EPA Webinar– Sanitary Survey for Marine Beaches

March 25, 2014

Presented by EPA Office of Science and Technology,

Standards and Health Protection Division

Presenters

- Moderator:
  - Samantha Fontenelle, EPA Office of Water
- Presenters:
  - Denise Hawkins, EPA Office of Water
  - Rick Hoffmann, EPA Office of Water
  - Shannon Briggs, Michigan Department of Environmental Quality
  - Keri Kaczor, University of Maine Cooperative Extension

EPA Webinar: Sanitary Survey for Marine Beaches

Welcome

Presented by:
Denise Hawkins
EPA Office of Water

Registered Participants

- Wide Range of Participants
- States
  - For example, California, Connecticut, Hawaii, Florida, New Jersey, New York and Washington
- Counties
- Universities
  - For example, University of Michigan, University of Washington, University of Hawaii, Georgia Southern, Miami University
- Environmental groups
  - Clean Ocean Action, Great Lake Organization, Surfrider
- Consulting Firms
- Federal Government
  - NOAA, EPA
- Others

Overview

- **Purpose:** Introduce the Marine Beach Sanitary Survey tool and provide state examples.
- **Presentations:**
  - Introduction to Marine Beach Sanitary Survey tool
    - Rick Hoffmann, EPA Office of Water
  - Beach sanitary surveys—old idea, new application
    - Shannon Briggs, Michigan Department of Environmental Quality
  - Strategies to identify sources of bacterial pollution affecting coastal beach water quality
    - Keri Kaczor, Maine Cooperative Extension

EPA Introduction to Marine Beach Sanitary Survey Tool

Presented by:
Rick Hoffmann
EPA Office of Water

Purpose of Sanitary Survey

- EPA developed the Marine Beach Sanitary Survey to help beach managers in coastal states identify and synthesize beach and watershed information so they can improve water quality for swimming, including:
  - Water quality data.
  - Pollutant source data.
  - Land use data.
- The goal is to give beach managers a technically sound and consistent approach for identifying pollution sources and sharing information.

Multiple Uses

The Marine Beach Sanitary Survey is a valuable tool that can address a variety of beach management uses.

- ***Characterize risk and prioritize beaches.***
- ***Beach and watershed planning.***
- ***Remediation.***
- ***Predictive models.***
- ***Other uses.***

Audiences

- Beach officials
  - Local beach and program managers and public health officials
- Others
  - Stormwater program managers, wastewater facility managers, local elected officials, local planning authorities, academic researchers, and other beach and water quality professionals

Marine Sanitary Survey Development Process

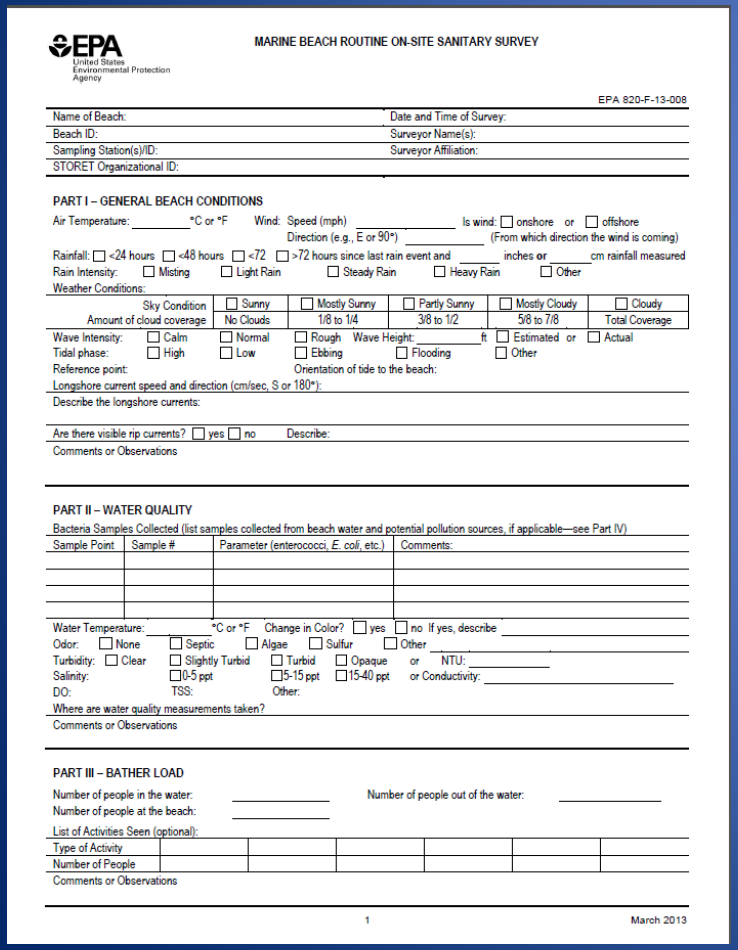
- Started with EPA's Great Lakes sanitary survey
- Reviewed marine surveys and developed draft marine survey
- Consulted with technical reviewers
- Published final in March 2013

Scope and Format

- Tailored to the marine beach environment; added topics for marine beaches
- Kept Great Lakes format – three parts
  - Routine On-Site Sanitary Survey: 2 pages, 4 sets of questions
  - Annual Sanitary Survey: 12 pages, 13 sets of questions
  - User Manual: 57 pages, link to each question

Marine Sanitary Survey Forms

Routine On-Site Survey



EPA United States Environmental Protection Agency

MARINE BEACH ROUTINE ON-SITE SANITARY SURVEY

EPA 820-F-13-008

Name of Beach:	Date and Time of Survey:
Beach ID:	Surveyor Name(s):
Sampling Station(s)/ID:	Surveyor Affiliation:
STORET Organizational ID:	

PART I – GENERAL BEACH CONDITIONS

Air Temperature: _____ °C or °F Wind: Speed (mph) _____ Is wind: ☐ onshore or ☐ offshore
Direction (e.g., E or 90°) _____ (From which direction the wind is coming)

Rainfall: ☐ <24 hours ☐ <48 hours ☐ <72 ☐ >72 hours since last rain event and _____ inches **or** _____ cm rainfall measured

Rain Intensity: ☐ Misting ☐ Light Rain ☐ Steady Rain ☐ Heavy Rain ☐ Other

Weather Conditions:

Sky Condition	☐ Sunny	☐ Mostly Sunny	☐ Partly Sunny	☐ Mostly Cloudy	☐ Cloudy
Amount of cloud coverage	No Clouds	1/8 to 1/4	3/8 to 1/2	5/8 to 7/8	Total Coverage

Wave Intensity: ☐ Calm ☐ Normal ☐ Rough Wave Height: _____ ft ☐ Estimated or ☐ Actual

Tidal phase: ☐ High ☐ Low ☐ Ebbing ☐ Flooding ☐ Other

Reference point: Orientation of tide to the beach:

Longshore current speed and direction (cm/sec, S or 180°):

Describe the longshore currents:

Are there visible rip currents? ☐ yes ☐ no Describe:

Comments or Observations

PART II – WATER QUALITY

Bacteria Samples Collected (list samples collected from beach water and potential pollution sources, if applicable—see Part IV)

Sample Point	Sample #	Parameter (enterococci, *E. coli*, etc.)	Comments:

Water Temperature: _____ °C or °F Change in Color? ☐ yes ☐ no If yes, describe _____

Odor: ☐ None ☐ Septic ☐ Algae ☐ Sulfur ☐ Other _____

Turbidity: ☐ Clear ☐ Slightly Turbid ☐ Turbid ☐ Opaque or NTU: _____

Salinity: ☐0-5 ppt ☐5-15 ppt ☐15-40 ppt or Conductivity: _____

DO: TSS: Other:

Where are water quality measurements taken?

Comments or Observations

PART III – BATHER LOAD

Number of people in the water: _____ Number of people out of the water: _____

Number of people at the beach: _____

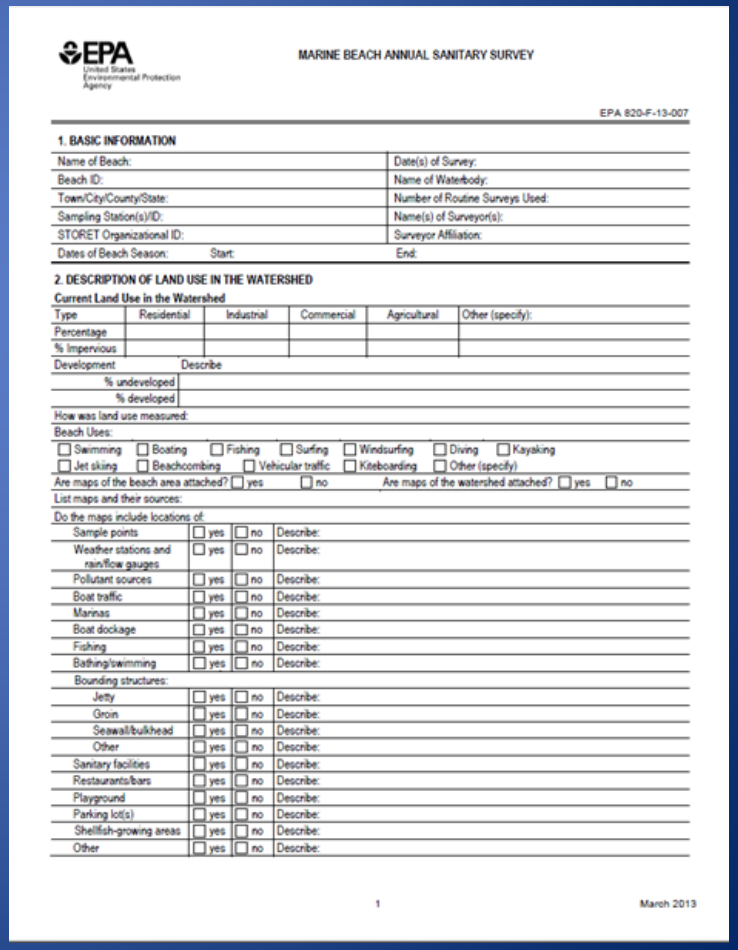
List of Activities Seen (optional):

Type of Activity						
Number of People						

Comments or Observations

1 March 2013

Annual Survey



EPA United States Environmental Protection Agency

MARINE BEACH ANNUAL SANITARY SURVEY

EPA 820-F-13-007

1. BASIC INFORMATION

Name of Beach:	Date(s) of Survey:
Beach ID:	Name of Waterbody:
Town/City/County/State:	Number of Routine Surveys Used:
Sampling Station(s)/ID:	Name(s) of Surveyor(s):
STORET Organizational ID:	Surveyor Affiliation:
Dates of Beach Season: Start:	End:

2. DESCRIPTION OF LAND USE IN THE WATERSHED

Current Land Use in the Watershed

Type	Residential	Industrial	Commercial	Agricultural	Other (specify):
Percentage					
% Impervious					

Development Describe

% undeveloped

% developed

How was land use measured:

Beach Uses:

☐ Swimming ☐ Boating ☐ Fishing ☐ Surfing ☐ Windsurfing ☐ Diving ☐ Kayaking
☐ Jet skiing ☐ Beachcombing ☐ Vehicular traffic ☐ Kiteboarding ☐ Other (specify)

Are maps of the beach area attached? ☐ yes ☐ no Are maps of the watershed attached? ☐ yes ☐ no

List maps and their sources:

Do the maps include locations of:

Sample points	☐ yes	☐ no	Describe:
Weather stations and rain/flow gauges	☐ yes	☐ no	Describe:
Pollutant sources	☐ yes	☐ no	Describe:
Boat traffic	☐ yes	☐ no	Describe:
Marinas	☐ yes	☐ no	Describe:
Boat dockage	☐ yes	☐ no	Describe:
Fishing	☐ yes	☐ no	Describe:
Bathing/swimming	☐ yes	☐ no	Describe:
Bounding structures:			
Jetty	☐ yes	☐ no	Describe:
Groin	☐ yes	☐ no	Describe:
Seawall/bulkhead	☐ yes	☐ no	Describe:
Other	☐ yes	☐ no	Describe:
Sanitary facilities	☐ yes	☐ no	Describe:
Restaurants/bars	☐ yes	☐ no	Describe:
Playground	☐ yes	☐ no	Describe:
Parking lot(s)	☐ yes	☐ no	Describe:
Shellfish-growing areas	☐ yes	☐ no	Describe:
Other	☐ yes	☐ no	Describe:

1 March 2013

Comparison: Annual vs. Routine Survey

Annual Survey ***Elements***	**Routine Survey** ***Elements***
1. Basic Info Name, location, dates, etc.	**I. General beach conditions**
2. Description of Land Use Beach and nearby watershed Land use type, beach uses, maps, circulation control structures, sediments, shellfish growing areas and photos	
3. Weather Conditions and Physical Characteristics Rain, air temperature, water, wave height, longshore currents, winds, tides, tidal pools, longshore and nearshore currents	
4. Beach Dimensions Length, width and slopes	

Comparison: Annual vs. Routine Survey

Annual Survey *Elements*	Routine Survey *Elements*
5. Bather Load (number of bathers)	**III. Bather load**
6. Beach Cleaning Debris, litter and other	
7. Sampling Location Information	
8. Water Quality Sampling Lab, algae observations, wildlife and domestic animals, samples, and water quality	**II. Water Quality**
9. Modeling and Other Studies Models, stormwater, discharges and microbial source tracking (MST)	
10. Advisories and Closings	
11. Potential Pollution Sources Numerous source types	**IV. Potential Pollutant Sources**
12.Sanitary Facilities	
13. Other Facilities	

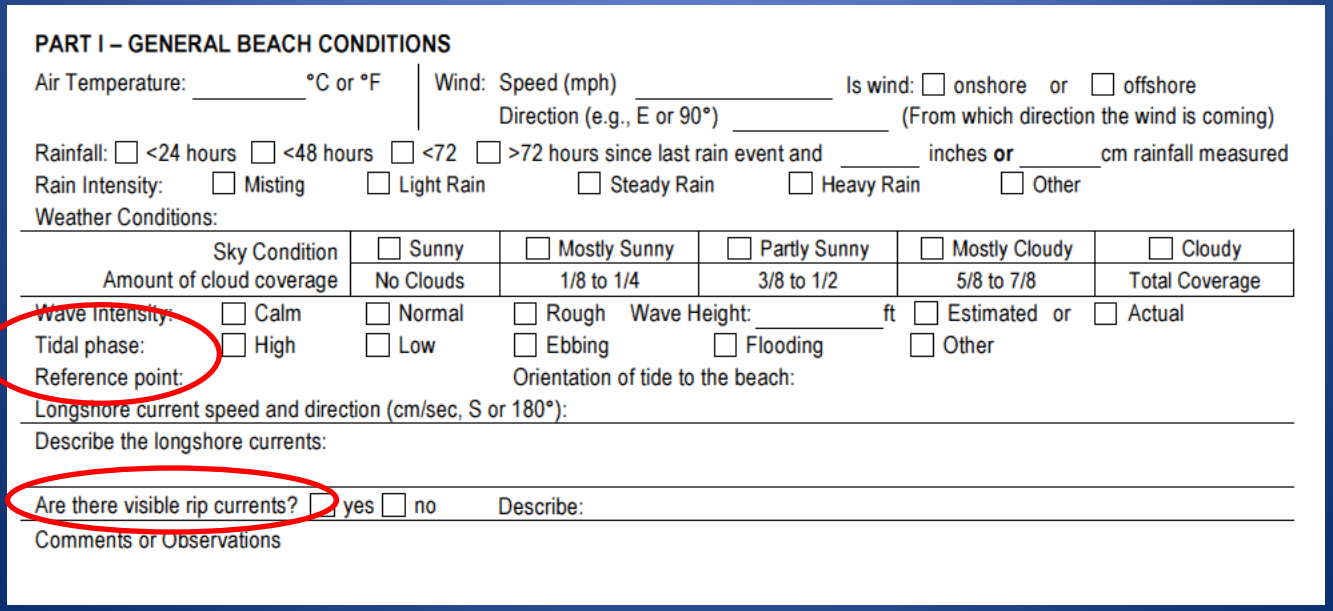
Differences Between Great Lakes and Marine Beach Sanitary Surveys

- Kept the same format.
- Made a few enhancements, including:
  - Circulation control.
  - Other studies
    - (e.g., microbial source tracking, etc.).
  - TMDLs.
  - Pollution sources.
- Added marine-specific data elements.

Examples of Additions

Routine survey additions:

- Tidal phase and flow
- Rip currents



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Longshore current speed and direction (cm/sec, S or 180°):

Describe the longshore currents:

Are there visible rip currents? ☐ yes ☐ no Describe:

Comments or Observations

Tides and Tide Pools

Annual survey additions

Tides

Tidal extent: Mean high: Mean low:

How does tidal flow manifest itself?

Do the tides create a cross-current?

Do tidal rivers or streams discharge near the beach? ☐ yes ☐ no If yes, describe flow, tidal influence, salinity, proximity to swimming area, and so forth:

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

Tide Pools

Describe the type of tide pools, if found, at this beach:

Are tide pools common at this beach? ☐ yes ☐ no How many pools are typically seen?

Average size: Duration pools remain filled:

Are samples collected from tide pools? ☐ yes ☐ no If yes, describe:

Do children frequently play in the tide pools? ☐ yes ☐ no If yes, describe:

Shellfish

Annual survey additions

Shellfish Growing Area

Describe any shellfish-growing areas near the beach, including size, distance from the swimming area, condition, issues, and results of any recent shellfish sanitary surveys (attach any relevant data or reports and cite sources):

Modeling and Other Studies

Annual survey additions

9. MODELING AND OTHER STUDIES

Are models being used? ☐ yes ☐ no

If yes, list types of models being used and briefly describe the models:

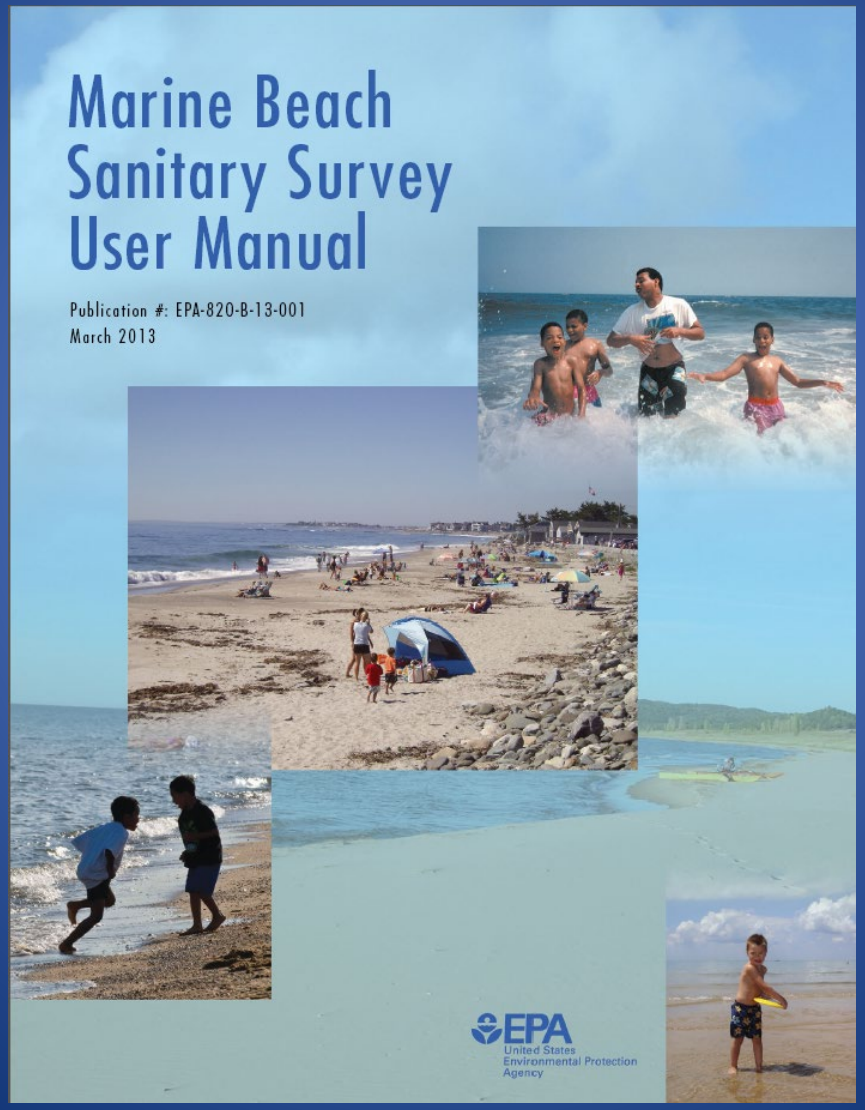
Have you tested for stormwater cross-connections in the sanitary sewer? ☐ yes ☐ no If yes, describe results:

Have you tested for human sources of contamination? ☐ yes ☐ no If yes, describe results:

Have you performed visual screening to isolate discharge areas during dry and wet weather? ☐ yes ☐ no If yes, describe:

Has microbial source tracking been done at this beach? ☐ yes ☐ no If yes, describe results and cite any reports:

User Manual


Marine Beach
Sanitary Survey
User Manual
Publication #: EPA-820-B-13-001
March 2013
EPA
United States
Environmental Protection
Agency

User Manual (cont.)

- The User Manual provides background on sanitary surveys, including why and how to use them.
- For the data elements on the survey forms, where applicable, the User Manual provides:
  - Examples
    - Including units
  - Descriptions
    - What is it, why is it important
  - Methods
    - How to collect the data
    - Links to instruments, data sources and methodologies

Tidal phase

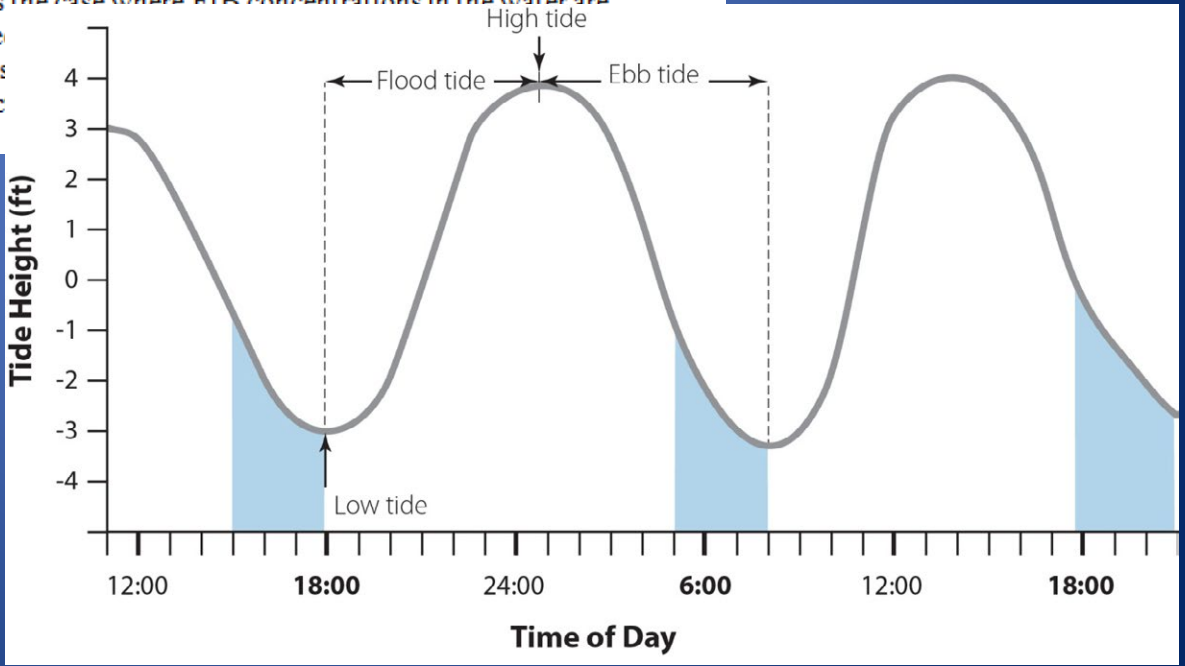
Example

High tide, ebb tide

Description

Tides are the periodic rise and fall of a body of water resulting from gravitational interactions among the sun, moon, and earth. Noting the tidal phase gives a point of reference for other pieces of information that you are collecting.

There are two main approaches for FIB monitoring at tidally influenced beaches and estuaries. The first approach is to consistently sample on an ebb tide, i.e., the period between high water and the succeeding low water, to remove the variability associated with tide from the sampling framework (see Figure 4-1). The guidance for this sampling approach is to sample on the ebb tide (falling from high tide to low tide) within 3 hours of approaching the actual low tide time (see shaded areas in Figure 4-1, depicting a diurnal tide fluctuation, with the shaded area highlighting the optimal sampling window). This sampling window is the case where FIB concentrations in the water are typically the most representative of the imme
effects of high tide has been minimalized. A s
without regard to tide, with sampling conduc

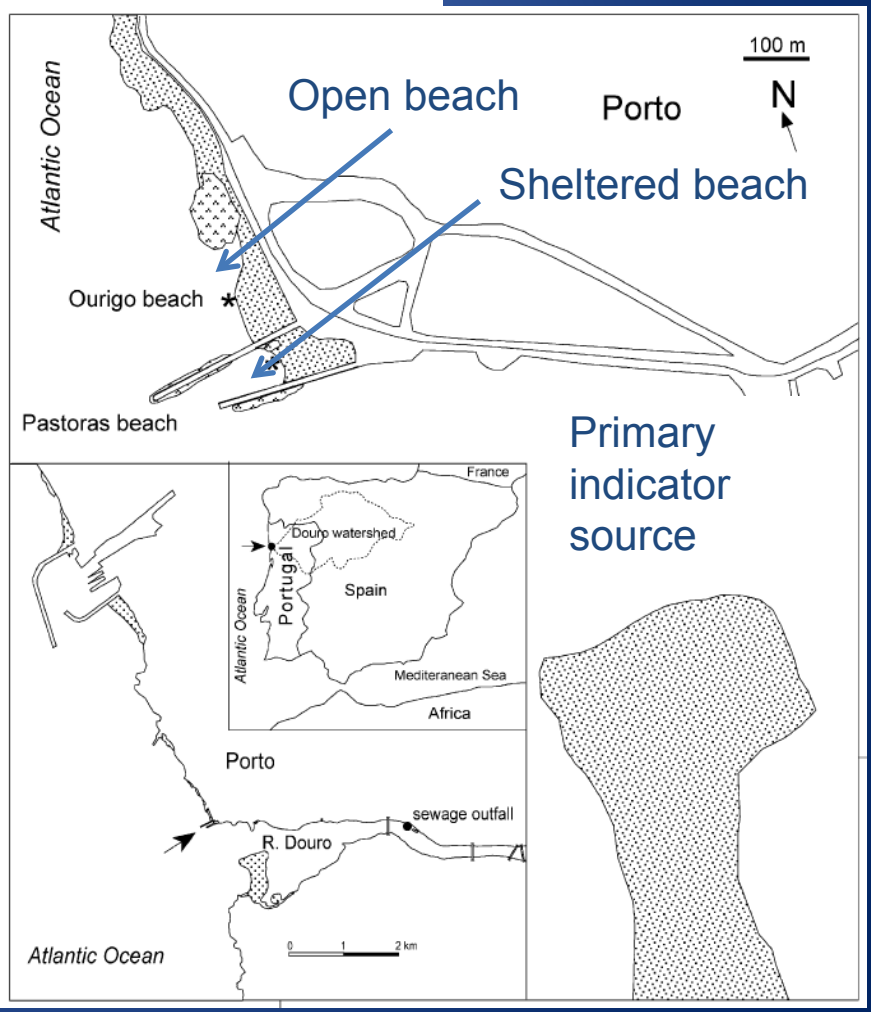


Shoreline hardening and circulation control structures

Alterations of the coastal environment can be made by installing man-made shoreline hardening (bounding) structures like jetties, groins, piers, and seawalls/bulkheads. Alterations affect coastal dynamics and have far-reaching effects on coastal ecosystems, hydrodynamic and tidal regimes, and sediment transport rates. Usually, shoreline hardening structures are placed in environments to counteract erosion in sediment-deficient areas or to deter accretion in dynamic areas such as inlets. Adjacent downdrift areas typically experience increased erosion after these structures have been installed (NPS 2011).

Groins are perpendicular structures used to maintain updrift beaches or sediment transport. Jetties, another type of perpendicular hard structure adjacent to tidal inlets to control inlet migration and to minimize sedim Seawalls, bulkheads, and revetments are shore-parallel structures desig front of a property or properties. Structures like breakwaters, headlands to alter the effects of waves and stop or alter natural coastal changes (N more for recreational use but can alter the beach area as well. For more structures, see www2.nature.nps.gov/geology/coastal/human_impact.cf http://www2.nature.nps.gov/geology/coastal/hardeng.cfm.

Shoreline hardening and circulation control structures can affect water affect FIB concentrations at the beach. Features such as breakwaters or uniform distribution of FIB (Bertke 2007). For example, Bordalo (2003 differences in bacterial water quality and in temperature and salinity for 250-meter-long jetty. A schematic drawing showing the beach and relev Figure 5-1. Observed trends at both beaches (response to rainfall events density, variations with tidal cycle) were similar, but one beach had cor The beach with the consistently higher density was confined on both si other beach was described as more open to the ocean. Higher densities explained by reduced dilution from the inhibition of mixing by the jetti



To view the sanitary survey documents, visit:

http://water.epa.gov/type/oceb/beaches/sanitary survey_index.cfm/marine