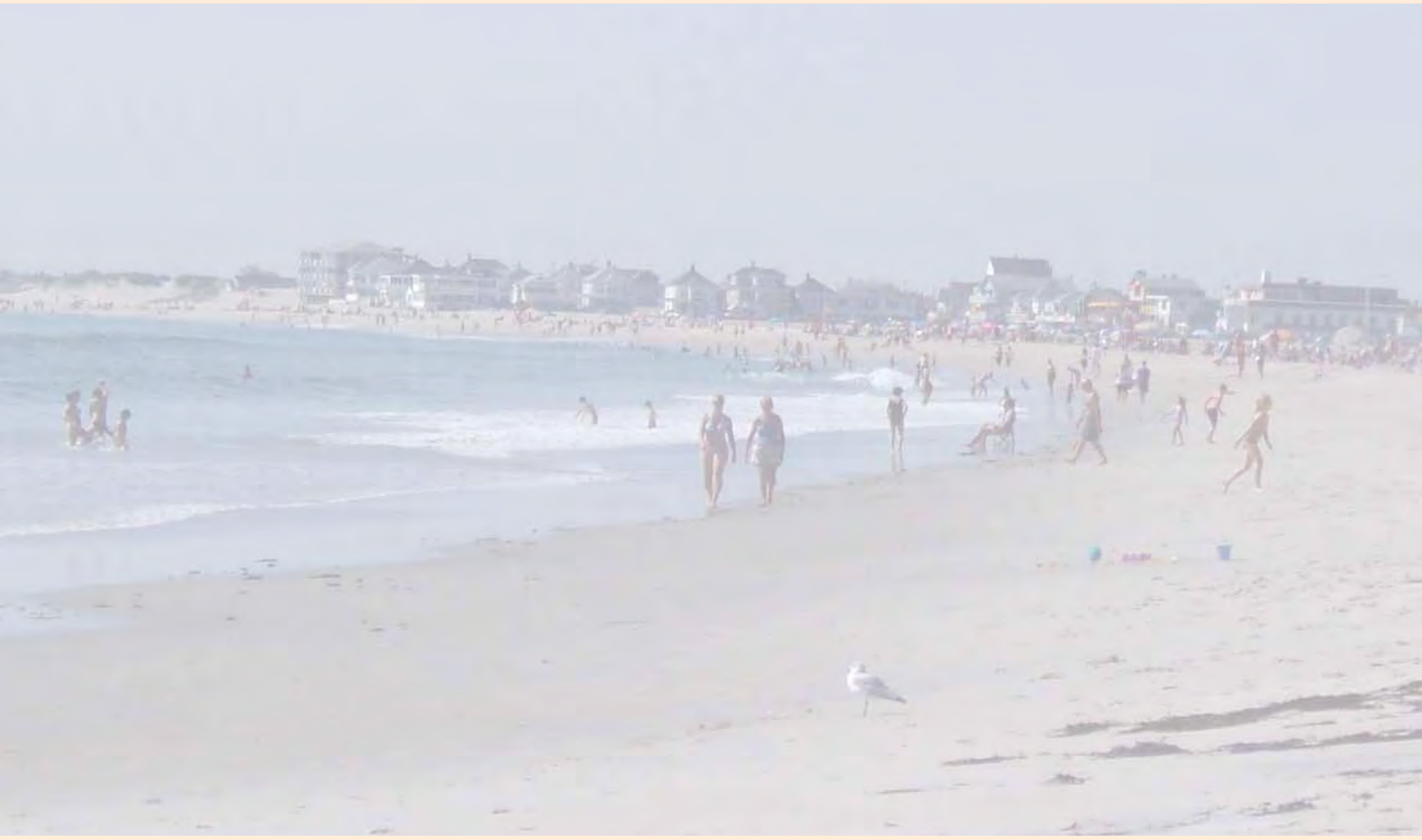
New Castle Town Beach, New Castle
Water Quality Report
Summer 2007



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Prepared by: Carolyn Merrifield & Alicia Carlson

Contacts: Sonya Carlson, Beach Program Coordinator

Jody Connor, Beach Program Administrator

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

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?

New Castle Town Beach is owned and maintained by the town of New Castle. It is located on Route 1B.

The substrate at New Castle Beach is comprised of sand and rocks. The beach is 840 feet long and is used by the public for swimming and general relaxing. There are two access points to the beach area from New Castle Commons and Ocean Street (Figure 1). Lifeguards are not present throughout the summer, but toilet facilities are available.

Waterfowl are frequently observed at the beach. The most commonly observed are gulls, though ducks were observed on the beach during one inspection. There are restrictions for dogs on the beach and no dogs were observed during any of the 2007 inspections.

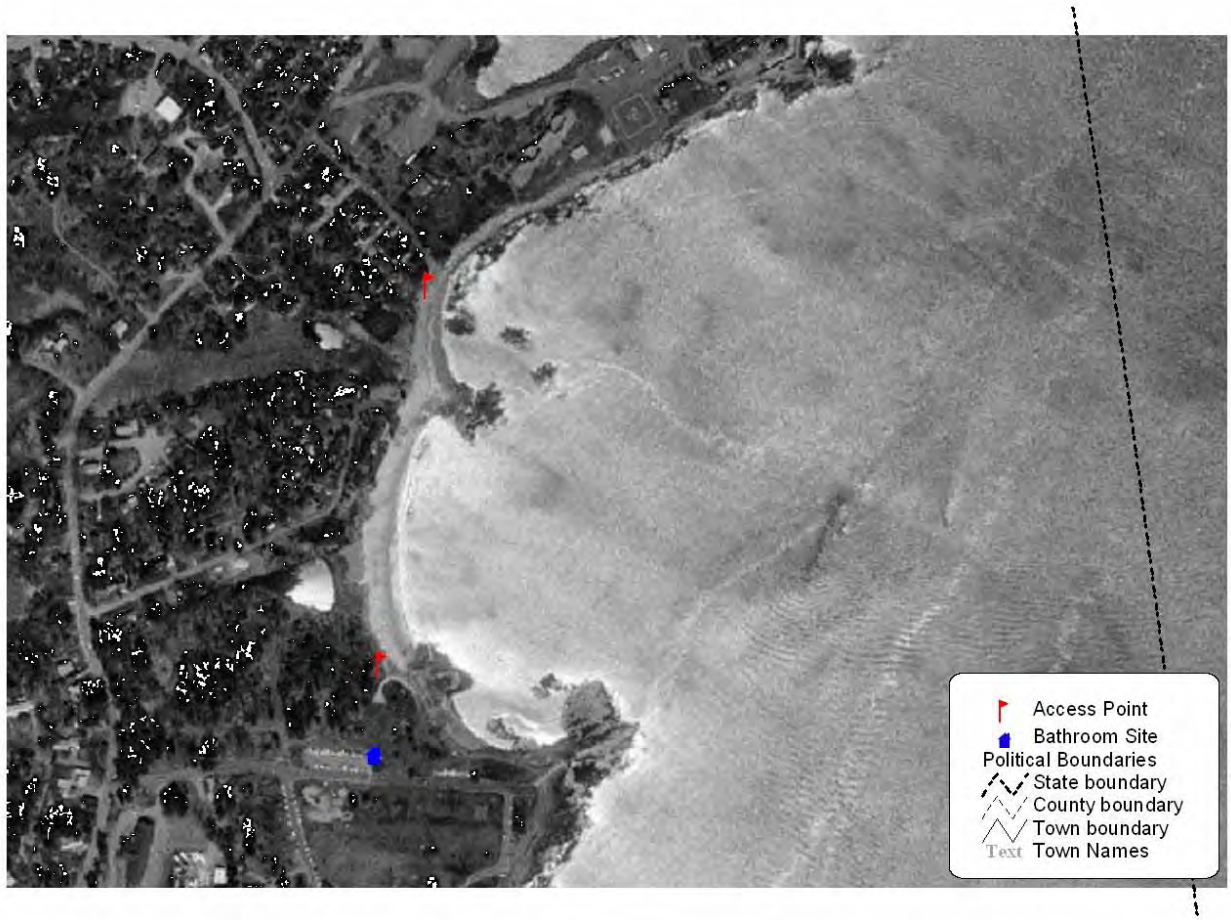

Figure 1. New Castle Town Beach Access Points and Restroom Facilities.

At New Castle Town Beach, samples are regularly collected at the left, center, and right stations (Table 1). In past seasons, samples have been collected from the pipe station. These stations are distributed along the shoreline (Figure 2).

Table 1. New Castle Town Beach Station Descriptions and Latitude/Longitude Points.

Station Description	Latitude	Longitude
Left Sample Station: Located in front of a wood clapboard house near the north end of the beach.	43° 4' 3.9517"	-70° 42' 47.7898"
Center Sample Station: Located between a gulley and a brown house with a chimney and sunroom. The sample is taken straight down the beach from this point.	43° 4' 1.2368"	-70° 42' 48.2041"
Right Sample Station: Located in front of the first pine tree on the left as you enter the beach area from the park.	43° 3' 59.4561"	-70° 42' 47.9113"
Pipe Sample Station: Located just across a berm from New Castle Town Beach. It can be accessed from the beach or from Ocean Drive off Route 1B.	43° 4' 7.838"	-70° 42' 46.3721"

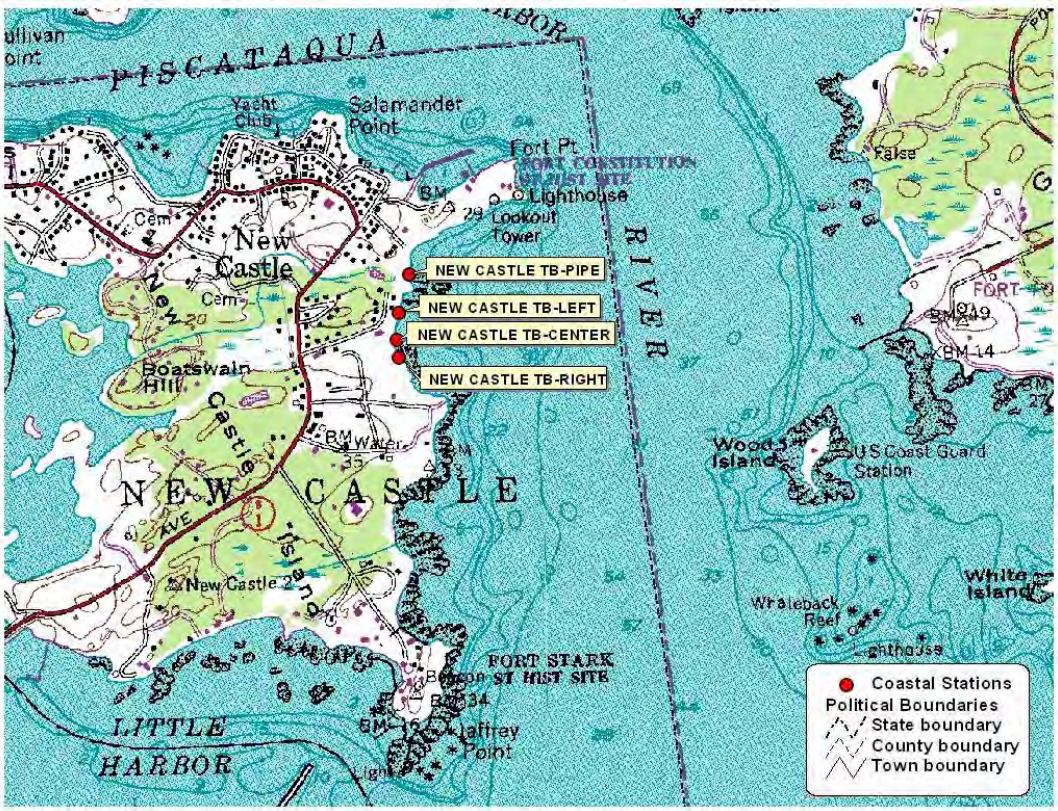

Figure 2. New Castle Town Beach Monitoring Stations.

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

New Castle Town Beach is a Tier I beach, based on the Beach Program's Risk-Based Evaluation ranking system, and sampled twice per week. This ranking indicates that there is frequent use of this beach, as compared to other coastal beaches. The beach ranking changed in 2006 for the first time since the 2002 beach ranking system was implemented. Samples were increased in 2006 to two times per week from one time per week.

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. 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 wetfall 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 29 routine inspections. Eighty-seven samples were collected at New Castle Town Beach (Appendix B). Overall, the 2007 summer Enterococci levels were moderate and occasionally above the state standard for public beaches (Figure 3). One advisory was issued for this beach in 2007.

On June 13, the Enterococci count was 140/100 mL at the right sampling station (Figure 3). This increase in the bacteria level may be due to the rainfall that lasted about six hours the previous day, as excess rainwater can wash bacteria into the beach area. An advisory was not issued at this time. The beach was re-sampled the next day and the Enterococci levels had decreased to within the state's standard.

On July 11, the bacteria levels were elevated again, at both the left and right sampling stations. The Enterococci counts of 170/100 mL and 320/100 mL, respectively, greatly exceeded the state's standards and a beach advisory was issued. When the beach was re-sampled, the bacteria levels had decreased and the advisory was removed.

The Enterococci count at the center sampling station was elevated again on July 18 when the count reached 140/100 mL; however, an advisory was not issued. Wetfall totaled 0.11 inches in the three days prior to the 18th and is likely associated to the increased Enterococci concentration.

Samples collected on August 13 and 16 showed slightly high bacteria counts, first on the left side and then on the right. While there is no indication of the pollution sources that contributed to the high counts, the Enterococci levels were back within the state's standards by the time the beach was re-sampled on August 21.

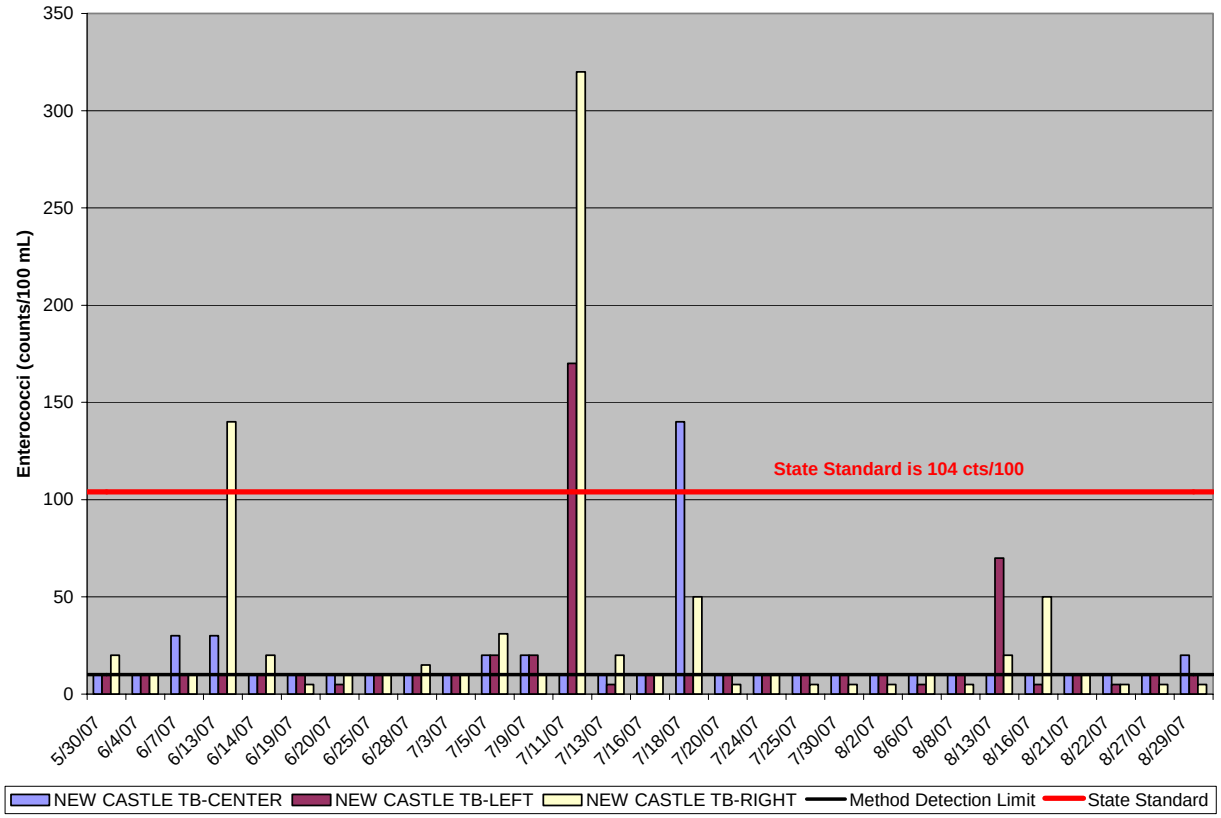

Figure 3. New Castle Town Beach 2007 Enterococci Data.

Are there any areas of concern?

A series of wetland systems drain Little Harbor and culminate in a small pond that drains through a pipe beyond the left end of New Castle Town Beach. The Beach Program has collected samples from this pipe during previous summers, but this year the pipe was submerged beneath the sand and was inaccessible. Pipe discharge may still negatively impact the beach area water quality, as ocean currents may wash discharge from the pipe to the New Castle Town Beach area. Through the joint efforts of the Beach Program and the University of New Hampshire's Jackson Estuarine Laboratory, a microbial source tracking study was conducted in 2006 to determine the major bacteria sources discharged by the pipe. The study concluded that the dominant bacteria sources discharged through the pipe are human, waterfowl, and both wild and domestic animals. The pipe discharge is a likely contributing factor to elevated Enterococci levels at New Castle Town Beach (Microbial Pollution Source Tracking at New Castle Beach, S. H. Jones, 2007). The final report is available on the NH DES website at the following address:

http://des.nh.gov/Beaches/documents/beach_reports/2006/new_castle_report_2006.pdf

What suggestions can be made for future projects?

The Town of New Castle, local businesses, or school groups should consider joining the 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.

New Castle Town Beach should consider installing pet waste stations because many people use the beach in the off season to walk dogs. Fecal matter often contributes to nutrient and bacteria loading to our public beaches. Pet waste stations will help to reduce the amount of fecal matter on the beach.

A study to document the bacteria concentrations in beach sand at New Castle Town Beach might be warranted. Studies in other areas of the country have shown concentrated populations of bacteria in the onshore sand near the water line. Initiating a project at the beach could document if bacteria proliferates in the sand and contributes bacteria populations. If the town is interested in pursuing a scientific beach sand and interstitial water study, the Beach Program can provide funds to support the research.

Discharge from Bull Toad Pond impacts the beach area during the spring/early summer months. This discharge likely contains elevated bacteria levels from marsh runoff. DES recommends restricting access to the discharge. Young children tend to play in these warmer waters and may be subjected to a health risk. The area can be roped off with a warning sign that states "this water may contain elevated bacteria levels".

For more information regarding Adopt-A-Beach, pet waste stations, or possible studies, please contact Sonya Carlson at (603) 271-0698 or sonya.carlson@des.nh.gov.

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: New Castle Town Beach 2007 Data by Date

Date	Enterococci (count/100 mL)			Rainfall in previous 24 hours (inches)	Number of bathers	Animal Presence
	Left	Center	Right			
5/30/07	10	10	20	0	5	0
6/4/07	10	10	10	2.23	0	100 gulls
6/7/07	10	30	10	0	12	0
6/13/07	10	30	140	0.03	0	5 gulls
6/14/07	10	10	20	0	30	0
6/19/07	10	10	5	0	10	0
6/20/07	5	10	10	0	0	2 ducks
6/25/07	10	10	10	0	10	0
6/28/07	10	10	15	0	0	0
7/3/07	10	10	10	0	3	0
7/5/07	20	20	31	1.40	0	0
7/9/07	20	20	10	0.08	1	5 gulls
7/11/07	170	10	320	0	10	2 gulls
7/13/07	5	10	20	0	11	0
7/16/07	10	10	10	0.06	20	0
7/18/07	10	140	50	0.05	0	5 gulls
7/20/07	10	10	5	0.36	1	5 gulls
7/24/07	10	10	10	0.14	2	0
7/25/07	10	10	5	0	10	2 gulls
7/30/07	10	5	10	0.02	1	0
8/2/07	10	10	5	0	25	0
8/6/07	5	10	10	0	2	5 gulls
8/8/07	10	10	5	0.23	0	0
8/13/07	70	10	20	0	5	5 gulls
8/16/07	5	10	50	0	12	0
8/21/07	10	10	10	0	4	0
8/22/07	5	10	5	0	3	5 gulls
8/27/07	10	10	5	0	5	0
8/29/07	10	20	5	0	5	3 gulls