

**State Beach, North Hampton
Water Quality Report
Summer 2007**



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Background

The New Hampshire Department of Environmental Services (DES) has operated a Public Beach Inspection Program, commonly called the Beach Program, for over 20 years. A coastal beach monitoring program was initiated in 1989 and the program continues to provide weekly summer monitoring. DES recognizes a health threat may exist at public beaches. Therefore, increased beach monitoring and bacteria source tracking have been implemented to protect public health.

Coastal beaches are monitored for the presence of the fecal bacteria Enterococci. These bacteria are present in the intestines of warm-blooded animals, including humans. They are known as indicator organisms, meaning their presence in water may indicate the presence of other potentially pathogenic (disease-causing) organisms. When fecal bacteria are present in high concentrations and ingested by beach visitors, common gastrointestinal illnesses such as nausea, vomiting, and diarrhea may occur.

In October 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. The BEACH Act authorizes EPA to award grants to eligible states with the purpose of developing and implementing monitoring and notification programs. The goal is to protect the public from exposure to pathogenic organisms in coastal recreation waters.

DES first received BEACH grant funding in 2002. Funds were used 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). DES has successfully met all requirements and continues to expand the monitoring and notification program. In 2002, only nine coastal beaches were monitored. The number has varied between 15 and 16 beaches since 2003. A beach in Hampton was added to the program in 2007 and was sampled every other week. In 2004, volunteers sampled Star Island beach, but circumstances did not allow for this cooperative effort in 2005 and 2006. DES hopes to reinstitute this sampling in 2008.

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What are the basic details about the beach?

State Beach is owned and maintained by the New Hampshire Division of Parks and Recreation, State Parks Bureau. It is located on Route 1A in the town of North Hampton.

The substrate at State Beach is comprised of sand with rocks exposed at low tide. The beach is 1,260 feet long and is used by the public for swimming and walking, among other recreational activities. There are three access points to the beach area from the parking lots (Figure 1). Lifeguards are present throughout the summer and toilet facilities are available.

Waterfowl are frequently observed at the beach. The most commonly observed waterfowl are gulls, especially at the northern end of the beach. There are restrictions for dogs on the beach; however, four dogs were observed during weekly inspections.

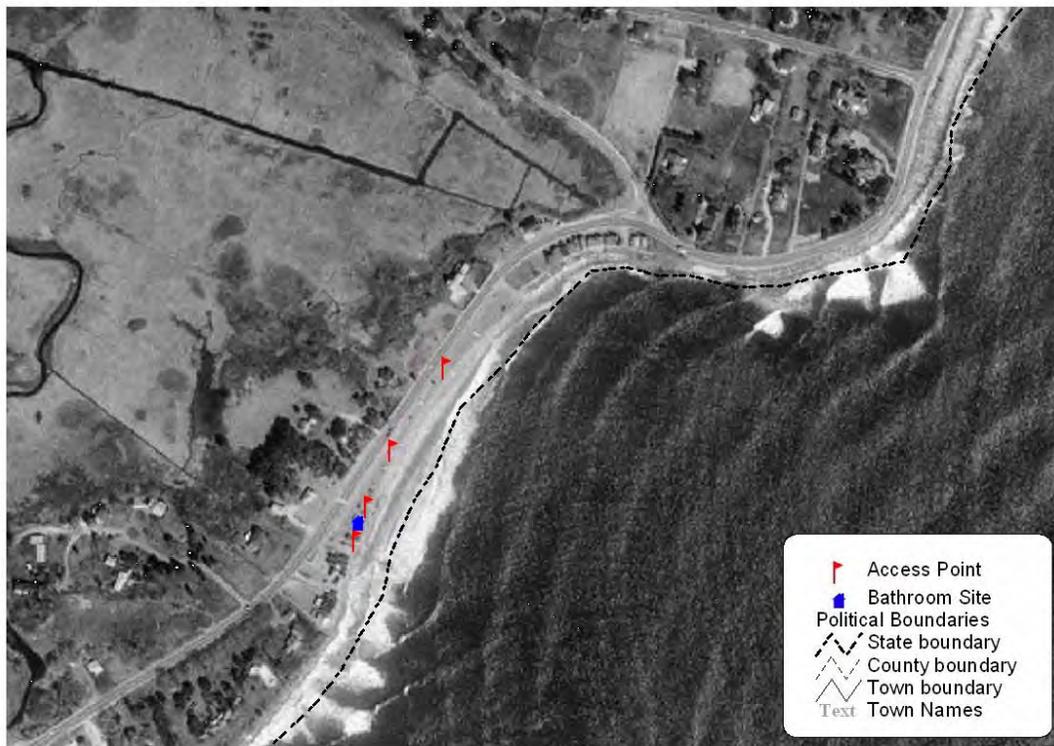


Figure 1. State Beach Access Points and Restroom Facilities.

At State Beach, samples are collected at the left, center, and right stations regularly (Table 1). All stations can be accessed via the entrances to the beach of Route 1A and are distributed evenly along the shoreline (Figure 2). Additional samples were also collected from Little River which is north of State Beach on the upstream side of Route 1A (Figure 2).

Table 1. State Beach Station Descriptions and Latitude/Longitude Points.

Station Description	Latitude	Longitude
Left Sample Station: Located in front of the northern entrance to the beach (straight down from the concrete step).	42° 57' 21.6120"	-70° 46' 50.6255"
Center Sample Station: Located straight in front of the center entrance to the beach.	42° 57' 19.2096"	-70° 46' 52.7805"
Right Sample Station: Located straight in front of the southern entrance to the beach.	42° 57' 16.9279"	-70° 46' 52.3503"
Little River Sample: Located on the upstream side of Route 1A in the center of the river before it flows through the culvert.	42° 57' 27"	-70° 46' 45"

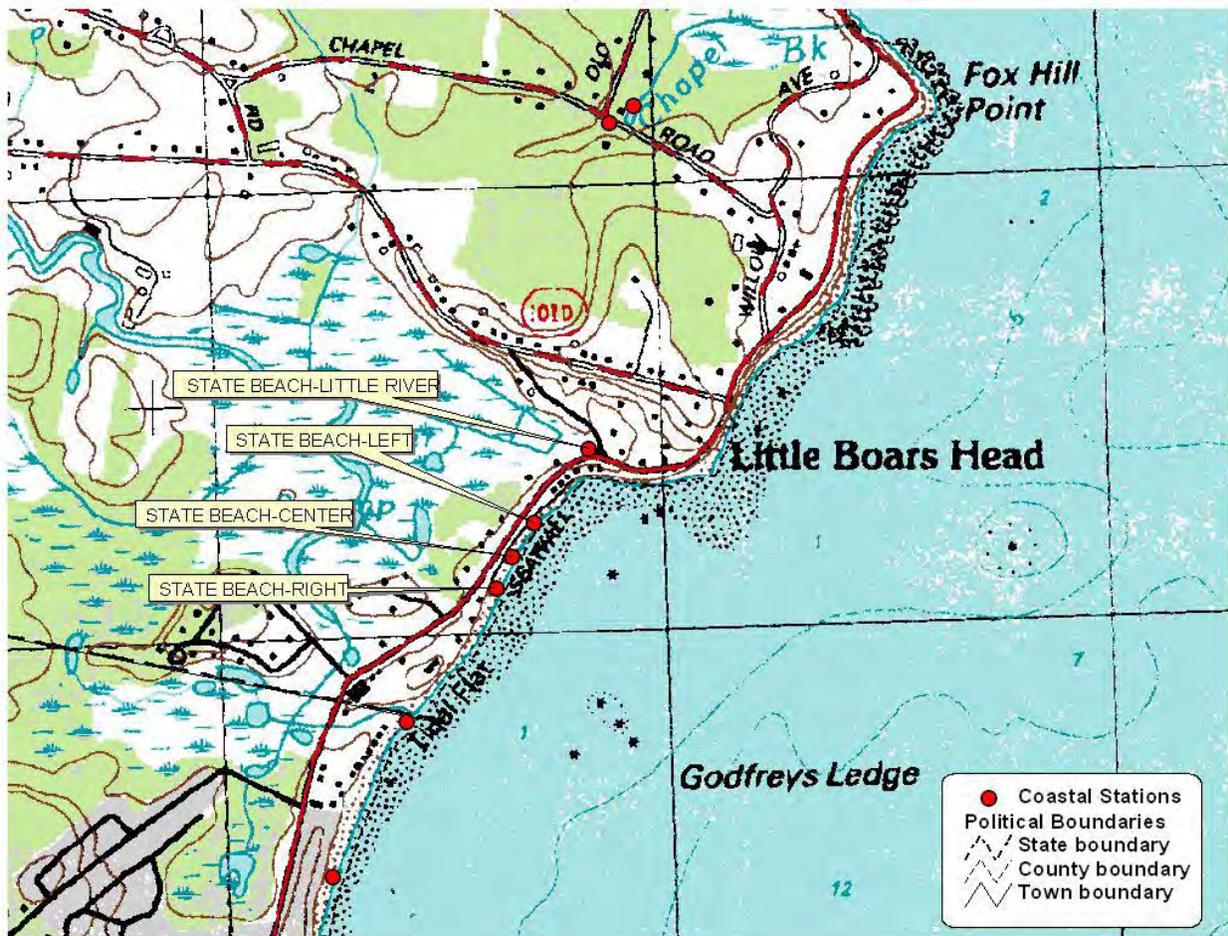


Figure 2. State Beach Monitoring Stations.

How often is the beach sampled and how was this determined?

State Beach is categorized as a Tier I beach, based on the Beach program's risk-based Evaluation ranking system, and is sampled twice per week. This ranking indicates that there is frequent use of this beach, as compared to other coastal beaches. The sampling was increased in 2006 to twice a week from the previous once a week schedule due to increased use and advisories.

The Beach Program developed a risk-based beach evaluation process and tiered monitoring approach during the 2003 beach season based on the EPA performance criteria. 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. Beaches are now assessed as impaired for bacteria based on the most recent version of the Consolidated Assessment and Listing Methodology (CALM). The CALM assesses beach units as impaired based on historical exceedances of both the single sample and geometric mean bacteria standards. This report is submitted to EPA every two years.

Based on the evaluations, beaches are assigned a Tier I, Tier II, or Tier III status. Tier I beaches are considered "high priority" and have an increased potential to affect public health. Tier II beaches are "medium priority." Tier III are "low priority" beaches that have less potential to affect public health. Beach sample frequency is based on Tier status; Tier I were sampled twice per week, Tier II beaches were sampled once per week, and Tier III beaches were sampled once every other week in 2007.

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 runoff from rain is expected to impact beach water quality.

What are the standards for coastal beaches?

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 other pathogenic organisms. 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. When samples exceed the standard, a beach advisory is issued. Beach advisories remain in effect until subsequent beach sampling indicates safe water quality conditions.

What were the results from this past summer?

The 2007 sampling season began May 29th. The sampling season encompassed 94 days. Precipitation was recorded on 28 days over the summer (based on Seabrook WWTF recorded precipitation). June rainfall totaled 2.83 inches, there were 2.62 inches of rain in July, and 0.78 inches of rain fell during August.

Samples were collected for Enterococci analysis during 27 routine inspections. Eighty-one samples were collected at State Beach (Appendix B). Overall, the 2007 summer Enterococci levels were moderate and occasionally above the state's standards for public beaches (Figure 3). No advisories were issued for this beach in 2007.

Elevated bacteria levels were measured on June 19 at the left sampling station of State Beach. Elevated levels measured on the left side reflect the possibility that bacteria-laden waters from Little River contributed to the high Enterococci count, as Little River also had a high bacteria count that day. The left sampling station had an increased Enterococci count again on July 5 (199/100 mL). Little River had an extremely high count of 1076/100 mL that day as well. These high Enterococci levels are likely related to the 1.4 inches of wetfall in the previous 24 hours, resulting in stormwater runoff that flush bacteria into the river that discharges into the State Beach waters. The high count persisted through July 9 as a result of three days of wetfall and runoff. The beach was re-sampled on July 12 and the bacteria count had returned to a normal level.

Enterococci counts significantly increased on August 7, when the left sampling station had a count of 140/100 mL. This exceedance corresponded to a half an inch of wetfall in the previous 24 hours, likely the result of the influence of the Little River. Beach inspectors also noted a dead fish on the beach. State Beach was re-sampled the next day and the bacteria levels had decreased and remained relatively low for the remaining sampling season.

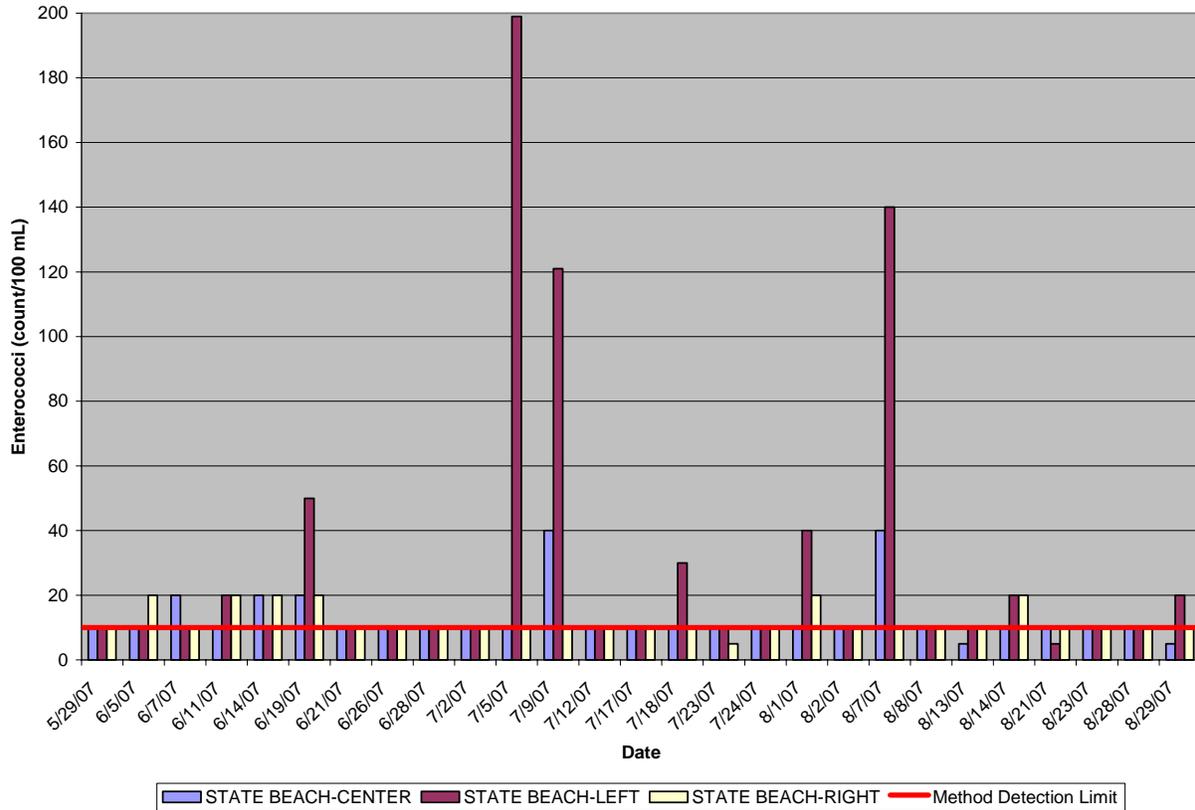


Figure 3. State Beach 2007 Enterococci Data.

Little River was sampled 18 times this season. The Enterococci levels were often very high throughout the summer (Figure 4, Appendix C). The river was usually sampled at low tide when flow from the salt marsh was directed at the beach area. When sampled at high tide, it is thought that the backflow from the ocean dilutes the water and thus lowers the bacteria count.

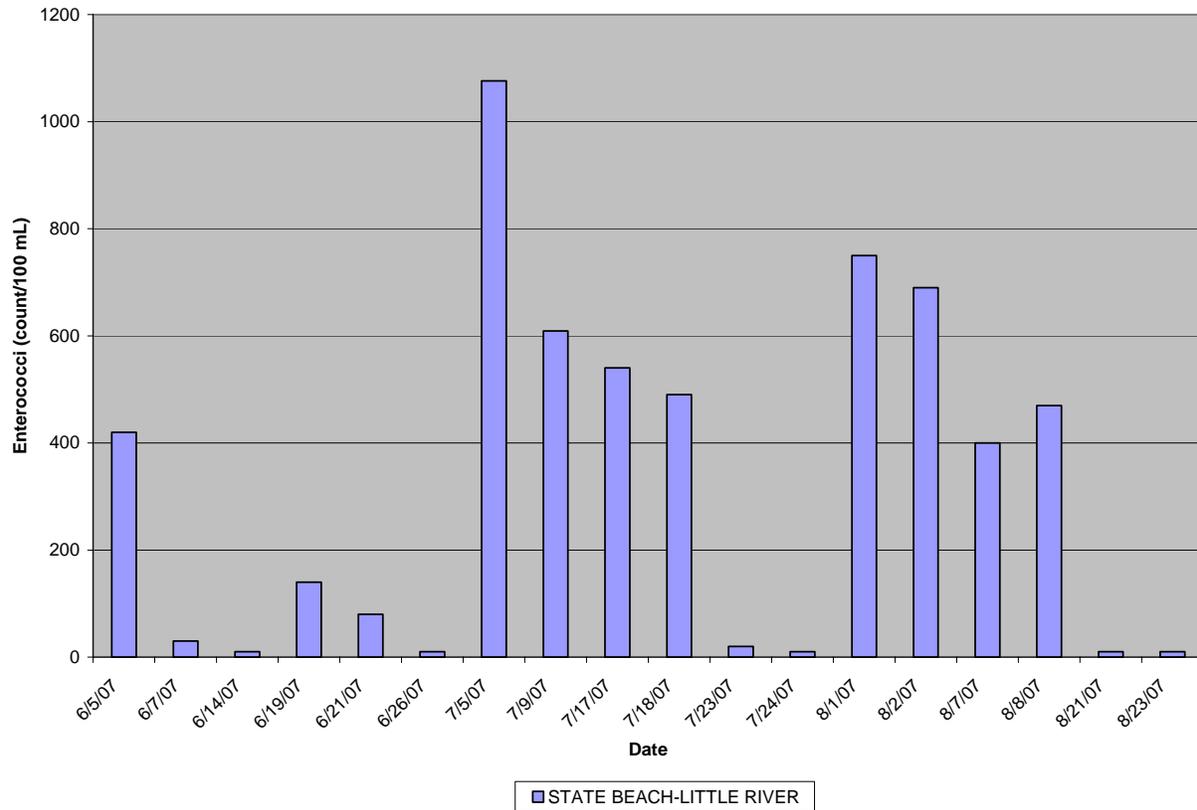


Figure 4 Little River 2007 Enterococci Data

Are there any areas of concern?

Little River bacteria contributions during wetfall events continue to be a cause for concern at State Beach. The river has been identified as a pollution source to coastal waters, contributing to elevated bacteria levels. Precipitation and associated bacteria laden stormwater runoff to Little River continues to influence bacteria levels at State Beach. The discharge from Little River impacts the left side of State Beach, posing a potential health risk to the public.

Dogs were observed in the beach area during the summer season. The New Hampshire State Parks Division restricts dogs from the beach area. DES recommends that the dog ordinance be enforced to eliminate this potential bacteria source. Pet wastes are sources of bacteria to swimming areas and may increase the potential for beach advisories. Young children may contact feces while playing in the sand and increase health risk potential.

What suggestions can be made for future projects?

Beach officials should consider erecting a sign to warn the public of associated health risks from high bacteria levels measured in Little River. DES can provide such a sign if officials are interested.

- The State Parks division, local businesses, or school groups 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.
- The State Parks division should consider posting signs warning the public not to feed waterfowl at the beach. The Beach Program is willing to collaborate on this effort by providing funds to purchase signs.
- The beach inspector noticed people playing in the tunnel around Little River. Signage should be displayed to warn the public of potential dangers in and around the tunnel and the Town of North Hampton should limit access to the area.
- A pre-emptive wetfall advisory may be necessary at State Beach. An analysis of historical bacteria data and wetfall may show a predictive relationship between a certain amount of wetfall and beach Enterococci levels that increase the potential of an advisory. Wetfall amounts exceeding this level will result in automatic beach advisories. A pre-emptive advisory plan will need to be devised and discussed by the beach manager and the Beach Coordinator.

If you are interested in any of these future projects, please contact Sonya Carlson at (603) 271-0698 or sonya.carlson@des.nh.gov.

2007 Beach Program Special Study

During the summer of 2007, a special project was conducted at four coastal New Hampshire beaches, including Seabrook Town Beach, Sun Valley Beach, North Hampton State Beach, and Sawyer Beach. The study was initiated to determine whether bacteria are present in the sand or groundwater at New Hampshire's beaches. Studies in other regions of the country showed that bacteria can prosper in these environments.

Preliminary data from this study show little or no contamination of the sand or underlying groundwater at these four beaches. Watch for the final report on the Beach Program website: www.des.nh.gov/Beaches.

Appendix A: Special Report 2007—Litter

Introduction

When you are getting ready to go to the beach in the morning, what do you pack? If you're like most people, you will bring towels, sunscreen, maybe an umbrella, and most likely food. Chances are, your food has packaging of some kind, whether it's plastic, paper, styrofoam, or cellophane. Do you remember to bring a garbage bag for all your trash?

No matter what beach you go to, you will likely see litter. Humans create litter every where they go. But it is especially disturbing to see litter on a beach, where so many people go to relax on a hot summer day. Unfortunately, trash is a problem at many of New Hampshire's beaches. To combat litter, regular citizens volunteer to help pick up litter at beaches. Data from clean ups events demonstrate the problem is not going away. The Beach Program is working on an outreach program to convince people to stop littering the beaches.

Trash is a problem

The water at New Hampshire's coastal beaches is generally clean. Each year, only one or two swimming advisories are issued along the coast. The Beach Program receives multiple complaints, however, of trash on the beaches and especially Hampton Beach. This past summer, an especially irate resident of Hampton left a five minute voice mail regarding the state of the beach during the sand castle competition. The resident was taking her small children to see the sand castles and was discouraged by the garbage greeting them when they arrived.

Hampton Beach State Park, like all state parks in New Hampshire, is a carry-in/carry-out beach. Whatever trash you bring with you must leave with you. At most state parks, including the southern portion of Hampton Beach, small trash bags are given to arriving visitors. Hampton Beach even has trash barrels along the Route 1A sidewalk, with one at every stairwell to the beach. These measures have not helped to reduce the amount of trash found on the beach.

In an effort to clean the beach, the state park administrators purchased a trash collecting machine. The machine is used early every morning to rake the sand and collect large trash items. Smaller items, like cigarette butts, straws, and food wrappers, are missed. Despite the use of the trash collector, Hampton Beach still remains coated in litter throughout much of the summer.

After several complaints about the litter problem on the beach, the Beach Program contacted the Blue Ocean Society for Marine Conservation. Blue Ocean (as the group is more commonly known) has administered an Adopt-a-Beach program at other area beaches for many years. An Adopt-a-

Beach program was established at Hampton Beach in 2005. Blue Ocean and the NH Department of Environmental Services now partner to locate volunteers and provide them with the supplies necessary to conduct beach cleanups at Hampton Beach.

Beach clean up participants collect more garbage each year

Unfortunately, the litter problem is not going away, and, in fact, seems to be getting worse. Blue Ocean volunteers track the types and amounts of trash collected during each clean up event at Hampton Beach. In 2005, volunteers collected 1,358 pounds of trash at Hampton Beach. The amount collected in 2006 was a record 2,117 pounds. In 2007, the total was slightly less at 1,950 pounds of trash. During 2007, volunteers also collected a total of 2,821 pounds of garbage from Fort Stark, Janness Beach, North Beach, the Sunken Forest area at Ordiorne Point, Wallis Sands, and Ragged Neck.

The Ocean Conservancy, another community organization, sponsors yearly beach clean up events along the coastline. The non-profit environmental organization holds an International Coastal Cleanup day every September. In 2005, 651 pounds of trash were collected during the Coastal Cleanup day at Hampton Beach and 458 pounds were collected in 2006. The amount collected September 15, 2007 was down to 351 pounds. The 2008 cleanup day is being organized for this coming September. Although the weight went down recently, more clean-up days are being organized and more volunteers are becoming involved.

Outreach program to address litter problems

Data collected from clean-up events show increased quantities of collected trash. Beach litter is not an isolated problem with only one solution. Many organizations, towns, and volunteers can work with various government agencies to make beaches a more pleasant and safe destination for everyone. More volunteers are needed to pick up the increasing trash volumes from New Hampshire's coastal beaches. More outreach is needed to remind beach goers that each person can help keep New Hampshire beaches clean. Programs and partnerships can be expanded to provide information, trash receptacles and recycling containers to reduce beach litter. With more outreach, education, and resources, change in the people's behavior at public beaches can become a reality.

Appendix B: State Beach 2007 Data by Date

Date	Enterococci (count/100 mL)			Rainfall in previous 24 hours (inches)	Number of bathers	Animal Presence
	Left	Center	Right			
5/29/07	10	10	10	0	2	0
6/5/07	10	10	20	2.23	1	10 gulls, 5 plovers
6/7/07	10	20	10	0	2	10 gulls
6/11/07	20	10	20	0	0	2 dogs
6/14/07	10	20	20	0	0	10 gulls
6/19/07	50	20	20	0	5	100 gulls
6/21/07	10	10	10	0.03	5	20 gulls
6/26/07	10	10	10	0	50	2 dogs
6/28/07	10	10	10	0	3	10 gulls
7/2/07	10	10	10	0	5	10 gulls
7/5/07	199	10	10	1.40	0	5 gulls
7/9/07	121	40	10	0.16	0	0
7/12/07	10	10	10	0.38	5	0
7/17/07	10	10	10	0	15	10 gulls
7/18/07	30	10	10	0.05	0	3 gulls
7/23/07	10	10	5	0	0	10 gulls
7/24/07	10	10	10	0.14	0	10 gulls
8/1/07	40	10	20	0	15	0
8/2/07	10	10	10	0	30	10 gulls
8/7/07	140	40	10	0.44	15	1 dead fish
8/8/07	10	10	10	0.23	0	10 gulls
8/13/07	10	5	10	0	0	25 gulls
8/14/07	20	10	20	0	2	5 gulls
8/21/07	5	10	10	0	0	15 gulls
8/23/07	10	10	10	0	5	25 gulls
8/28/07	10	10	10	0.03	0	0
8/29/07	20	5	10	0	3	20

Appendix C: Little River 2007 Enterococci Data

Date	Enterococci (count/100 mL)	Tide
6/5/07	420	Low
6/7/07	30	Low
6/14/07	10	High
6/19/07	140	Low
6/21/07	80	Low
6/26/07	10	High
7/5/07	1076	Low
7/9/07	609	High
7/17/07	540	Low
7/18/07	490	Low
7/23/07	20	Low
7/24/07	10	High
8/1/07	750	Low
8/2/07	690	Low
8/7/07	400	High
8/8/07	470	High
8/21/07	10	Low
8/23/07	10	High