

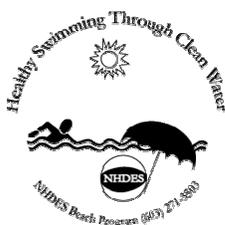
Seabrook Harbor Beach, Seabrook

BEACH WATER QUALITY REPORT

SUMMER 2005



February 2006



BACKGROUND

The New Hampshire Department of Environmental Services (NHDES) has operated its Public Beach Inspection Program, or Beach Program, for over twenty years. Coastal beach monitoring began in 1989 and has continued through the present. NHDES recognizes the threat to public health at public beaches and continues to monitor public beaches throughout the state for the presence of pathogenic organisms. Coastal beaches are monitored for the presence of the fecal bacteria *Enterococci*. These fecal bacteria are present in the intestines of warm-blooded animals including humans. Fecal bacteria, when present in high concentrations and ingested, can commonly cause gastrointestinal illnesses such as nausea, vomiting and diarrhea. They are also known as indicator organisms, meaning their presence in water may indicate the presence of other potentially pathogenic organisms.

In October of 2000, the United States Environmental Protection Agency (EPA) signed into law the Beaches Environmental Assessment and Coastal Health (BEACH) Act. The BEACH Act is an amendment to the Clean Water Act that authorizes the EPA to award grants to eligible states. The purpose of the BEACH Act is to reduce the risk of disease to users of the nation's recreational waters. BEACH Act grants provide support for development and implementation of monitoring and notification programs that help protect the public from exposure to pathogenic microorganisms in coastal recreation waters.

NHDES received grant funding in 2002 to develop and implement a beach monitoring and notification program consistent with EPA's performance criteria requirements published in the *National Beach Guidance and Required Performance Criteria for Grants* document (www.epa.gov/waterscience/beaches/grants). NHDES has successfully met all requirements and continues to expand the monitoring and notification program. In 2002, only nine coastal beaches were monitored, while in 2003 and 2004, 15 and 16 beaches, respectively, were monitored on a routine basis. There were 15 beaches sampled again in 2005, as the Star Island Beach was not sampled. In 2004, volunteers sampled the beach, but circumstances did not allow for this cooperative effort in 2005.

Table of Contents

Beach Description	4
Tier Status and Sampling Frequency	6
Water Quality	7
Areas of Concern	10
Thoughts for the Future	11

List of Figures

Figure 1. Seabrook Harbor Beach Access Points and Restroom Facilities	4
Figure 2. Map of Seabrook Harbor Beach	6
Figure 3. Seabrook Harbor Beach Enterococci Data 2005	10

List of Tables

Table 1. Station Description	5
Table 2. Seabrook Harbor Beach Enterococci Data 2005	9

List of Appendices

Appendix A: Special Topic 2005	12
--------------------------------------	----

Beach Description

Seabrook Harbor Beach is a sandy beach overlooking Seabrook/Hampton Harbor. Its total length is 787 feet. The beach is frequented by residents and vacationers for recreational activities. There are 41 access points (Figure 1) to the beach area from the neighborhood and the main parking lot (this includes all the narrow paths through the grass). Lifeguards are not present. Sanitary facilities are available during the beach season (Figure 1).



Figure 1. Seabrook Harbor Beach Access Points and Restroom Facilities

Waterfowl are frequently observed with gulls being the most prevalent bird observed at the beach. Dogs and fishing are restricted on the beach through a town ordinance. The Hampton/Seabrook Harbor area contains a large boat mooring field and several shellfish beds.

Below is a brief description of the sampling stations at Seabrook Harbor Beach, Seabrook. The stations are pictured in Figure 2.

Table 1. Station Description

Description	Latitude	Longitude
Right sample station: located to the north side of the main beach entrance and to the right of a sign that reads “No Fishing (etc)... from beach”. There is a path to the north of the sign to access the beach area. The sample is collected in front of the access point.	42° 53' 22.7551”	-70° 49' 7.2673”
Center sample station: located between the main beach entrance and restroom facilities. There is a path between the 5th and 6th wooden post south of the main beach entrance to access the beach area. The sample is collected in front of the access point.	42° 53' 20.3157”	-70° 49' 7.4179”
Left sample station: located to the south of the restrooms and south of a sign that reads “No Bus or Camper Parking”. There is a path next to the sign to access the beach area. The sample is collected in front of the access point.	42° 53' 18.3092”	-70° 49' 8.9922”

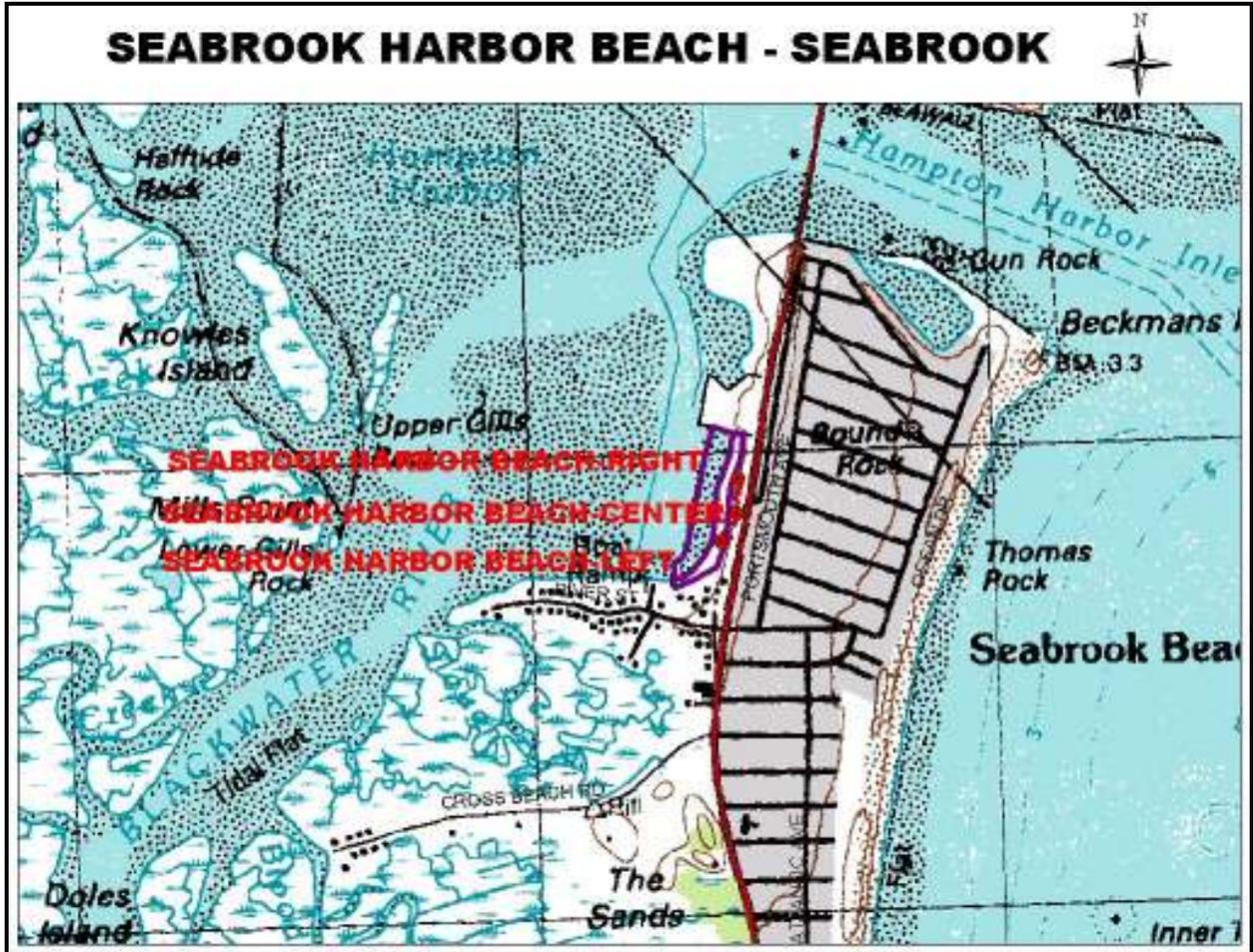


Figure 2. Map of Seabrook Harbor Beach

Tier Status and Sampling Frequency

The Beach Program developed a risk-based beach evaluation process and tiered monitoring approach and implemented this approach during the 2003 beach season. Beach evaluations are conducted annually to determine potential health threats to the public. Evaluations are based on several criteria in three main categories: beach history, microbial pathogen sources, and beach use. Based on these criteria, beaches are assigned either a Tier I or Tier II status. Tier I are high priority beaches that have an increased potential to affect public health while Tier II are low priority beaches that have less potential to affect public health. Beach sample frequency is based on the Tier statuses; Tier I beaches are sampled weekly and Tier II beaches are sampled every other week.

Seabrook Harbor Beach is a Tier I beach. This ranking indicates the beach is popular with local residents and there are potential pollution sources and risks present. Ranking of the beach has changed since 2002, when the ranking system was implemented. Seabrook Harbor Beach was

considered a Tier II beach in 2003, its initial year in the program, due to insufficient beach data. Water quality data and additional information were gathered during the 2003 season. The 2004 annual evaluation incorporated this data and the result was a change to Tier I status.

Water Quality

Beaches are monitored to ensure compliance with State Water Quality Standards. Marine waters are analyzed for the presence of the fecal bacteria Enterococci. Enterococci are known as indicator organisms, meaning their presence may indicate the presence of pathogenic bacteria. The state standard for Enterococci at public beaches is 104 counts/100 mL in one sample, or a geometric mean of 35 counts/100 mL in three samples collected over sixty days. Standard exceedances require the issuance and posting of a beach advisory. Beach advisories remain in effect until subsequent beach sampling indicates safe water quality conditions.

The number of samples collected at each beach is determined by the beach length. Beaches less than 100 feet in length are sampled at left and right locations 1/3 of the distance from either end of the beach. Beaches greater than 100 feet in length are bracketed into thirds and sampled at left, center and right locations. Routine sample collection may be enhanced by sampling known or suspected pollution sources to the beach area. Also, storm event sampling may be conducted at beaches where wet-weather events are expected to affect beach water quality.

The 2005 sampling season began June 1st. June was warmer and wetter than normal, while July and August were warmer and drier than normal. The sampling season encompassed 96 days, of which precipitation was recorded on 35 days (based on Seabrook WWTF recorded precipitation). Eleven beach days (normal beach hours are considered 9:00 a.m. to 5:00 p.m.) were directly affected by precipitation.

Seabrook Harbor Beach was sampled once per week from June 1st through Labor Day. There were a total of 13 routine inspections, one advisory inspection, and 42 samples collected in 2005. Three samples were collected at left, center and right stations (Figure 2).

Table 2 includes Enterococci data from each sampling event in 2005. Enterococci levels were typically less than 50 counts/100 mL, however, beach Enterococci levels exceeded state standards on July 11 and July 20, 2005 (Figure 3). Field inspection data indicate that Seabrook Station recorded 1.15 inches of rainfall on July 8 and 9th prior to the July 11 sampling event. Rainfall and corresponding watershed runoff may have been a contributing factor to the transport of bacteria to the beach area. Field data also noted low tide levels, turbid water conditions, and complaints of oil spills in the harbor. Over twenty boats are moored directly in front of the beach area. The potential exists that illegal boat sewage discharge may contribute to elevated bacteria levels at the beach area.

A beach advisory was not issued on July 11 for exceeding the state limits for designated beaches. Information derived from the microbiology laboratory indicated that a significant amount of interfering growth was observed on the agar plate. Interfering growth could not be positively identified as Enterococci, which prompted a re-sample.

A beach advisory was issued and posted as a result of samples collected on July 20 (Figure 3). It is speculated that spring tide phenomenon may have significantly contributed to the elevated bacteria levels. Spring tides are unusually high tides that occur when the sun and moon are aligned. Spring tides can wash bacteria from upstream salt marshes into beach areas. Salt marshes harbor bacteria on vegetation and in the sediments that travel downstream during rain events or unusually high tides. Spring tides occurred in New England from July 19 to 21, 2005 causing beach closures in Maine, Massachusetts, and likely Seabrook Harbor Beach. Although spring tides may have resulted in the elevated bacteria levels, other factors may have contributed to the increased Enterococci levels. Field inspection data noted cloudy water clarity, an oily film and floating trash on the left side of the beach. The report notes that a large amount of trash and three decomposing fish had washed onto the beach and that 15 boats were moored in the harbor.

The beach was re-sampled on July 22, 2005. Subsequent field inspection data noted brown foam along the waters edge at the center and right stations. A sample was collected and a microscopic examination revealed the foam was likely a natural occurrence. Subsequent samples indicated bacteria levels were back to a safe and normal level allowing the beach advisory to be removed on July 23, 2005.

Table 2. Seabrook Harbor Beach Enterococci Data 2005

Sample Date	Station Name	Results (counts per 100 mL)
05/31/2005	Left	10
	Center	20
	Right	20
06/14/2005	Left	80
	Center	20
	Right	50
06/20/2005	Left	15
	Center	10
	Right	10
06/29/2005	Left	10
	Center	10
	Right	10
07/06/2005	Left	10
	Center	60
	Right	40
07/11/2005	Left	270
	Center	10
	Right	10
07/20/2005	Left	380
	Center	60
	Right	60
07/22/2005	Left	30
	Center	10
	Right	5
07/26/2005	Left	10
	Center	10
	Right	5
08/01/2005	Left	10
	Center	10
	Right	20
08/10/2005	Left	10
	Center	10
	Right	5
08/16/2005	Left	10
	Center	10
	Right	10
08/22/2005	Left	10
	Center	10
	Right	5
08/31/2005	Left	10
	Center	10
	Right	10

Figure 3 depicts the relationship between Enterococci data at Seabrook Harbor Beach and the state standard for coastal beaches.

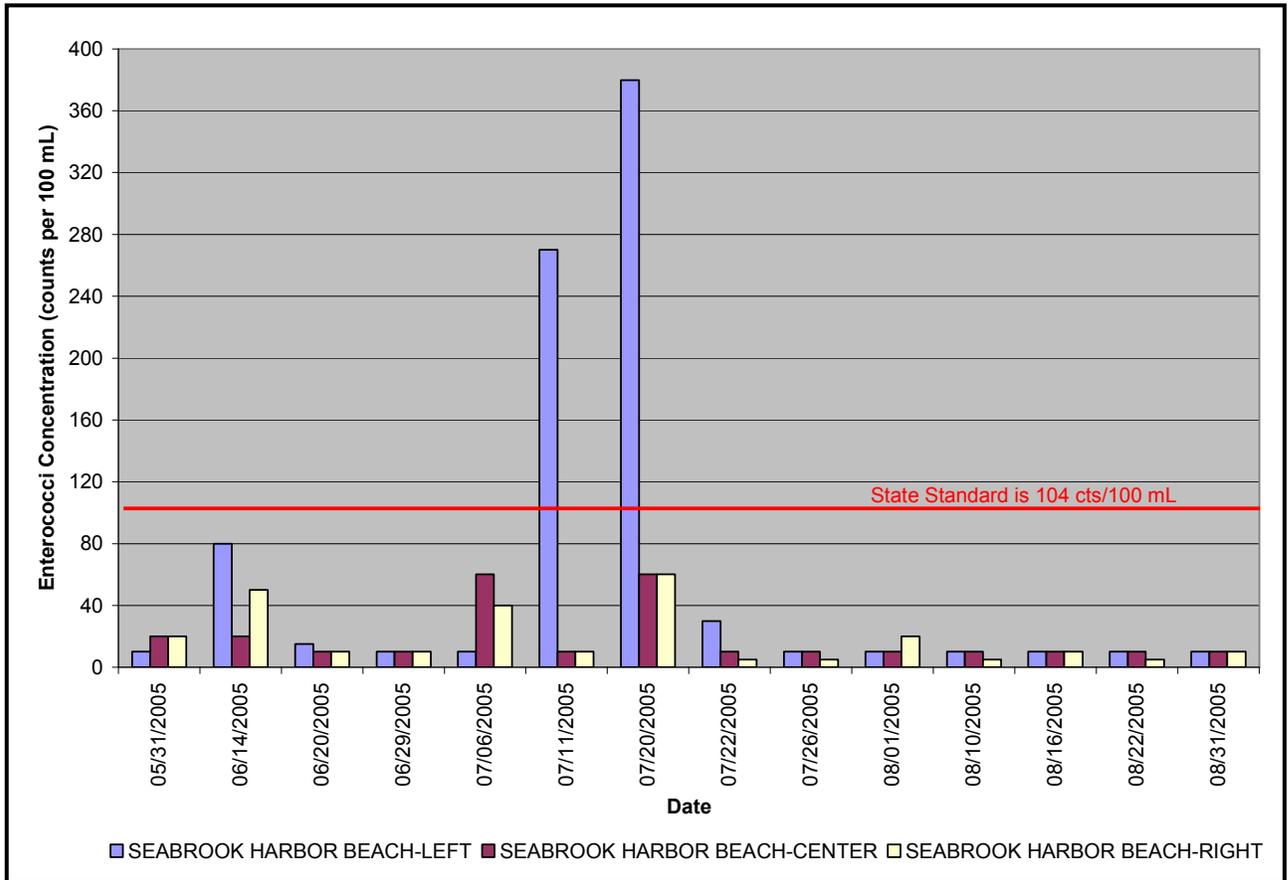


Figure 3. Seabrook Harbor Beach Enterococci Data 2005

Areas of Concern

Fishermen were noted to be present in the public beach area during at least 50 percent of the weekly beach sampling events and continue to be a cause for concern. On two occasions, dead sand sharks and fish were observed on the beach. Although no direct evidence indicates that the fishermen are the source, they potentially could be contributing to dead fish carcasses on the beach. Fishing lines and hooks in the water are also a threat to swimmers safety. On many occasions, Beach Program staff had to be cautious not to get caught in the fishing line when collecting water samples.

Boats moored in the harbor continue to be a concern. Between 14 and 29 boats were moored in the harbor during beach inspections. Some of the boats have toilet facilities on board, and although discharging waste into the harbor is illegal, there have been documented cases of sewage discharges. The NHDES Shellfish Program is also concerned that boat sewage is a threat

to shellfish beds in the harbor. If a boat is observed discharging to the harbor, please notify local authorities and Marine Patrol. There are sufficient boat pumpout stations located along the coast and also a mobile pumpout boat to discharge boat sewage.

Thoughts for the Future

- The beach area should be used for recreational purposes such as picnicking, swimming, or sun bathing. Consider increased enforcement efforts against fishermen violating beach rules. Fishing lines and lures are dangerous to swimmers and the discarded fish parts contribute bacteria and pose a nuisance to beach goers.
- In previous years the beach area displayed signs indicating “No Fishing”. Those signs were not observed this year and it is highly recommended that the Town display the signs and enforce the no fishing zone at the beach area.
- The Seabrook Beach Committee, local businesses, or school group should consider joining NHDES’ Adopt-a-Beach Program. The program would consist of beach clean-ups and water quality monitoring. DES would conduct training sessions and participate in education and outreach activities for the community. If you are interested, please contact Sara Sumner at 603-271-8803 or ssumner@des.state.nh.us.
- The Seabrook Beach Committee, the Town of Seabrook and NHDES could partner to install an informational kiosk at the beach. The kiosk could include information about the Beach Program and the surrounding community.

Appendix A

Special Topic 2005

Health Threats from Beach Sand: Why You Should be Concerned

As beach managers, one question we are often faced with is: What are the sources of *Escherichia coli* (*E. coli*) plaguing my beach and how must I evaluate management and remedial efforts to prevent further contamination?

E. coli bacteria are natural components of the intestines of warm-blooded animals, including humans. *E. coli* are indicator bacteria, meaning their presence often indicates the presence of other pathogenic organisms (bacteria, viruses, protozoa). Sources of *E. coli* to beach areas include: waterfowl (ducks, geese, gulls, etc.), domestic animals (dogs, cats), agriculture, faulty septic systems, storm water, and sewer overflows. Recently, research efforts have focused on the presence of *E. coli* and other pathogenic organisms in beach sand.



These studies have shown that beach sand can harbor significant levels of bacteria. Various researchers have focused research activities on bacteria in underlying lake sediment, in pore water, in the swash zone, in onshore beach sand (not in direct contact with water), and in near-shore surface waters. A recent study at four Canadian beaches found significant amounts of *E. coli* in pore water at public beaches. Pore or interstitial water inhabits the spaces between sand particles and can be observed in holes when one digs into the sand. Although the study did not find that the pore water significantly affected beach water quality, it does suggest that beach sand is a source of bacteria at beaches. Another study in Ohio found high concentrations of *E. coli* in the swash zone that were attributed to beach sand. The swash zone is the area along the shore that is constantly washed by waves or tides.

It is evident that bacteria are surviving in beach sand but we can only speculate on the potential sources of bacteria to the sand. Waterfowl, wild or domestic animals often defecate on beaches. Bacteria from their feces can contaminate beach sand and beach water. Rainfall can cause bacteria or other harmful organisms to infiltrate directly into the beach sand, as well as transport them directly to beach waters. Contaminated groundwater from septic systems may contribute to bacteria measured in beach sand. Beach goers themselves may contribute by leaving trash on the beach, dirty diapers, or food scraps. Beach sand bacteria populations survive longer than in the water column due to less predation, decreased exposure to UV radiation, and warmer temperatures.

This discussion yields concern about public health issues relating to beach sand as well as beach waters. Children often dig holes or trenches in the sand and are in frequent contact with pore water. Young children are often found playing in swash zone waters. It is important that the public be informed of the potential risks associated with beach sand, but also realizes that not all beaches harbor elevated concentrations of bacteria. If a large number of waterfowl are evident, or if a storm drain outfall is present, consider the fact that both the beach sand and water may

contain pollutants that can create public health related illnesses. It is important to evaluate the area and use your best judgment when recreating at a public beach. Make sure that the beach is regularly monitored and check for advisories that may be posted at a public beach. Never swim at areas that may compromise public health or safety.