
NEW CASTLE TOWN BEACH

Water Quality Report Summer 2009



**New Castle Town Beach, New Castle
Water Quality Report
Summer 2009**



**Prepared by:
Megan Kerivan, Teresa Ptak,
Sonya Carlson & Jody Connor
Water Division**

**29 Hazen Drive, PO Box 95
Concord, NH 03302-0095
(603) 271-3503
www.des.nh.gov**

January 2010

**Thomas S. Burack, Commissioner
Michael J. Walls, Assistant Commissioner
Harry T. Stewart, Water Division Director**

Table of Contents

History of the Beach Program	4
Beach Statistics.....	4
Assessing Your Beach	6
Sampling Frequency and Location	6
Coastal Water Quality Standards and 2009 Results.....	7
New Castle Town Beach Adopt-a-Beach Program	12
Concerns.....	12
Future Projects.....	13

List of Figures

Figure 1. New Castle Town Beach sampling locations, access point, and restrooms.....	5
Figure 2. New Castle Town Beach 2009 mean Enterococci results.....	9
Figure 3. Enterococci samples and violations at New Castle Beach.....	10
Figure 4. Pipe results more than 20 counts higher than the left beach result.....	11

List of Tables

Table 1. New Castle Town Beach Station Descriptions and Latitude/Longitude Points..	7
---	---

Appendices

Appendix A: 2009 Special Report – Bacteria Source Identification	14
Appendix B: New Castle Town Beach 2009 Data by Date	16

History of the Beach Program

The New Hampshire Department of Environmental Services (NHDES) recognizes a public health threat may exist within recreational waters and tests the water at the state's beaches to ensure swimmers are not exposed to disease-causing pathogens or cyanobacteria scums. The NHDES has operated a Public Beach Inspection Program, commonly called the Beach Program, for over 20 years.

The New Hampshire coastal beach monitoring program was initiated in 1989 with the DES inspecting five beaches. In October 2000, the United States Congress amended the Clean Water Act to include the BEACH Act. The Environmental Protection Agency (EPA) was then authorized to award grants to eligible states to develop and implement monitoring and notification programs. These programs protect the public from exposure to pathogenic microorganisms in coastal recreation waters.

The DES first received grant funds in 2002. Since then the New Hampshire Beach Program has successfully met all of the EPA's performance criteria requirements (National Beach Guidance and Required Performance Criteria for Grants) and continues to expand the monitoring and notification program. Weekly summer monitoring throughout the state was conducted at nine beaches in 2002, and has since nearly doubled to 17 by 2009. The Beach program strives to expand sampling to include all coastal New Hampshire beaches.

Coastal beaches are monitored for the presence of the fecal bacteria *Enterococci* which 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. These indicator organisms signify the possible presence of other potentially disease-causing organisms in the waterbody.

Beach monitoring and bacteria source tracking have been implemented to protect public health. In a collaborative effort, the NHDES Beach program, towns, beach managers, recreational directors and health inspectors encourage public awareness of sources of pollution and environmental responsibilities. Thank you for your interest and concern in New Hampshire's water quality.

Beach Statistics

New Castle Town Beach is owned and maintained by the town of New Castle. It is located on Route 1B in the Great Island Common. The Great Island Common is open 365 days a year from 9 a.m. to p.m.

New Castle Town Beach is an 840-foot long sandy and rocky beach. The beach is used by the public for swimming and general relaxing. There are two access points to the beach area from the Great Island Common and Ocean Street (Figure 1). Lifeguards are not present throughout the summer, but toilet facilities are available.

Waterfowl are frequently observed at the beach. There are restrictions for dogs on the beach, yet one dog was observed during a routine inspection on July 23, 2009.

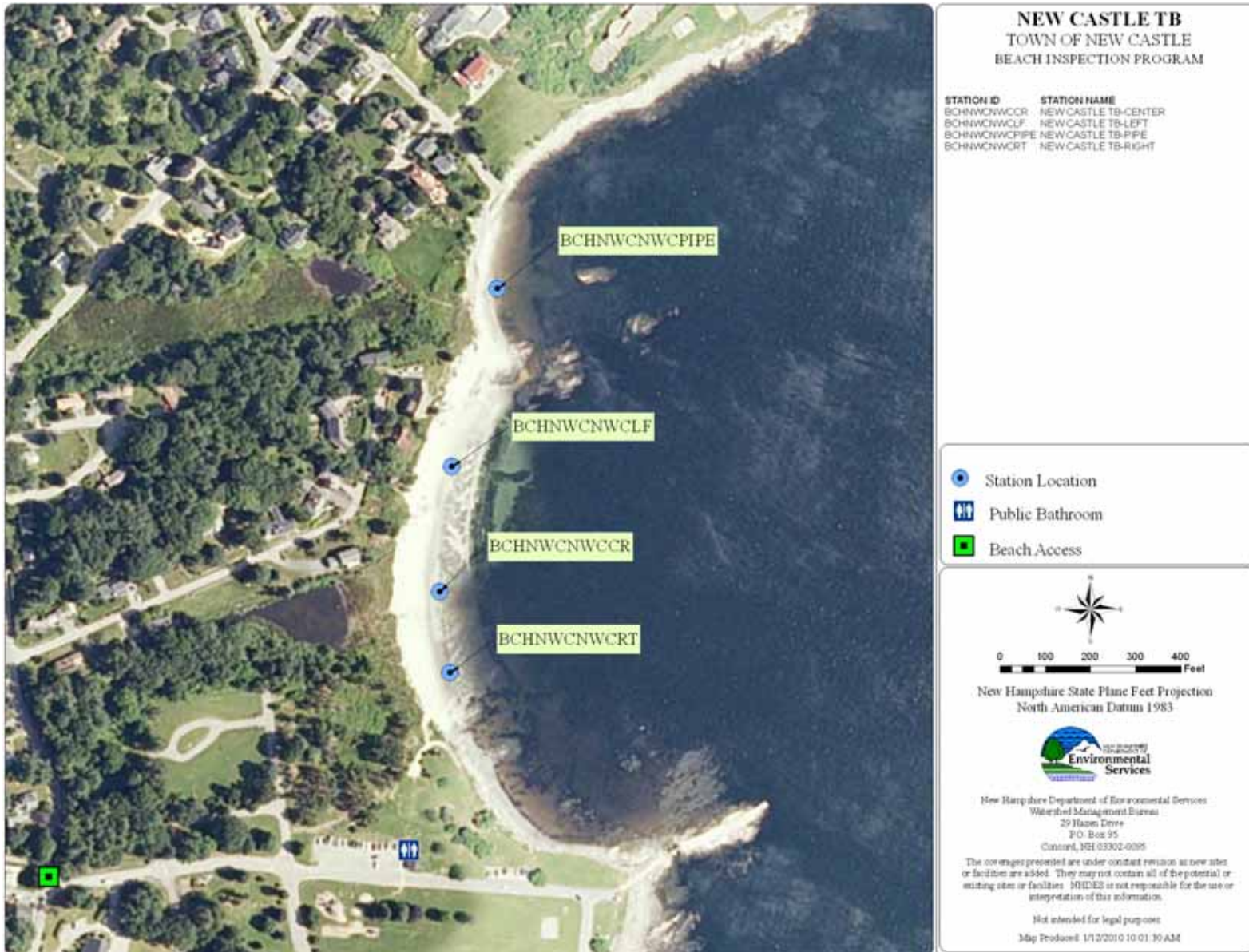


Figure 1. New Castle Town Beach sampling locations, access point, and restrooms.

New Castle Great Island Common Ordinances

The Town of New Castle has the following ordinances that apply to the New Castle beaches:

1. Glass containers of any kind are prohibited. Alcohol is also prohibited.
2. Dogs are not permitted from May 15th to September 15th.
3. Collecting of rocks, sand, and shells is prohibited
4. Parking is not allowed on the grass
5. Fires and portable grills are prohibited.
6. No climbing trees, peeling the bark, or breaking branches.
7. Chipping or driving of golf balls is not permitted.
8. Garbage must be carried out.

Assessing Your Beach

Sampling Frequency and Location

In 2003, the beach program developed a risk-based evaluation process to determine how often a beach should be monitored. Beaches with a bigger potential impact on the health of visitors are monitored more often than beaches with a smaller impact. Annually, each beach is evaluated by the beach program on several criteria within three main categories: beach history, microbial pathogen sources, and beach use. Additionally, a beach that appears on the most recent 303(d) list as “not supporting primary recreational contact” is elevated to the most intense inspection schedule. The Federal Clean Water Act (CWA) requires each state to present a 303(d) list to the EPA every two years that indicates surface waters that are impaired or threatened by a pollutant or pollutants. A tidal beach is listed if there were two or more exceedances of the state standard of 104 Enterococci counts/100 ml during sampling in the last five years. Exceptions to the rule can be made if a large number of recent samples are all below the state standard.

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 due to heavy beach use, previous elevated bacteria levels sampled, potential bacteria sources near the beach, are listed on the 303(d) list, or a combination of these factors. Tier II beaches are “medium priority” and Tier III are “low priority” beaches that have less potential to affect public health. Beach sample frequency is based on Tier status; Tier I beaches are sampled twice per week, Tier II beaches are sampled once per week, and Tier III beaches are sampled every other week..

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 one-third 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 watershed runoff resulting from rainfall is expected to impact beach water quality.

New Castle Town Beach is listed as impaired for primary recreational contact on the 303(d) list since it had 16 samples that exceeded the state standard during the last the assessment period. Based on the past beach use, sample results, and 303(d) assessment, New Castle Town Beach is classified as a Tier I beach and sampling is conducted twice a week. The frequency of sampling at the beach has increased since the launch of the beach evaluation process implemented in the 2003 sampling season. Sampling at New Castle Beach increased from weekly to biweekly in 2006 due to a CALM impairment. New Castle Beach has been sampled by the NH DES since 1994.

At New Castle Beach, samples are collected at the left, center, and right stations regularly (Table 1). All stations are evenly distributed along the shoreline and can be accessed via the Great Island Common (Figure 1). Samples are collected from a pipe draining a duck pond located north of the beach area when the tide was low.

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

Station Description	Latitude	Longitude
Left Station: The sample is collected in front of the wood clapboard house near the north end of the beach.	43.067764°	-70.713275°
Center Station: The sample is collected out from a point half way between the gulley and brown house with a chimney and sunroom.	43.06701°	-70.71339°
Right Station: The sample is collected in front of the first pine tree upon entering beach area from the parking lot.	43.066516°	-70.713309°
Pipe Station: The station is just across a berm north of the New Castle Town Beach. The station is accessible from the beach or from Ocean Drive off Route 1B. During high tide the pipe is covered.	43.068844°	-70.712881°

Coastal Water Quality Standards and 2009 Results

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 of water in one sample. When either two or more samples taken at a beach exceed the standard or when one sample exceeds 174 counts/100 ml. A beach advisory is issued and posted on the beach website, beach managers are notified, and signs are placed at the entrances to the beach to warn the public of the potential health threat posed by water contact at the beach. Beach advisories remain in effect until subsequent beach sampling reflects results below the state standard. Although samples are collected at the bacteria source station, the pipe to the north of the beach, the results are not used to issue beach advisories. The

results from the New Castle Pipe are used for long term studies of bacteria sources at New Castle Beach.

The 2009 sampling season began May 26th. The summer sampling season encompassed 99 days. Additional sampling was conducted weekly at each coastal beach until September 23. Precipitation was recorded on 45 days during the summer sampling season and twice during the September sampling, based on precipitation recorded at the Pease Air National Guard weather station (Figure 2). Wetfall during the May sampling totaled 1.39 inches, June wetfall totaled 6.07 inches. July and August yielded 8.35 and 3.64 inches of rain respectively. In September, 0.59 inches of rain was measured on the 12th and a trace was recorded on the 18th.

The New Castle Town Beach Program resulted in 27 routine inspections and three safety inspections conducted during the summer of 2009. Additionally, three inspections were conducted after the swim season in September. At New Castle, 105 Enterococci samples were collected from the beach and 18 samples were collected from the pipe to the north of the beach (Appendix B). During the 2009 sampling season, six of the Enterococci samples taken at the beach were above the state standards for Enterococci (Figure 3), leading to two beach advisories being issued by DES.

The first advisory occurred on June 23, when the right sample contained an elevated bacteria level of 650/100 ml. An advisory was posted and the beach was re-sampled as scheduled on June 25. Sampling on June 25 showed that bacteria levels had decreased and the New Castle Beach advisory was removed.

The second advisory at New Castle Town Beach occurred on June 29, when the left station had a count of 270/100 ml. An advisory was posted until the beach was re-sampled as scheduled on July 1; the left sample had decreased below the state's standard for tidal swimming waters.

Four 2009 routine inspections revealed one of the three samples collected at New Castle Beach was above the state standard. Since no samples exceeded 174 counts/100 ml, only safety inspections for resampling were required and no advisory was posted. Safety inspections were conducted on June 12 and 26 since routine sampling were not scheduled for either day. Routine scheduled inspections were conducted at New Castle Beach on May 29 and June 29.

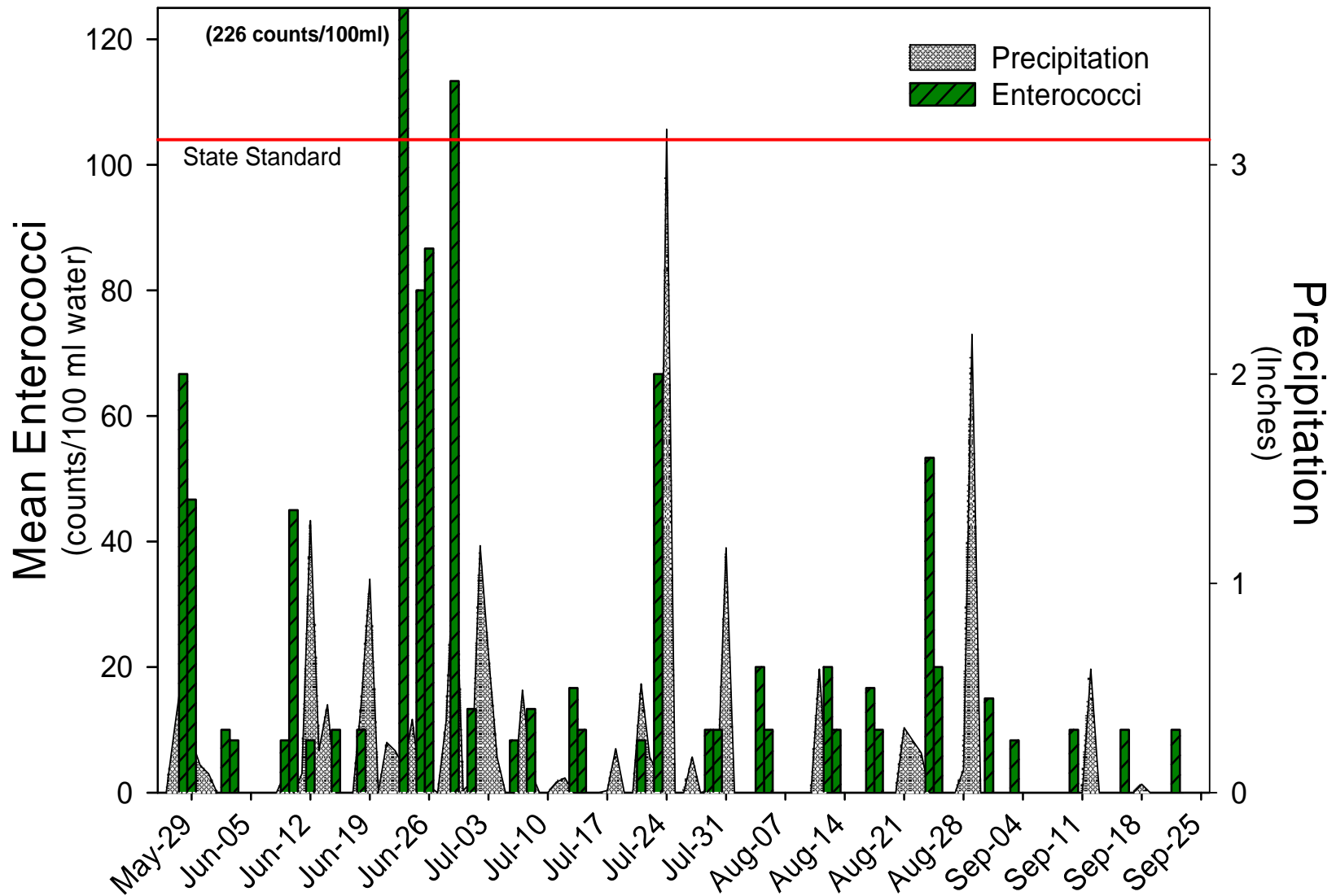


Figure 2. New Castle Town Beach 2009 mean Enterococci results. Two advisories were posted at New Castle Town Beach after the sampling on June 23 & 29, 2009. See Appendix B for all results from New Castle Town Beach stations for the 2009 sampling season.

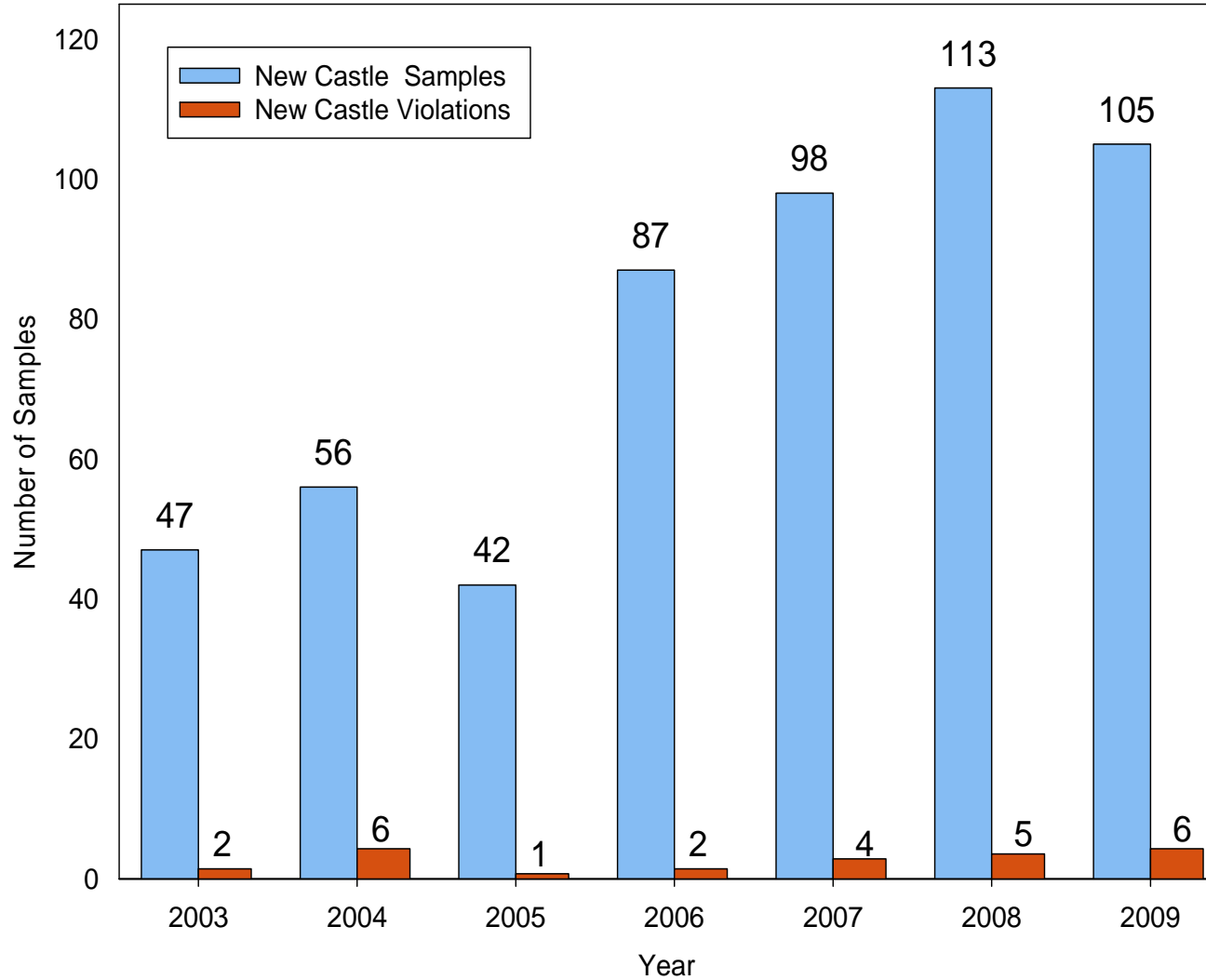


Figure 3. Enterococci samples and violations at New Castle Beach. An exceedance of the state standard for Enterococci bacteria is a violation. All violations recorded at NH coastal beaches when violations occurred at New Castle Beach are: 5 total violations in 2003, 22 total violations in 2004, 4 total violations in 2005, 23 total violations in 2006, 12 total violations in 2007, 21 total violations in 2008, and 15 total violations in 2009.

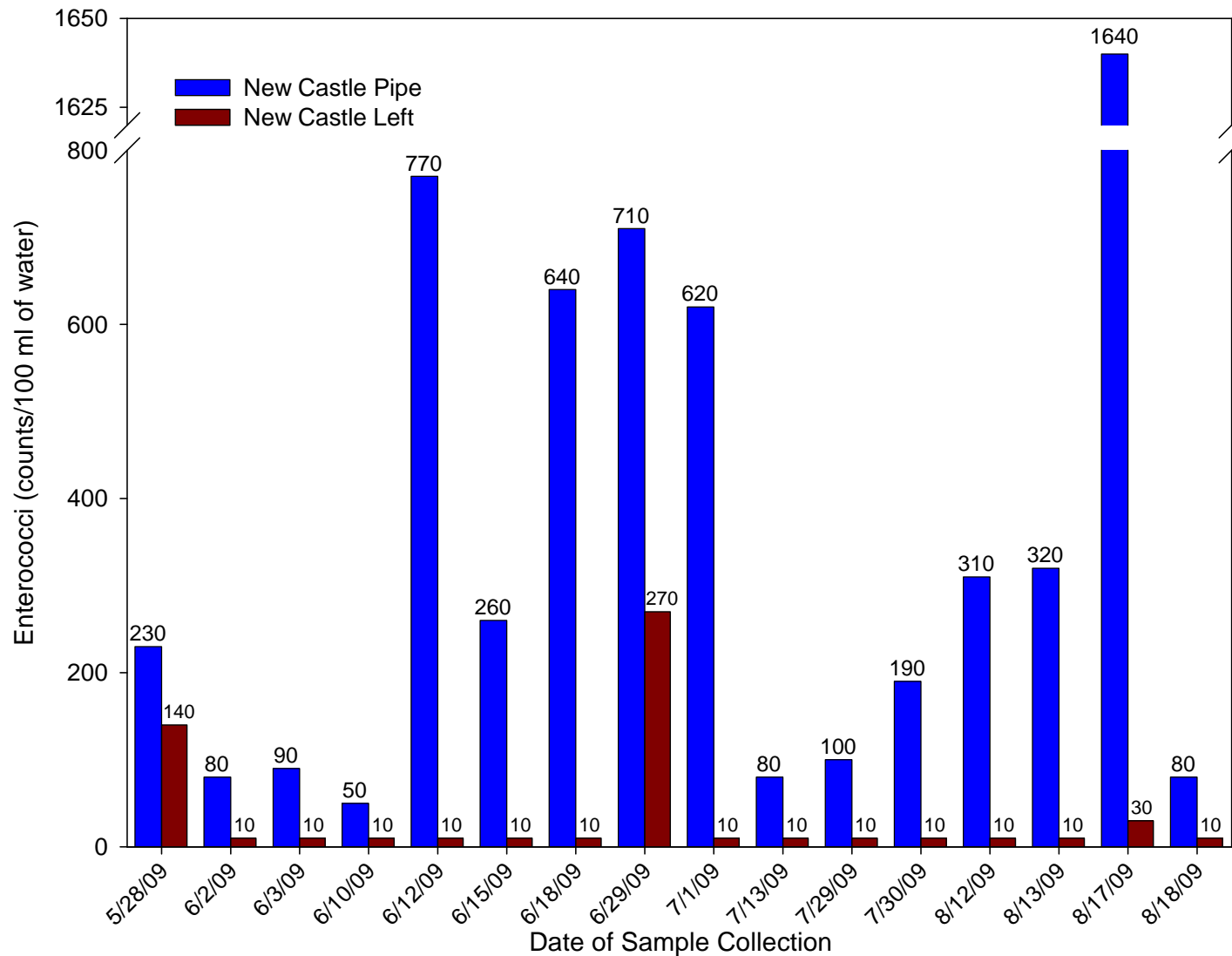


Figure 4. Pipe results more than 20 counts higher than the left beach result. On July 14, 2009, the pipe result was 10 counts and August 25, 2009, the pipe result was 30 counts. On 10 of the 18 days when samples were collected at the pipe, the result was over the state standard for Enterococci. However, on only two of those days, May 28 and June 29, was the result at the left station of New Castle beach over the state Enterococci standard of 104 counts/100 ml of water.

New Castle Town Beach Adopt-a-Beach Program

In response to growing concern over the amount of litter and marine debris impacting visual and environmental aspects of Hampton Beach, the beach program partnered with the Blue Ocean Society for Marine Protection (BOS) from Portsmouth, N.H. Both parties met to discuss the development of an Adopt-a-Beach Program at Hampton Beach in the spring of 2005. A formal Memorandum of Agreement stated that the Blue Ocean Society would add Hampton Beach to their Adopt-a-Beach Program and that the beach program would supply materials such as gloves, garbage bags, scales and pencils to volunteers who clean Hampton Beach.

In the fall of 2009, the Memorandum of Agreement between the DES and the BOS was revised to acknowledge the 16 mainland coastal beaches monitored by DES and divided into 23 sections available for adoption through the BOS. Previously, only five sections at Hampton Beach State Park were recognized. Currently, 19 sections are adopted including the New Castle Town Beach. Employees of Seacoast Mental Health Center are the current stewards of New Castle Beach, also known as the Great Common Island Beach. However, four other sections are still unclaimed for regular clean ups.

Volunteers conduct beach clean-ups monthly. All litter washed up or left behind at the beach is weighed, categorized and recorded for analysis by the BOS. The most numerous items found at New Castle Town Beach in past years were cigarette butts, plastic bags, and bottle caps. The BOS produces an annual summary of clean-ups and litter collected at all coastal beaches. The 2009 report will be available for downloading in early 2010 on the BOS website:

www.blueoceansociety.org/Research/pollution_research.html.

Please contact Sonya Carlson, beach program coordinator, or Jen Kennedy, (603) 431-0260 or **jen@blueoceansociety.org** for information about adopting orphaned beach sections.

Concerns

The New Castle Beach watershed include wetland areas that drain to a small duck pond. The discharge from the duck pond enters the ocean through a pipe adjacent to the left sampling station at the New Castle Town Beach. Samples are collected from the pipe during beach inspections if the tide is low enough to allow access to the draining water. Although the pipe discharge area is not designated as part of the New Castle Beach, the Enterococci results are often over the state standard for tidal swimming waters. Recreational activities within the pipe discharge area during elevated bacteria levels can result in increased risk of contracting any number of waterborne diseases. Elevated bacteria results from the pipe do not always indicate elevated bacteria levels at the New Castle Town Beach left station. Two of the ten sample days reflected results above 104 counts also showed left side bathing area levels over 104 counts (Figure 4). Although high bacteria discharge from the pipe does not always correlate with high designated beach bacteria concentration, the discharge itself could present problems to the public.

Bull Toad Marsh is another potential area contributing bacteria to the beach. The marsh is located west of the New Castle Town Beach area and drains to the beach between the right and center stations during high water levels. Samples were not collected in 2009 because of the lack of running water during inspections. Wet weather sampling is recommended for this location, but scheduled beach inspections are conducted twice a week during the summer making rain event sampling difficult.

In order to investigate bacteria sources to coastal beaches, a special study is currently being conducted at three coastal watersheds to isolate possible Enterococci sources to the beach. One project goal is to identify bacteria sources and recommend actions to minimize the bacteria discharging from these sources. Watershed investigations are being conducted at New Castle, North Hampton State Beach, and Wallis Sands Beach. Once bacteria sources are measured, the town of New Castle or other interested parties could apply for funding from the EPA to assist with bacteria source mitigation.

Future Projects

- A study to document the beach sand bacteria concentrations at New Castle Town Beach may be warranted. Despite the NHDES study results to the contrary, beach sand studies in other areas of the country have shown concentrated populations of bacteria in the onshore sand near the water line. Initiating a similar project could document if bacteria proliferate in the sand and contributes bacteria populations to the beach area. 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 at the New Castle Pipe has been continuously monitored and reveals elevated bacteria levels. 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 marked with a warning sign that states “this water may contain elevated bacteria levels”. The Beach Program is willing to collaborate on this effort by providing funds to purchase signs.

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

Appendix A: 2009 Special Report – Bacteria Source Identification

The NHDES Beach Program is responsible for monitoring the quality of New Hampshire's Public Bathing Beaches, conducting special investigations and cooperatively working with local communities to improve beach water quality. The Beach Program also identifies local community actions that reduce pollutants from possible contamination sources.

Potential contamination sources within a watershed include improper disposal of human, pet, and livestock waste, land use, stormwater runoff, and wildlife. Once identified, source reduction can be prioritized by severity of bacteria loading and our ability to manage the source. Human wastewater and livestock contributions are more easily managed than those of wildlife, though the best management practices designed to reduce stormwater runoff will also reduce contributions from wildlife.

In 2008 the Beach Program initiated a bacteria source identification program at New Hampshire's coastal swimming waters. The ultimate goal of this project was to improve our coastal water quality by eliminating major contributors of fecal bacteria at their sources.

The first phase of the study initiated in 2008 was comprised of the following six main tasks:

1. Data collection.
2. Data interpretation, including statistical analysis of elevated beach bacteria events
3. Computer modeling to estimate bacteria loading.
4. Review of existing literature about the study area and study topic.
5. Interviewing local environmental professionals with experience and background in the study areas.
6. Report Production summarizing our findings.

The initial study area for this bacteria source investigation included the watersheds of all 16 coastal beaches monitored by the NHDES Beach Program. Phase one of this project served as a platform to thoroughly review the watersheds of New Hampshire's coastal beaches and allowed DES to narrow the study area to the most impacted watersheds.

DES is conducting the 2009 second phase of this investigation which focuses on three coastal beach watersheds of concern: New Castle Town Beach Watershed, Wallis Sands Watershed in Rye, and North Hampton State Beach Watershed. Extensive wet and dry weather sampling will be conducted throughout each focus watershed to determine where bacteria sources are located. Suspected sources are bracketed by sampling above and below a location in the watershed. A bacteria source is identified when high bacteria counts are measured downstream, but not upstream of a potential bacteria source in the watershed. Once an area of elevated bacteria levels is identified, the area will be investigated further to pinpoint the pollution source.

A watershed management plan (WMP) will be developed for each of the focus beach watersheds. These WMP documents will identify the bacteria sources, prioritize them for remediation, and provide remediation options. The NHDES Beach Program looks forward to working with the towns of New Castle, Rye, and North Hampton as well as other local parties to improve the water quality of their coastal swimming beaches.

In the late summer of 2009, Beach Program staff attended public meetings in each town and introduced the idea of developing a municipal and state partnership. As partners, each watershed could apply for EPA Clean Water Act grant monies to help fund the reduction of bacterial pollution to these coastal beaches. All grant funding requires a 40% match in funds from each town which may be matched as services in lieu of payment, such as work performed by town employees or volunteers. Several remediation projects will be outlined in each WMP and the town will then select the corrective actions that can be implemented.

The suggested partnerships were received well by most of the towns. When the watershed management planning documents are finished, the NHDES Beach Program anticipates a positive and productive partnership with the towns of New Castle, Rye, and North Hampton to protect and improve the water quality at the coastal beaches.

Additional phase two tasks include investigating bacteria transport to the beaches by ocean currents and statistical analysis of elevated beach bacteria events. Elevated bacteria results from beach locations will be compared with environmental data such as amount of rain, tide height, temperature, and solar irradiance occurring at the same time. Identifying the environmental factors that best correlate with the observance of high bacteria counts in beach water could allow staff to predict when conditions may cause elevated bacteria levels before they occur.

Appendix B: New Castle Town Beach 2009 Data by Date

Results from beach sampling locations exceeding the state standard for Enterococci are in bold below.

Date	Enterococci (count/100 ml)				Inspection Type	Previous 24 hour rainfall (inches)	Number of bathers	Animal Presence
	Left	Center	Right	Pipe				
5/28/09	140	10	50	230	Routine	0.31	0	73 birds
5/29/09	20	80	40		Routine	0.61	0	6 birds
6/2/09	<10	<10	<10	80	Routine	0	5	0
6/3/09	<10	<10	<5	90	Routine	0	7	1 bird
6/9/09	5	<10	10		Routine	0	0	6 birds
6/10/09	<10	<5	120	50	Routine	0.09	0	2 birds
6/12/09	<10	<10	<5	770	Safety	0.09	0	1 bird
6/15/09	<10	<10	<10	260	Routine	0.42	0	3 birds
6/18/09	10	<10	10	640	Routine	0	5	3 birds
6/23/09	20	<10	650		Routine	0.2	12	15 birds
6/25/09	50	170	20		Advisory	0.35	0	0
6/26/09	140	80	40		Safety	0.02	0	0
6/29/09	270	60	<10	710	Safety	0.34	0	15 birds
7/1/09	<10	10	20	620	Advisory	0.01	4	12 ducks
7/6/09	5	10	<10		Routine	0	60	0
7/8/09	10	<10	20		Routine	0.49	0	0
7/13/09	<10	<10	30	80	Routine	0.07	26	0
7/14/09	<10	<10	<10	10	Routine	0	7	0
7/21/09	<10	<10	<5		Routine	0	0	0
7/23/09	10	90	100		Routine	0.09	1	1 dog
7/29/09	<10	<10	<10	100	Routine	0	23	1 bird
7/30/09	<10	<10	<10	190	Routine	0.01	7	6 birds
8/4/09	20	30	10		Routine	0	28	1 bird
8/5/09	<10	<10	10		Routine	0	41	1 bird
8/12/09	10	10	40	310	Routine	0.59	9	0
8/13/09	10	10	10	320	Routine	0	4	0
8/17/09	30	<10	<10	1640	Routine	0	35	0
8/18/09	<10	<10	<10	80	Routine	0	44	2 birds
8/24/09	40	80	10		Routine	0.19	8	0
8/25/09	<10	20	30	30	Routine	0	145	13 birds
8/31/09	<10	30	<5		Routine	0	2	2 birds
9/3/09	<5	<10	<10		Routine	0	1	0
9/10/09	<10	<10	<10		Fall	0	0	0
9/16/09	<10	<10	<10		Fall	0	0	0
9/22/09	<10	<10	<10		Fall	0	0	4 birds