June 2002, EPA-823-B-02-004).

Between 1999 and 2003, prior to the passage of the BEACH Act and the development of the *National Beach Guidance and Required Performance Criteria for Grants*, the GLO secured and allocated Texas Coastal Management Program (CMP) funds for water quality monitoring at thirteen of the most heavily used beaches in six counties along the Texas coast.

### **3. Project/Task Description**

#### ***Sanitary Survey Project***

Because beaches are dynamic systems, they need to be gauged periodically for short- and long-term health risks. The Center for Water Supply Studies (CWSS) has developed two types of beach sanitary surveys—the Marine Beach Routine On-site Survey and Marine Beach Annual On-Site Survey—to assist with short- and long-term assessments. The Marine Beach Routine On-site Survey is performed with water quality sample collection. The Marine Beach Annual On-Site Survey is performed annually to collect beach sanitary data that changes infrequently. In addition, the Marine Beach Annual Analysis Form and Marine Beaches Sanitary Survey Database have been developed.

The Marine Beach Routine On-site Survey is designed to be used each time a water sample is collected during regular bacterial monitoring to supplement information collected during water quality sampling. The survey will help to provide useful information on water quality to support the annual surveys. The form will help identify underlying conditions at the beach that can be observed frequently and that can contribute to microbiological contamination of the recreational waters and beach areas. The Routine On-Site Sanitary Survey form is in Appendix A.

In the Marine Beach Annual On-Site Survey (Appendix A), beach measurements and observations, beach materials and sediments, habitat around beach, description of any Shellfish Growing Areas, bounding structures, description of sanitary and other facilities, and observed

potential pollution sources are documented. If any photos are taken, the file name and description of the photo should also be documented.

The Marine Beach Annual Analysis form compiles collected data from the On-site Surveys (routine and annual) as well as program information collected by telephone interviews with program administrators and spatial analysis of landscape changes into an annual evaluation of beach conditions and changes. This survey expands geographically to include the contributing watershed and surrounding shoreline. The Marine Beach Annual Analysis form is in Appendix A.

The Texas Marine Beaches Sanitary Survey Database is a Microsoft Access format relational database system used to store data relating to the location and description of the individual beaches, water quality parameters, weather conditions, and all other data collected with the Routine, Annual and annual analysis forms. Each record contains a unique Beach ID along with the Beach name and Federal Information Processing Standard (FIPS) code. The Texas Marine Beaches Sanitary Survey Database is described by the Texas Marine Beaches Sanitary Survey Data Dictionary in Appendix B.

### ***Texas Beach Watch Project***

The Texas Beach Watch project involves the collection and testing of water quality samples for the presence of Enterococcus bacteria. Local contractors will collect water quality samples using standard collection methods described under Section B, Data Generation and Acquisition, Subsection 2, Sampling Methods, of this QAPP. Local laboratories will analyze the samples and enter results in the Texas Beach Watch Program database. The GLO database will be used to compare sample results to EPA's recommended criteria. If sample results exceed EPA's recommended criteria, the GLO will notify local government representatives immediately. Local government representatives may then require signs, warning of elevated bacteria levels, be posted at the affected beaches. In addition, bacteria levels for each sample are posted in real time on the Texas Beach Watch Program's public Internet site at [www.TexasBeachWatch.com](http://www.TexasBeachWatch.com).

In September 2003, pilot implementation of the expanded monitoring program commenced in the six counties previously participating in the CMP funded Texas Beach Watch Program (Jefferson, Galveston, Brazoria, Matagorda, Nueces, and Cameron) and continued through the summer of 2004. In July 2004, nine additional stations were established in Galveston (1), Brazoria (2), Nueces (2), and Cameron (4) counties, and four new stations were established when Aransas County began participating in the program. In 2005 sampling was being conducted at 161 stations on beach segments in Jefferson, Galveston, Brazoria, Matagorda, Aransas, Nueces, and Cameron counties. In 2006, the Texas Beach Watch Program added six new stations in three counties: four stations in Kleberg County, one station in San Patricio County, and one station in Nueces County. Beginning in 2011, the GLO added two testing locations at Sylvan Beach located in the City of La Porte, Harris County and in September ceased testing at all four stations in Kleberg County.

In 2008, the Texas Commission on Environmental Quality (TCEQ) listed Ropes Park and Cole Park beaches in Nueces County as impaired. The beaches are included in the state's 303(d) list and subjected to additional testing in 2010. The Coastal Bend Bays and Estuaries Program and

the GLO's Coastal Management Program simultaneously funded a study conducted by Texas A&M University – Corpus Christi titled "Detection of Human Fecal Contamination in Corpus Christi Bay with Bacteria Monitoring and Source Tracking in Corpus Christi Bay at Cole and Ropes Parks".

Appendix C – Unique Local Contractor Information contains specific information for each local contractor including maps and GPS coordinates of sampling locations. As new local contractors are added to the program, Appendix C is updated incorporated into the contract's Work Plan and prior to the new local contractor beginning sampling. Appendix C is also updated when sampling stations are added or deleted. A copy of the QAPP and applicable Appendices is included in all contracts between the GLO and a local contractor.

#### **4. Quality Objectives and Criteria for Measured Data**

##### ***Sanitary Survey Project***

The goal of the Sanitary Survey Program is to develop a standard sanitary survey tool for Texas beaches to support the Texas Beach Watch Program that will be available for all the coastal counties, and to apply the sanitary survey plan to perform sanitary surveys at Coastal Bend beaches currently being monitored for water quality, make recommendations for appropriate tier categories for each beach and based on these initial results, adjust the survey tool as needed for future use.

##### ***Texas Beach Watch Project***

The goal of the Texas Beach Watch project is to provide the public with information about water quality at recreational beaches. Development and implementation of a water quality monitoring and notification program will meet this goal. Water quality samples will be collected and tested for *Enterococcus* bacteria and compared to the EPA recommended Single Sample Maximum Density (SSMD) criteria of 104 colony forming units (cfu)/100 ml. Upon receipt of reliable data, advisories will be recommended when sample results for *Enterococcus* exceed EPA's recommended criteria. Data is of acceptable quality when it meets the requirements established in the QAPP under Section B, Data Generation and Acquisition, Subsections 5 thru 8 and conducted in accordance with the sampling and analytical methods identified in Section B, Subsections 1 thru 4.

#### **5. Special Training/Certification**

No special training or certification is required for the Sanitary Survey project; however, all samples taken for the Texas Beach Watch Project will be collected under the supervision of licensed sanitarians or qualified environmental scientists under contract with the Texas General Land Office's Texas Beach Watch Program, who have been trained to collect samples in accordance with the QAPP and the laboratory's Standard Operating Procedures (SOP). All laboratory analyses will be conducted at contracted laboratories under the direction of the Project Manager identified in Appendix C.

Data entry staff will receive training on the proper procedures to enter and validate data by the Project Manager or their designee.

This QAPP is intended to apply to multiple labs using multiple EPA approved techniques (Method 1600 and IDEXX Enterolert) on a regular basis and therefore references laboratory and manufacturer QA/QC requirements for equipment and is more general in nature consistent with the EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5) document, specifically 2.4 General Content And Detail Requirements, 2.4.1 General Content and 2.4.2 Level of Detail.

## **6. Documentation and Records**

The Center for Water Supply Studies and contract laboratories will be responsible for maintaining all records related to the collection and analysis of data. These records include Marine Beach Routine On-Site Survey Form, Marine Beach Annual On-Site Survey Form, Marine Beach Annual Analysis Form, Texas Marine Beaches Sanitary Survey Data Dictionary, Texas Beach Watch chain of custody forms, sample analysis forms, individual laboratory QA/QC records, and any other documentation generated. Hard copies and electronic files containing field and laboratory data will be stored for three years. The GLO will not require the submission of hard copies, unless specifically requested. When a contract laboratory ceases to participate in the Beach Watch Program, all records related to the collection and analysis of data will be provided to the GLO for recordkeeping purposes. The data can be in electronic format or hard copy.

The GLO is responsible for maintaining the Texas Beach Watch Program database and ensuring sample data is maintained and backed up in an electronic format. In addition, the GLO is responsible for submitting annual data results to EPA on or before January 31.

## **B. DATA GENERATION / ACQUISITION**

### **1. Sanitary Survey Forms**

#### ***Marine Beach Routine On-Site Survey***

The Marine Beach Routine On-site Survey is designed to be filled out each time a water sample is taken for bacterial analysis. The information requested in this form is primarily information that can be gathered locally, at the beach.

In the first section of the Marine Beach Routine On-Site Survey form, list the basic information about your beach, such as the date of survey, Beach name and ID, sampling station ID, sampler's or monitor's names, and time sample(s) were collected and delivered to the lab.

The subsequent sections of the Marine Beach Routine On-Site Survey outline site conditions, beach use, bather load, sampling site information or potential pollution sources and presence or evidence of wildlife and/or domestic animals. The data fields for the Marine Beach Routine On-Site Survey may be viewed in Appendix A.

#### ***Marine Beach Annual On-Site Survey***

This form includes fields for types of data you should consider collecting if you are conducting a Marine Beach Annual On-Site Survey. Make sure that you document all sources of information, including name of beach/ID, date of survey, city/county/state, name of water body, name of surveyors, surveyor affiliation and organization STORET ID. In this survey, beach measurements and observations, beach materials and sediments, habitat around beach, description of any Shellfish Growing Areas, bounding structures, description of sanitary and other facilities, observed potential pollution sources are documented. If any photographs are taken, the file name and description of the photographs should also be documented.

#### ***Marine Beach Annual Analysis Form***

In the first section of the Marine Beach Annual Analysis form, list the basic information about your beach, such as the Beach name and ID, city/county/state, period of analysis, name of water body, sampling station IDs, name of analyst, analyst's affiliation, number of routine surveys analyzed and STORET ID.

The Marine Beach Annual Analysis is a very detailed survey that documents information about average weather conditions, erosion/accretion measurements, lab analysis of beach materials and sediment, biological (algae, shellfish, snails or other aquatic organisms) survey results, description of land use in water shed, beach use, activities at the beach, beach cleaning, water quality sampling, health concerns associated with the beach, advisories/closings and correlation of parameters and elevated bacteria concentrations.

#### ***Texas Marine Beaches Sanitary Survey Data Dictionary***

The Texas Marine Beaches Sanitary Survey Data Dictionary is a table used to store data relating to the location and description of the individual beaches. Each record contains a unique Beach ID along with the Beach name and FIPS code.

## **2. Sampling Process Design**

### ***Sanitary Survey Project***

The CWSS has developed standard operating procedures (SOPs) for data collected for the Sanitary Survey project. These SOPs are current and reflect activities as actually performed. SOPs are maintained in a Laboratory Method Manual document located in NRC 3100. If SOPs have not been generated by CWSS, other published methods may be used as SOPs. When collecting data, CWSS employees will follow the SOPs described in the document. All SOPs, including manuals or published methods, are written clearly and in enough detail to provide instruction for any person collecting data to easily follow the methods.

### ***Texas Beach Watch Project***

Pursuant to the BEACH Act, Texas determined the number of primary and secondary contact recreation gulf and bay beaches along with the corresponding beach miles. Beaches in each county were ranked as primary or secondary contact recreation beaches based on frequency and density of use. With the exception of Cameron, Galveston, Harris, Nueces, and San Patricio counties, most of the primary contact recreation beaches are located along the Gulf of Mexico, where there are no direct discharges from land (point sources or stormwater outfalls). All beaches along the Gulf of Mexico are ranked as high priority (Tier 1) and sampling of coastal waters will be conducted as sampling costs and funding allows. The most heavily used beaches are located in Galveston, Nueces, and Cameron counties. These counties contain the most sampling stations and receive the majority of the funds available.

Data from sample results are used to recommend swimming advisories; therefore, the collection and analysis of water samples are classified as critical measurements. Critical measurements are those required to achieve project objectives or limits on decision errors. The project objective seeks to provide the public with information about the water quality at beaches used for contact recreation. One sample will be collected at each sampling station. The sample result is compared to EPA's recommended criteria. The criteria or "action levels" is the EPA recommended 104 cfu/100 ml for the SSMD. If the SSMD is exceeded, an advisory will be recommended by the GLO and a sample will be collected daily until the sample result is below the recommended criteria.

The SOPs for field sampling are described in sequential steps. The SOP also includes information pertaining to specific facilities, equipment, materials and methods, and QA/QC procedures. All local contractors will follow the SOPs described in Part 9000 (Microbial Examination) of *Standard Methods for the Examination of Water and Wastewater* (APHA, AWWA, WEF, 21<sup>st</sup> Edition, 2005 or available online: [Standard Methods for the Examination of Water and Wastewater at www.standardmethods.org](http://www.standardmethods.org)).

The proper collection, preservation, and storage of beach water samples are necessary to reduce analytical errors. Bacteriological samples will be collected in polypropylene bottles with a volume of at least 125 milliliters (ml), but no more than 1000 ml, to allow for adequate sample mixing. To avoid contamination, the collection bottles must remain sealed until immediately prior to sample collection. Initial samples will be collected between sunrise and noon. If results exceed EPA's recommended criteria, local contractors are required to collect additional samples

within two hours. If results are received late in the day, the additional samples may be collected the following morning.

### ***Sampling Depth***

EPA's *Environmental Monitoring for Public Access and Community Tracking Beaches Project* (EMPACT Beaches Project Results from a Study on Microbiological Monitoring in Recreational Waters, <http://www.epa.gov/microbes/empact.pdf>), (EPA 600/R-04/023) recommends samples be collected in waist deep (~ 3 ft.) water, 0.3 m (~12 inches) from the surface. However, according to discussions at the 2004 National Beaches Conference, EPA's recommended sampling depth may not be appropriate for samples collected in the swash zone. The swash zone is defined as water one foot deep or less and is the area of water where children, an at risk population, spend most of their time. In Texas waters, the swash zone usually contains large amounts of sand and sediment due to wave action. Therefore, the Texas Beach Watch Program will sample at approximately two feet or knee depth. The two-foot standing depth will apply unless:

The majority of recreational activity occurs at a depth significantly different from two feet. If this occurs, samples may be collected at the location of greatest swimmer activity; or

The two-foot standing depth occurs more than 50 meters (164 feet) from shore. If the two-foot sampling depth occurs more than 50 meters from the shore, samples may be collected at 50 meters from shore or at the location of greatest swimmer activity. The distance shall be measured from the approximate water line at the time of sampling.

The numbers of microorganisms in marine water samples are susceptible to rapid change due to growth or death after collection. Therefore, to minimize change, samples will be held for the shortest time possible. Standard protocol dictates holding times will be no longer than six hours. Steps for the preservation and transit of collected water samples will be followed precisely or the sample will not be analyzed and another sample will be collected. Bacteriological samples will be stored in insulated containers and maintained at a temperature of <10 degrees Celsius as described in section 8.1.2 of Method 1600 which states in part that "ice or refrigerate water samples at a temperature of <10 degrees Celsius during transit to the laboratory."

### ***Design Assumptions***

When more than one sampling station exists on a beach, the sampling stations will be spaced approximately 500 meters apart (500 meters = 1640.42 feet). However, due to the variability of Gulf beach public access points, the 500-meter spacing may not be practicable. The majority of recreational beach users congregate around public access points; therefore, samples will be collected near access points.

Sample locations are included as part of the individual appendices for each local contractor. As counties are added to the Texas Beach Watch Program, appendices will be added to document sampling locations, contact information, and any other information specific to each county.

Samples will be collected weekly during the beach season (currently May-September) and biweekly during the off-season (October-April). Circumstances may dictate modifications to

sampling time and frequency for certain beaches. For example, during March sampling will be conducted weekly on all Gulf beaches to account for the increase in the number of tourists visiting during spring break.

Tuesday is the preferred sample collection day. Monday and Wednesday are alternate sample collection days. This schedule allows time for re-sampling to occur, before the next regular sampling period, when elevated bacteria levels are detected. Depending on the number of beaches, stations, and travel distance, local contractors may require several days to collect samples.

The local contractor's field personnel currently document rainfall and tidal information on a Field Observation Form to explain sample collection difficulties (for example: the current was too strong to enter the water safely). The Sanitary Survey Project will incorporate the Marine Beach Routine On-Site Survey in Appendix A. If a sample cannot be collected according to the sampling schedule, field personnel will collect the samples as soon as possible to ensure re-sampling can be conducted, if necessary, prior to the next sampling period. If sampling cannot be conducted during the required period, the local contractor must inform the Coordinator during that sampling period.

Samples must be processed as soon as possible after collection so the holding time limit does not exceed six hours between collection and initiation of sample analyses.

The Texas Beach Watch Program contracted laboratories will be required to analyze samples weekly and notify the Coordinator by entering sample results into the Texas Beach Watch Program's database within two hours. The database generates detailed email notifications to all interested parties designated by the Coordinator.

### **3. Sampling Methods**

#### ***Sanitary Survey Project***

##### ***Procedures for CWSS Field Samplers/Monitors***

The sampling method requirements for data collected during the Marine Beach Routine On-Site Survey are listed in Table 1.



**Table 1: Marine Beach Routine On-Site Survey Parameters.**

PARAMETER	UNITS	MATRIX	METHOD	PARAMETER CODES
<b>Field Parameters</b>				
Present weather	1=Clear 2=Partly Cloudy < 50% 3=Cloudy > 50% 4=Rain 5=Drizzle 6=Fog 7=Other/Explain	NA	TCEQ SOP	47501
Tide stage	1=low 2=falling 3=slack 4=rising 5=high	Water	TCEQ SOP	84381
Air temperature	°C	Air	TCEQ SOP	00020
Longshore Current	m/s	Water	NA	70225
Water color	1=Brown 2=Red 3=Green 4=Black 5=Clear 6=Other	Water	TCEQ SOP	00081
Water Temperature	°C	Water	TCEQ SOP	00010
pH	su	Water	TCEQ SOP	00406
Turbidity	NTU	Water		82078
Tidal Pools Present/Quantity #	NA	Water	NA	C87000
Average Size of Tidal Pools	m	Water	NA	C87001
Days Since Last Rainfall	Days	NA	TCEQ SOP	72053
Rainfall (inches past 1 day)	Inches	NA	TCEQ SOP	82553
Rainfall (inches past 3 days)	Inches	NA	TCEQ SOP	82371
Rainfall (inches past 7 days)	Inches	NA	TCEQ SOP	82554
Wind intensity	1=Calm 2=Slight breeze 3=Moderate breeze 4=Strong wind Slight=5-10 mph, Moderate =10-30 mph, Strong >30 mph	Water	TCEQ SOP	00035
Specific Conductance	S/cm	Water	TCEQ SOP	00094

PARAMETER	UNITS	MATRIX	METHOD	PARAMETER CODES
Dissolved Oxygen	Mg/L	Water	TCEQ SOP	00300
Salinity	Ppt	Water	TCEQ SOP	00480
Water Odor	1=Sewage 2=Oily/Chemical 3=Rotten eggs 4=Musky 5=Fishy 6=None 7=Other/Explain	Water	TCEQ SOP	34773
Depth of Water Sample	ft	Water	TCEQ SOP	00068
Wind direction	1=North 2=Northeast 3=East 4=Southeast 5=South 6=Southwest 7=West 8=Northwest	Air	TCEQ SOP	00038
Water Surface or Intensity	1=Calm 2=Ripples 3=Waves 4=white Caps	Water	TCEQ SOP	46001

mg/L = milligrams per liter; m/s = meters per second; ft = feet; m = meters; °C = degrees Celsius; Ppt = parts-per-thousand; su = standard units; Siemens per centimeter  
NA = Not applicable

References for Table 1:

TCEQ SOP – TCEQ Surface Water Quality Monitoring Procedures Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment and Tissue (October 2008).

The following tables (Tables 2 and 3) contain a listing of the data to be collected during the Sanitary Survey project during the Marine Beach Routine On-Site and the Marine Beach Annual On-Site Surveys. SOP document numbers and parameter codes are included. The CWSS has developed a Laboratory Method Manual, which is a collection of SOPs and other published methods, containing detailed information on how to collect each parameter listed.

**Table 2. Marine Beach Routine/Annual On-Site Survey Parameters.**

SOP Number	Parameter	Parameter Code
<b>Beach Use</b>		
SOP001	Swimming/Sunbathing	C87002
SOP002	Surfing/Windsurfing	C87003
SOP003	RVs on Beach	C87004
SOP004	Fishing/from Pier	C87005
SOP005	Watercraft	C87006

<b>SOP Number</b>	<b>Parameter</b>	<b>Parameter Code</b>
SOP006	Vehicles on Beach	C87007
SOP007	Fishing/from Shore	C87008
SOP008	Overnight Camping	C87009
SOP009	Other Types of Beach Use	C87010
<b>Bather Load</b>		
SOP010	Humans on Land	C87011
SOP011	Humans in Water	C87012
SOP012	Total People at Beach	C87013
<b>Sampling Site Information/Potential Pollution Sources</b>		
SOP013	Evidence of Beach Maintenance	C87014
SOP014	Appropriate Removal of Trash	C87015
SOP015	Floatables Present	C87016
SOP016	Type of Floatables Found	C87017
SOP017	Litter Present	C87018
SOP018	Type of Litter / Debris Found	C87019
SOP019	Seaweed (Algae) Present in Water	C87020
SOP020	Seaweed (Algae) Present on Land	C87021
SOP021	Type of Seaweed (Algae) in Water	C87022
SOP022	Type of Seaweed (Algae) on Land	C87023
SOP023	Seagrass Present in Water	C87024
SOP024	Seagrass Present on Land	C87025
SOP025	Type of Seagrass in Water	C87026
SOP026	Type of Seagrass on Land	C87027
<b>Presence or Evidence of Wildlife/Domestic Animals</b>		
SOP027	Presence of Fish Alive	C87028
SOP028	Presence of Fish Dead	C87029
SOP029	Presence of Avian Alive	C87030
SOP030	Presence of Avian Dead	C87031
SOP031	Presence of Avian Fecal Droppings	C87032
SOP032	Presence of Jellyfish Alive	C87033
SOP033	Presence of Jellyfish Dead	C87034
SOP034	Presence of Canine Alive	C87035
SOP035	Presence of Canine Fecal Dropping	C87037
SOP036	Presence of Crabs Alive	C87038

SOP Number	Parameter	Parameter Code
SOP037	Presence of Crabs Dead	C87039
SOP038	Presence of Equine Alive	C87040
SOP039	Presence of Equine Dead	C87041
SOP040	Presence of Equine Fecal Droppings	C87042
<b>Beach Measurements/Observations</b>		
SOP041	Z1 Width (m)	C87047
SOP041	Z2 Width (m)	C87048
SOP041	Z3 Width (m)	C87049
SOP041	Z1 Slope %	C87050
SOP041	Z2 Slope %	C87051
SOP041	Z3 Slope %	C87052

**Table 3. Marine Beach Annual On-Site Survey Parameters.**

SOP Number	Type
<b>Beach Materials/Sediment</b>	<b>Sediment/Material Type</b>
SOP042	Sand
SOP042	Mud
SOP042	Rock
SOP042	Shell
<b>Habitat Around Beach</b>	<b>Habitat Type</b>
SOP043	Dunes
SOP043	Wetlands
SOP043	River/Stream
SOP043	Forest
SOP043	Park
SOP043	Urban/Boardwalk
SOP043	Protected Habitat or Reserve
<b>Shellfish Growing Areas</b>	<b>Area Type</b>
SOP044	Shellfish Growing Areas
<b>Bounding Structures</b>	<b>Structure Type</b>
SOP045	Jetty
SOP045	Groin
SOP045	Seawall
SOP045	Pier
SOP045	Natural Formation

<b>SOP Number</b>	<b>Type</b>
SOP045	Breakwater
<b>Description of Sanitary Facilities</b>	<b>Facility Type</b>
SOP046	Toilets
SOP046	Urinals
SOP046	Sinks
SOP046	Showers
<b>Description of Other Facilities</b>	<b>Facility Type</b>
SOP047	Bathhouse
SOP047	Restroom
SOP047	Portable Sanitary Unit
SOP047	Restaurant
SOP047	Marina
SOP047	Bar
SOP047	Parking Lot
SOP047	Fish cleaning Station
SOP047	Playground
SOP047	Dog Park
SOP047	Boat Pump Out
<b>Disposal of Sanitary Wastes</b>	<b>Disposal Type</b>
SOP048	Public Sewer
SOP048	Septic Field
SOP048	Pump Out
SOP048	On-Site Treatment
<b>Observed Potential Pollution Sources</b>	<b>Source Type</b>
SOP049	Wastewater discharges
SOP049	Sewage Overflows
SOP049	Septic Systems
SOP049	Subsurface Sewage Disposal
SOP049	Unsewered Areas
SOP049	Groundwater Seepage
SOP049	Bathhouse Leakage
SOP049	Drains and Pipes Nearby
SOP049	Stormwater Outfalls
SOP049	Erosion Prone Areas
SOP049	Vacant Areas

<b>SOP Number</b>	<b>Type</b>
SOP049	Wetland Drainage
SOP049	Rivers/Streams
SOP049	Landfills, Open Dumps
SOP049	Urban Runoff, Industrial Waste
SOP049	Agricultural Runoff
SOP049	Land Application of Biosolids and Manure
SOP049	CAFOs or AFOs
SOP049	Domestic Animals
SOP049	Wildlife
SOP049	Marinas, Harbors
SOP049	Mooring Boats
<b>Photographs Taken</b>	<b>Image Type</b>
SOP050	Photographs
<b>Litterbins</b>	<b>Type</b>
SOP051	Litterbins

***Texas Beach Watch Project  
Procedures for Local Contractors***

The following procedures for sampling are based upon Appendix J of the National Beach Guidance and Performance Criteria for Recreational Waters (EPA-823-B-02-004) June 2002.

Identify the sampling site on a chain of custody tag, if required, or on the bottle label and on a field log sheet.

- Remove the bottle covering and closure just before obtaining each sample and protect them from contamination. Be careful not to touch the inside of the bottle itself or the inside of the cover.
- The first sample to be prepared is the trip blank (at least one per sampling day for routine sampling is recommended). Open the sampling bottle and fill it with 100 ml of sterile buffered dilution solution when collecting freshwater, estuarine, or marine water samples. Cap the bottle and place it in a cooler. The trip blank will be used to verify samples have been maintained at the correct temperature for transportation.
- To collect the water samples, carefully move to the first sampling location. If wading in the water, try to avoid kicking up bottom material at the sampling station. The sampler should be positioned downstream of any water current to take the sample from the incoming flow. Samples shall be collected in approximately two feet of water.
- Open a sampling bottle, grasp it at the base with one hand, and plunge the bottle mouth downward into the water to avoid introducing surface scum. Position the mouth of the bottle into the current away from the hand of the sampler. The sampling depth should be 15 to 30 centimeters (6 to 12 inches) below the water surface, depending on the depth

from which the sample must be taken. Samples collected in less than the two foot standing depth will collect the sample at the 15-centimeter (six inch) sampling depth to avoid the collection of sedimentation. Allow time for sediment settling prior to collecting the sample. If the water body is static, an artificial current can be created by moving the bottle horizontally with the direction of the bottle pointed away from the sampler. Tip the bottle slightly upward to allow air to exit and the bottle to fill.

- Remove the bottle from the water body.
- Pour out a small portion of the sample to allow an air space of 2.5 centimeters (1 to 2 inches) above each sample for proper mixing of the sample before analysis. [NOTE: If the bottle contains any debris, contaminants, or excessive sediment/sand<sup>1</sup>, a new bottle must be used. Do not discard the water sample and refill the bottle.]
- Tightly close the stopper and label the bottle.
- Enter specific details to identify the sample on a permanent label. Take care in transcribing sampling information to the label. The label should be clean, waterproof, non-smearing, and large enough for the necessary information. The label must be securely attached to the sample bottle but removable when necessary. Preprinting standard information on the label can save time in the field. The marking pen or other device must be non-smearing and maintain a permanent legible mark.
- Complete a Field Observation Form for each beach to record the full details on sampling and other pertinent remarks, such as flooding, rain, or extreme temperature, that are relevant to interpretation of the results. This record also provides a back-up record of sample identification.
- Place the samples in a suitable container and transport them to the laboratory as soon as possible. Adhering to sample preservation and holding time limits is critical to the production of valid data. Bacteriological samples should be iced or refrigerated at <10°C during transit to the laboratory. Use insulated containers such as plastic or Styrofoam coolers, if possible, to ensure proper maintenance of storage temperature. Take care to ensure sample bottles are not totally immersed in water during transit or storage. Process samples as soon as possible after collection. Do not hold samples longer than six hours between collection and initiation of analysis (US Environmental Protection Agency, 2000). Do not analyze samples that exceed holding time limits.
- Collect water samples for analyses of other parameters in separate appropriate containers at the same time and perform analyses as specified in the particular methods.
- After collecting samples from a station, wash hands and arms with alcohol wipes, a disinfectant lotion, or soap and water, and dry to reduce exposure to potentially harmful bacteria or other microorganisms.

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<sup>1</sup> Excessive sand or sediment will clog the filtration process and prevent bacteria colonies from growing. It will be up to the sampler to determine what is considered excessive based on his or her own experience.

### ***Labeling the Samples***

Each sample bottle shall be labeled with the following information:

- Date and time of sample collection
- Sampler's name
- Sample letters and station number (If more than one sample is collected at a station, identify the first sample with the letter "A" after the station number, the second sample with the letter "B" and so forth).

Samples must be processed as soon as possible after collection so the holding time limit does not exceed six hours between collection and initiation of sample analyses. Samples will only be delivered to Texas Beach Watch Program contracted laboratories.

### **4. Sample Handling and Custody Requirements**

Chain of Custody (COC) procedures will be followed when samples are collected, transferred, stored, and analyzed. The local contractor's staff will follow sampling protocol and deliver samples directly to a Texas Beach Watch Program contracted laboratory for analysis.

When samples are delivered to the laboratory, the local contractor and laboratory staff will complete COC records required by the laboratory.

### **5. Analytical Methods Requirements**

Local contractors will analyze the samples for Enterococci bacteria using EPA's Method 1600: Enterococci in Water by Membrane Filtration Using membrane-Enterococcus Indoxyl-β-D-Glucoside Agar (mEI) or the IDEXX Enterolert™ system. The specific method for each local contractor is addressed by County in Appendix C, Unique Local Contractor Information.

### **6. Quality Control Requirements**

Local contractors monitor coastal beach water quality. It is the responsibility of the local contractor's Project Manager to ensure field staff are properly trained and routinely monitored for compliance with established protocols. The Project Manager will also be responsible for periodically verifying the completeness of field sampling records prior to data entry.

The field technician will be responsible for sample handling and custody requirements for each sample collected and transferred to the laboratory.

The Texas Beach Watch Program database was developed to meet requirements of the BEACH Act. The database and Web-based data entry form were designed to minimize the possibility of data entry errors. The Coordinator will periodically review and evaluate results entered into the database.

The Texas Beach Watch Program will conduct an annual in-depth review of a local contractor's records and field sampling techniques to evaluate training methods and documentation



procedures. The review will include an assessment of the local contractor's adherence to the criteria contained in the QAPP. Additional informal reviews of each laboratory may be conducted during the year.

### ***Specifying Measurement Performance Criteria***

Performance criteria or Data Quality Indicators (DQIs) are qualitative and quantitative descriptors used to interpret the degree of acceptability, or utility of the data. The principal DQIs include precision, bias, representativeness, comparability, and completeness. Precision and bias are quantitative measures. Representativeness and comparability are qualitative measures, and completeness constitutes both a quantitative and qualitative measure.

**Precision** is the measure of agreement among replicate measurements of the same property, under prescribed similar conditions. Local contractors will estimate field precision through the sequential collection and measurement of two samples, 10% of the time. For every 10 stations sampled, a second sample will be collected for comparison to the first sample. The two samples will be used to calculate the relative percent difference described below. The second sample will be entered into the database and used to calculate the station average. Field personnel will assess precision on a regular basis to determine sampling performance.

The precision of laboratory analyses is estimated by analyzing two or more aliquots (duplicates) of the same water sample. The precision analysis procedures used by a laboratory are included in each local contractor's QA/QC plan. QA/QC is assessed in the laboratory on a regular basis and the laboratory shall maintain records of the assessment.

The precision DQI is obtained from two duplicate samples by calculating the relative percent difference (RPD) as follows:

$$RPD = (|(C1-C2)| / ((C1+C2)/2)) * 100\%$$

C1 is the first of the two values and C2 is the second value. An RPD of less than or equal to 60 percent between field duplicates microbiological analyses could be considered acceptable because of the heterogeneity of bacteria populations in surface waters. When laboratory duplicates are analyzed, precision of the test will be expressed in terms of standard deviation and the ability to detect the target organism. Analysts should duplicate bacterial colony counts on the same membrane within five percent, and other analysts' counts within ten percent; otherwise, procedures should be reviewed and corrective action implemented.

**Bias** - is the systematic or persistent distortion of a measurement process that causes errors in one direction (USEPA 2002a). Bias assessments for environmental measurements are typically based on analysis of spiked samples, which is not feasible for microbiological samples. It is assumed bias will be minimized in this study by close adherence to SOPs and QA plans.

**Accuracy** - is the degree of agreement between an observed value and an accepted reference or true value. Accuracy is a combination of random error (precision) and systematic error (bias), both of which are due to sampling and analytical operations (USEPA 2002a). Accuracy is

estimated by comparing the measured value to its “true” value. Because microbiological analysis measures constantly changing living populations, the true values cannot be known.

Accordingly, accuracy, like bias, is difficult to assess for microbiological analyses. However, because indicator organism density estimates are assumed to have minimum bias, accuracy equates to precision, which will be rigorously assessed.

**Representativeness**, comparability, and completeness are of particular concern to field sampling staff. Representativeness is the degree to which data accurately and precisely represents the characteristics of a population. One method for ensuring representativeness includes the evaluation of the sampling design to determine whether the sampled area is typical and representative of each area of concern. The Texas Beach Watch Program ensures representativeness by sampling coastal waters near beaches used for public recreation.

**Comparability** is the qualitative term that expresses the confidence two data sets contribute to a common analysis and interpolation. Comparability must be evaluated carefully to establish whether two data sets can be considered equivalent with regard to the measurement of a specific variable or groups of variables. In laboratory analyses, the term comparability focuses on method type comparison, holding times, stability issues, and aspects of overall analytical quantitation. Sampling based on similar geographic and seasonal characteristics; adequate training of field sampling and laboratory personnel and the use of standardized sampling and analysis methods ensure comparability.

**Completeness** is a measure of the amount of valid data obtained from a measurement system. Completeness is expressed as a percent of the number of valid measurements that should have been collected (i.e., measurements planned for collection). Every effort is made to avoid sample and/or data loss through accidents.

Percent completeness (%C) for measurement parameters is defined as follows:

$$\%C = v/T \times 100$$

Where, v = the number of measurements judged valid and T = the total number of measurements. To recommend an advisory, the Texas Beach Watch Program requires one sample be collected at a given site. The result is compared to the standard criteria to determine if an advisory is warranted. The sample collected at the site must be deemed valid prior to an advisory being recommended. The completeness goal for valid decisions at each site is 100%. The Texas Beach Watch Program database includes measures to prevent the omission of data necessary to ensure the completeness measure.

## **7. Instrument Testing, Inspection, Maintenance, Calibration and Frequency**

Testing, inspection, maintenance, and calibration of laboratory equipment will be conducted according to laboratory QA/QC manuals, and as specified by the equipment manufacturer.

Local contractors employing the IDEXX Enterolert™ system for enumerating *Enterococcus* may require special equipment including the IDEXX Quanti-Tray® Sealer with insert along with the required supplies.

## **8. Inspection/Acceptance of Supplies/Consumables**

Project Managers will be responsible for ensuring all supplies and consumables are appropriate and acceptable. The Texas Beach Watch Program requires all samples to be collected in sterilized polypropylene bottles with a volume of at least 125 milliliters (ml), but no more than 1000 ml. In addition, laboratories will not accept collection containers if the individual containers or the delivery container are not properly closed or sealed.

Laboratories that re-use sample bottles should make sure the decontamination procedures are readily available at the lab and consistent with the practices identified in “EPA Method 1600, Appendix A”; thoroughly clean with detergent and hot water, hot water rinse conducted to remove all trace amounts of detergent, and triple rinse with laboratory pure water.

## **9. Data Management**

### ***Data Recording***

Water quality results are entered into the Texas Beach Watch Program database via the Web. The Texas Beach Watch Program will assess the data for completeness and errors on a periodic basis. The Project Manager will be notified of discrepancies by email or fax as soon as practicable. The nature of the data and the subsequent analyses must be consistent to allow data sets to be compared.

### ***Data Validation***

Data will be validated and verified based on the following factors:

- Completeness of data;
- Adherence to proper sample preservation, transport, and handling protocols;
- Proper sample collection procedures;
- Proper quality control criteria;
- Documentation of all data (including QC data);
- Ability to reconstruct field sampling procedures through documentation and records;
- Ability to trace data to specific sampling sites, dates, and times; and
- Appropriateness of the data based on specific data quality objectives / indicators.

Laboratory verification procedures will be outlined for each laboratory in their QA/QC manual, guidance, or procedural documentation. Validation confirms that requirements for specific intended uses have been fulfilled and that data is systematically examined to determine technical usability with respect to planned objectives. Project Managers or their designees are responsible for reviewing field-sampling reports before data is entered in the system.

## **C. ASSESSMENT/OVERSIGHT**

### **1. Assessment and Response Actions**

#### ***Assessment Activities and Project Planning***

The Coordinator is responsible for the preliminary assessment and oversight of the program, including contract management procedures for the allocation of BEACH Act funds to local contractors. Additionally, the Coordinator will periodically review data submitted to the Texas Beach Watch Program database to identify possible trends and to ensure QAPP requirements are met. QA assessment results, to include RPD calculations of replicate samples, will be reported to EPA on an annual basis (in every other semiannual report) as required by the cooperative agreement between EPA and the GLO.

GLO will perform an annual review of a local contractor's laboratory to ensure their protocols are consistent with the QAPP. If the review finds a local contractor not adhering to the QAPP, the local contractor will be required to take corrective action to address the deficiency. Failure to do so will result in possible financial penalties (withholding of payment until corrected) or termination of contract.

#### ***Documentation of Assessments and Reports to Management***

Data quality will be assessed as part of the annual review to ensure adherence to the QAPP. The Contractor and Data Review template (Appendix D) will be completed by the Quality Assurance Officer or Coordinator to document the results of the review and any corrective action taken in the local contractor's data file. This information will be included in semiannual reports to EPA. Supplemental reports will be submitted as warranted.

## **D. DATA VALIDATION AND USABILITY**

### **1. Data Review, Validation, and Verification Requirements**

#### ***Sampling Design***

Changes to sampling location and/or frequency of sampling will occur on a yearly basis or as needed and will be documented in Appendix B. In addition, as new local contractors are added to the Texas Beach Watch Program, Appendix B will be updated to include new site locations, in order of importance, frequency of sampling, number of stations per beach, site maps of all beaches and stations, contact information and other relevant information.

#### ***Sample Collection Procedures***

Samples must be collected according to the protocol described in Section B, Data Generation and Acquisition, Subsection 2, Sampling Methods, of the QAPP. If sampling protocol is not followed, the samples will not be analyzed and replacement samples will be collected according to protocol.

#### ***Sample Handling***

Project Managers will routinely check storage containers to ensure samples are stored and transported under conditions that will not adversely affect sample quality. Chain of custody documentation will be conducted according to each local contractor's QA/QC procedures. If samples are not handled properly, laboratories shall refuse the samples and collection of replacement samples will be required.

#### ***Analytical Procedures***

Texas Beach Watch Program contracted laboratories must have the capability to analyze samples weekly. Laboratory staff must be qualified to use the required instruments and must be familiar with techniques necessary to analyze water quality samples. Laboratory SOPs related to COC, instrumentation, and technique are provided in laboratory QA/QC manuals. Laboratory personnel will utilize EPA Method 1600<sup>2</sup> or the IDEXX Enterolert™ for the detection of *Enterococci*. Laboratory supervisors may request copies from the EPA's National Service Center for Environmental Publications (<http://www.epa.gov/ncepihom>). The Method 1600 document is also available at <http://www.epa.gov/waterscience/methods/>. Information pertaining to Enterolert™ may be found at <http://www.idexx.com/water/enterolert/>.

#### ***Quality Control***

Sampling quality control measures will be applied as discussed in Section B, Data Generation and Acquisition, Subsection 5, Quality Control Requirements, while laboratory quality control activities will be conducted according to the laboratory's QA/QC manual.

#### ***Calibration***

Instruments will be calibrated according to the laboratory's QA/QC manual and as recommended by the manufacturer. Data not conforming to sampling protocols or laboratory handling and

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<sup>2</sup> USEPA. July 2006 or September 2002. Method 1600: Enterococci in Water by Membrane Filtration Using membrane-Enterococcus Indoxyl-[beta]-D-Glucoside Agar (mEI). U.S. Environmental Protection Agency, Office of Water, Washington, DC EPA-821-R-06-009.

analysis protocols will not be used. Laboratory analysis protocols include the calibration and verification of instruments to manufacturer and/or method specifications.

### ***Data Reduction and Processing***

Loss of detail in data will be avoided by periodically reviewing the data entered and by following procedures for data reduction and processing activities described in the laboratory's QA/QC manual.

## **2. Validation and Verification Methods**

Validation and verification activities will be performed during annual reviews of a local contractor and as described in Section B, Data Generation and Acquisition, Subsection 8, Data Management, and the laboratory's QA/QC manual. The local contractor maintains and reviews sampling and analytical data as the data is generated.

The GLO will assess and review the online data submitted on a monthly basis. The assessment activities will include the continual or frequent monitoring of the status of a project and the analysis of records to ensure specified requirements are being fulfilled. Key project personnel (Project Managers) are responsible for surveillance of the program under their control; however, the Texas Beach Watch Coordinator monitors data entry through the various queries that generate Summary Reports in EPA's Monitoring and Notification Databases. These Summary Reports in addition to Summary Reports generated for billing comparisons will be used for validation and verification of data entered by the Contractors. Any corrective action taken to remedy deficiencies will be documented.

### ***Reconciliation with User Objectives***

The Texas Beach Watch Program is designed to support the intended use of results through the compilation of water quality data. The Texas Beach Watch Program will analyze data for correlation between environmental factors and water quality results to determine the feasibility of predictive models.

If serious deficiencies are noted in data quality, the data may be reported to EPA with an appropriate data qualifier or not reported with an explanation. The data qualifier will be identified in the Monitoring Database, Activity table comments field. The appropriate action will be performed in consultation with EPA Region 6 personnel.

If serious discrepancies are noted, appropriate action may include the cessation of advisories until the deficiency is resolved. The resolution will consist of written communication to address and identify a solution and implement correction action. A follow up lab visit may be conducted.

**APPENDIX A - MARINE BEACH SANITARY SURVEY FORMS**

## Marine Beach Routine On-Site Survey

Date \_\_\_\_\_ Time Sample(s) Collected \_\_\_\_\_ Time Sample(s) Delivered to Lab \_\_\_\_\_

Name of Beach / ID \_\_\_\_\_ Sampling Station ID \_\_\_\_\_

Sampler's / Monitor's Names \_\_\_\_\_

### Site Conditions:

PARAMETER	VALUE	PARAMETER	VALUE
<b>Present Weather</b> (47501) 1=Clear, 2=Partly Cloudy < 50% , 3=Cloudy > 50%, 4=Rain, 5=Drizzle, 6=Fog, 7=Other/Explain		<b>Wind Intensity</b> (00035) 1=Calm, 2=Slight Breeze, 3=Moderate Breeze, 4=Strong Wind <b>Slight (5-10 mph) Moderate (10-30 mph) Strong &gt;30 mph</b>	
<b>Tide Stage</b> (84381) 1=Low, 2=Falling, 3=Slack, 4=Rising, 5=High		<b>Water Surface or Intensity</b> (46001) 1=Calm, 2=Ripples, 3=Waves, 4=White Caps	
<b>Air Temperature °C</b> (00020)		<b>Wind Direction</b> (00038) 1=N, 2=NE, 3=E, 4=SE, 5=S, 6=SW, 7=W, 8=NW	
<b>Longshore Current m/sec</b> (70225)		<b>Depth of Water Sample ft</b> (00068)	
<b>Water Color</b> (00081) 1=Brown, 2=Red, 3=Green, 4=Black, 5=Clear, 6= Other		<b>Water Odor</b> (34773) 1=Sewage, 2=Oily/Chemical, 3=Rotten Eggs, 4=Musky, 5=Fishy, 6=None, 7=Other/Explain	
<b>Water Temperature °C</b> (00010)		<b>Salinity ppt</b> (00480)	
<b>pH SU</b> (00406)		<b>Dissolved Oxygen mg/L</b> (00300)	
<b>Turbidity NTU</b> (82078)		<b>Specific Conductance Siemens/cm</b> (00094)	
<b>Tidal Pools Present/Quantity #</b> (C87000)		<b>Average size of Tidal Pools m</b> (C87001)	
<b>Days Since Last Rainfall</b> (72053)		<b>Rainfall - Inches past 1 day</b> (82553)	
<b>Rainfall - Inches past 3 days</b> (82371)		<b>Rainfall - Inches past 7 days</b> (82554)	
<b>Comments:</b>			

### Beach Use (COUNT):

PARAMETER	VALUE	PARAMETER	VALUE	PARAMETER	VALUE
<b>Swimming/Sunbathing</b> (C87002)		<b>Surfing/Windsurfing</b> (C87003)		<b>RVs on Beach</b> (C87004)	
<b>Fishing from Pier</b> (C87005)		<b>Watercraft</b> (C87006)		<b>Vehicles on Beach</b> (C87007)	
<b>Fishing from Shore</b> (C87008)		<b>Overnight Camping</b> (C87009)		<b>Other</b> (C87010)	
<b>Comments:</b>					

### Bather Load (COUNT):

PARAMETER	VALUE	PARAMETER	VALUE	PARAMETER	VALUE
<b>Humans on Land (A)</b> (C87011)		<b>Humans in Water (B)</b> (C87012)		<b>Total People at Beach (A+B)</b> (C87013)	



**Sampling Site Information/Potential Pollution Sources:**

**Slight =1-20% Moderate =21-50% High >50%**

PARAMETER	VALUE	
<b>Evidence of Beach Maintenance</b> (C87014) 0=None 1=Sand raked 2=Sand leveled 3=Construction		
<b>Appropriate Removal of Trash?</b> (C87015) 0=Yes 1=No, overflowing trash bins 2=No, trash receptacles not present 3=No, trash bins available and unused		
<b>Floatables Present?</b> (C87016) 0=None 1=Slight 2=Moderate 3=Heavy		
<b>Type of Floatables Found</b> (C87017) 0=None 1=Street litter 2=Food related 3=Medical items 4=Household 5=Sewage related 6=Construction materials 7=Fishing related 8=Tar/Oil 9=Biological 10=Other		
<b>Litter Present?</b> (C87018) 0=None 1=Slight 2=Moderate 3=Heavy		
<b>Type of Litter/Debris Found</b> (C87019) 0=None 1=Street litter 2=Food related 3=Medical items 4=Household 5=Sewage related 6=Construction materials 7=Fishing related 8=Tar/Oil 9=Biological 10=Other		
PARAMETER	In Water	On Land
<b>Seaweed (Algae) Present?</b> (C87020 – in water, C87021 – on land) 0=None 1=Slight 2=Moderate 3=Heavy		
<b>Type of Seaweed (Algae)</b> (C87022 – in water, C87023 – on land) 0=None 1=Ulva 2= Chaetomorpha 3=Cladophora 4=Acetabularia 5=Sargassum 6=Ectocarpus 7=Digenea 8=Palisada 9=Gracilaria 10=Chondria 11=Jania		
<b>Seagrass Present?</b> (C87024 – in water, C87025 – on land) 0=None 1=Slight 2=Moderate 3=Heavy		
<b>Type of Seagrass</b> (C87026 – in water, C87027 – on land) 0=None 1=Halodule 2=Halophila 3=Thlassia 4=Cymodoceae		
<b>Comments:</b>		

**Presence or Evidence of Wildlife/Domestic Animals (COUNT):**

PARAMETER	Alive	Dead	PARAMETER	Alive	Dead	Fecal Droppings Degree of Presence ( 1=Low, 2=Moderate, 4=High)
<b>Fish</b> (C87028 – alive, C87029 – dead)			<b>Avian</b> (C87030 – alive, C87031 - dead, C87032 – fecal droppings)			
<b>Jellyfish</b> (C87033 – alive, C87034 – dead)			<b>Canine</b> (C87035 – alive, C87036 - dead, C87037 – fecal droppings)			
<b>Crabs</b> (C87038 – alive, C87039 – dead)			<b>Equine</b> (C87040 – alive, C87041 - dead, C87042 – fecal droppings)			
<b>Other Specify:</b>			<b>Other Specify:</b> (C87043 – alive, C87044 - dead, C87045 – fecal droppings)			
<b>Comments:</b>						

## Marine Beach Annual On-Site Survey

Name of Beach/ID \_\_\_\_\_ Date of Survey \_\_\_\_\_  
 City/County/State \_\_\_\_\_ Name of Waterbody \_\_\_\_\_  
 Name of Surveyors \_\_\_\_\_  
 Surveyor Affiliation \_\_\_\_\_ Organization STORET ID \_\_\_\_\_

**Beach Measurements/Observations:**

Length (C87046) \_\_\_\_\_ (m) Average Width (Z1+Z2+Z3/3) \_\_\_\_\_ (m) Average beach slope \_\_\_\_\_ %

Width (m)		Slope %		Latitude	Longitude
Location	Measurement	Location	Measurement		
Z1 (C87047)		Z1 (C87050)			
Z2 (C87048)		Z2 (C87051)			
Z3 (C87049)		Z3 (C87052)			

**Beach materials/sediment:**

Name of Lab Analyzing Sediment Samples \_\_\_\_\_

Location	Sample ID	Time Sample Collected	Time Delivered to Lab	Type of Sediment/Material (C87053) 1=Sand, 2=Mud, 3=Rock, 4=Shell, 5=Other
Z1				
Z2				
Z3				

**Habitat around beach:** Dunes \_\_\_\_\_ Wetlands \_\_\_\_\_ River/Stream \_\_\_\_\_ Forest Park \_\_\_\_\_ Urban/Boardwalk \_\_\_\_\_  
 Protected habitat or Reserve \_\_\_\_\_ Other \_\_\_\_\_

**Description of any Shellfish Growing Areas including size and distance to swimming areas:** \_\_\_\_\_

**Bounding Structures: (Type\*: 1=jetty, 2=groin, 3=seawall, 4=pier, 5=natural formation 6=breakwater, 7=other)**

Type of Structure*	Location		Length (m)	Orientation azimuth	How was it measured? G=GPS, M=Map, P=Physical measurement	Description or Comments
	Latitude	Longitude				

**Observation of how the bounding structures affect water circulation at the beach:** \_\_\_\_\_





## Marine Beach Annual Analysis

Name of Beach/ID \_\_\_\_\_  
 City/County/State \_\_\_\_\_ Period of Analysis \_\_\_\_\_  
 Name of Waterbody \_\_\_\_\_ Sampling Station Ids \_\_\_\_\_

Number of Routine Surveys Analyzed \_\_\_\_\_ Name of Analyst \_\_\_\_\_  
 Analyst's Affiliation \_\_\_\_\_ Organization STORET ID \_\_\_\_\_

**Average Weather Conditions:**

What are the dates of the beach season? Start: \_\_\_\_\_ End: \_\_\_\_\_

Period	Average Air Temperature °C	Average Water Temperature °C	Rainfall (in)		Number of significant rain events (> 0.1")	Typical Weather Conditions 1=Clear, 2=Partly Cloudy, 3=Cloudy, 4=Rain, 5=Drizzle, 6=Fog, 7=Other/Explain
			Average	Total		
Beach Season						
Spring						
Summer						
Fall						
Winter						

**Winds:**

Prevailing wind speed: \_\_\_\_\_ Prevailing wind direction: \_\_\_\_\_ How does the prevailing wind blow? From beach to water: \_\_\_\_\_ From water to beach: \_\_\_\_\_ Across the beach sand interface: \_\_\_\_\_

**Waves:**

Describe the typical wave conditions during the beach season: \_\_\_\_\_

**Tides:**

Tide extent: \_\_\_\_\_ Mean High: \_\_\_\_\_ Mean Low: \_\_\_\_\_ Do tides create cross current? \_\_\_\_\_

How does the tidal flow manifest itself? \_\_\_\_\_

Characterize any longshore or nearshore currents: \_\_\_\_\_

Do any tidal rivers or streams that discharge near the beach have any correlation to elevated bacteria concentrations? If yes, describe flow, tidal influence, salinity, proximity to swimming area, etc.: \_\_\_\_\_

Describe the relationship of tidal flow to known point or nonpoint pollution sources: \_\_\_\_\_

Description of hydrometric network (note that this is a network of monitoring stations that collect data such as rainfall and stream flow): \_\_\_\_\_

**Erosion/Accretion Measurements:**

High Watermark Location Identification	Location of High Watermark		Fixed Object Description (e.g., tree, building, mile marker, etc.)	Distance from Fixed Object to High Watermark (m)	Distance between High Watermark Locations (m)	
	Latitude	Longitude				
A					A <-> B	
B					B <-> C	
C					C <-> D	
D (optional)					D <-> E	
E (optional)						

How do erosion/accretion measurements compare to data from previous years? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Explain how the bounding structures affect water circulation at the beach: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Assess whether the bounding structures might affect bacteria concentrations at the beach: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Lab Analysis of Beach Material/Sediment:**

Sample ID	Mean Grain Size Diameter	Uniformity Coefficient	Date of Collection	Name of Lab Used for Analysis
Average				

Describe the results and conclusion of the sediment analysis and potential effects of the sediment distribution at this beach: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Biological Survey Results:**

Algae blooms observed during the beach season:

Date Observed	Species	Color 1= Green 2=Red 3=Brown	Duration of Bloom	Location 1=Nearshore 2=On beach

Percent of beach season where algae was present in significant amounts? 1=None, 2=Low (1-20%), 3=Moderate (21-50%), 4=High (> 50%) Nearshore water: \_\_\_\_\_ On Beach: \_\_\_\_\_

Types of algae found: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Describe any shellfish growing areas near the beach, including size, distance to swimming area, condition, issues and results of any shellfish sanitary surveys: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

List any infectious snails or any other dangerous aquatic organisms that were found: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Were a significant number of dead birds found on the beach during the beach season? If so, describe types, numbers found and possible causes: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Were a significant number of dead fish found on the beach during the beach season? If so, describe types, numbers found and possible cause: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Description of Land Use in Watershed:**

Percentage of current land use in watershed:

Residential: \_\_\_\_\_ Industrial: \_\_\_\_\_ Commercial: \_\_\_\_\_ Agricultural: \_\_\_\_\_ Other: \_\_\_\_\_

Development	Percentage	Description
Undeveloped		
Developed		

How was land use measured? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Have you performed visual screening to isolate discharge areas during dry and wet weather? If yes, explain:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Are there any discharge reports available for discharges in the watershed? If yes, attach report or pertinent sections and summarize here, including permit limits for bacteria: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Have any sources been remediated, or have steps been taken to remediate sources? If yes, explain: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Beach Use:**

Is bather load measured? If so, describe how numbers are calculated (i.e., turnstile, counting at noon, photographs etc.): \_\_\_\_\_

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Frequency of measurements of bathers and beach activities. (e.g. daily, weekly, monthly): \_\_\_\_\_

Beachgoer Category	Number of People Per Day Using Beach					
	Peak Use for the Season	Seasonal Average	Holiday Average	Weekend Average	Weekday Average	Off-Season Average (if applicable)
Total People In the Water (A)						
Total People Out of the Water (B)						
Total People at the Beach (A+B)						

Examine bather load data along with sampling results for the past beach season. Look at each sampling point or different area of the beach (light use vs. heavy use).

Does the bather load appear to correlate with bacteria concentrations at any of these areas? \_\_\_\_\_

Does the number of people in the water correlate with bacteria concentrations? \_\_\_\_\_

Has a statistical analysis been done? Describe: \_\_\_\_\_

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**Breakdown of Activities at Beach (Percentage of time activity was observed on Beach from data collected on Routine On Site Surveys)**

Activity	Percentage of Time Observed				
	Beach Season	Spring	Summer	Fall	Winter
Swimming/Sunbathing					
Fishing/from Pier					
Fishing/from Shore					
Surfing/Windsurfing					
Watercraft					
Overnight Camping					
RVs on Beach					
Vehicles on Beach					
Other :					
Other:					
Other:					
Other:					
Other:					

Notes: \_\_\_\_\_

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**Beach Cleaning:**

Natural or Engineered beach? (include year engineered and source of sand): \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

	Leveling of Sand	Trimming or Removing Vegetation	Removing Debris	Removing Trash	Construction and Maintenance of a Temporary Pathway Directly to Open Water	Other
Frequency During Season (Daily, Weekly, Monthly)						
Equipment used						

Description and date of last beach rehabilitation (i.e., new sand including source, nourishment, dredging, etc.): \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Water Quality Sampling:**

Name of Laboratory Analyzing samples: \_\_\_\_\_

NELAC certified. Yes \_\_\_\_\_ No \_\_\_\_\_ Distance to laboratory: \_\_\_\_\_ miles.

Year water quality monitoring began: \_\_\_\_\_

What is the normal time frame between sample collection and arrival at the lab? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Where in the water are water quality measurements taken? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Is there a sampling and analysis plan? \_\_\_\_\_ Is it adequate? \_\_\_\_\_

Are sampling staff properly trained on sampling techniques, equipment maintenance and calibration procedures? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Total number of samples collected including resamples? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Did you sample within 3 days of significant rainfall? \_\_\_\_\_

\_\_\_\_\_



**Bacteria samples collected at beach:**

Type of Bacteria	Was testing performed?		Analytical Method Used
	Yes	No	
Escherichia coli			
Enterococcus			
Fecal coliform			
Other:			
Other:			

Do you composite any bacterial samples? If yes, explain: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

How does this past season's bacteria results compare to that of previous years? (Describe in detail analyses that were performed on the data): \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Have you conducted bacterial source tracking? If yes, explain: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Did you collect bacteria samples from any potential pollution sources, such as streams and outfalls? (Describe in detail analyses that were performed on the data): \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Based on your understanding of the beach, which fecal pollution sources are most likely to impact the levels of bacteria at the beach? If you have specific concerns about any of the fecal pollution sources as sources of specific pathogens, please describe: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Comments:** \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Health Concerns:**

Has this beach been associated with any of the following? If so, list further details: \_\_\_\_\_

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Cases of swimmer's itch: \_\_\_\_\_

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Outbreaks of diarrheal disease: \_\_\_\_\_

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High incidence of skin infections: \_\_\_\_\_

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High incidence of skin rashes: \_\_\_\_\_

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High incidence of ear infections: \_\_\_\_\_

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Other adverse health issues or concerns: \_\_\_\_\_

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**Correlation of Parameters and Elevated Bacteria Concentrations:**

Examine the data collected from the routine surveys over the prior beach season along with the bacteria sampling results. Do the bacteria concentrations at this beach appear to correlate with any of the following parameters?

Parameter	Correlation		Degree of correlation calculated by statistical analysis		Further Explanation
	Yes	No	Yes	No	
Cloud Cover					
Air Temperature					
Wind Intensity					
Water Surface or Intensity					
Wind Direction					
Tide Stage					
Longshore Current					
Depth Sample Taken					
Rainfall					
Tidal Pools					
Water Temperature					
Water Color					
Water Odor					
Salinity					
Specific Conductance					
pH					
Turbidity					
Dissolved Oxygen					
Total People at Beach					
Swimming /Sunbathing					
Fishing / on Pier					
Vehicles on Beach					
RVs on Beach					
Overnight Camping					

Parameter	Correlation		Degree of correlation calculated by statistical analysis		Further Explanation
	Yes	No	Yes	No	
Watercraft					
Surfing/ Windsurfing					
Beach Maintenance					
Presence of Floatables					
Litter					
Seaweed/ Algae					
Seagrass					
Gulls					
Pigeons					
Other Avian Species					
Fishing /from Shore					
Fecal Droppings					
Fish					
Jellyfish					
Crabs					
Turtles					
Other Marine Species					
Canines					
Horses					
Other Mammals					
Other					





**Maps:**

List maps and their sources: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Are maps attached?** Beach: \_\_\_\_\_ Watershed: \_\_\_\_\_

Do the maps include locations of:	Yes	No	NA	Comment
Measurement/Sediment Sample points				
Water Sample Points				
Hydrometric Network				
All Observed Pollutant Sources				
Boat Traffic				
Marinas				
Boat Dockage				
Fishing				
Bathing/Swimming				
Jetty				
Groin				
Seawall				
Piers				
Natural Formations				
Breakwater				
Other Bounding Structures				
Bathhouses				
Restrooms				
Portable Sanitary Units				
Fish Cleaning Stations				
Dog Parks				
Restaurants/ Bars				
Playground				
Parking Lot				
Shellfish Growing Areas				
Other				



## **APPENDIX B - DATA DICTIONARY**

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**Texas Marine Beaches Sanitary Survey  
Data Dictionary**

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June 2013

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## Beach Table (BEACH)

**Description:** This table is used to store data relating to the location and description of the individual beaches. Each record must contain a unique Beach ID along with the Beach name and FIPS code.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
BEACH_ID	Text (9)	Yes	Yes (No Duplicates)	<p>Unique 8-digit alphanumeric code identifying beach and State. TX111111 format.</p> <p>The following is a listing of the Beach ID and name of the corresponding beach analyzed for this project.</p> <p>TX139394 = NUECES BAY CAUSEWAY #3            TX149569 = UNIVERSITY BEACH            TX199413 = EMERALD BEACH            TX227625 = PACKERY CHANNEL PARK            TX259473 = COLE PARK            TX289381 = KAUFER-HUBERT MEMORIAL PARK #3            TX305317 = CORPUS CHRISTI MARINA            TX314643 = PADRE BALI PARK            TX315916 = PORT ARANSAS-SOUTH            TX339922 = KAUFER-HUBERT MEMORIAL PARK #2            TX396020 = MUSTANG ISLAND            TX442541 = JFK CAUSEWAY-SW            TX471201 = KAUFER-HUBERT MEMORIAL PARK #1            TX536781 = MCGEE BEACH            TX538780 = LIGHTHOUSE LAKE            TX546628 = CORPUS CHRISTI BEACH-MAIN            TX551380 = MUSTANG ISLAND STATE PARK            TX607336 = JP LUBY PARK            TX682648 = POENISCH PARK            TX722300 = PORT ARANSAS PARK            TX748844 = ROCKPORT BEACH PARK            TX821303 = ROPES PARK            TX937228 = LAGUNA SHORES            TX948394 = RIVERIA BEACH PIER</p>

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
BEACH_NAME	Text (50)	Yes	Yes (No Duplicates)	<p>Name of the Beach in alphabetized.</p> <p>The following is a listing of the name of the beach identified for this project and the corresponding Beach ID.</p> <p>COLE PARK = TX259473  CORPUS CHRISTI BEACH-MAIN = TX546628  CORPUS CHRISTI MARINA = TX305317  EMERALD BEACH = TX199413  JFK CAUSEWAY-SW = TX442541  JP LUBY PARK = TX607336  KAUFER-HUBERT MEMORIAL PARK #1 = TX471201  KAUFER-HUBERT MEMORIAL PARK #2 = TX339922  KAUFER-HUBERT MEMORIAL PARK #3 = TX289381  LAGUNA SHORES = TX937228  LIGHTHOUSE LAKE = TX538780  MCGEE BEACH = TX536781  MUSTANG ISLAND = TX396020  MUSTANG ISLAND STATE PARK = TX551380  NUECES BAY CAUSEWAY #3 = TX139394  PACKERY CHANNEL PARK = TX227625  PADRE BALI PARK = TX314643  POENISCH PARK = TX682648  PORT ARANSAS PARK = TX722300  PORT ARANSAS-SOUTH = TX315916  RIVERIA BEACH PIER = TX948394  ROCKPORT BEACH PARK = TX748844  ROPES PARK = TX821303  UNIVERSITY BEACH = TX149569</p>
FIPS	Text (6)	Yes	Yes (Duplicates OK)	<p>Federal Information Processing Standard - Unique 5-digit numeric code identifying County and geographical area.</p> <p>The following lists the FIPS code and corresponding County name.</p> <p>48007 = Aransas County  48273 = Kleberg County  48355 = Nueces County  48409 = San Patricio County</p>
COUNTY	Text (50)	Yes	No	County in which the beach is located in capital letters.
STATE	Text (3)	Yes	No	Abbreviation of State in which the beach is located in a capital letter 2-character format.

<b>FIELD NAME</b>	<b>DATA TYPE (SIZE)</b>	<b>REQ'D</b>	<b>INDEXED</b>	<b>DESCRIPTION</b>
WATERBODY	Text (50)	Yes	No	Name of waterbody associated with the beach in capital letters. If name consists of more than one word, spaces are populated with an underscore. Ex. "GULF_OF_MEXICO".
COMMENTS	Text (255)	No	No	Optional description or comments related to beach.

## Bounding Structures Table (BOUND\_STRUC)

**Description:** This table is used to store data relating to any bounding structures natural or fabricated that border or exist within a beach's boundaries. Each record must contain the type of structure, length and location identified by latitude and longitude.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
EVID	Text (27)	Yes	Yes (Duplicates OK)	26-character alpha numeric Event ID comprised of Beach ID, Sample Location ID, Date and Event Type ID. Ex. – TX748844_ANL000_20130115_2
CODE_TYPE_BND_STRUC	Text(3)	Yes	Yes (Duplicates OK)	Numeric code identifying the type of bounding structure. Refer to REF_TYPE_BND_STRUC table. The following lists the codes for the types of bounding structures and the assigned meanings. 1 = JETTY 2 = GROIN 3 = SEAWALL 4 = PIER 5 = NATURAL FORMATION 6 = BREAKWATER 7 = OTHER
LATITUDE	Text (11)	Yes	No	Latitude of bounding structure in decimal degree format with 6 decimal places. Ex. DD.dddddd
LONGITUDE	Text (12)	Yes	No	Longitude of bounding structure in decimal degree format with 6 decimal places. Ex. DD.dddddd
ORIENTATION_(AZIMUTH)	Number	Yes	No	Orientation of the bounding structure expressed as the angular direction from true North. Values range from 0 to 359.
LENGTH	Number	Yes	No	Length of the bounding structure measured in meters (m). Value expressed to one decimal point.
CODE_BND_STRC_MSRMT	Text (2)	Yes	No	Code referring to how the bounding structure was measured. Refer to REF_BND_STRC_MSRMT table  The following lists the codes for the type of method in which a bounding structure was measured and the assigned meaning. G = GPS - Global Positioning System M = Map P = Physical measurement
FLOW_IMPACT	Text (255)	No	No	Any observation of how the bounding structure affects water circulation at the beach.
COMMENTS	Text (255)	No	No	Optional additional description or comments related to bounding structures and clarification if OTHER was selected as the type of bounding structure.



## Event Table (EVENT)

**Description:** This table is used to store data relating to specific events occurring on a beach. Each record must contain a unique Event ID, Beach ID, Station ID, type of event and date/time.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
EVID	Text (27)	Yes	Yes (No Duplicates)	Unique 26 character alpha numeric Event ID comprised of Beach ID, Sample Location ID, Date and Event Type ID. Ex. – TX748844_ARA001_20130115_1
BEACH_ID	Text (9)	Yes	Yes (Duplicates OK)	Unique 8-digit alphanumeric code identifying beach and state. Ex. TX111111 format. Refer to BEACH table.
STATION_ID	Text (11)	Yes	Yes (Duplicates OK)	Unique 6 digit alphanumeric code identifying county and sampling station location. Refer to STATION_LOC table.
EVENT_DATE	Date/Time	Yes	Yes (Duplicates OK)	Date event occurred in MM/DD/YYYY format.
TIME	Date/Time	Yes	No	Time event occurred. Ex. 08:22 am format.
SAMPLE_DEPTH	Number	No	No	Depth below surface from which sample was obtained. Measured in feet with one decimal place.
CODE_TYPE_EVENT	Text (3)	Yes	Yes (Duplicates OK)	Numeric code identifying type of event. Refer to REF_TYPE_EVENT table.  The following lists the codes for the type of event and the assigned meanings.  1 = ROUTINE 2 = ANNUAL 3 = CONTINUOUS 4 = RESAMPLE
COMMENTS	Text (255)	No	No	Optional additional description or comments related to event.

## Facilities Table (FACILITIES)

**Description:** This table is used to store data identifying the type and condition of facilities on each beach. This table also includes a count of sanitary facilities (toilets, sinks etc.) and identifies how sanitary wastes are disposed and distance to waterline.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
EVID	Text (27)	Yes	Yes (Duplicates OK)	26-character alpha numeric Event ID comprised of Beach ID, Sample Location ID, Date and Event Type ID. Ex. – TX748844_ANL000_20130115_2
FACILITY_NAME	Text (50)	No	No	Name of the facility (if available) in capital letters.
CODE_TYPE_FAC	Text (3)	Yes	Yes (Duplicates OK)	Numeric code identifying the type of facility. Refer to REF_TYPE_FAC table.  The following lists the codes for the type of facility and the assigned meanings.  1 = BATHHOUSE 2 = RESTROOM 3 = PORTABLE SANITARY UNIT 4 = RESTRAURANT 5 = MARINA 6 = BAR 7 = PARKING LOT 8 = FISH CLEANING STATION 9 = PLAYGROUND 10 = DOG PARK 11 = BOAT PUMP OUT 12 = OTHER
TOILET	Number	No	No	Count of toilets.
URINAL	Number	No	No	Count of urinals.
SINK	Number	No	No	Count of sinks.
SHOWER	Number	No	No	Count of showers.
LATITUDE	Text (11)	Yes	No	Latitude of facility in decimal degree format with 6 decimal places. Ex. DD.dddddd
LONGITUDE	Text (12)	Yes	No	Longitude of facility in decimal degree format with 6 decimal places. Ex. DD.dddddd
CODE_CONDITION	Text (3)	Yes	Yes (Duplicates OK)	Numeric code identifying the condition of the facility. Refer to REF_CONDITION table.  The following lists the codes for the condition of the facility and the assigned meanings.  1 = GOOD 2 = FAIR 3 = POOR

<b>FIELD NAME</b>	<b>DATA TYPE (SIZE)</b>	<b>REQ'D</b>	<b>INDEXED</b>	<b>DESCRIPTION</b>
DIST_TO_WATER	Number	Yes	Yes (Duplicates OK)	Distance from facility to water, measured in meters.
CODE_DISP_SAN_WSTE	Text (3)	Yes	Yes (Duplicates OK)	Numeric code identifying the disposal of sanitary waste at the facility. Refer to REF_DISP_SAN_WSTE table.  The following lists the codes for the method of sanitary waste disposal and the assigned meanings.  1 = PUBLIC SEWER 2 = SEPTIC FIELD 3 = PUMP OUT 4 = ON-SITE 5 = OTHER
CODE_FREQ_PER	Text (3)	Yes	No	Code identifying how often the facility is cleaned. Refer to REF_FREQ_PER table.  The following lists the codes for the period of frequency and the assigned meanings.  1 = HOURLY 2 = TWICE DAILY 3 = DAILY 4 = BI-WEEKLY 5 = WEEKLY 6 = BI-MONTHLY 7 = MONTHLY 8 = QUARTERLY 9 = ANNUALLY 10 = OTHER
COMMENTS	Text (255)	No	No	Optional additional description or comments related to facilities and further explanation if OTHER was selected as an option in any field.

## Habitat Table (HABITAT)

**Description:** This table is used to store data relating to the type of habitat at and surrounding a beach.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
EVID	Text (27)	Yes	Yes (Duplicates OK)	26-character alpha numeric Event ID comprised of Beach ID, Sample Location ID, Date and Event Type ID. Ex. – TX748844_ANL000_20130115_2
DUNES	Yes/No	No	No	YES / NO field to indicate presence of dunes at beach.
WETLANDS	Yes/No	No	No	YES / NO field to indicate presence of wetlands at beach.
RIVER	Yes/No	No	No	YES / NO field to indicate presence of a river at beach.
FOREST	Yes/No	No	No	YES / NO field to indicate presence of forested areas at beach.
PARK	Yes/No	No	No	YES / NO field to indicate presence of parks at beach.
URBAN	Yes/No	No	No	YES / NO field to indicate presence of urban areas at beach.
PROTECTED	Yes/No	No	No	YES / NO field to indicate presence of protected areas at beach.
OTHER	Yes/No	No	No	YES / NO field to indicate presence of other types of habitat at beach.
COMMENTS	Text (255)	No	No	Additional description of OTHER type of habitat or comments related to habitat.

## Litterbins Table (LITTERBINS)

**Description:** This table is used to store data relating to litterbins and trash receptacles at a beach. Each record must contain an Event ID, location identified by latitude and longitude, condition, emptying frequency and distance to waterline.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
EVID	Text (27)	Yes	Yes (Duplicates OK)	26-character alpha numeric Event ID comprised of Beach ID, Sample Location ID, Date and Event Type ID. Ex. – TX748844_ANL000_20130115_2
BIN_ID	Text (20)	No	No	Identifying number of litterbin if available.
LATITUDE	Text (11)	Yes	No	Latitude of litterbin in decimal degree format with 6 decimal places. Ex. DD.dddddd
LONGITUDE	Text (12)	Yes	No	Longitude of litterbin in decimal degree format with 6 decimal places. Ex. DD.dddddd
CODE_CONDITION	Text (3)	Yes	Yes (Duplicates OK)	Numeric code identifying the condition of the litterbin. Refer to REF_CONDITION table.  The following lists the codes for the condition of the litterbin and the assigned meanings. 1 = GOOD 2 = FAIR 3 = POOR
DIST_TO_WATER	Number	Yes	Yes (Duplicates OK)	Distance from litterbin to water, measured in meters (m).
CODE_FREQ_PER	Text (3)	Yes	No	Code identifying how often the litterbin is emptied. Refer to REF_FREQ_PER table.  The following lists the codes for the period of frequency and the assigned meanings.  1 = HOURLY 2 = TWICE DAILY 3 = DAILY 4 = BI-WEEKLY 5 = WEEKLY 6 = BI-MONTHLY 7 = MONTHLY 8 = QUARTERLY 9 = ANNUALLY 10 = OTHER
COMMENTS	Text (255)	No	No	Optional additional description or comments related to Litterbins and clarification if OTHER was selected as an option for how often the litterbin was emptied.

## Observed Pollution Sources Table (OBS\_POL\_SRC)

**Description:** This table is used to store data relating to any observed pollution sources. Each record must contain an Event ID, code for the type of pollution source and location identified by latitude and longitude. Level of concern and distance to the water must also be recorded.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
EVID	Text (27)	Yes	Yes (Duplicates OK)	26-character alpha numeric Event ID comprised of Beach ID, Sample Location ID, Date and Event Type ID. Ex. – TX748844_ANL000_20130115_2
CODE_TYPE_POL_SRC	Text (3)	Yes	Yes (Duplicates OK)	<p>Numeric code representing the type of observed pollution source. Refer to REF_TYPE_POL_SRC table.</p> <p>The following lists the codes for the type of pollution source and the assigned meanings.</p> <p>1 = WASTEWATER DISCHARGE            2 = SEWAGE OVERFLOWS            3 = SEPTIC SYSTEMS            4 = SUBSURFACE SEWAGE DISPOSAL            5 = UNSEWERED AREAS            6 = GROUNDWATER SEEPAGE            7 = BATHHOUSE LEAKAGE            8 = DRAINS AND PIPES NEARBY            9 = STORMWATER OUTFALLS            10 = EROSION PRONE AREAS            11 = VACANT AREAS            12 = WETLAND DRAINAGE            13 = RIVERS/STREAMS            14 = LANDFILLS, OPEN DUMPS            15 = URBAN RUNOFF, INDUSTRIAL WASTE            16 = AGRICULTURAL RUNOFF            17 = LAND APPLICATION OF BIOSOLIDS AND MANURE            18 = CAFOs OR AFOs            19 = DOMESTIC ANIMALS            20 = WILDLIFE            21 = MARINAS, HARBORS            22 = MOORING BOATS            23 = OTHER</p>
LATITUDE	Text (11)	Yes	No	Latitude of observed pollution source in decimal degree format with 6 decimal places. Ex. DD.ddddd
LONGITUDE	Text (12)	Yes	No	Longitude of observed pollution source in decimal degree format with 6 decimal places. Ex. DD.ddddd

<b>FIELD NAME</b>	<b>DATA TYPE (SIZE)</b>	<b>REQ'D</b>	<b>INDEXED</b>	<b>DESCRIPTION</b>
CODE_LEV_CNCRN	Text (3)	Yes	Yes (Duplicates OK)	Code for level of concern. Refer to REF_LEV_CNCRN table.  The following lists the codes for the level of concern and the assigned meanings.  1 = HIGH 2 = MEDIUM 3 = LOW
DIST_TO_WATER	Number	Yes	Yes (Duplicates OK)	Distance from observed pollution source to the water, measured in meters.
EST_FLOW	Number	No	No	Measurement of estimated flow from any observed pollutions source where applicable. Measured in cubic feet per second (ft <sup>3</sup> /s).
COMMENTS	Text (255)	No	No	Optional additional description or comments related to observed pollution sources.

## Parameter Codes Table (PARM\_CODES)

**Description:** This table is used to store data relating to the Parameter code for each type of data collected. EPA STORET codes will be utilized if known, otherwise a Parameter code will be created and will begin with the letter C. Each record will contain a short description with the unit of measurement and an expanded long description that includes predefined numeric codes for values that are not measured or counted.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
PARM_CODE	Text (7)	Yes	Yes (No Duplicates)	<p>Code assigned to each parameter or type of data collected. 5-digit numeric EPA STORET codes are utilized if known. In absence of a STORET code, a 6-digit alphanumeric code beginning with the letter "C" was created. The following is a listing of the parameter codes to be collected for this project with the corresponding meanings.</p> <p>00010 = Water Temperature</p> <p>00020 = Air Temperature</p> <p>00035 = Wind Intensity</p> <p>00038 = Wind Direction</p> <p>00068 = Depth of Water Sample</p> <p>00081 = Water Color</p> <p>00094 = Specific Conductance (water)</p> <p>00300 = Dissolved Oxygen (water)</p> <p>00406 = pH (water)</p> <p>00480 = Salinity (water)</p> <p>34773 = Water Odor</p> <p>46001 = Water Surface or Intensity</p> <p>47501 = Present Weather</p> <p>70225 = Longshore Current</p> <p>72053 = Days Since Last Rainfall</p> <p>82078= Turbidity (water)</p> <p>82371 = Rainfall - inches past 3 Days</p> <p>82553 = Rainfall - inches past 1 Day</p> <p>82554 = Rainfall - inches past 7 Days</p> <p>84381 = Tide Stage</p> <p>C87000 = Tide Pools Present/Quantity</p> <p>C87001 = Average size of Tide Pools</p> <p>C87002 = Swimming/Sunbathing</p> <p>C87003 = Surfing/Windsurfing</p> <p>C87004 = RVs on Beach</p> <p>C87005 = Fishing / from Pier</p>



FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
				C87006 = Watercraft C87007 = Vehicles on Beach C87008 = Fishing / from Shore C87009 = Overnight Camping C87010 = Other Types of Beach Use C87011 = Humans on Land C87012 = Humans in Water C87013 = Total People at Beach C87014 = Evidence of Beach Maintenance C87015 = Appropriate Removal of Trash? C87016 = Floatables Present? C87017 = Type of Floatables Found C87018 = Litter Present? C87019 = Type of Litter / Debris Found C87020 = Seaweed (Algae) Present in Water C87021 = Seaweed (Algae) Present on Land C87022 = Type of Seaweed (Algae) in Water C87023 = Type of Seaweed (Algae) on Land C87024 = Seagrass present in Water C87025 = Seagrass present on Land C87026 = Type of Seagrass in Water C87027 = Type of Seagrass on Land C87028 = Presence of Fish Alive C87029 = Presence of Fish Dead C87030 = Presence of Avian Alive C87031 = Presence of Avian Dead C87032 = Presence of Fecal Droppings Avian C87033 = Presence of Jellyfish Alive C87034 = Presence of Jellyfish Dead C87035 = Presence of Canine Alive C87036 = Presence of Canine Dead C87037 = Presence of Fecal Droppings Canine C87038 = Presence of Crabs Alive C87039 = Presence of Crabs Dead C87040 = Presence of Equine Alive C87041 = Presence of Equine Dead

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
				C87042 = Presence of Fecal Droppings Equine C87043 = Presence of Other Live Wildlife/Domestic Animals C87044 = Presence of Other Dead Wildlife/Domestic Animals C87045 = Presence of Other Fecal Droppings C87046 = Beach Length C87047 = Beach Width Z1 C87048 = Beach Width Z2 C87049 = Beach Width Z3 C87050 = Beach Slope Z1 C87051 = Beach Slope Z2 C87052 = Beach Slope Z3 C87053 = Sediment Type C87054 = Mean Grain Size C87055 = Mode Grain Size C87056 = Median Grain Size C87057 = Skewness C87058 = Kurtosis C87059 = d10
SHORT_DESC	Text (50)	Yes	No	Short description of parameter.
UNIT	Text (20)	Yes	No	Unit of measurement for each parameter.
LONG_DESC	Text (255)	Yes	No	Expanded description of parameter including predefined numeric codes for values that are not measured or counted.
COMMENTS	Text (255)	No	No	Optional additional description or comments related to parameter codes.

## Programs Table (PROGRAMS)

**Description:** This table is used to store data relating to any program that have occurred on a beach. Each record must contain an Event ID, type of program and frequency. The organization responsible for the implementation of the program will also be included along with a contact name, phone number and address.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
EVID	Text (27)	Yes	Yes (Duplicates OK)	26-character alpha numeric Event ID comprised of Beach ID, Sample Location ID, Date and Event Type ID. Ex. – TX748844_ANL000_20130115_2
CODE_TYPE_PROGRAM	Text (3)	Yes	Yes (Duplicates OK)	Numeric code identifying the type of beach program. Refer to REF_TYPE_PROGRAM table.
ORGANIZATION	Text (50)	Yes	Yes (Duplicates OK)	Name of the organization in capital letters.
CONTACT_PERSON	Text (50)	Yes	No	Name of the person to contact regarding any questions related to the beach program.
CONTACT_PHONE	Text (13)	Yes	No	Phone number for contact person of program. Ex. 123-456-1234 format.
ORG_ADDRESS	Text (75)	Yes	No	Address of organization that performs beach program.
CODE_FREQ_PER	Text (3)	Yes	Yes (Duplicates OK)	Code identifying frequency that program is performed. Refer to REF_FREQ_PER table.  The following lists the codes for the period of frequency and the assigned meanings.  1 = HOURLY 2 = TWICE DAILY 3 = DAILY 4 = BI-WEEKLY 5 = WEEKLY 6 = BI-MONTHLY 7 = MONTHLY 8 = QUARTERLY 9 = ANNUALLY 10 = OTHER
COMMENTS	Text (255)	No	No	Optional additional description or comments related to programs.

## Results Table (RESULTS)

**Description:** This table is used to store data relating to the results of data collected at a beach. Each record must contain the Event ID, date, parameter code and the value or code for the result.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
EVID	Text (27)	Yes	Yes (Duplicates OK)	26-character alpha numeric Event ID comprised of Beach ID, Sample Location ID, Date and Event Type ID. Ex. – TX748844_ARA001_20130115_1
EVENT_DATE	Date/Time	Yes	Yes (Duplicates OK)	Date event occurred in MM/DD/YYYY format.
PARAM_CODE	Text (7)	Yes	Yes (Duplicates OK)	<p>Code assigned to each parameter or type of data collected. 5-digit numeric EPA STORET codes are utilized if known. In absence of a STORET code, a 6-digit alphanumeric code beginning with a “C” was created. Refer to PARAM_CODE table.</p> <p>The following is a listing of the parameters to be collected for this project with the corresponding assigned parameter code.</p> <p>Air Temperature = 00020            Appropriate Removal of Trash? = C87015            Average size of Tide Pools = C87001            Beach Length = C87046            Beach Slope Z1 = C87050            Beach Slope Z2 = C87051            Beach Slope Z3 = C87052            Beach Width Z1 = C87047            Beach Width Z2 = C87048            Beach Width Z3 = C87049            d10 = C87059            Days Since Last Rainfall = 72053            Depth of Water Sample = 00068            Dissolved Oxygen (water) = 00300            Evidence of Beach Maintenance = C87014            Fishing / from Pier = C87005            Fishing / from Shore = C87008            Floatables Present? = C87016            Humans in Water = C87012            Humans on Land = C87011            Kurtosis = C87058            Litter Present? = C87018            Longshore Current = 70225            Mean Grain Size = C87054            Median Grain Size = C87056            Mode Grain Size = C87055            Other Types of Beach Use = C87010</p>

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
				<p>Overnight Camping = C87009  pH (water) = 00406  Presence of Avian Alive = C87030  Presence of Avian Dead = C87031  Presence of Canine Alive = C87035  Presence of Canine Dead = C87036  Presence of Crabs Alive = C87038  Presence of Crabs Dead = C87039  Presence of Equine Alive = C87040  Presence of Equine Dead = C87041  Presence of Fecal Droppings Avian = C87032  Presence of Fecal Droppings Canine = C87037  Presence of Fecal Droppings Equine = C87042  Presence of Fish Alive = C87028  Presence of Fish Dead = C87029  Presence of Jellyfish Alive = C87033  Presence of Jellyfish Dead = C87034  Presence of Other Dead Wildlife/Domestic Animals = C87044  Presence of Other Fecal Droppings = C87045  Presence of Other Live Wildlife/Domestic Animals = C87043  Present Weather = 47501  Rainfall - inches past 1 Day = 82553  Rainfall - inches past 3 Days = 82371  Rainfall - inches past 7 Days = 82554  RVs on Beach = C87004  Salinity (water) = 00480  Seagrass present in Water = C87024  Seagrass present on Land = C87025  Seaweed (Algae) Present in Water = C87020  Seaweed (Algae) Present on Land = C87021  Sediment = C87053  Skewness = C87057  Specific Conductance (water) = 00094  Surfing/Windsurfing = C87003  Swimming/Sunbathing = C87002  Tide Pools Present/Quantity = C87000  Tide Stage = 84381  Total People at Beach = C87013  Turbidity (water) = 82078  Type of Floatables Found = C87017  Type of Litter / Debris Found = C87019  Type of Seagrass in Water = C87026  Type of Seagrass on Land = C87027  Type of Seaweed (Algae) in Water = C87022  Type of Seaweed (Algae) on Land = C87023  Vehicles on Beach = C87007  Water Color = 00081  Water Odor = 34773  Water Surface or Intensity = 46001  Water Temperature = 00010</p>

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
				Watercraft = C87006 Wind Direction = 00038 Wind Intensity = 00035
RESULT_VALUE	Text (10)	Yes	Yes (Duplicates OK)	Results of collected data. Values will either be a direct measurement, a count or a numeric code selected from the Routine or Annual data collection forms.
QUALIFIER	Text (10)	No	No	Optional qualifier further defining result value. Ex. < or >
COMMENTS	Text (255)	No	No	Optional additional description or comments related to results.

### Shellfish Table (SHELLFISH)

**Description:** This table is used to store data relating to any shellfish growing areas near a beach. Each record must contain an Event ID, type of shellfish, size of growing area and distance to swimming area.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
EVID	Text (27)	Yes	Yes (Duplicates OK)	26-character alpha numeric Event ID comprised of Beach ID, Sample Location ID, Date and Event Type ID. Ex. – TX748844_ANL000_20130115_2
CODE_TYPE_SHLFSH	Text (3)	Yes	Yes (Duplicates OK)	Type of Shellfish beds growing in area. Refer to REF_TYPE_SHELLFSH table.  The following lists the codes for the type of shellfish and the assigned meanings.  1 = OYSTER 2 = CLAM 3 = MUSSEL 4 = OTHER
SIZE	Number	Yes	No	Estimated size of shellfish growing areas measured in square feet (ft <sup>2</sup> )
DIST_SWM_AREA	Number	Yes	No	Distance from shellfish areas to swimming area. Measured in meters (m).
COMMENTS	Text (255)	No	No	Optional additional description or comments related to shellfish growing areas.

## Station Location Table (STATION\_LOC)

**Description:** This table is used to store data relating to the location and identification of sampling stations. Each record must contain the unique Station ID, Station Name, Beach ID, FIPS and latitude/longitude.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
STATION_ID	Text (11)	Yes	Yes (No Duplicates)	<p>Unique 6-digit alphanumeric code identifying the sampling station location.</p> <p>The following is a listing of the station location ID and name of the corresponding site.</p> <p>ANL000 = ANNUAL BEACH ANALYSIS            ARA001 = ROCKPORT BEACH PARK SOUTH            ARA002 = ROCKPORT BEACH PARK NORTH            ARA003 = ROCKPORT SALTWATER POOL            ARA004 = LITTLE BAY SKI BASIN            KLE001 = RIVERIA BEACH PIER            KLE002 = KAUFER-HUBERT MEMORIAL PARK #1            KLE003 = KAUFER-HUBERT MEMORIAL PARK #2            KLE004 = KAUFER-HUBERT MEMORIAL PARK #3            NUE001 = PORT ARANSAS #1            NUE002 = PORT ARANSAS #2            NUE003 = PORT ARANSAS #3            NUE004 = PORT ARANSAS #4            NUE005 = PORT ARANSAS #5            NUE006 = PORT ARANSAS #6            NUE007 = MUSTANG ISLAND SP #1            NUE008 = MUSTANG ISLAND SP #2            NUE009 = MUSTANG ISLAND SP #3            NUE010 = MUSTANG ISLAND SP #4            NUE012 = MUSTANG ISLAND SP #6            NUE013 = J.P. LUBY PARK #1            NUE014 = J.P. LUBY PARK #2            NUE015 = J.P. LUBY PARK #3            NUE016 = J.P. LUBY PARK #4            NUE017 = BOB HALL PIER/SEAWALL #1            NUE018 = BOB HALL PIER/SEAWALL #2            NUE019 = BOB HALL PIER/SEAWALL #3            NUE020 = BOB HALL PIER/SEAWALL #4            NUE021 = BOB HALL PIER/SEAWALL #5            NUE022 = BOB HALL PIER/SEAWALL #6            NUE023 = BOB HALL PIER/SEAWALL #7            NUE024 = BOB HALL PIER/SEAWALL #8            NUE025 = UNIVERISTY BEACH            NUE026 = POENISCH PARK            NUE028 = ROPES PARK #2            NUE029 = ROPES PARK #3            NUE031 = COLE PARK #2</p>

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
				NUE032 = COLE PARK #3 NUE033 = COLE PARK #4 NUE035 = COLE PARK #6 NUE036 = MCGEE BEACH #1 NUE037 = MCGEE BEACH #2 NUE038 = COASTAL NUE039 = BREAKERS NUE040 = GULFSPRAY NUE041 = GULDEN NUE042 = JFK-A NUE043 = LAGUNA SHORES NUE044 = PARK ROAD 22 NUE045 = CORPUS CHRISTI MARINA – SOUTH NUE046 = CORPUS CHRISTI MARINA – CENTER NUE047 = CORPUS CHRISTI MARINA – NORTH NUE048 = MUSTANG ISLAND NUE049 = LIGHTHOUSE LAKE NUE050 = EMERALD BEACH SAN001 = NUECES BAY CAUSEWAY #3
BEACH_ID	Text (9)	Yes	Yes (Duplicates OK)	Unique 8-digit alphanumeric code identifying beach and State. TX111111 format. Refer to BEACH table.
STATION_NAME	Text (50)	Yes	Yes (Duplicates OK)	Name identifying Station ID in capital letters.  The following is a listing of the name of the sampling station and the corresponding station ID.  ANNUAL BEACH ANALYSIS = ANL000 BOB HALL PIER/SEAWALL #1 = NUE017 BOB HALL PIER/SEAWALL #2 = NUE018 BOB HALL PIER/SEAWALL #3 = NUE019 BOB HALL PIER/SEAWALL #4 = NUE020 BOB HALL PIER/SEAWALL #5 = NUE021 BOB HALL PIER/SEAWALL #6 = NUE022 BOB HALL PIER/SEAWALL #7 = NUE023 BOB HALL PIER/SEAWALL #8 = NUE024 BREAKERS = NUE039 COASTAL = NUE038 COLE PARK #2 = NUE031 COLE PARK #3 = NUE032 COLE PARK #4 = NUE033 COLE PARK #6 = NUE035 CORPUS CHRISTI MARINA – CENTER = NUE046 CORPUS CHRISTI MARINA – NORTH = NUE047 CORPUS CHRISTI MARINA – SOUTH = NUE045 EMERALD BEACH = NUE050 GULDEN = NUE041 GULFSPRAY = NUE040



FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
				<p>J.P. LUBY PARK #1 = NUE013  J.P. LUBY PARK #2 = NUE014  J.P. LUBY PARK #3 = NUE015  J.P. LUBY PARK #4 = NUE016  JFK-A = NUE042  KAUFER-HUBERT MEMORIAL PARK #1 = KLE002  KAUFER-HUBERT MEMORIAL PARK #2 = KLE003  KAUFER-HUBERT MEMORIAL PARK #3 = KLE004  LAGUNA SHORES = NUE043  LIGHTHOUSE LAKE = NUE049  LITTLE BAY SKI BASIN = ARA004  MCGEE BEACH #1 = NUE036  MCGEE BEACH #2 = NUE037  MUSTANG ISLAND = NUE048  MUSTANG ISLAND SP #1 = NUE007  MUSTANG ISLAND SP #2 = NUE008  MUSTANG ISLAND SP #3 = NUE009  MUSTANG ISLAND SP #4 = NUE010  MUSTANG ISLAND SP #6 = NUE012  NUECES BAY CAUSEWAY #3 = SAN001  PARK ROAD 22 = NUE044  POENISCH PARK = NUE026  PORT ARANSAS #1 = NUE001  PORT ARANSAS #2 = NUE002  PORT ARANSAS #3 = NUE003  PORT ARANSAS #4 = NUE004  PORT ARANSAS #5 = NUE005  PORT ARANSAS #6 = NUE006  RIVERIA BEACH PIER = KLE001  ROCKPORT BEACH PARK NORTH = ARA002  ROCKPORT BEACH PARK SOUTH = ARA001  ROCKPORT SALTWATER POOL = ARA003  ROPES PARK #2 = NUE028  ROPES PARK #3 = NUE029  UNIVERISTY BEACH = NUE025</p>
FIPS	Text (6)	Yes	Yes  (Duplicates OK)	<p>Federal Information Processing Standard –  Unique 5-digit numeric code identifying county and geographical area.  The following lists the FIPS code and the corresponding county name.  48007 = Aransas County  48273 = Kleberg County  48355 = Nueces County  48409 = San Patricio County</p>

<b>FIELD NAME</b>	<b>DATA TYPE (SIZE)</b>	<b>REQ'D</b>	<b>INDEXED</b>	<b>DESCRIPTION</b>
LATITUDE	Text (11)	Yes	No	Latitude of sampling location in decimal degree format with 6 decimal places. Ex. DD.dddddd
LONGITUDE	Text (12)	Yes	No	Longitude of sampling location in decimal degree format with 6 decimal places. Ex. DD.dddddd
LOC_DESC	Text (255)	No	No	Optional further description for identifying location of sampling site.
COMMENTS	Text (255)	No	No	Optional additional description or comments related to Sampling Location

### **Bounding Structures Measurement Reference Table (REF\_BND\_STRC\_MSRMT)**

**Description:** This reference table is used to store data relating to the method in which a bounding structure was measured. Also includes the code for the type method.

<b>FIELD NAME</b>	<b>DATA TYPE (SIZE)</b>	<b>REQ'D</b>	<b>INDEXED</b>	<b>DESCRIPTION</b>
CODE_BND_STRC_MSRMT	Text (3)	Yes	No	Code referring to how the bounding structure was measured.  The following lists the codes for the type of method in which a bounding structures was measured and the assigned meanings. G = GPS - Global Positioning System M = Map P = Physical measurement
BND_STRC_MSRMT	Text (30)	Yes	No	Method by which the bounding structure was measured.

### Condition of Facilities/Litterbins Reference Table (REF\_CONDITION)

**Description:** This reference table is used to store data relating to the condition of a facility or litterbin. Also includes the code for the level of condition.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
CODE_CONDITION	Text (3)	Yes	No	Code identifying the condition of a facility or litterbin.  The following lists the codes for the condition of a facility or litterbin and the assigned meanings.  1 = GOOD 2 = FAIR 3 = POOR
CONDITION	Text (20)	Yes	No	Condition of facility or litterbin

### Disposal of Sanitary Waste Reference Table (REF\_DISP\_SAN\_WSTE)

**Description:** This reference table is used to store data relating to how sanitary wastes are disposed. Also includes the code for the type of disposal method.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
CODE_DISP_SAN_WSTE	Text (3)	Yes	No	Code identifying the method of sanitary waste disposal.  The following lists the codes for type of method in which sanitary wastes are disposed and the assigned meanings.  1 = PUBLIC SEWER 2 = SEPTIC FIELD 3 = PUMP OUT 4 = ON-SITE 5 = OTHER
DISP_SAN_WSTE	Text (20)	Yes	No	Method in which sanitary wastes are disposed.

### Frequency Period Reference Table (REF\_FREQ\_PER)

**Description:** This reference table is used to store data relating to the frequency that an event or program occurs. Also includes the code for the frequency period.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
CODE_FREQ_PER	Text (3)	Yes	No	Code identifying how often an event occurred.  The following lists the codes for the period of frequency and the assigned meanings.  1 = HOURLY 2 = TWICE DAILY 3 = DAILY 4 = BI-WEEKLY 5 = WEEKLY 6 = BI-MONTHLY 7 = MONTHLY 8 = QUARTERLY 9 = ANNUALLY 10 = OTHER
FREQ_PER	Text (20)	Yes	No	Frequency period.

### Level of Concern Reference Table (REF\_LEV\_CNCRN)

**Description:** This reference table is used to store data relating to the degree of the level of concern. Also includes the code for the level of concern.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
CODE_LEV_CNCRN	Text (3)	Yes	No	Code for the level of concern.  The following lists the codes for the level of concern and the assigned meanings.  1 = HIGH 2 = MEDIUM 3 = LOW
LEV_CNCRN	Text (20)	Yes	No	Degree of level of concern.

## Type of Beach Material Reference Table (REF\_TYPE\_BCH\_MAT)

**Description:** This reference table is used to store data relating to the type of material that makes up the beach. Also includes the code for the type of material.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
CODE_TYPE_BCH_MAT	Text (3)	Yes	No	Numeric code identifying the type of beach material.  The following lists the codes for the type of beach material and the assigned meanings.  1 = SAND 2 = MUD 3 = ROCK 4 = SHELL 5 = OTHER
TYPE_BCH_MAT	Text (20)	Yes	No	Name of type of beach material.

## Type of Bounding Structure Reference Table (REF\_TYPE\_BND\_STRUC)

**Description:** This reference table is used to store data relating to the type of any bounding structures natural or fabricated that border or exist within a beach's boundaries. Also includes the code for the type of bounding structure.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
CODE_TYPE_BND_STRUC	Text (3)	Yes	No	Code identifying the type of bounding structure.  The following lists the codes for the types of bounding structures and the assigned meanings.  1 = JETTY 2 = GROIN 3 = SEAWALL 4 = PIER 5 = NATURAL FORMATION 6 = BREAKWATER 7 = OTHER
TYPE_BND_STRUC	Text (20)	Yes	No	Name of the type of bounding structure.

### Type of Event Reference Table (REF\_TYPE\_EVENT)

**Description:** This reference table is used to store data relating to the type of event occurring at a beach. Also includes the code for the type of event.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
CODE_TYPE_EVENT	Text (3)	Yes	No	Code identifying type of event.  The following lists the codes for the type of event and the assigned meanings.  1 = ROUTINE 2 = ANNUAL 3 = CONTINUOUS 4 = RESAMPLE
TYPE_EVENT	Text (20)	Yes	No	Name of type of event.

### Type of Facility Reference Table (REF\_TYPE\_FAC)

**Description:** This reference table is used to store data relating to the type of facility. Also includes the code for the type of facility.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
CODE_TYPE_FAC	Text (3)	Yes	No	Code identifying the type of facility.  The following lists the codes for the type of facility and the assigned meanings.  1 = BATHHOUSE 2 = RESTROOM 3 = PORTABLE SANITARY UNIT 4 = RESTRAURANT 5 = MARINA 6 = BAR 7 = PARKING LOT 8 = FISH CLEANING STATION 9 = PLAYGROUND 10 = DOG PARK 11 = BOAT PUMP OUT 12 = OTHER
TYPE_FAC	Text (30)	Yes	No	Name of type of facility

## Type of Observed Pollution Source Reference Table (REF\_TYPE\_POL\_SRC)

**Description:** This reference table is used to store data relating to the type of any observed pollution sources at a beach. Also includes the code identifying the type of pollution source.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
CODE_TYPE_POL_SRC	Text (3)	Yes	No	<p>Numeric code representing the type of observed pollution source.</p> <p>The following lists the codes for the type of pollution source and the assigned meanings.</p> <p>1 = WASTEWATER DISCHARGE            2 = SEWAGE OVERFLOWS            3 = SEPTIC SYSTEMS            4 = SUBSURFACE SEWAGE DISPOSAL            5 = UNSEWERED AREAS            6 = GROUNDWATER SEEPAGE            7 = BATHHOUSE LEAKAGE            8 = DRAINS AND PIPES NEARBY            9 = STORMWATER OUTFALLS            10 = EROSION PRONE AREAS            11 = VACANT AREAS            12 = WETLAND DRAINAGE            13 = RIVERS/STREAMS            14 = LANDFILLS, OPEN DUMPS            15 = URBAN RUNOFF, INDUSTRIAL WASTE            16 = AGRICULTURAL RUNOFF            17 = LAND APPLICATION OF BIOSOLIDS AND MANURE            18 = CAFOs OR AFOs            19 = DOMESTIC ANIMALS            20 = WILDLIFE            21 = MARINAS, HARBORS            22 = MOORING BOATS            23 = OTHER</p>
TYPE_POL_SRC	Text (50)	Yes	No	Name of type of pollution source.

### Type of Program Table (REF\_TYPE\_PROGRAM)

**Description:** This reference table is used to store data relating to any program occurring on a beach. Also includes the code for the type of program.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
CODE_TYPE_PROGRAM	Text (3)	Yes	No	Numeric code for type of beach program.
TYPE_PROGRAM	Text (50)	Yes	No	Name of type of program.

### Type of Shellfish Reference Table (REF\_TYPE\_SHLFSH)

**Description:** This reference table is used to store data relating to any shellfish growing areas found at a beach. Also includes the code for the type of shellfish.

FIELD NAME	DATA TYPE (SIZE)	REQ'D	INDEXED	DESCRIPTION
CODE_TYPE_SHLFSH	Text (3)	Yes	No	Numeric code for type of shellfish growing area.  The following lists the codes for the type of shellfish and the assigned meanings.  1 = OYSTER 2 = CLAM 3 = MUSSEL 4 = OTHER
TYPE_SHLFSH	Text (20)	Yes	No	Name of type of shellfish.



**APPENDIX C - UNIQUE LOCAL CONTRACTOR INFORMATION**

## ARANSAS COUNTY

### Local Entity/Contractor

Corpus Christi-Nueces County Public Health  
District  
1702 Horne Road  
Corpus Christi, Texas 78416

### Laboratory

Donna Rosson, MPH, MT(ASCP)  
Laboratory Manager  
Corpus Christi-Nueces County Public Health  
District  
1702 Horne Road  
Corpus Christi, Texas 78416  
(361) 826-1323  
(361) 826-7217 - Fax  
[DonnaR@cctexas.com](mailto:DonnaR@cctexas.com)

### Local Government Contacts

Mr. Tom Staley, Director  
Parks and Leisure Department  
City of Rockport  
P.O. Box 1059  
Rockport, TX 78381  
361-729-2213 ext.134  
[parks@cityofrockport.com](mailto:parks@cityofrockport.com)  
[admin@cityofrockport.com](mailto:admin@cityofrockport.com)

Jace Tunnell, Project Manager  
Coastal Bend Bays and Estuaries Program  
1305 N. Shoreline, Suite 205  
Corpus Christi, TX 78401  
(361) 885-6245  
(361) 883-7801 - Fax  
[jtunnell@cbbep.org](mailto:jtunnell@cbbep.org)

Aransas County's most popular beach is the Rockport Beach Park in the City of Rockport. The Beach Watch Program samples at four locations at this one beach.

### Project Manager

Annette Rodriguez, Director  
Corpus Christi-Nueces County Public Health  
District  
1702 Horne Road  
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(361) 826-7203  
[annetter@cctexas.com](mailto:annetter@cctexas.com)

### Laboratory

Samantha Pollack, B.S.  
Microbiologist  
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### Analysis Method

Enterolert™

Brian Smith, M.D., M.P.H.  
Regional Medical Director  
Texas Department of State Health Services  
601 West Sesame Drive  
Harlingen, Texas 78550, Mail Code 1907  
(956) 423-0130  
(956) 444-3298 - Fax  
(956) 444-3202  
[Brian.Smith@dshs.state.tx.us](mailto:Brian.Smith@dshs.state.tx.us)

Station ID	Station Name	Beach Name	EPA Beach ID	Latitude	Longitude
ARA001	Rockport Beach Park South	Rockport Beach Park	TX748844	28.02859	-97.04233
ARA002	Rockport Beach Park North	Rockport Beach Park	TX748844	28.0302	-97.03763
ARA003	Rockport Saltwater Pool	Rockport Beach Park	TX748844	28.03251	-97.03215
ARA004	Little Bay Ski Basin	Rockport Beach Park	TX748844	28.03064	-97.03961

*Aransas County Beach Locations*



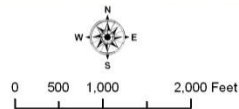
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Commissioner

Texas General Land Office  
Coastal GIS  
December 2011

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**Rockport Beach Park**  
Texas Beach Watch Sampling Stations

Aerial Photography: NAIP April 2010



## NUECES COUNTY

### Local Entity/Contractor

Corpus Christi-Nueces County Public Health  
District  
1702 Horne Road  
Corpus Christi, Texas 78416

### Project Manager

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### Laboratory

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### Analysis Method

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(361) 826-3464  
[michaelmo@cctexas.com](mailto:michaelmo@cctexas.com)

Damon Reeves, Park Superintendent  
Mustang Island State Park  
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Scott Cross, Director  
Nueces County Parks & Recreation Department

Derek Herzog, Beach Superintendent  
City of Corpus Christi

**Local Government Contacts**

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 Corpus Christi, TX 78480-8608  
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 (361) 749-6117 – Port Aransas Office  
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 (361) 883-7801 - Fax  
[jtunnell@cbbep.org](mailto:jtunnell@cbbep.org)

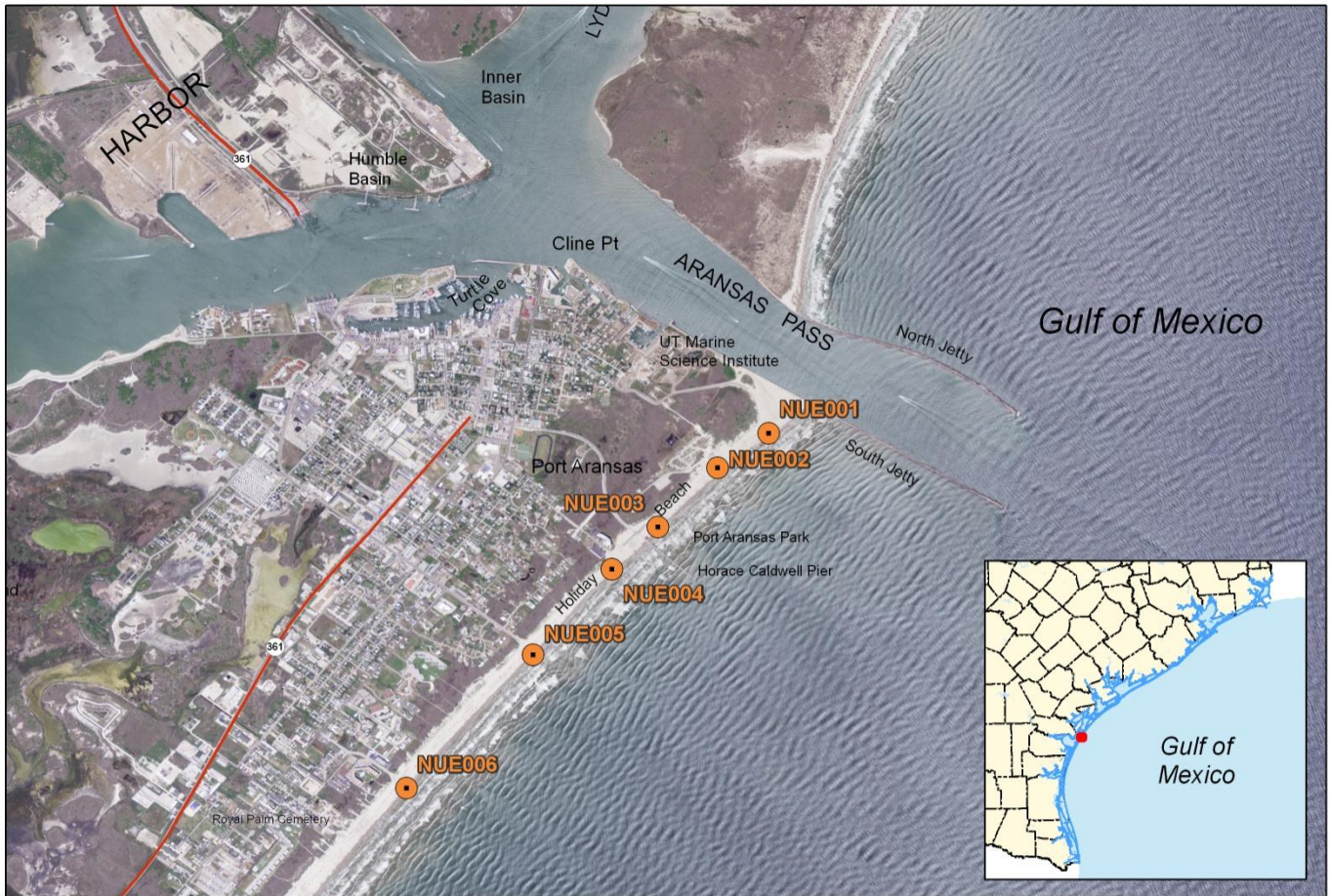
Nueces County has a very extensive beach area both along the Gulf of Mexico and within Corpus Christi Bay. Twenty-four stations on the Gulf and twenty-two stations on the Bay will be sampled.

<b>Station ID</b>	<b>Station Name</b>	<b>Beach Name</b>	<b>EPA Beach ID</b>	<b>Latitude</b>	<b>Longitude</b>
NUE001	Port Aransas #1	Port Aransas	TX722300	27.83317	-97.04689
NUE002	Port Aransas #2	Port Aransas	TX722300	27.83144	-97.04943
NUE003	Port Aransas #3	Port Aransas	TX722300	27.82847	-97.05243
NUE004	Port Aransas #4	Port Aransas	TX722300	27.82637	-97.05472
NUE005	Port Aransas #5	Port Aransas	TX315916	27.82207	-97.05867
NUE006	Port Aransas #6	Port Aransas	TX315916	27.8154	-97.06501
NUE007	Mustang Island SP #1	Mustang Island	TX551380	27.67892	-97.1647
NUE008	Mustang Island SP #2	Mustang Island	TX551380	27.67422	-97.16769
NUE009	Mustang Island SP #3	Mustang Island	TX551380	27.67079	-97.17082
NUE010	Mustang Island SP #4	Mustang Island	TX551380	27.66642	-97.17331
NUE012	Mustang Island SP #6	Mustang Island	TX551380	27.64334	-97.18714
NUE013	J.P. Luby Park #1	JP Luby Park	TX607336	27.63635	-97.19066
NUE014	J.P. Luby Park #2	JP Luby Park	TX607336	27.62909	-97.19497
NUE015	J.P. Luby Park #3	JP Luby Park	TX607336	27.62252	-97.19879
NUE016	J.P. Luby Park #4	JP Luby Park	TX607336	27.61649	-97.20199
NUE017	Bob Hall Pier/Seawall #1	Padre Balli Park	TX314643	27.60959	-97.20562
NUE018	Bob Hall Pier/Seawall #2	Padre Balli Park	TX314643	27.6047	-97.20822
NUE019	Bob Hall Pier/Seawall #3	Padre Balli Park	TX314643	27.59873	-97.21126
NUE020	Bob Hall Pier/Seawall #4	Padre Balli Park	TX314643	27.59484	-97.21354
NUE021	Bob Hall Pier/Seawall #5	Padre Balli Park	TX314643	27.58956	-97.21601

<b>Station ID</b>	<b>Station Name</b>	<b>Beach Name</b>	<b>EPA Beach ID</b>	<b>Latitude</b>	<b>Longitude</b>
NUE022	Bob Hall Pier/Seawall #6	Padre Balli Park	TX314643	27.58575	-97.21811
NUE023	Bob Hall Pier/Seawall #7	Padre Balli Park	TX314643	27.58271	-97.21966
NUE024	Bob Hall Pier/Seawall #8	Padre Balli Park	TX314643	27.57988	-97.22107
NUE025	University Beach	Ocean Drive	TX149569	27.71535	-97.32116
NUE026	Poenisch Park	Poenisch Park	TX682648	27.72406	-97.34344
NUE028	Ropes Park #2	Ropes Park	TX821303	27.75279	-97.37587
NUE029	Ropes Park #3	Ropes Park	TX821303	27.75477	-97.37623
NUE031	Cole Park#2	Cole Park	TX259473	27.76762	-97.3845
NUE032	Cole Park#3	Cole Park	TX259473	27.76991	-97.38717
NUE033	Cole Park#4	Cole Park	TX259473	27.77199	-97.38829
NUE035	Cole Park#6	Cole Park	TX259473	27.77545	-97.39112
NUE036	McGee Beach #1	McGee Beach	TX536781	27.78406	-97.39376
NUE037	McGee Beach #2	McGee Beach	TX536781	27.78589	-97.39332
NUE038	Coastal	Corpus Christi Beach	TX546628	27.81751	-97.38943
NUE039	Breakers	Corpus Christi Beach	TX546628	27.82167	-97.38636
NUE040	Gulfspray	Corpus Christi Beach	TX546628	27.82666	-97.38307
NUE041	Gulden	Corpus Christi Beach	TX546628	27.83105	-97.37972
NUE042	JFK-A	JFK Causeway	TX442541	27.65808	-97.26189
NUE043	Laguna Shores	Laguna Shores	TX937228	27.63813	-97.28644
NUE044	Park Road 22	Packery Channel Park	TX227625	27.63041	-97.22514
NUE045	Corpus Christi Marina - South	Corpus Christi Marina	TX305317	27.79056	-97.39167
NUE046	Corpus Christi Marina - Center	Corpus Christi Marina	TX305317	27.79333	-97.39056
NUE047	Corpus Christi Marina - North	Corpus Christi Marina	TX305317	27.79667	-97.38778
NUE048	Mustang Island	Mustang Island	TX396020	27.70333	-97.14972
NUE049	Lighthouse Lake	Lighthouse Lakes Kayak Trail	TX538780	27.860833	-97.082778
NUE050	Emerald Beach	Emerald Beach	TX199413	27.781611	-97.393444



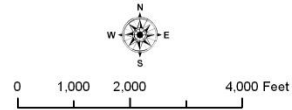
# Nueces County Beach Locations



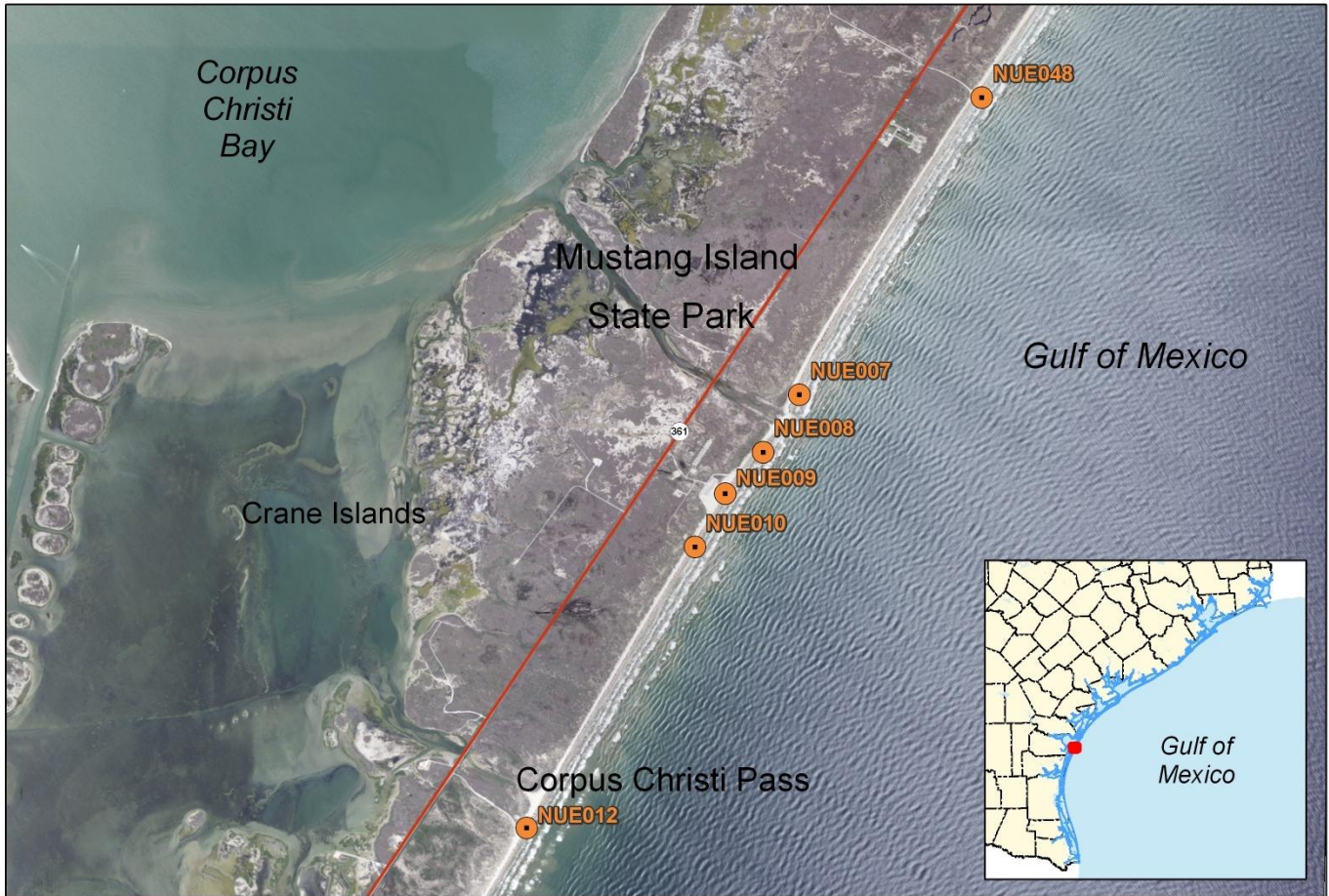
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December 2011

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**Port Aransas**  
Texas Beach Watch Sampling Stations  
Aerial Photography: NAIP April 2010



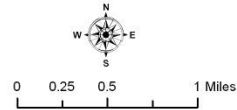
# Nueces County Beach Locations



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**Mustang Island**  
Texas Beach Watch Sampling Stations  
Aerial Photography: NAIP April 2010





# Nueces County Beach Locations



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Commissioner

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## JP Luby Park Texas Beach Watch Sampling Stations

Aerial Photography: NAIP April 2010



0 500 1,000 2,000 Feet



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JERRY PATTERSON, COMMISSIONER

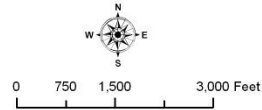
# Nueces County Beach Locations



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**Padre Balli Park**  
Texas Beach Watch Sampling Stations  
Aerial Photography: NAIP April 2010





# Nueces County Beach Locations



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Commissioner

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## Laguna Shores, JFK Causeway & Packery Channel Park Texas Beach Watch Sampling Stations

Aerial Photography: NAIP April 2010

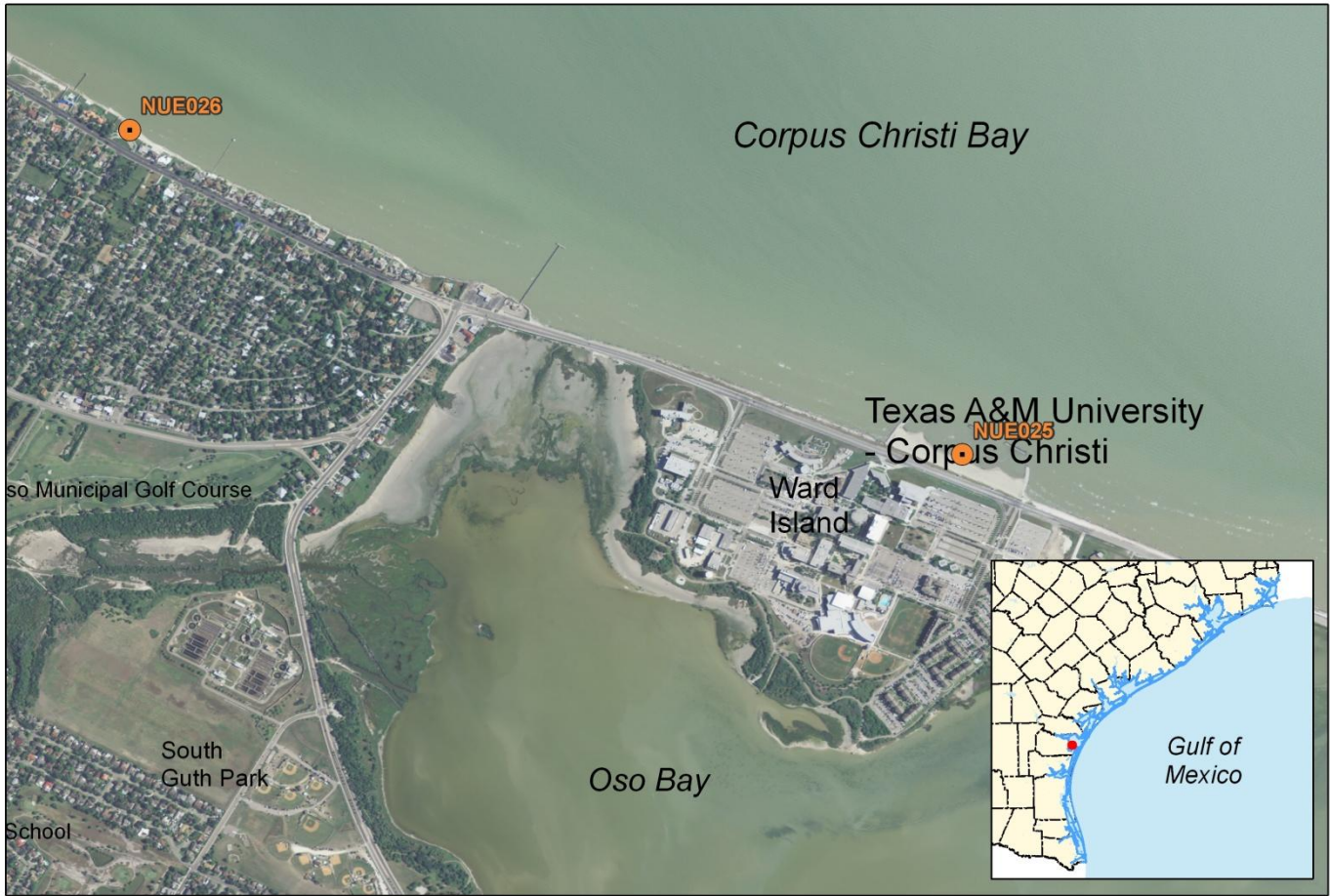


0 1,000 2,000 4,000 Feet



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JERRY PATTERSON, COMMISSIONER

# Nueces County Beach Locations



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## Poenisch Park & University Beach

Texas Beach Watch Sampling Stations

Aerial Photography: NAIP April 2010

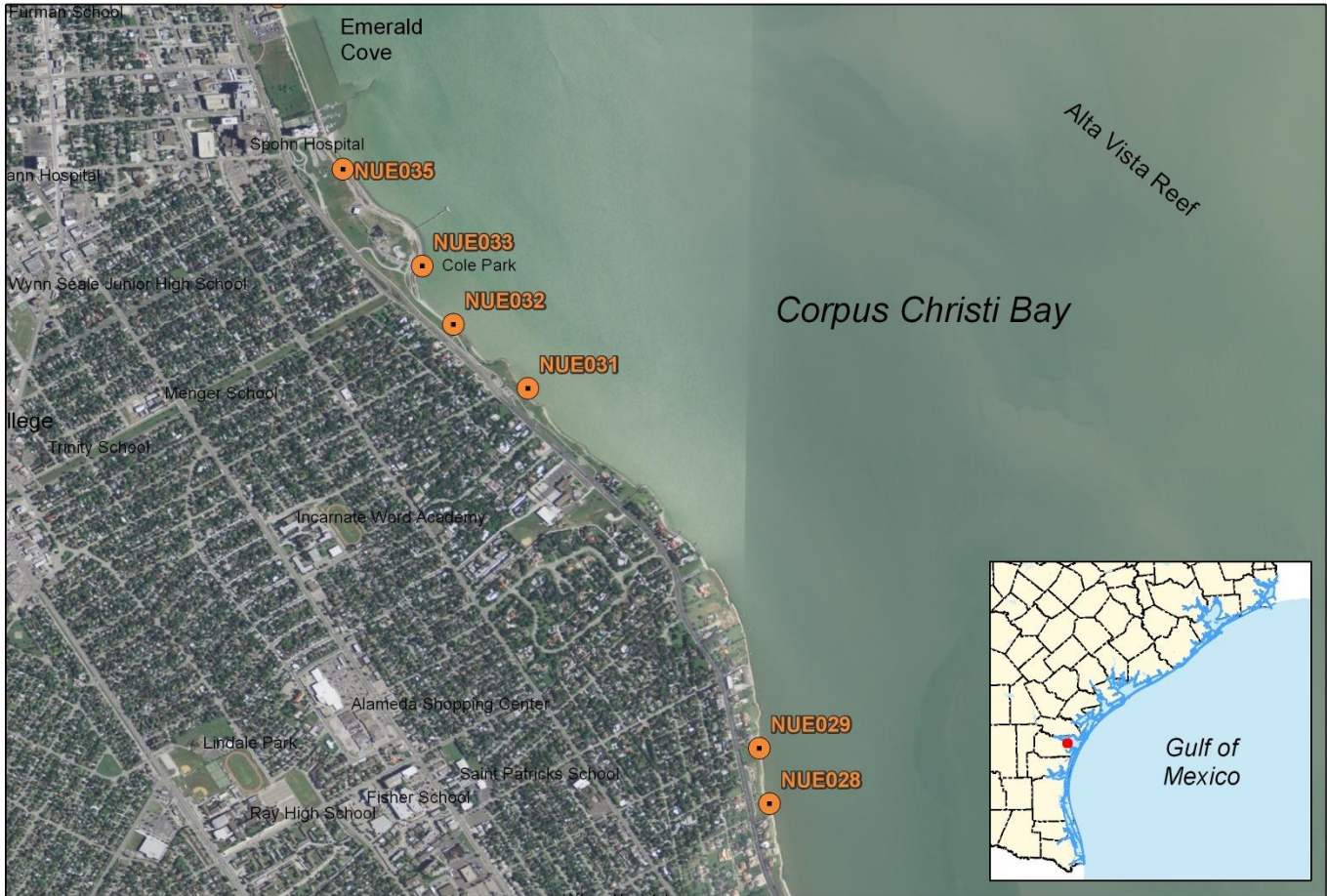


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# Nueces County Beach Locations

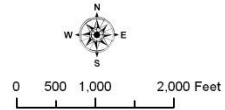


Texas General Land Office  
Coastal GIS  
December 2011

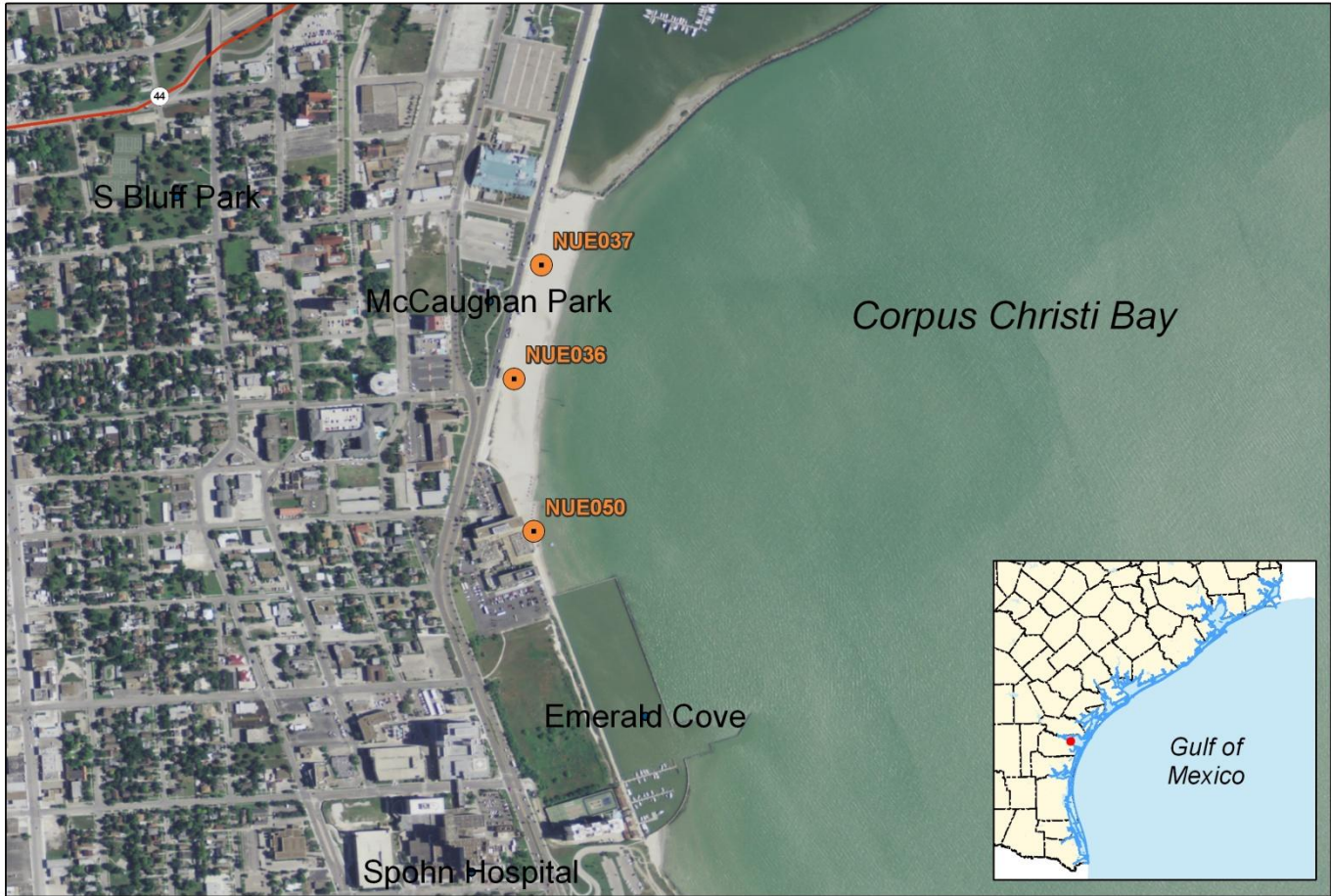
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## Cole Park & Ropes Park Texas Beach Watch Sampling Stations

Aerial Photography: NAIP April 2010



# Nueces County Beach Locations



Jerry Patterson  
Commissioner

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## McGee Beach & Emerald Beach Texas Beach Watch Sampling Stations

Aerial Photography: NAIP April 2010



0 250 500 1,000 Feet





# Nueces County Beach Locations



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## Corpus Christi Marina Texas Beach Watch Sampling Stations

Aerial Photography: NAIP April 2010

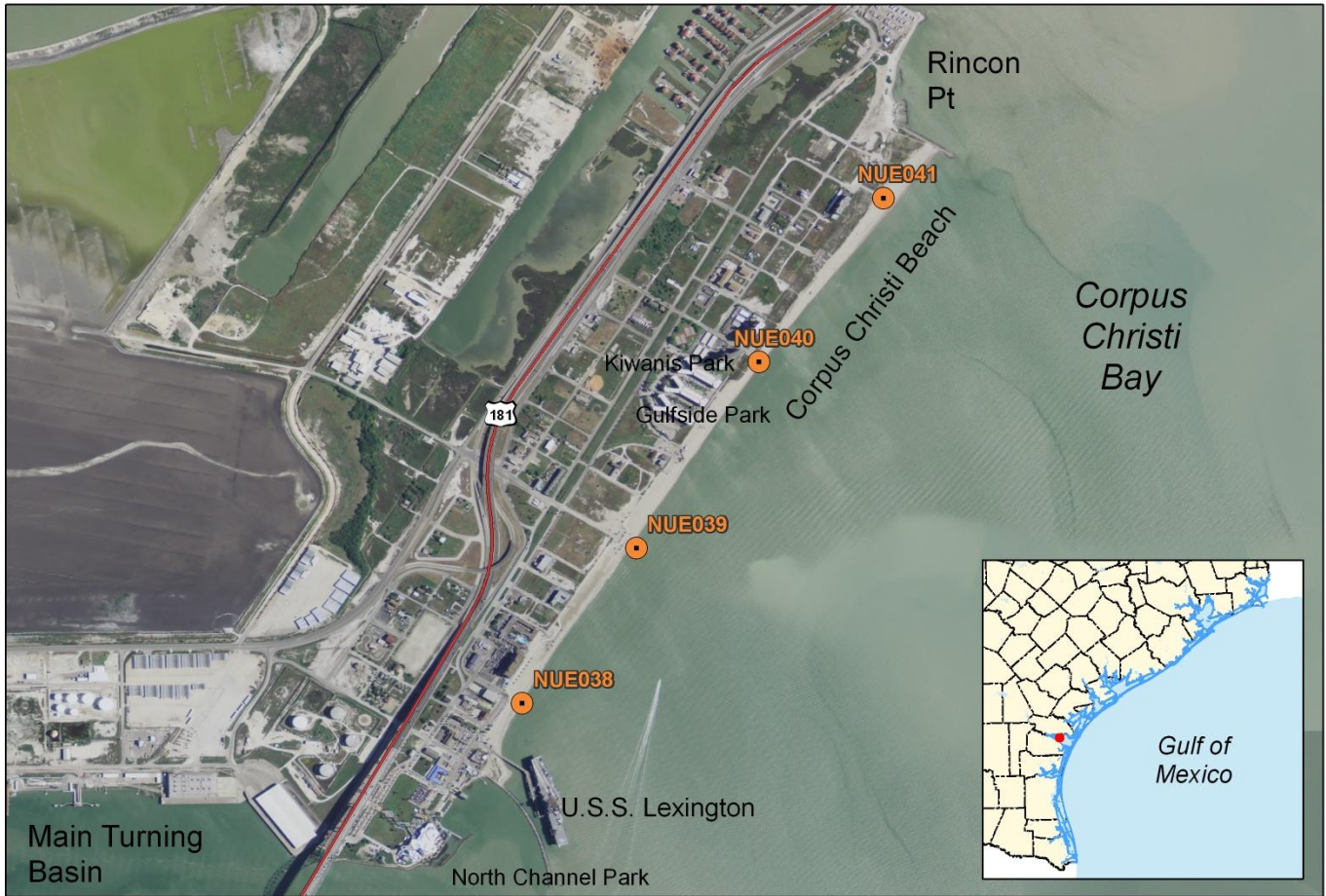


0 250 500 1,000 Feet



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JERRY PATTERSON, COMMISSIONER

# Nueces County Beach Locations



Jerry Patterson  
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## Corpus Christi Beach

Texas Beach Watch Sampling Stations

Aerial Photography: NAIP April 2010



0 500 1,000 2,000 Feet



TEXAS GENERAL LAND OFFICE  
JERRY PATTERSON, COMMISSIONER



# Nueces County Beach Locations



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## Lighthouse Lakes Kayak Trail Texas Beach Watch Sampling Stations

Aerial Photography: NAIP April 2010



0 1,000 2,000 4,000 Feet



TEXAS GENERAL LAND OFFICE  
JERRY PATTERSON, COMMISSIONER

## **SAN PATRICIO COUNTY**

### **Local Entity/Contractor**

Corpus Christi-Nueces County Public Health  
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Corpus Christi, Texas 78416

### **Project Manager**

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### **Laboratory**

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### **Analysis Method**

Enterolert™

### **Local Government Contacts**

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[terry.simpson@co.san-patricio.tx.us](mailto:terry.simpson@co.san-patricio.tx.us)

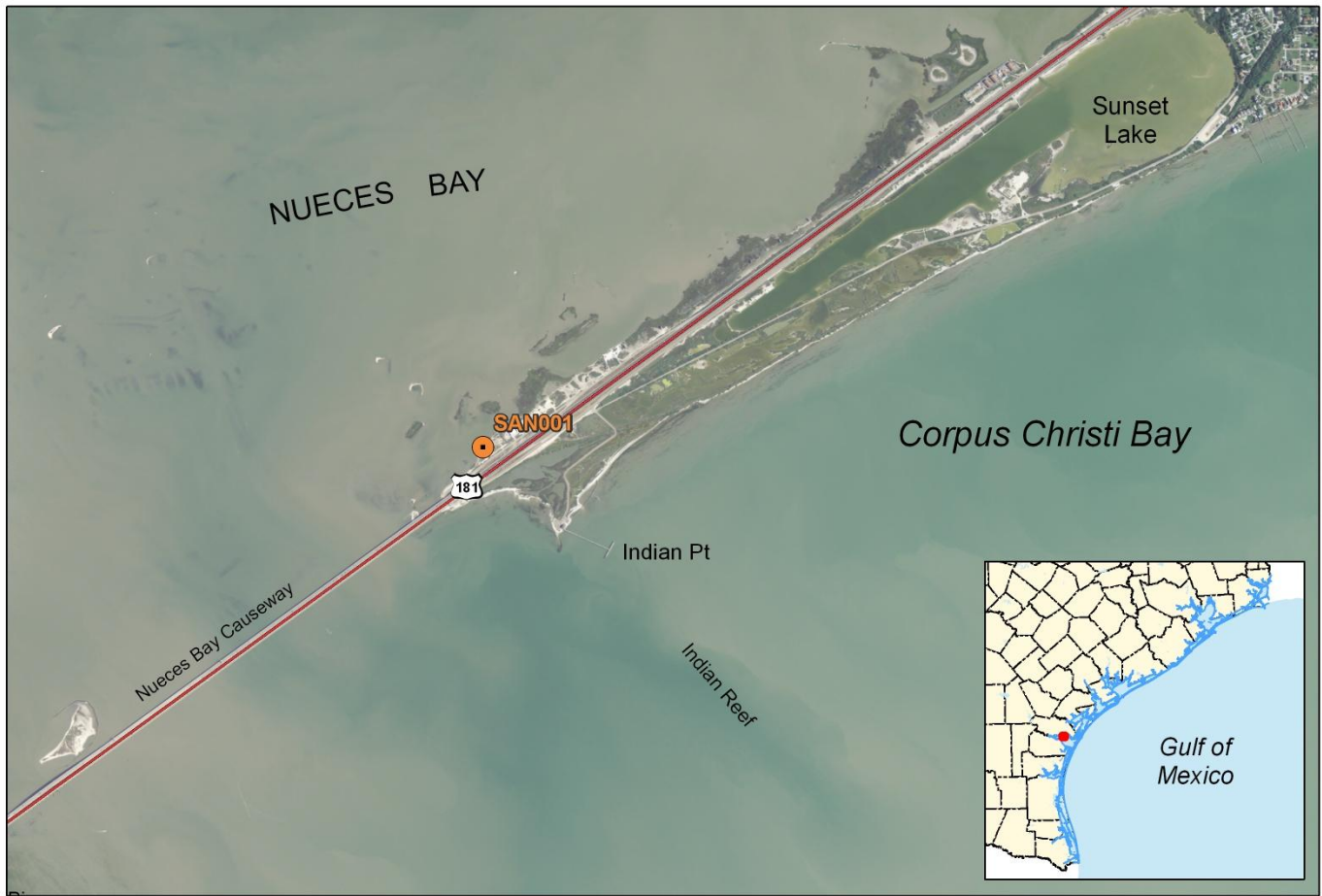
Brian Smith, M.D., M.P.H.  
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Harlingen, Texas 78550, Mail Code 1907  
(956) 423-0130  
[Brian.Smith@dshs.state.tx.us](mailto:Brian.Smith@dshs.state.tx.us)

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(361) 885-6245  
(361) 883-7801 - Fax  
[jtunnell@cbbep.org](mailto:jtunnell@cbbep.org)

San Patricio County has one station at a recreational beach that is being sampled. The location is primarily utilized for wade fishing and a kayak launch.

Station ID	Station Name	Beach Name	EPA Beach ID	Latitude	Longitude
SAN001	Nueces Bay Causeway #3	Highway 35 - Nueces Bay Causeway	TX139394	27.854111	-97.358056

***San Patricio County Beach Location***

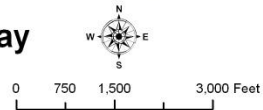


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**Hwy 35 - Nueces Bay Causeway**  
Texas Beach Watch Sampling Stations

Aerial Photography: NAIP April 2010



**APPENDIX D - PROJECT MANAGER SIGNATURE PAGE**

**PROJECT MANAGER SIGNATURE PAGE**

By my signature below, I attest that I have read and understand the Quality Assurance Project Plan for \_\_\_\_\_ **County**.

\_\_\_\_\_  
Project Manager

\_\_\_\_\_  
Project Manager (Print Name)

\_\_\_\_\_  
Date

**APPENDIX E - CONTRACTOR AND DATA REVIEW TEMPLATE**

## CONTRACTOR AND DATA REVIEW TEMPLATE

The following review was conducted on [insert date] by (insert name), Quality Assurance Officer, Texas Beach Watch Program during the normal sampling conducted by [insert lab tech name], [insert name of laboratory], at various sampling points in [insert county name] County. Sample processing was observed at the laboratory. [Insert lab tech name] performed the sample processing.

Questions/Documentation	Yes/No	Comments
<b>Sample Collection Containers</b>		
Are samples collected in sterilized polypropylene bottles with a volume of at least 125 ml, but no more than 1000 ml?		
Are collection bottles kept sealed until immediately prior to taking the sample?		
<b>Sample Collection Depth and Location</b>		
Are the samples being collected at the appropriate standing depth? (Knee depth (~2 ft), this may change if the majority of the recreational activity occurs in a significantly different depth or if the distance to achieve a sampling depth is greater than 50 meters from the water line.)		
Are samples collected as near as possible to the access points of a beach?		

Questions/Documentation	Yes/No	Comments
<b>Sample Collection Procedure</b>		
Is the sub recipient following the step-by-step field-sampling methods outlined under B2 of the QAPP? (From Appendix J of the National Beach Guidance and Performance Criteria for Recreational Water (EPA-823-B-02-004) June 2002.)		
<b>Sample Handling and Labeling</b>		
Are sample-holding times (of no longer than six hours from collection to delivery) being met?		
Are samples being maintained at a temperature of <10° Celsius (C) and stored in insulated containers during transit to the laboratory?		
Is each sample bottle properly labeled with the following information: date and time of collection, sampler's name, sample letters, and station number?		
<b>Sample Collection Times and Frequency</b>		
Is one sample being collected per station?		
Is re-sampling being conducted on a daily basis when the result value exceeds the recommended standard?		



Questions/Documentation	Yes/No	Comments
Is sample collection occurring between sunrise and noon?		
Are field replicates being collected and analyzed by field personnel at the appropriate frequency?		
Does re-sampling occur within two hours of a count that exceeds standards (when possible)?		
Does sample collection follow the schedule as outlined in the work plan? The required collection period is on Tuesday with Monday and Wednesday as alternate days (Multiple days may be needed to collect all of the samples).		
<b>Recording and Chain of Custody</b>		
Do field personnel document rainfall and tidal information to explain sample collection difficulties?		
Is the Beach Watch Coordinator contacted if there are sampling difficulties?		

Questions/Documentation	Yes/No	Comments
Are Chain of Custody (COC) procedures followed whenever samples are collected, transferred, stored, and analyzed?		
Were missed sampling events (completeness <100%) explained and documented?		
<b>Analytical Method</b>		
Are the samples analyzed using either EPA's Method 1600: 24 hour Membrane Filter Test or IDEXX's Enterolert™ system?		
Are the sample results being entered into the Beach Watch Database, through the web, within two hours of receiving them?		
<b>Local Project Manager Duties</b>		
Does the sub recipient have a training manual for new hires on procedures, protocol, etc? Has a copy been provided to the Beach Watch Program?		

Questions/Documentation	Yes/No	Comments
Does the project manager periodically verify the completeness of field sampling records prior to data entry?		
<b>Quality Control Requirements</b>		
Has the sub recipient submitted its QA/QC plan that has been certified and approved by TCEQ?		
Are duplicate lab samples being conducted in the lab to verify precision? Is it being conducted for 10% of the samples?		
Is the sub recipient documenting that sterilization of lab autoclaves occurs?		
Is documentation being maintained on daily incubation temperatures?		
Is documentation being maintained on calibration of lab equipment used?		

