



## NORTH CAROLINA 7th in Beachwater Quality

4% of samples exceeded national standards in 2010

Polluted urban and suburban runoff is a major threat to water quality at the nation's coastal beaches. Runoff from storms and irrigation carries pollution from parking lots, yards, and streets directly to waterways. In some parts of the country, stormwater routinely causes overflows from sewage systems. Innovative solutions known as green infrastructure enable communities to naturally absorb or use runoff before it causes problems. The U.S. Environmental Protection Agency is modernizing its national rules for sources of runoff pollution and should develop strong, green infrastructure-based requirements.

Most of North Carolina's 240 public coastal beaches, which stretch along 320 miles of Atlantic waters, are located on barrier islands. The North Carolina Department of Environment and Natural Resources (NCDENR) administers the state's BEACH Act grant.

In late September 2010, 15 to 20 inches of rain fell in the southeastern part of the state, prompting a blanket beach advisory for the region<sup>3</sup> (these types of advisories are not reported to the EPA and do not appear in NRDC's data analysis). Many of the year's beachwater quality exceedances occurred during this period.

While Kure Beach (Ocean Pier at K Avenue) has consistently enjoyed good water quality, the town of Kure Beach was concerned about discharging stormwater with elevated levels of fecal indicator bacteria to outfalls at its beach. This beach has a well-established dune system whose crest is 12 to 14 feet above sea level, and the town decided to explore filtering its stormwater through the sand in the dunes in order to remove the bacteria. To test the feasibility of this strategy, two filtration units were installed in 2006, treating 95% of the runoff from a residential section of town. The filtration units consist of plastic chambers on a bed of gravel. They are buried and covered with sand, which is then replanted with dune vegetation (American beach grass, panicum, and sea oats) to maintain stability. There has been no indication of the dunes slumping or eroding or of adverse effects on the water table. Fecal indicator bacteria levels of 1,000 cfu/100 ml in runoff at the entrance to the filtration units drop to typical groundwater concentrations of 10 cfu/100 ml at the base of the dunes. A third system was installed in 2009. The systems were paid for by the NC Department of Transportation, designed and monitored by NCSU-Biological and Agricultural Engineering, and installed by the Kure Beach Public Works department.<sup>1</sup>

### KEY FINDINGS IN NORTH CAROLINA

#### Beachwater Contamination

(% of samples exceeding state standards in 2010)

- Jockey's Ridge Soundside Access in Dare County (22%)
- Colington Harbour Swimming Beach in Dare County (17%)

#### Reported Sources of Beachwater Contamination

Statewide (number of closing/advisory days)

- 345 (70%) stormwater runoff
- 298 (60%) wildlife
- 37 (7%) other sources of contamination
- 4 (1%) unknown sources of contamination

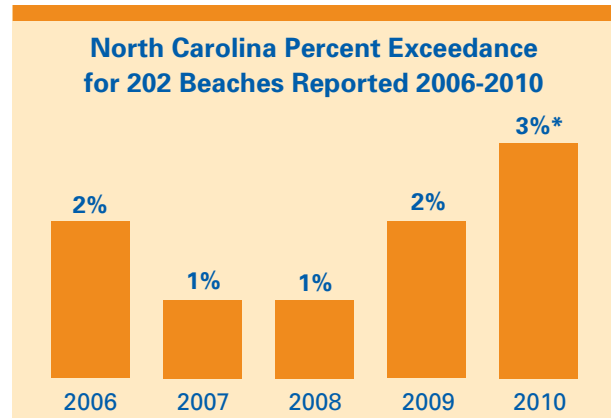
Totals exceed total days and 100% because more than one contamination source was reported for most events.

### Monitoring Results

In 2010 North Carolina reported 240 coastal beaches, 114 (48%) of which were monitored once a week, and 126 (52%) every other week. For this section of the report, NRDC looked at the percent of monitoring samples that exceeded the state's daily maximum bacterial standards (all reported samples were used to calculate the 2010 percent exceedance rates, including triplicate samples and samples taken outside the official beach season, if any). In 2010, 2% of all reported beach monitoring samples exceeded the state's daily maximum bacterial standards. The beaches with the highest percent exceedance rates in 2010 were Jockey's Ridge Soundside Access (22%) and Colington Harbour Swimming Beach (17%)

in Dare County, Lighthouse Park; Ed Zaleskiway Way - Oak Island in Brunswick County (15%), Park Service Dock in Carteret County (15%), Intracoastal Waterway, beach area between marker #28 & marker #29 in Brunswick County (14%), Kitty Hawk Bay Wildlife Ramp in jet ski riding area in Dare County (14%), and North side mouth of Town Creek in Beaufort in Carteret County (13%).

New Hanover County had the highest exceedance rate (4%) in 2010 followed by Dare (3%), Brunswick (3%), Pamlico (2%), Carteret (2%), Pender (1%), Beaufort (1%), and Currituck (1%) counties. There were no exceedances in Bertie, Camden, Chowan, Craven, Hyde, Onslow, Pasquotank, Perquimans, and Tyrell counties.



**Sampling Practices:** North Carolina’s swimming season is from April 1 to October 31. Monitoring occurs year-round but is less frequent during the off-season, and alerts and advisories are not issued during that period.<sup>2</sup> Off-season monitoring is conducted because it can allow authorities to find and correct bacteriological problems before the swim season begins.<sup>4</sup>

NCDENR conducts sampling and notification activities throughout the coastal waters of the state; these duties are not delegated to local authorities. Samples are collected in a variety of ways. Samples in the ocean surf are taken 16 feet from the sampler’s body using a telescopic golf ball retriever in knee-deep water, 6 to 12 inches below the surface of the water. Approximately half of the samples are collected by boat, and these samples are taken in water that is three feet deep, 12 inches below the surface. Samples taken from piers must be taken at the location of the most used area 6 to 12 inches below the water’s surface. North Carolina prioritizes its beaches for sampling based on usage.

Tier 1 beaches are adjacent to resort areas, public accesses, and sailing camps and are used on a daily basis. All ocean beaches are considered Tier 1. Tier 2 beaches constitute areas such as those in the intracoastal waterway, tidal creeks, and exposed shoals. People frequent Tier 2 sites mostly on weekends and they are usually accessed by watercraft. Tier 3 beaches are used an average of four times per month, or used less frequently but intensively for special events such as triathlons. North Carolina regularly monitors all of its beaches, including its Tier 3 beaches.<sup>3</sup>

Beaches with storm drains that extend to the water’s edge are sampled 10 feet on either side of the



**Dune filtration unit under construction at Kure Beach.**

\* Why don’t the 2010 percent exceedance values in this summary match? To get the value in the header (4%), beachwater monitoring samples were compared to EPA’s single-sample maximum standard for designated beach areas. North Carolina applies this standard at its high-use Tier 1 beaches, but applies EPA standards that are not as strict at its moderately and lightly used beaches (Tier 2 and Tier 3 beaches, which are generally accessible only by boat). The percent exceedance value in the “Monitoring Results” section (2%) compares beachwater monitoring samples to North Carolina’s single-sample maximum standards. Also, only samples from a common set of beaches monitored each year from 2006-2010 are included in the bar chart. Because some beaches were not monitored in each of those years, the percent exceedance for this subset of beaches (3%) did not have the same value as the percent exceedance of state standards for all of the beaches monitored in 2010 (2%).

† NRDC has learned that the beach that has the highest rate of exceedances in the state, Southern Shores Private Soundside Access in Dare County, is not a public beach. Monitoring of this beach has been discontinued. If it were not included in the 2010 data, Dare County’s exceedance rate would be 3%.

drain when practical. Beaches with storm drains that do not extend to the water's edge are sampled where the water flowing back down the beach from the previous wave meets the next incoming wave.<sup>3</sup> States that deliberately sample near potential sources of pollution, such as storm drains, tend to have higher percent exceedance rates than states that don't. In Dare County, lateral sampling is done to determine the extent of a bacteria plume from discharging storm drains after a storm. Lateral sampling is also done at some sites when the running monthly geometric mean water quality standard is exceeded, in order to determine the extent of the contaminated area.<sup>3</sup> The NCDENR samples after storm events, sewage spills, dredge disposal, and floodwater pumping to confirm safe bacteria levels before lifting preemptive advisories.<sup>3</sup> States that monitor more frequently after exceedances are found and after storm or pollution events will tend to have higher percent exceedance rates and fewer total closing/advisory days than they would if their sampling frequency did not increase after exceedances or storm/ pollution events.

North Carolina also monitors for *Karenia brevis*, a marine alga responsible for causing "red tide," a type of harmful algal bloom. If a *K. brevis* bloom is detected off the east coast of Florida, satellite imagery is used to locate the Gulf Stream. When the Gulf Stream comes near the North Carolina coast, sampling for *K. brevis* begins.

## Alerts and Advisories

Total alert and advisory days for 41 events lasting six consecutive weeks or less more than doubled to 495 days in 2010, from 233 days in 2009. For prior years, there were 168 alert and advisory days in 2008, 123 days in 2007, 346 days in 2006, and 197 days in 2005. There were 2 extended (168 days) and no permanent events in 2010. Extended events are those in effect for more than six weeks but not more than 13 consecutive weeks; permanent events are in effect for more than 13 consecutive weeks. All alert and advisory days in 2010 were due to monitoring that revealed elevated bacteria levels.

**Standards and Procedures:** The NCDENR does not have the authority to close beaches; it issues alerts and advisories only. The public is notified of alerts and advisories through avenues that include the Internet and press releases, but signs are posted at the beach only for advisories. However, the state and county health directors do have the authority to close any body of water if necessary for the protection of public health.<sup>4</sup>

North Carolina uses the Enterolert® method for analysis instead of membrane filtration. This method produces bacterial counts in terms of most probable number (mpn) rather than colony-forming units (cfu), but both of these values are intended to represent the number of viable organisms in a sample. From May 1 to September 30, North Carolina's water quality standards at its Tier 1 beaches are a single-sample maximum of 104 mpn/100 ml water and a running monthly geometric mean of 35 mpn/100 ml. These match the EPA's criteria for designated beach areas. At Tier 2 beaches the standard is a single-sample maximum of 276 mpn/100 ml, and at Tier 3 beaches the standard is a single-sample maximum of 500 mpn/100 ml.<sup>4</sup> North Carolina's single-sample maximum standard for Tier 2 beaches matches EPA's criterion for moderately used full-body-contact marine beachwater, and its standard for Tier 3 beaches matches EPA's criterion for lightly used full-body-contact marine beachwater.<sup>5</sup> During April and October, the standard for Tier 1 beaches is generally the same as the standard for Tier 2 beaches.<sup>3</sup> However, the NCDENR generally opts to apply Tier 1 standards during those months if temperatures are warm enough for high recreational usage.<sup>4</sup>

North Carolina has an elaborate process for determining when to issue a notification, based on three tiers.

- Tier 1 beaches whose water quality exceeds standards more than just occasionally are sampled in triplicate; other Tier 1 beaches have one sample taken per sampling event. For Tier 1 beaches that are sampled in triplicate, an advisory is issued without resampling when two out of three simultaneous samples exceed 104 mpn/100 ml (alerts do not apply to beaches that are sampled in triplicate). Between May 1 and September 30 at the Tier 1 beaches that are not sampled in triplicate, an alert is issued for beaches when enterococcus levels are between 104 and 500 mpn/100 ml. A second sample is collected immediately when an alert is issued, and if levels in the resample exceed 104 mpn/100 ml, the alert converts to an advisory. It is rare for an alert to become an advisory because the beaches for which alerts are issued have a history of good water quality and resamples almost never exceed standards. An advisory is issued without a resample at Tier 1 beaches if a single sample is greater than 500 mpn/100 ml.

- For Tier 2 beaches, an alert is issued if a sample is 276 to 500 mpn/100 ml. Then a resample is conducted, and the alert converts to an advisory if the resample exceeds 276 mpn/100 ml. An advisory is issued without a resample at Tier 2 beaches if a single sample is greater than 500 mpn/100 ml.

- Alerts are not issued at Tier 3 beaches. If a sample is higher than 500 mpn/100 ml at a Tier 3 beach, a resample is done, and if the second sample is above that level, an advisory is issued.<sup>3</sup>

The NCDENR observes fecal coliform results from the state’s shellfish-growing waters in order to get an indication of water quality at nearby recreational sites, but fecal coliform results are not used to issue advisories or alerts.

During extreme rain events such as tropical storms and hurricanes, the NCDENR sometimes issues blanket advisories that cover large regions or all of coastal North Carolina.<sup>4</sup> (This type of advisory is not reported to the EPA and does not appear in NRDC’s data analysis.) In addition, permanent signs are posted on either side of storm drain outfalls stating that swimming between the signs is not recommended and that waters may be contaminated by discharge from the pipe.<sup>4</sup> Otherwise, preemptive rainfall advisories (advisories issued after rain before monitoring results are available) are not issued because, according to the state, beachwater-quality monitoring data indicate that water quality at ocean beaches is not affected by rainfall except near storm drains. Preemptive advisories are issued after known sewage spills, when pumping of floodwaters between a primary dune area and an ocean beach occurs, or when dredge material from closed shellfishing waters is placed on ocean beaches.<sup>3</sup>

<b>North Carolina 2010 Monitoring Results and Closing or Advisory Days</b>					
<b>Beach</b>	<b>Tier</b>	<b>Assigned Monitoring Frequency</b>	<b>Total Samples</b>	<b>% of Samples Exceeding State Standards</b>	<b>Closing or Advisory Days</b>
<b>Beaufort County</b>					
Dock on south side of Highway 92 bridge on west side of bath	3	2/mo	20	0%	0
East shore of Blounts Bay–Pamlico River	2	2/mo	20	0%	1
Pamlico River–City Park	3	2/mo	19	0%	0
Pamlico River–junction of Upper Goose Creek and Dinah's Landing	2	2/mo	20	10%	0
Pamlico River–Maul's Point	3	2/mo	19	0%	0
Pamlico River–Ragged Point Swim Area	1	1/wk	26	4%	0
Pamlico River–Tripp Point Recreational Area	3	2/mo	19	0%	0
Pamlico River–Washington–railroad trestle	3	2/mo	19	0%	0
Southeast of Austin Point–Pamlico River	2	2/mo	19	0%	0
Sound access at intersection of East Main and Tooley, Belhaven	1	1/wk	33	0%	0
West of Hills Point–Pamlico River	2	2/mo	19	0%	0
<b>Bertie County</b>					
Boat ramp at intersection of State Route 1500 and Vincent Street	3	2/mo	19	0%	0
<b>Brunswick County</b>					
Beach access btw. Bald Head Harbor entrance & Bald Head Creek	1	1/wk	28	0%	0
Beach Access near Captain Jack’s on Holden Beach	1	1/wk	33	0%	0

Beach	Tier	Assigned Monitoring Frequency	Total Samples	% of Samples Exceeding State Standards	Closing or Advisory Days
<b>Brunswick County</b>					
Cape Fear River, beach area adjacent to Southport municipal pier	2	2/mo	19	0%	0
Caswell Beach Public access off Caswell Beach Road	1	1/wk	36	8%	28
East Beach area–beach access 42	1	1/wk	28	0%	0
Ferry Road Public access	1	1/wk	34	3%	0
Greensboro Street emergency vehicle access/stormwater outfall pipe	1	1/wk	33	0%	0
Intracoastal Waterway, marker 59 near Holden Beach	2	2/mo	20	5%	0
Intracoastal Waterway, soundside access at east end of Ocean Isle Beach	2	2/mo	19	0%	0
Intracoastal Waterway end of Beach Drive at Bonaparte's Landing	3	2/mo	22	5%	4
Intracoastal Waterway, beach area adjacent to Howells Point wildlife boat ramp	2	2/mo	21	10%	0
Intracoastal Waterway, beach area between markers 28 and 29	2	2/mo	21	14%	1
Intracoastal Waterway, marker 67 near Holden Beach	2	2/mo	20	5%	0
Intracoastal Waterway, shoreline adjacent to Ocean Isle wildlife boat ramp	2	2/mo	19	0%	0
Intracoastal Waterway, waterfront park at end of NE 52nd Street	3	2/mo	21	10%	0
Lighthouse Park, Ed Zaleskiway Way–Oak Island	1	1/wk	41	15%	23
Middleton Public access–Oak Island	1	1/wk	33	0%	0
Oak Island wildlife ramp off Fish Factory Road	2	2/mo	20	0%	1
Ocean pier at 30th Place West and Beach Drive	1	1/wk	35	3%	8
Ocean pier at Causeway and First Street	1	1/wk	33	3%	0
Ocean pier at Main Street and Sunset Boulevard	1	1/wk	33	0%	0
Ocean pier at Ocean Boulevard and Durham Street	1	1/wk	33	3%	0
Ocean pier between 14th and 15th Place East and Beach Drive	1	1/wk	33	0%	0
Park on Fish Factory Road in Southport	2	2/mo	21	10%	1
Public access at 40th and Main Street	1	1/wk	34	3%	1
Public access at Dawson Street–Ocean Isle Beach	1	1/wk	33	0%	0
Public access at Dolphin Street Holden Beach	1	1/wk	33	0%	0
Public access at Driftwood Street–Ocean Isle Beach	1	1/wk	33	3%	0

Beach	Tier	Assigned Monitoring Frequency	Total Samples	% of Samples Exceeding State Standards	Closing or Advisory Days
<b>Brunswick County</b>					
Public access at First and Chadbourne Street	1	1/wk	33	0%	0
Public access at Ocean Dr. and Keziah Street	1	1/wk	35	3%	7
Public access just west of marker 1	1	1/wk	33	0%	0
Public access, 46th St/SE and E. Beach Drive–Oak Island	1	1/wk	36	6%	28
Public access, 58th St/SE and E. Beach Drive–Oak Island	1	1/wk	36	6%	15
Public access, east end Holden Beach	1	1/wk	33	0%	0
Public access, east end Sunset Beach	1	1/wk	34	3%	0
Public access, west end of Oak Island Drive–Oak Island	3	2/mo	21	10%	0
South Beach area–beach access 17	1	1/wk	28	0%	0
Southwest side, Holden Beach Bridge	3	2/mo	19	0%	0
Waterway Park	3	2/mo	19	0%	0
<b>Camden County</b>					
Canal boat ramp on State Route 1153	3	2/mo	18	0%	0
Sound access on State Route 1153	3	2/mo	20	0%	0
<b>Carteret County</b>					
1/2 mile west of marker 10, oceanside	1	1/wk	33	0%	0
1/4 mile west of 20 1/2 marker, oceanside	1	1/wk	33	0%	0
100 yards northeast of Gallant's Channel Bridge by shore	3	2/mo	19	0%	0
2 1/4 miles north of Cape Point near Barden Inlet	1	1/wk	39	8%	16
400 yards southeast of Bean Island off Core Banks	3	2/mo	19	0%	0
50 yards east of NC Marine Fisheries Dock	2	2/mo	19	0%	0
Adams Creek off Silver Dollar Road	2	2/mo	16	0%	0
Atlantic Ocean–public beach access, Inlet Road, west-side junction of Coast Guard and Inlet Drive	1	1/wk	33	0%	0
Bogue Inlet, mouth of Coast Guard Channel	2	2/mo	19	0%	0
Bogue Sound–Archer Point	2	2/mo	19	0%	0
Bogue Sound–boat landing Tourist Center	2	2/mo	19	0%	0
Bogue Sound–canal leading to Moonlite Bay	3	2/mo	19	0%	0
Bogue Sound–east side of mouth of Gales Creek	2	2/mo	19	0%	0
Bogue Sound–Goose Creek, off campground	2	2/mo	19	0%	0

Beach	Tier	Assigned Monitoring Frequency	Total Samples	% of Samples Exceeding State Standards	Closing or Advisory Days
<b>Carteret County</b>					
Bouge Sound–West Salter Path, ~200 yards off Wam Squam Lane	2	2/mo	19	0%	0
Cape Lookout Coast Guard Dock	2	2/mo	19	0%	0
Cedar Island–beach area southeast of wildlife ramp adjacent to ferry landing	2	2/mo	19	0%	0
Core Sound–Shell Point off Harkers Island	2	2/mo	19	0%	0
Deer Creek–public access end of Bogue Sound Drive	2	2/mo	19	0%	0
Fort Macon, park access	1	1/wk	33	0%	0
Harker’s Island bridge at swimming area	2	2/mo	19	0%	0
Headen Lane Salter Path–soundside ~200 yards offshore	2	2/mo	19	0%	0
Intracoastal Waterway, marker 44	3	2/mo	19	0%	0
Intracoastal Waterway, Ski Beach, channel to Bogue Inlet	2	2/mo	19	0%	0
Indian Beach–public access at marker 12	1	1/wk	33	0%	0
Knob Island–north side	2	2/mo	19	0%	0
Lennoxville boat ramp	3	2/mo	19	0%	0
marker 15, oceanside	1	1/wk	33	0%	0
marker 7 1/2, oceanside	1	1/wk	33	0%	0
marker 19 1/2, oceanside	1	1/wk	99	0%	0
marker 4 1/2, ocean side of Pelican Drive	1	1/wk	33	0%	0
Morehead City–Drainpipe at 16th Street	3	2/mo	18	0%	0
Mouth of Back Creek–left side by beach	3	2/mo	18	0%	0
North end of Old Ferry Road, soundside	2	2/mo	19	0%	0
Newport River–public access northwest of bridge	2	2/mo	19	5%	0
North River–at Highway 70 bridge	2	2/mo	19	5%	0
North side mouth of Town Creek in Beaufort	1	1/wk	111	13%	29
Ocean end of Central Drive	1	1/wk	33	0%	0
Ocean end of Henderson Boulevard, Atlantic Ocean	1	1/wk	34	3%	0
Ocean end of New Bern Street, Atlantic Ocean	1	1/wk	33	0%	0
Off Brown’s Island	2	2/mo	19	0%	0
Park Service Dock	1	1/wk	41	15%	61
Pine Knoll Shores–Just east of marker 8 1/2–Highway 58 East	1	1/wk	33	0%	0
Public access near Fawn Drive, Emerald Isle	1	1/wk	33	0%	0
Radio Island public beach access	1	1/wk	108	3%	28
Shackelford Banks–by restrooms	2	2/mo	19	0%	0

Beach	Tier	Assigned Monitoring Frequency	Total Samples	% of Samples Exceeding State Standards	Closing or Advisory Days
<b>Carteret County</b>					
Shackelford Banks–nun buoy 2	2	2/mo	19	0%	0
Spoils Island off Salty Shores	2	2/mo	19	0%	0
Taylor’s Creek at post office dock	3	2/mo	19	0%	0
West side of mouth of South River	2	2/mo	16	0%	0
West end of Sugarloaf Island, Morehead City	2	2/mo	19	0%	0
Western tip of Bird Shoals on Rachel Carson Reserve	2	2/mo	19	0%	0
Whitehurst Island east of marker 24	2	2/mo	19	0%	0
<b>Chowan County</b>					
Chowan River wildlife ramp, east side of bridge	3	2/mo	12	0%	0
<b>Craven County</b>					
Hancock Creek Dock at wildlife ramp	3	2/mo	18	0%	0
Mouth of Slocum Creek, North Side Beach	3	2/mo	18	0%	0
Neuse River–200 yards north of mouth of North West Creek	3	2/mo	19	0%	0
Neuse River–Flanner’s Beach	2	2/mo	16	0%	0
Neuse River–Great Neck Point	2	2/mo	16	0%	0
Neuse River–Green Spring Swim Area	2	2/mo	16	0%	0
Neuse River–Pine Cliff Recreation Area	2	2/mo	16	0%	0
Neuse River–Union Point	3	2/mo	16	0%	0
<b>Currituck County</b>					
100 yards offshore in sound near intersection of Highway 12 and Albacore Street Corolla	2	2/mo	19	0%	0
Atlantic Ocean–2.8 miles north of Corolla Ramp	1	1/wk	33	0%	0
Corolla Lighthouse beach access	1	1/wk	36	6%	14
Corolla Ramp, end of paved road	1	1/wk	33	0%	0
Corolla, Albacore Street beach access	1	1/wk	33	0%	0
Currituck South Beach Access at Pine island	1	1/wk	33	0%	0
Dock at end of State Route 1245	3	2/mo	19	0%	0
Park on Woodhouse Dr. Grandy, NC	3	2/mo	20	0%	6
Swimming area at end of State Route 1142	3	2/mo	19	5%	6
<b>Dare County</b>					
1 1/2 miles southwest of RO Plant	2	2/mo	19	0%	0
1/4 mile east of EMS Station	1	1/wk	34	0%	0
100 feet north of Jennettes Pier	1	1/wk	33	0%	0
100 yards east-northeast of Little Bridge, Causeway, Nags Head	2	2/mo	19	0%	0

Beach	Tier	Assigned Monitoring Frequency	Total Samples	% of Samples Exceeding State Standards	Closing or Advisory Days
<b>Dare County</b>					
100 yards offshore at Island Creek Court, Avon	2	2/mo	19	0%	0
100 yards offshore at North Holiday Road, Rodanthe	2	2/mo	19	0%	0
100 yards offshore at Sunset Strip Drive, Frisco	2	2/mo	19	0%	0
100 yards offshore of 7517 South Virginia Dare Trail, Nags Head	2	2/mo	19	0%	0
2Mi southwest of Frisco Volunteer Fire Department	3	2/mo	19	0%	0
3/4 miles north of sound access across from ramp 29	2	2/mo	19	0%	0
500 yards offshore, 100 yards south of east side of Wright Memorial Bridge	2	2/mo	19	0%	0
500 yards off Sandyridge Road, Currituck Sound	2	2/mo	19	0%	0
500 yards off Spy Glass Road, Currituck Sound	2	2/mo	19	0%	0
750 yards off Ocean Bay Boulevard, Currituck Sound	2	2/mo	19	0%	0
800 yards off State Route 1425	2	2/mo	19	0%	0
Bathhouse at Ocean Bay Drive	1	1/wk	33	0%	0
Bathhouse on State Route 1206	1	1/wk	33	0%	0
Beach access 1 1/2 mile north of Kitty Hawk Pier	1	1/wk	33	0%	0
Beach access at 3rd Street	1	1/wk	33	0%	0
Beach access at Sportsman Drive	1	1/wk	33	0%	0
Beach access at Sprigtail Drive	1	1/wk	33	0%	0
Beach access south of refuge offices	1	1/wk	34	0%	0
Beach at Cape Hatteras Lighthouse	1	1/wk	34	0%	0
Canadian Hole	2	2/mo	19	0%	0
Colington Harbour swimming beach	1	1/wk	102	17%	0 (84)*
Conch Street beach access	1	1/wk	33	0%	0
Drainpipe at Hollowell Street	1	1/wk	33	3%	0
Drainpipe at Lake Drive beach access	1	1/wk	33	0%	0
Drainpipe at Martin Street	1	1/wk	33	9%	0
Drainpipe at milepost 10.5	1	1/wk	33	3%	0
Drainpipe at milepost 12.5	1	1/wk	33	0%	0
Drainpipe at milepost 8 3/4	1	1/wk	33	3%	0
Drainpipe at Oregon Street	1	1/wk	33	0%	0
Drainpipe at South Nags Head/ Federal Park border	1	1/wk	33	0%	0
Federal campground	1	1/wk	34	0%	0
Frisco Bathhouse	1	1/wk	34	0%	0

Beach	Tier	Assigned Monitoring Frequency	Total Samples	% of Samples Exceeding State Standards	Closing or Advisory Days
<b>Dare County</b>					
Hillcrest Drive access	1	1/wk	33	0%	0
Jockey's Ridge soundside access	1	1/wk	111	22%	22 (84)*
Kitty Hawk Bay wildlife ramp in JetSki riding area	2	2/mo	22	14%	28
Nags Head Bathhouse	1	1/wk	33	0%	0
New Inlet sound access	3	2/mo	19	0%	0
Northernmost beach access	1	1/wk	34	0%	0
Ocean Ramp 30	1	1/wk	34	0%	0
Oregon Inlet Coast Guard Station	3	2/mo	19	0%	0
Oregon Inlet Federal Campground	1	1/wk	33	0%	0
Ramp 23 and access	1	1/wk	20	0%	0
Ramp 34 and access	1	1/wk	34	0%	0
Ramp 38 and access	1	1/wk	34	0%	0
Ramp 55 and access	1	1/wk	34	0%	0
Roanoke Sound, Danube Street drainpipe, South Nags Head	2	2/mo	19	0%	0
Shallowbag Bay–swim platform, Manteo Bridge	2	2/mo	19	0%	0
Sound access across from ramp 29	2	2/mo	19	0%	0
Southeast side of Mann's Harbor Bridge	3	2/mo	19	0%	0
S-turns just north of Rodanthe	1	1/wk	34	0%	0
The Swimming Hole	2	2/mo	19	0%	0
Wanchese Seafood Industrial Park	3	2/mo	19	0%	0
<b>Hyde County</b>					
Atlantic Ocean–5 miles southwest of Ocracoke State Ferry	1	1/wk	34	0%	0
Beach access by airport ramp	1	1/wk	34	0%	0
Federal Campground–Ocracoke	1	1/wk	34	0%	0
Ocracoke–1st public access southwest of State Ferry	1	1/wk	34	0%	0
Swanquarter Bay–end of docks on State Route 1136	3	2/mo	19	0%	0
<b>New Hanover County</b>					
Area behind northern end Masonboro Island	2	2/mo	19	0%	0
Banks Channel–Waynick Boulevard–between Snyder and Seashore Streets	1	1/wk	117	10%	44
Banks Channel–Waynick Boulevard–between Taylor and Bellamy Streets	1	1/wk	108	4%	28
Banks Channel–Waynick Boulevard, ~150 yards north of Lula Street	1	1/wk	111	6%	29
Banks Channel, swimming beach south of Coast Guard station	1	1/wk	36	3%	28

Beach	Tier	Assigned Monitoring Frequency	Total Samples	% of Samples Exceeding State Standards	Closing or Advisory Days
<b>New Hanover County</b>					
Beach access at Periwinkle Lane, Carolina Beach	1	1/wk	33	0%	0
Cama access, corner of Waynick Boulevard and Sunset Ave (WB)	1	1/wk	114	5%	36
Cape Fear River, west end of Snows Cut	3	2/mo	19	0%	0
Carolina Beach Inlet–north end of Carolina Beach	2	2/mo	19	0%	0
Fort Fisher–Beach adjacent to NCWRC ramp	2	2/mo	19	0%	0
Fort Fisher Beach State Park access off Loggerhead Road	1	1/wk	33	3%	0
North end of Wrightsville Beach at public access 2 off Lumina Drive	1	1/wk	33	0%	0
Ocean Pier at K Avenue	1	1/wk	34	6%	0
Ocean pier at Nathan Street and South Lumina Drive	1	1/wk	33	3%	0
Ocean pier at Salisbury Street public access	1	1/wk	33	0%	0
Public access at Hanby Beach storm drain	1	1/wk	33	0%	0
Public beach, Masonboro Sound–end of Florida Avenue, Carolina Beach	2	2/mo	20	5%	1
Public beach access at Hemlet Avenue	1	1/wk	33	0%	0
Stone Street public access–oceanside Wrightsville Beach	1	1/wk	34	3%	0
Trails End public access on Masonboro Loop	3	2/mo	20	5%	0
Vehicle access, 600 yards from North Carolina Beach Pier at Dune Mark	1	1/wk	33	0%	0
<b>Onslow County</b>					
Atlantic Ocean–~1 mile south of Bogue Inlet	1	1/wk	33	0%	0
Atlantic Ocean–~2miles south of Brown's Inlet	1	1/wk	33	0%	0
Bogue Sound, 1/2 mile south of Bear Inlet, soundside	2	2/mo	18	0%	0
North Topsail Bridge–wildlife ramp	3	2/mo	19	0%	0
North Topsail, emergency vehicle access	1	1/wk	33	0%	0
New River at mouth of Southwest Creek	2	2/mo	19	0%	0
New River, Wilson Park	3	2/mo	19	0%	0
Onslow Beach–public access ~1/4 mile south of Onslow Beach Bridge	2	2/mo	20	0%	0
Public access, mouth of Northeast Creek–New River	2	2/mo	19	0%	0
Public access, North Topsail	1	1/wk	33	0%	0
Regional public access at marker 12 on New River Inlet Road	1	1/wk	33	0%	0

Beach	Tier	Assigned Monitoring Frequency	Total Samples	% of Samples Exceeding State Standards	Closing or Advisory Days
<b>Onslow County</b>					
Regional public access at marker 17 on New River Inlet Road	1	1/wk	33	0%	0
Sanders Creek at Bear Creek	2	2/mo	19	0%	0
Soundside Bear Island	3	2/mo	19	0%	0
Wards Shore–Bogue Sound	2	2/mo	19	0%	0
<b>Pamlico County</b>					
Dawson Creek, 100 yards north of bridge	2	2/mo	19	0%	0
<b>Pamlico County</b>					
Just east of mouth of Beard Creek	2	2/mo	19	0%	0
Just east of Wilkinson Point	2	2/mo	19	0%	0
Kennals Beach	2	2/mo	19	0%	0
Near mouth of Gatlin Creek	2	2/mo	19	5%	0
Neuse River, end of State Route 1310	2	2/mo	19	0%	0
Public beach, south side of Dawson Creek Bridge	1	1/wk	105	4%	1
Public beach southwest of mouth of Whittaker Creek, north of marker 3	2	2/mo	0	NA	0
Vandemere Creek	2	2/mo	20	0%	0
<b>Pasquotank County</b>					
Pasquotank River–E.C. Coast Guard Station Beach	3	2/mo	20	0%	0
<b>Pender County</b>					
Intracoastal Waterway, Highway 210 bridge at Surf City	2	2/mo	19	0%	0
Public access O-10 at Ocean Boulevard and Crews Avenue	1	1/wk	33	0%	0
Public access O-3 at marker 3	1	1/wk	33	3%	0
Public access S-1 at end of Shoreline Drive (soundside station)	1	1/wk	36	3%	0
Public access at Broadway Street & North Shore Drive	1	1/wk	33	3%	0
Public access at South Shore Drive and Kinston Avenue	1	1/wk	33	0%	0
Stump Sound just east of Dixon Point	2	2/mo	19	0%	0
<b>Perquimans County</b>					
Albemarle Sound at end of Holiday Lane Road	3	2/mo	19	0%	0
<b>Tyrell County</b>					
Albemarle Sound–Bull Bay Swimming Area 4H Camp	3	2/mo	17	0%	0

\*Reported closing or advisory days are for events lasting six consecutive weeks or less. Number of days in parentheses are for events lasting more than six consecutive weeks.

## NOTES

- 1 Michael R. Burchell II, Ph.D., North Carolina State University. Personal communication. March 2011.
- 2 North Carolina Department of Environment and Natural Resources, North Carolina Beach Monitoring Project Quality Assurance Project Plan, revised January 4, 2005.
- 3 J.D. Potts, North Carolina Department of Environment and Natural Resources. Personal communication. March 2011.
- 4 North Carolina Department of Environment and Natural Resources. "Coastal Recreational Waters Monitoring, Evaluation, and Notification." 15A NCAC 18A .3400. Accessed at [www.deh.enr.state.nc.us/shellfish/Water\\_Monitoring/RWQweb/images/15ANCAC8A3400Rules.pdf](http://www.deh.enr.state.nc.us/shellfish/Water_Monitoring/RWQweb/images/15ANCAC8A3400Rules.pdf). February 2011.
- 5 U.S. EPA. "Ambient Water Quality Criteria for Bacteria–1986." January 1986.

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***Testing the Waters 2011 reflects data as of June 27, 2011.***