REPORT OF SANITARY SURVEY

AREA E-1

BROAD CREEK AREA

MAY 2010 THROUGH SEPTEMBER 2014

Prepared 12/14

Approved By: _____

Date: _____

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The E-1 area of coastal North Carolina includes the waters of Broad Creek, Gales Creek, and a portion of Bogue Sound. Review of all bacteriological data covered by time period of this report indicates little change in water quality since the last triennial report was completed, and no changes will be recommended.

1.0 SANITARY SURVEY

1.1 INTRODUCTION

The E-1 growing area includes the waters of Broad Creek, Gales Creek, and a portion of Bogue Sound extending between Intracoastal Waterway Beacons #21 and #28. Overall, the area includes a total of approximately 4,808 water acres (Figure 1). The watershed for Area E-1 is relatively small, draining a total of only about 16 square miles. According to 2010 US Census block data, the total permanent population of the area is around 3,635. See Figure 2 for a map of the growing area, including sampling station locations, and see Table 1 for a description of those sampling stations.

1.2 SHORELINE SURVEY OF POLLUTION SOURCES

Survey Methods

A comprehensive shoreline survey of Area E-1 was completed on February 20th, 2013, and an annual update was completed in April 2014. Evaluations of properties in the area were conducted by NC Shellfish Sanitation staff to determine potential sources of pollution entering shellfish growing waters (Figure 3).

New actual and potential pollution sources for this survey were mapped using GPS, and pollution source data were collected using Trimble's sub-meter GeoXT GPS receiver with EVEREST multipath rejection technology. Data were collected in the SSF format using real-time corrections from the integrated Wide Area Augmentation System receiver. The data were post-processed using GPS Pathfinder Tools applications in order to get the most precise data. Additionally, a Geographic Information System (GIS) was developed, including pertinent information and digital pictures for each source.

Area E-1: Broad and Gales Creek Area

A comprehensive shoreline survey of the Broad and Gales Creek portion of Area E-1 was completed on February 20th, 2013, and an annual update in April 2014. The Carteret County Health Department was notified prior to the survey, and they have agreed to provide corrective action and follow-up for any malfunctioning septic systems or illegal discharges discovered.

This portion of Area E-1 includes the waters of Broad Creek and Gales Creek, as well as portions of the Intracoastal Waterway and Bogue Sound. According to 2010 US Census block data, the permanent population within this portion of the area is around 3,470.

Marinas – Marina facilities are evaluated during the shoreline survey because of their potential to affect the suitability of shellfish for harvest through inputs of both biological and chemical contaminants (Figure 4, Table 2). The North Carolina Shellfish Sanitation and Recreational Water Quality Section defines a marina as "any water area with a structure (dock, basin, floating dock, etc.) which is utilized for docking or otherwise mooring vessels and constructed to provide

temporary or permanent docking space for more than 10 boats" (15A NCAC 18A .0901). The waters enclosed by a marina are classified as *Prohibited* for the harvest of shellfish, and an additional area beyond the marina can also be classified as *Prohibited* depending on the number of boat slips present.

Osprey Oaks Marina has undergone a few minor renovations, including the addition of one new slip, bringing the total slip count for the facility to 25. This marina is located well within the *Prohibited* waters of Broad Creek, so no changes in classification are necessary.

There have been no changes of note at either the Salty Shores or the R.W. Jones Fish Company marinas.

Subdivisions – Subdivisions are noted in the survey as an indicator of population growth, as well as for their tendency to concentrate potential sources of pollution such as septic systems, pet wastes, and stormwater (Figure 5, Table 3).

There has been very little growth within this portion of the growing area since the last survey was completed in 2010. Karobi Park added 13 homes, but no other subdivision increased in home count by more than one.

The Whispering Pines Mobile Home and RV Park has plans to remove all mobile homes and convert those lots into smaller RV lots. 24 mobile homes will be removed this year and replaced with 44 RV lots, and once the transition is complete in a few years, the park will include a total of 360 RV lots. Sewage within the park is treated by several centralized onsite wastewater systems that are inspected and maintained regularly.

Stormwater – Stormwater can adversely impact shellfish growing areas by rapidly transporting fecal coliform bacteria and other contaminants from the land to the water. Runoff from impervious surfaces, subdivisions, and other cleared land is the primary contributor to fecal coliform levels throughout this portion of the survey area (Figure 6).

Management at the Whispering Pines Mobile Home Park and Campground has plans to dredge the large stormwater pond located near the southern edge of the property. This pond collects stormwater from the majority of the development and acts as a retention basin before overflowing into the *Conditionally Approved Open* waters of Bogue Sound.

Residents in the area continue to express concern over the sedimentation problems that have plagued both Broad and Gales Creeks over the past several years.

Onsite Wastewater – All of the homes and businesses within this portion of E-1 are served by onsite wastewater systems, and many of these systems were visited and inspected during the survey. Most were found to be functioning properly, but two failures were noted and were reported to the Carteret County Health Department for corrective action (Figure 7, Table 4).

Both violations are ongoing graywater discharges that were originally uncovered during the 2010 shoreline survey. Both eventually drain to the *Prohibited* waters of Broad Creek, so most likely do not have an impact on *Approved* shellfishing waters.

Wildlife and Domestic Animals – Much of this watershed consists of the Croatan National Forest, so wildlife is abundant throughout. Waterfowl and other shorebirds are common within the creeks and sound area.

Several small horse farms and a large cattle farm are scattered around the head of Gales Creek (Figure 8, Table 5). The horse farms each contain less than five animals, and most likely have minimal impact on surrounding water quality. The cattle operation includes about 40 cattle which are regularly rotated between different fields. The majority of the manure from these cattle is collected and used as fertilizer on other parts of the farm.

An old sand mine, which has been decommissioned and converted into a pond, was found to be home to large concentrations of ducks and geese. It is likely that these waterfowl are present only during the winter months, and the pond is located more than a half mile from the nearest shellfishing waters, so the impact of any discharge on surrounding water quality is likely low.

Area E-1: Bogue Banks Area

A comprehensive shoreline survey of the Bogue Banks portion of Area E-1 was completed on January 14th, 2013, and an annual update in April 2014. The Carteret County Health Department was notified prior to the survey, and they have agreed to provide corrective action and follow-up for any malfunctioning septic systems or illegal discharges discovered.

Most of the homes within this portion of the growing area are used a rental properties or as second homes, so the population during much of the year is very low, with significant increases in the summer months. According to 2010 US Census block data, the permanent population within the area is only 165.

Marinas – In the past, the Ocean Club Resort has maintained an 8-slip docking facility with a seating area, canoe/kayak launch, and a fishing area (Figure 4, Table 2). However, this facility was destroyed during Hurricane Irene in 2011, and has yet to be rebuilt.

Stormwater – Stormwater can adversely impact shellfish growing areas by rapidly transporting fecal coliform bacteria and other contaminants from the land to the water. Runoff from roadways and residential properties is the primary contributor to fecal coliform levels throughout this portion of the survey area (Figure 6).

Stormwater along this portion of Bogue Banks is collected in a series of ditches and gutters and is discharged into Bogue Sound via eight outfall pipes. There was some severe erosion along the backside of Bogue Banks during Hurricane Irene, and some of these pipes were damaged and rendered non-functional. All of these drains are currently being repaired or replaced.

Onsite Wastewater – With the exception of the Ocean Club complex, this portion of E-1 is served entirely by individual onsite wastewater systems. The majority of these systems were visited and inspected during this survey, and were found to be functioning well. However, one potential issue was uncovered (Figure 7, Table 4).

An unknown pipe was found at a vacant rental property. Nothing was observed draining from the pipe during the visit, and there was no evidence of recent discharge. This pipe empties onto the beach along the *Approved* waters of Bogue Sound, so the risk of contamination to shellfishing waters is high if this is found to be an illicit discharge. Followup visits will continue to be made until the source of this pipe can be determined.

Package Wastewater Treatment Plants – The Ocean Club Resort and Conference Center maintains a 68,000 gallon per day package wastewater treatment plant (Figure 7, Table 4).

During the 2010 survey, plant operators expressed some concerns that leaves and other debris from surrounding trees were getting into the plant and clogging the pumps. Since that time, screens have been added throughout the plant, and this seems to have remedied the problem. Pumps and other mechanical components were replaced in 2012, which has resulted in a more efficient operation.

Wildlife and Domestic Animals – Only a few small forested parcels remain among the developed homesites within this portion of the growing area, so there is relatively little wildlife present. Pets are abundant during the summer months when many of the homes are occupied, but are much less prevalent in the offseason.

1.3 HYDROGRAPHIC FACTORS RESPONSIBLE FOR THE SPREAD OF POLLUTION

Currents and tides within the E-1 area are influenced primarily by Beaufort Inlet. Salinities are generally high, and ranged from 22 to 37 parts per thousand during the period covered within this survey (Table 6).

Within the E-1 growing area, all waters from the Intracoastal Waterway to the mainland between Channel Markers # 21 and 28, excluding the creeks themselves and a few small marina closures, are classified as *Conditionally Approved Open.* During the time period covered within this report, the waters of Area E-1 have been temporarily closed 21 times for a total of 219 days (Table 7). Five of these closures, totaling 43 days, were due to heavy rainfall associated with hurricanes or tropical storms, including Nicole, Irene, Beryl, Sandy, and Karen. Table 8 contains the sampling results used to assess bacteriological water quality in the area before reopening these temporary closures.

One rain gauge, located in nearby growing area E-2, is used to monitor rainfall for E-1. Monthly rainfall calendars are submitted for this station (Table 9), and the gauge monitor is available by phone to report rainfall totals after rain events.

1.4 BACTERIOLOGICAL SURVEY OF SHELLFISH GROWING WATERS

The monitoring of Area E-1 adheres to the systematic random sampling strategy outlined by the National Shellfish Sanitation Program (NSSP), and consists of 30 sample sets from each of 14 sampling stations, as well as 19 sample sets from one station added in late 2011 (Figure 2).

The bacteriological survey covered within this report includes water samples taken between 5/19/2010 and 9/2/2014. Water samples were collected and analyzed for fecal coliform bacteria in compliance with the systematic random sampling regime. Table 10 lists, for each individual sampling station, the date the sample was obtained, the tidal cycle upon which the sample was taken, and the ambient salinity. Fecal coliform Most Probable Number (MPN) and summary statistics are included as well.

Of the 15 sampling stations monitored within E-1, only one, located in the *Prohibited* waters of Broad Creek, currently exceeds the NSSP criteria for *Approved* status. Station 6 currently exhibits an estimated 90th percentile of 45.

1.5 SUMMARY OF BACTERIOLOGICAL DATA ANALYSIS

The bacteriological survey for Area E-1 indicates little change in bacteriological water quality throughout the area. Only one sampling station currently exceeds the NSSP standards for *Approved* status, and it is located in *Prohibited* waters. Table 11 provides a summary of bacteriological data for all stations within the growing area.

1.6 OVERALL EVALUATION AND RECOMMENDATIONS

The only sampling station currently exceeding the standards for *Approved* status is located within *Prohibited* waters, so no changes in classification will be recommended as a result of this report.

2.0 CONDITIONAL AREA MANAGEMENT PLAN

2.1 INTRODUCTION

Area E-1 is composed of those waters of Bogue Sound located between Intracoastal Waterway (ICWW) Beacons #21 and #28, including Broad and Gales Creeks. See Figure 2 for a map of the area, and Table 1 for a description of sampling station locations.

Area E-1 is relatively small, covering only about 4,808 water acres (Figure X) and draining only about 16 square miles. According to 2010 US Census block data, the total permanent population within the area is about 3,635. Oyster production in the area is poor, while clam production is good.

The portion of Area E-1 that is classified as *Conditionally Approved Open* includes all those waters from the ICWW to the mainland between Beacons #21 and #28, excluding the *Prohibited* waters of Broad and Gales Creek, as well as a few small marina buffer closures.

2.2 MANAGEMENT PLAN

For coastal North Carolina, rainfall resulting in significant runoff is the event having the most detrimental effect on growing area water quality. The *Conditionally Approved Open* waters of Area E-1 are normally open to shellfish harvesting, but are closed following 2.5 inches of rain or greater within 24 hours. When such a rain event occurs, the following closure will be made:

> **Bogue Sound** – All those waters from the ICWW to the mainland between the Atlantic Beach High Rise Bridge and the Emerald Isle High Rise Bridge.

This closure also includes waters within Areas E-3, E-2, and D-4. This area will remain closed until such time as the rainfall event has ended, sampling indicates that water quality meets approved area criteria, and shellfish have had sufficient time to cleanse.

A rain gauge station has been established in nearby growing area E-2 in order to monitor rainfall for this portion of Bogue Sound. Rainfall information is collected daily, and monthly tally sheets are received by the Shellfish Sanitation office. Rainfall amounts are also recorded in Areas D-4 and E-3, and together, these rain stations provide an excellent picture of local rainfall conditions around the *Conditionally Approved* portions of Bogue Sound.

In addition to the monthly tally sheets, efforts are made to contact all rainfall monitors via phone whenever a rain event is suspected. Additional resources such as NOAA National Weather Service online data are also used when making management decisions.

During extremely heavy rainfall events or unusual storm events such as hurricanes, additional temporary closures are recommended within the E-1 area. These types of events are classified as emergency closures, and would close all waters within E-1. The closures remain in effect until such time as sampling indicates that water quality meets approved area criteria and shellfish have had sufficient time to cleanse.

2.3 IMPLEMENTATION OF MANAGEMENT PLAN

If the rainfall level in the management plan for the area is exceeded, a proclamation is issued by DMF resulting in an immediate closure of the area. The proclamation is issued by fax, mail, email, or by area law enforcement officers who in turn distribute it to local establishments in the affected area for public notification.

After hours and on weekends, Shellfish Sanitation personnel will be in contact with rain gauge monitors and with the DMF Communications Center for information regarding rainfall reports. The DMF Communications Center is on duty 24 hours per day.

2.4 PATROL OF CLOSED AREA

Patrol of shellfish harvesting areas is the sole responsibility of the Division of Marine Fisheries Law Enforcement Section. For information regarding enforcement of closures and patrol of closed areas, see the Patrol Policy of the DMF Law Enforcement Section.

2.5 REOPENING CRITERIA

After the rainfall event has ended and sufficient time has elapsed to allow the area to return to normal, the temporarily closed area will be sampled. If the results indicate fecal coliform levels to be acceptable, a proclamation is issued to reopen the area. DMF issues and distributes the proclamation. In accordance with 15A NCAC 113-221 of the DMF rules, a 12-hour notification is required before reopening of closed shellfishing waters.

3.0 CONDITIONAL AREA EVALUATION

3.1 INTRODUCTION

The National Shellfish Sanitation Program (NSSP) *Conditionally Approved* classification for shellfish growing waters allows the utilization of valuable shellfish resources by permitting harvesting in areas that would otherwise be closed to shellfishing when environmental conditions cause fecal coliform levels to be satisfactory. In order for the State to be in compliance with NSSP guidelines, conditionally approved areas must be evaluated yearly in accordance with the Model Ordinance, Chapter IV, @03, C., (3), (a) and (b) of the NSSP Guide for the Control of Molluscan Shellfish. This report is intended to comply with that portion of the NSSP yearly evaluation of the *Conditionally Approved* areas for the Broad Creek Area, E-1, in Carteret County. Each of the six required elements of the evaluation will be included in this report.

3.2 COMPLIANCE WITH MANAGEMENT PLAN

The monitoring of Area E-1 adheres to the systematic random sampling strategy outlined by the NSSP, and consists of 30 sample sets from each of 14 sampling stations, as well as 19 sample sets from one station added in late 2011 (Figure 2, Table 1). The area has also been sampled in accordance with management plan criteria for the conditionally approved classification of the NSSP.

Rain events that exceed the management plan criteria for Area E-1 result in a temporary closure of the conditionally approved area. Table 7 contains a list of temporary closures of conditionally approved waters that have occurred within E-1 during this survey period. A review of the management of Area E-1 from 2010 to the present indicates that all closures were made in accordance with plan requirements.

There was one instance where a rainfall total exceeding the management plan criteria was recorded, and yet a closure was not made. On 9/4/2010, a rain gauge monitor within Area E-2 recorded a rainfall total of more than 6 inches of rain. However, it appears that this total may have been recorded in error, as all surrounding gauges, as well as official rainfall data from the National Weather Service, indicated that the area received less than one inch of rain.

3.3 ADEQUACY OF REPORTING

For coastal North Carolina, rainfall and the resultant runoff is the event most detrimental to shellfish water quality. Currently, all management plans for conditionally approved waters are dependent upon the amount of rainfall received within the watershed of a particular growing area. The process of developing management plans for conditionally approved areas is complex. Rainfall amounts can vary tremendously, and there are often significant differences in accumulation within a very small area. Current procedures for obtaining rainfall data include the use of local volunteer rainfall stations, as well as NOAA and other commercial weather websites. Rainfall accumulations recorded at local rain gauges are included in Table 9.

3.4 COOPERATION OF PERSONS INVOLVED

The conditionally approved area concept is a cooperative effort involving the Marine Patrol and Shellfish Sanitation Sections of the Division of Marine Fisheries (DMF). The Shellfish Sanitation Section is responsible for monitoring conditionally approved growing areas and developing management plans. Patrol of shellfish harvesting waters is the sole responsibility of the DMF Marine Patrol. The administrative procedures to implement these actions are outlined in a memorandum of understanding between the Division of Marine Fisheries and the Shellfish Sanitation Section. No major problems have occurred with implementing the conditionally approved area concept in North Carolina.

Rainfall information is gathered from various individuals throughout the state including private citizens, DMF Marine Patrol, and Shellfish Sanitation personnel. Additional resources are used to determine the amount and locations of precipitation, such as the NOAA National Weather Service precipitation website.

3.5 COMPLIANCE WITH APPROVED GROWING AREA CRITERIA

Review of the bacteriological data collected for Area E-1 during this survey period indicates compliance with approved growing area criteria. The only sampling station currently exceeding NSSP approved criteria is located in waters classified as *Prohibited* to shellfish harvest.

3.6 FIELD INSPECTION OF POLLUTION SOURCES

A comprehensive shoreline survey of Area E-1 was completed on February 20th, 2013, and an annual update was completed in April 2014. Both were conducted in accordance with the requirements of the NSSP Guide for the Control of Molluscan Shellfish, Chapter IV, @ .03.

3.7 COLLECTION OF WATER SAMPLES

Since the previous Sanitary Survey Report, Area E-1 has been sampled in accordance with management plan criteria as required by the conditionally approved classification of the NSSP. Area E-1 currently adheres to the systematic random sampling strategy outlined by the NSSP, and consists of 30 sample sets from each of 14 sampling stations, as well as 19 sample sets from one station added in late 2011.

The bacteriological survey covered within this report includes water samples gathered between 5/19/2010 and 9/2/2014. During that time period, a total of 439 water samples were collected during periods when the waters were open to shellfish harvesting. Each of these samples was analyzed for fecal coliform bacteria in compliance with the systematic random sampling regime. Table 10 lists, for each individual sampling station, the date the sample was obtained, the tidal cycle upon which the sample was taken, and the ambient salinity. Fecal coliform MPN and summary statistics are listed here as well.

Additionally, 74 bacteriological samples were collected and analyzed as part of the conditional area sampling for E-1 (Table 8).

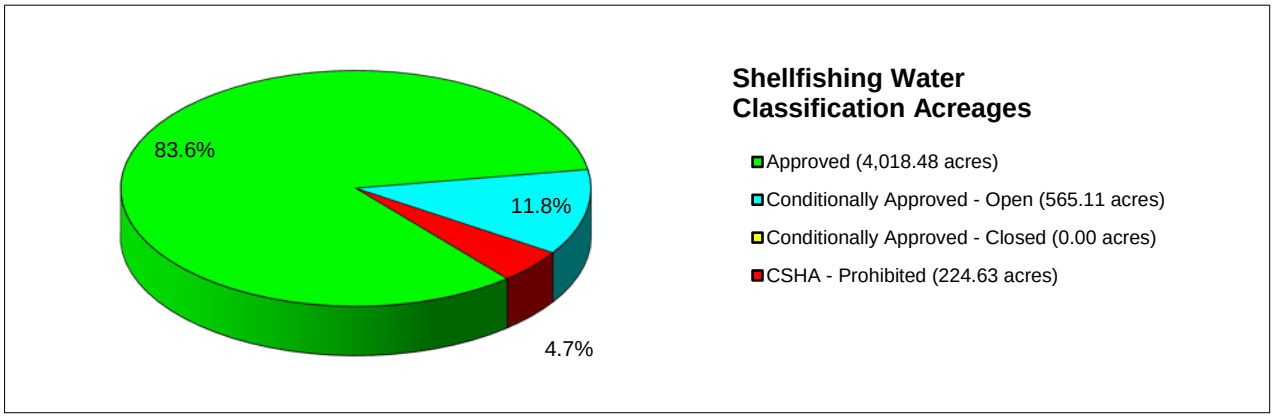
3.8 SUMMARY

The conditionally approved area classification of the NSSP provides a way to utilize a resource for direct market purposes that would otherwise only be available for relaying or depuration. Refinement of management plans is critical to assure that shellfish harvested from the conditionally approved growing areas are taken from waters that meet approved area criteria.

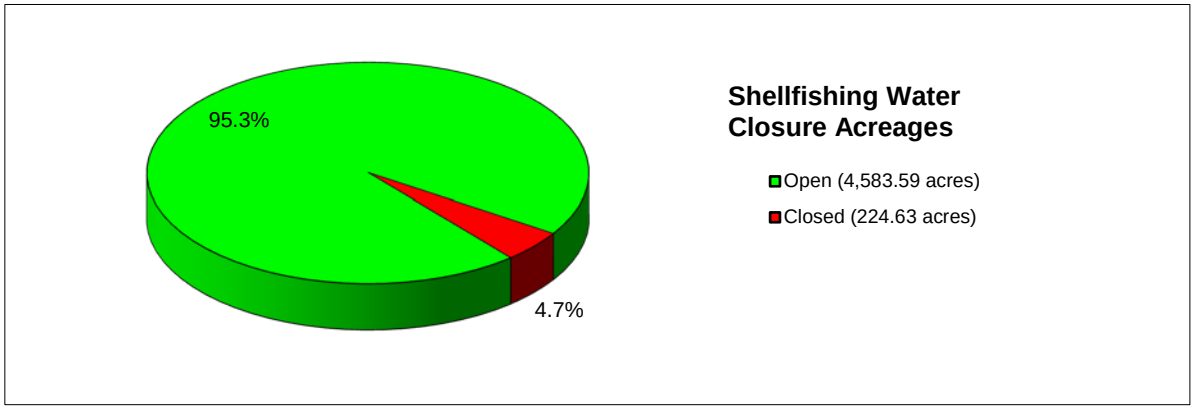
The current Conditional Area Management Plan for Growing Area E-1 appears to be working properly, and no changes will be recommended at this time.

Figure 1: Acreage

REGION: (All)	County: (All)	Growing Area: E1



Classification	Acres	Percent of Total
Approved	4,018.48	83.6%
Conditionally Approved - Open	565.11	11.8%
Conditionally Approved - Closed	0.00	
CSHA - Prohibited	224.63	4.7%
Total	4,808.22	100.0%



Status	Acres	Percent of Total
Open	4,583.59	95.3%
Closed	224.63	4.7%
Total	4,808.22	100.0%

E-1 Growing Area:

Shellfishing Water Sampling Stations

Legend

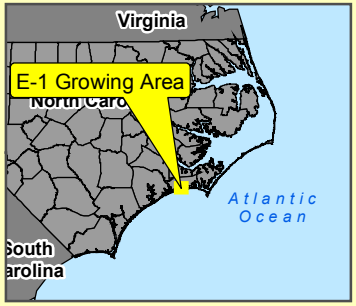
- # Sampling Stations
- Shellfish Growing Area Boundaries
- 14-digit Hydrologic Units

Shellfish Growing Area Classifications

- Approved
- Conditionally Approved-Open
- Conditionally Approved-Closed
- Prohibited

N
W E
S

0 0.25 0.5 Miles



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December 02, 2014

Sampling Stations

Table 1: Sampling Station Descriptions

Station	Description of Site
1	South of Highway Bridge, Gales Creek, East Bank (Mouth of Creek, Open Area)
1A	Gales Creek, Halfway Between Closure Line and Bridge Near Dock On West Shore
2	800 Yards Southwest of Station #1, In Shallow Water
3	Roger Jones Clam Bed
4	Roger Jones Boat Harbor
5	North of Flashing Beacon #25, In Shallow Water
6	Mouth of Broad Creek, East Side of Railways
9	Northwest of Beacon #27, Along Shore
11	700 Yards Southeast of Wood Island, Along Shore
12	Halfway To Water Tower
13	Jet Ski Rental
14	West of Buck Point, Near Shore
18	Day Beacon #28, Intracoastal Waterway
19	Day Beacon #26, Intracoastal Waterway
19A	Outside New Closure Between Stations #6 and #19

E-1 Growing Area: Actual and Potential Pollution Sources

Legend

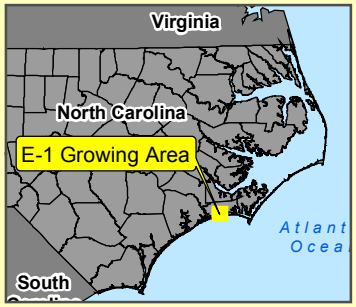
- Animals
- Areas of Concern
- Dockage
- Golf Courses
- Stormwater
- Subdivisions
- Wastewater
- Sampling Stations
- Shellfish Growing Area Boundaries
- 14-digit Hydrologic Units

Shellfish Growing Area Classifications

- Approved
- Conditionally Approved-Open
- Conditionally Approved-Closed
- Prohibited

N W E S

0 0.25 0.5 Miles



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Pollution: All Sources

E-1 Growing Area:

Dockage

Legend

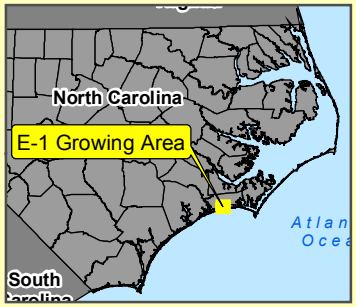
- Dockage
- Shellfish Growing Area Boundaries
- 14-digit Hydrologic Units

Shellfish Growing Area Classifications

- Approved
- Conditionally Approved-Open
- Conditionally Approved-Closed
- Prohibited

N
W E
S

0 0.3 0.6 Miles



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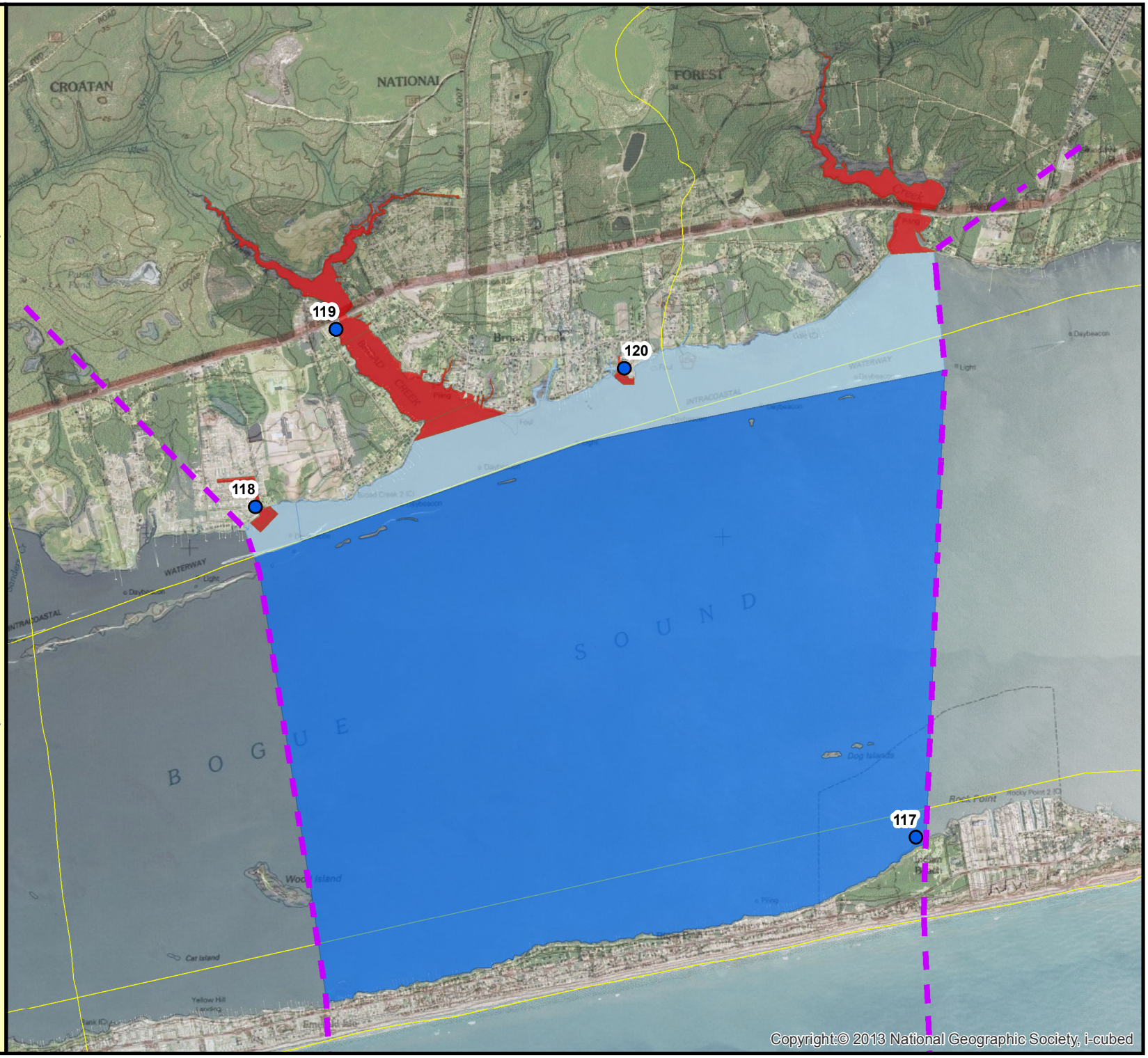

Pollution: Dockage

Table 2: Marinas

SGA_Index	Marina Name	Total Slips	Pumpout?	Comments
117	Ocean Club Community Dock	0	No	Destroyed In Hurricane Irene, Not Yet Rebuilt
118	Salty Shores Marina	30	No	
119	Osprey Oaks Marina	25	No	Recently Renovated, Including Addition Of One New Slip
120	RW Jones Fish Company	GD	No	1000 Feet General Dockage; Trash and Fishing Gear Around Property

E-1 Growing Area:

Subdivisions

Legend

- Subdivisions
- Shellfish Growing Area Boundaries
- 14-digit Hydrologic Units

Shellfish Growing Area Classifications

- Approved
- Conditionally Approved-Open
- Conditionally Approved-Closed
- Prohibited

N
W E
S

0 0.3 0.6
Miles

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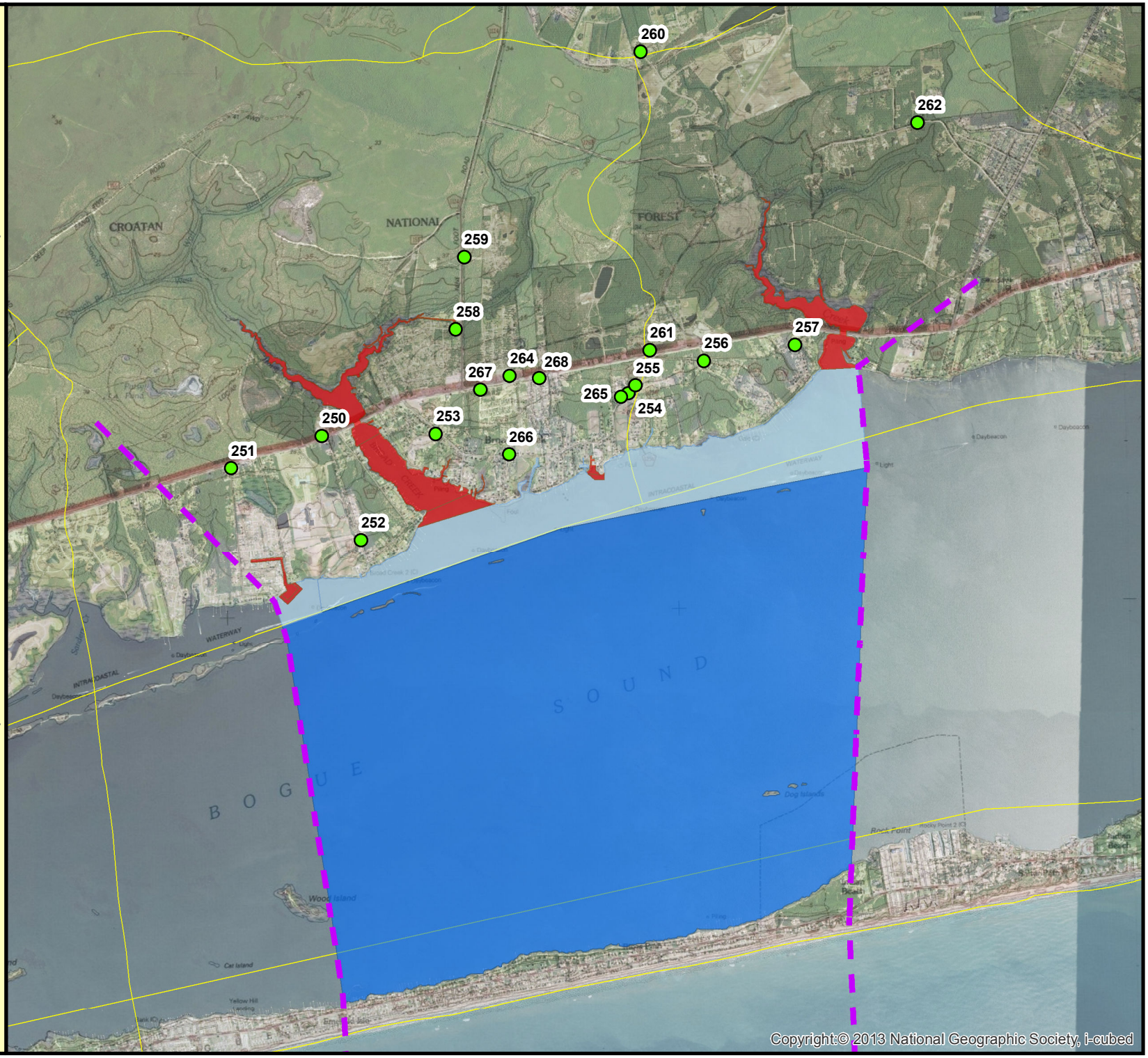


Pollution: Subdivisions

Table 3: Subdivisions

SGA Index	Subdivision Name	# Lots	# Homes 2010	# Homes 2013	Comments
250	Cottage Pointe	12	5	6	
251	Salty Shores	165	151	151	Also Includes 26 Campers
252	Broad Ridge	20	15	16	
253	Adams Harbor	23	18	18	
254	Bar Harbor	52	40	40	
255	Belle Cove	20	14	14	
256	Bluewater Banks	70	64	64	
257	Bogue Sound Shores	45	29	29	
258	Rollingwood Acres	150	131	132	
259	Croatan Colony	29	29	29	
260	Sandhills	19	10	11	Several Animal Farms
261	Foxlair	614	59	59	
262	Eaglewood	NA	14	14	Very Large, Multi-Acre Lots
264	Bogue Pines	NA	144	144	Mobile Home Park
265	Silver Maple Estates	NA	12	11	Mobile Home Park
266	Country Pine Estates	NA	28	28	Mobile Home Park
267	Karobi Park	NA	34	47	Mobile Home Park
268	Whispering Pines	NA	56	32	Replacing Mobile Homes With Camper Spaces

E-1 Growing Area:

Stormwater

Legend

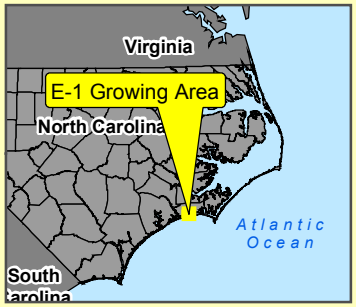
- Stormwater
- Shellfish Growing Area Boundaries
- 14-digit Hydrologic Units

Shellfish Growing Area Classifications

- Approved
- Conditionally Approved-Open
- Conditionally Approved-Closed
- Prohibited

N
W E
S

0 0.3 0.6 Miles



North Carolina Department of Environment and Natural Resources
Division of Environmental Health
Shellfish Sanitation and Recreational Water Quality Section
December 02, 2014

Pollution: Stormwater

E-1 Growing Area:

Wastewater

Legend

Wastewater

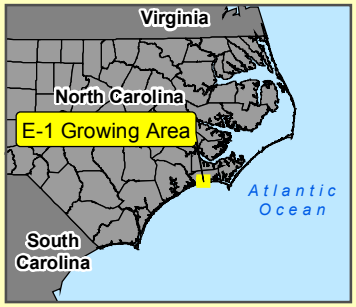
- GRAY WATER DISCHARGE
- PACKAGE PLANT
- Shellfish Growing Area Boundaries
- 14-digit Hydrologic Units

Shellfish Growing Area Classifications

- Approved
- Conditionally Approved-Open
- Conditionally Approved-Closed
- Prohibited

N W E S

0 0.4 0.8 Miles



North Carolina Department of Environment and Natural Resources
Division of Environmental Health
Shellfish Sanitation and Recreational Water Quality Section
December 02, 2014

Table 4: Wastewater

SGA_Index	Comments
154	Ocean Club Package Wastewater Treatment Plant
939	Graywater Discharge Removed
940	Graywater Discharge
941	Graywater Discharge

E-1 Growing Area:

Animals

Legend

Animals

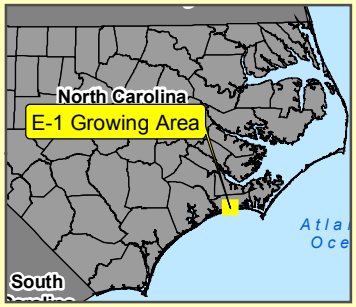
- CATTLE
- DOGS
- GOATS
- HORSES
- POULTRY
- WATERFOWL
- OTHER-SEE COMMENTS
- Shellfish Growing Area Boundaries
- 14-digit Hydrologic Units

Shellfish Growing Area Classifications

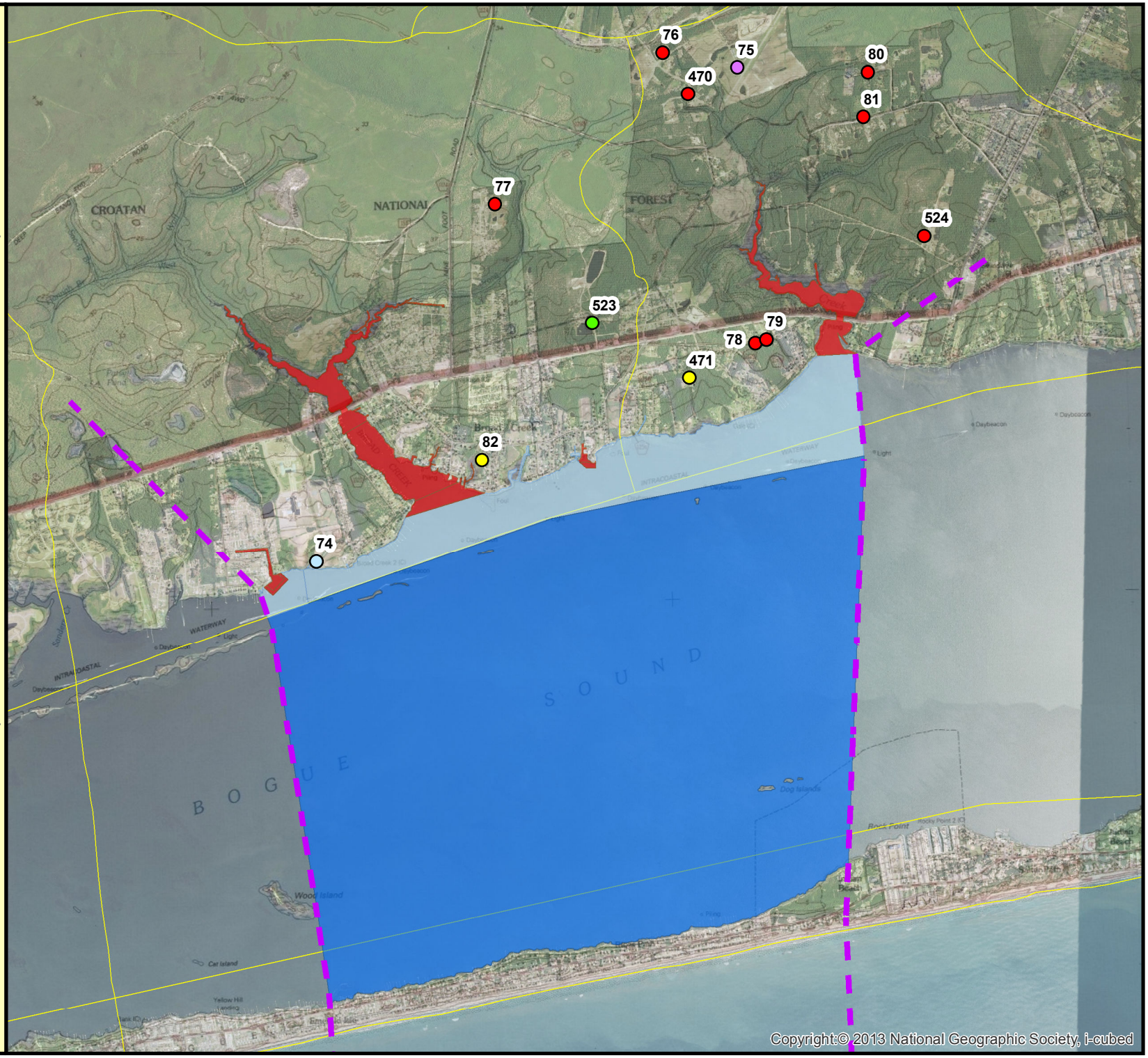
- Approved
- Conditionally Approved-Open
- Conditionally Approved-Closed
- Prohibited

N W E S

0 0.3 0.6 Miles



North Carolina Department of Environment and Natural Resources
Division of Environmental Health
Shellfish Sanitation and Recreational Water Quality Section
December 02, 2014



Pollution: Animals

Table 5: Animals

SGA Index	Comments
74	Free Range Guinea Fowl
75	About 30-40 Cattle On 128 Acres
76	2 Horses
77	Animals No Longer Present
78	Horse
79	Horse
80	2 Horses
81	4 Horses
82	10-12 Hunting Dogs
470	4 Horses
471	Hunting Dogs
523	Ducks and Geese
524	3 Horses

Table C: Tides and Salinities

		Station ID														
Date	Tidal Stage	1	1A	2	3	4	5	6	9	11	12	13	14	18	19	19A
5/19/2010	1/4 FLD	34		34	34	34	32	32	34	36	36	34	36	34	34	32
7/7/2010	3/4 EBB	37		37	37	37	36	36	36	37	37	37	37	36	36	36
7/29/2010	1/4 FLD	36		36	36	36	36	36	36	37	37	37	37	36	36	36
9/20/2010	1ST EBB	36		34	34	34	34	34	34	34	34	34	34	34	34	34
11/30/2010	3/4 EBB	32		32	32	32	32	32	33	31	32	32	31	32	32	32
1/13/2011	LAST EBB	34		33	32	32	32	30	31	32	32	32	31	32	31	30
3/16/2011	1ST EBB	30		30	30	30	30	30	30	30	28	28	28	30	30	30
4/27/2011	1/2 EBB	33		33	32	33	32	33	33	32	32	32	32	33	33	33
5/12/2011	1ST EBB	34		34	34	34	34	34	34	34	34	34	34	34	34	34
7/13/2011	3/4 FLD	36		36	34	34	36	36	34	34	34	36	36	36	36	34
10/10/2011	LAST FLD	32		32	32	33	32	33	33	34	34	34	34	33	33	33
11/22/2011	1/2 EBB	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
1/24/2012	LAST FLD	35	32	32	32	34	34	35	34	35	35	35	35	35	35	35
2/14/2012	1/4 FLD	32	34	32	34	34	35	35	35	35	35	35	35	35	34	35
3/19/2012	1ST EBB	32	32	34	34	34	34	34	34	35	35	35	35	34	30	34
4/25/2012	1/4 FLD	34	32	35	36	35	36	34	35	36	35	36	35	35	34	34
5/15/2012	1/2 EBB	36	36	36	36	37	36	36	37	37	37	37	37	37	36	36
12/17/2012	1/2 FLD	30	30	30	30	30	30	30	30	32	32	30	30	32	32	32
2/5/2013	1/2 EBB	30	30	30	30	30	30	30	30	32	30	32	32	30	30	30
5/6/2013	1/4 EBB	28	28	28	30	30	30	28	30	30	30	30	30	30	30	30
6/4/2013	1/2 EBB	33	32	34	33	34	32	34	34	34	33	33	32	34	34	33
8/6/2013	LAST FLD	35	35	35	34	35	34	34	35	34	34	34	34	34	34	34
9/12/2013	3/4 EBB	34	32	32	26	34	34	32	34	36	34	36	35	34	32	32
11/12/2013	3/4 EBB	32	32	32	32	32	32	32	32	32	33	33	33	32	32	32
2/4/2014	1ST FLD	28	28	30	28	30	28	32	30	32	32	32	32	32	32	30
4/3/2014	1/4 FLD	26	26	27	28	27	28	28	29	30	30	28	28	29	28	28
5/7/2014	LAST EBB	28	25	28	30	28	28	30	30	28	30	30	30	30	30	28
5/19/2014	1/4 FLD	30	28	28	30	30	30	30	30	30	32	32	30	30	30	30
6/19/2014	LAST EBB	32	32	32	34	34	33	32	34	34	34	34	34	34	34	34
9/2/2014	1/2 EBB	25	22	26	26	24	23	26	26	25	25	24	24	26	26	26

Table 7: Conditional Closures

Proclamation Date	Closure Description	Closure Date	Opening Date	Comments
01/03/10	**All those waters** from the ICWW to the mainland between Fl. Beacon #25 in Bogue Sound, near Broad Creek and ICWW Channel Marker #65A near Salliers Bay, to include Freeman Creek returns to status - except Bear Creek, Queens Creek, White Oak River, and Hunting Island Creek		01/04/10	Sampling
08/22/10	**All those waters** between the Atlantic Beach High Rise Bridge ICWW Channel Marker #25, near Broak Creek.	08/22/10		Rainfall
08/27/10	**All those waters** between the Atlantic Beach High Rise Bridge ICWW Channel Marker #25, near Broak Creek.		08/28/10	Sampling
09/12/10	**All those waters** in Bogue Sound between the Emerald Isle High Rise Bridge and Fort Macon, to include Tar Landing Bay.	09/12/10		Rainfall
09/15/10	**A portion of Bogue Sound** returns to normal boundaries except all those waters from the IWW to the mainland between IWW Marker #25 and ICWW Marker #27 at Broad Creek.		09/16/10	Sampling
09/21/10	**Bogue Sound** returns to normal boundaries.		09/22/10	Sampling
09/27/10	**All those waters** in Bogue Sound between IWW Marker #29 and Fort Macon, to include Broad Creek and Tar Landing Bay.	09/27/10		Rainfall
09/30/10	**All those waters** between the South Carolina State Line and a straight line beginning at Hall Point near Thorofare Bay in Carteret County; running southeasterly through Fl. Beacon # 20 in Core Sound to a point on the Core Banks shoreline in Carteret County. This includes Tubbs Inlet, Shallotte River, Lockwoods Folly River, Cape Fear River, Myrtle Grove Sound, Topsail Sound, Stump Sound, Chadwick Bay, New River, Freeman Creek, Bear Creek, Queens Creek, White Oak River, Bogue Sound, Newport River, North River, The Straits, Back Sound and Core Sound, including Jarrett Bay, Oyster Creek, Brett Bay, and Nelson Bay.	09/30/10		Nicole Remnants
10/08/10	A portion of Bogue Sound between Fl. Beacon #33 to a point on the mainland near Camp Morehead returns to normal boundaries except all those waters in Bogue Sound 100 yards offshore of Pine Knoll Shores between the permanent closure line and the Bogue Pines boat basin.		10/09/10	Sampling
01/18/11	**All those waters** from the ICWW to the mainland between the Morehead City State Port permanent closure line near 16th Street and ICWW Channel Marker #65A, located just west of Salliers Bay, near New River Inlet, to include White Oak River, Queens Creek and Bear Creek.	01/18/11		Rainfall
01/21/11	E-1 returns to status except all those waters from the ICWW to the mainland between Fl. Beacon #25 and ICWW Marker #27 in the Broad Creek area.		01/22/11	Sampling
02/01/11	Broad Creek area in Bogue Sound returns to normal boundaries.		02/02/11	Sampling

Table 7: Conditional Closures

Proclamation Date	Closure Description	Closure Date	Opening Date	Comments
08/29/11	**All Coastal waters close.**	08/29/11		Hurricane Irene
08/31/11	A portion of Bogue Inlet **AND** a portion of Bogue Sound returns to normal boundaries **except All those waters** from the IWW to the mainland between IWW Fl. Beacon #55 near Sanders Creek in Onslow County and the Morehead City permanent closure line near 16th Street in Carteret County, to include Queens Creek, White Oak River, and all other creeks and tributaries within said boundaries.		09/01/11	Sampling
09/01/11	**All those waters** in Bogue Sound between the Emerald Isle High-rise Bridge and the permanent closure line near 16th Street in Morehead City returns to status prior to 8/27/11 Hurricane Irene. (E-1 returns to status)		09/02/11	Sampling
10/20/11	prohibited area closure line at Fort Macon to the Emerald Isle High Rise Bridge. This includes Tar Lar	10/20/11		Rainfall
10/25/11	A portion of Bogue Sound returns to normal boundaries **except** All those waters in Bogue Sound from the ICWW to the mainland between ICWW Beacon #23 and Fl. Beacon #29 to include Broad Creek.		10/26/11	Sampling
10/28/11	**Bogue Sound** (Broad Creek area) returns to normal boundaries.		10/29/11	Sampling
05/31/12	**All those waters** from the ICWW to the mainland between the Morehead City State Port permanent closure line near 16th Street and the Emerald Isle High-Rise Bridge.	05/31/12		TD Beryl
06/05/12	Bogue Sound, from the IWW to the mainland, from the Emerald Isle High Rise Bridge to IWW Beacon #21, near GalesCreek, returns to normal boundaries.		06/06/12	Sampling
08/25/12	**All those waters** from the Intracoastal Waterway to the mainland in Bogue Sound between IWW Fl. Beacon #49, near Swansboro, and IWW Beacon #20, near Gales Creek, to include White Oak River, Deer Creek, Hunting Island Creek, Goose Creek, Sanders Creek, Broad Creek and Gales Creek.	08/25/12		Rainfall
08/31/12	Bogue Sound returns to normal boundaries.		09/01/12	Sampling
09/07/12	**All those waters** from the Intracoastal Waterway to the mainland in Bogue Sound between IWW Fl. Beacon #49, near Swansboro, and IWW Beacon #20, near Gales Creek, to include White Oak River, Deer Creek, Hunting Island creek, Goose Creek, Sanders Creek, Broad Creek, and Gales Creek.	09/07/12		Rainfall
09/11/12	**All those waters** from the Intracoastal Waterway to the mainland in Bogue Sound between IWW Fl. Beacon #49, near Swansboro, and IWW Beacon #20, near Gales Creek returns to normal boundaries **EXCEPT** All those waters from the IWW to the mainland between Channel Marker #36 and Channel Marker #38 near Goose Creek **and** All those waters from the ICWW to mainland between Fl.Beacon 25 & Channel Marker #27 near Broad Ck.		09/12/12	Sampling

Table 7: Conditional Closures

Proclamation Date	Closure Description	Closure Date	Opening Date	Comments
09/14/12	Bogue Sound IWW to mainland between markers #25 and #27 near Broad Creek returns to normal boundaries.		09/15/12	Sampling
10/28/12	All those waters from the IWW to the mainland between Salliers Bay and the Atlantic Beach High-Rise Bridge, to include Salliers Bay, Freeman Creek, Bear Creek, Queens Creek, White Oak River, Deer Creek, Hunting Island Creek, Goose Creek, Sanders Creek, Broad Creek, and Gales Creek.	10/28/12		Hurricane Sandy
11/01/12	E-1 returns to normal boundaries.		11/02/12	Sampling
02/08/13	**All those waters** between the Morehead City State Port closure line and ICWW Channel Marker #65A, located just west of Salliers Bay, near New River Inlet, to include Bogue Sound, Tar Landing Bay, Hoop Pole Creek, Gales Creek, Broad Creek, Sanders Creek, Goose Creek, Hunting Island Creek, Deer Creek, White Oak River, Queens Creek, Bear Creek, Freeman Creek, and Salliers Bay.	02/08/13		Rainfall
02/13/13	IWW to ocean side returns to normal boundaries - IWW to mainland remains closed.		02/14/13	Sampling
02/15/13	E-1 returns to normal boundaries.		02/16/13	Sampling
10/09/13	ure line at Fort Macon to the Emerald Isle High Rise Bridge. This includes Tar Landing Bay, the south	10/09/13		TS Karen remants
10/15/13	E-1 returns to normal boundaries EXCEPT All those waters from the IWW to the mainland between IWW Beacon “27” and IWW Fl. Beacon “25”, to include all of Broad Creek.		10/16/13	Sampling
10/23/13	Bogue Sound returns to normal boundaries.		10/24/13	Sampling
11/27/13	**Bogue Sound - All those waters** from the IWW to the mainland between the Morehead City State Port permanent closure line near 16th Street and Emerald Isle High-Rise Bridge.	11/27/13		Rainfall
12/03/13	Bogue Sound returns to normal boundaries.		12/04/13	Sampling
03/07/14	**All those waters** from the Intracoastal Waterway to the mainland between Morehead Ctiy permanent closure line near 16th Street and Intracoastal Waterway Channel Marker #65A, located just west of Salliers Bay near New River Inlet, to include White Oak River, Queens Creek, Bear Creek, Freeman Creek, and Salliers Bay.	03/07/14		Rainfall
03/11/14	A portion of Bogue Sound (between Emerald Isle High-rise Bridge and the permanent closure line at 16th Street in Morehead City) returns to normal boundaries **EXCEPT** all those waters from the IWW to the mainland between IWW Beacon "27" and IWW Fl. Beacon "25", to include Broad Creek.		03/12/14	Sampling
03/25/14	Bogue Sound and Broad Creek area returns to normal boundaries		03/26/14	Sampling
05/16/14	**Bogue Sound** - All those waters from the IWW to the mainland between Beacon "27", near Broad Creek, and Fl. Beacon "9", near Spooner's Creek.	05/16/14		Rainfall

Table 7: Conditional Closures

Proclamation Date	Closure Description	Closure Date	Opening Date	Comments
05/20/14	A portion of Bogue Sound (IWW "20" to Spooner's Creek) returns to normal boundaries **EXCEPT** all those waters from the IWW to the mainland between IWW Beacon "27" and IWW Beacon "20", to include Broad Creek and Gales Creek.		05/21/14	Sampling
05/22/14	Bogue Sound returns to normal boundaries.		05/23/14	Sampling
06/28/14	**Bogue Sound** - All those waters in Bogue Sound from the Intracoastal Waterway to the mainland, between IWW Marker "27" near Broad Creek and IWW Marker "14" near Gull Harbor.	06/28/14		Rainfall
07/01/14	A portion of Bogue Sound returns to normal boundaries EXCEPT all those waters in Bogue Sound from the Intracoastal Waterway to the mainland, between IWW Marker "27" near Broad Breek and IWW Marker "24"		07/01/14	Sampling
07/10/14	All those waters in Bogue Sound from the Intracoastal Waterway to the mainland, between IWW Marker "27" near Broad Breek and IWW Marker "24"		07/11/14	Sampling
07/25/14	**All those waters** between the Emerald Isle High Rise Bridge, and a line beginning at a point on the east shore of Spit Bay near Jarrett Bay; thence in a straight line to the southern end of Davis Island; thence in a straight line to Beacon #37 in Core Sound, thence in a straight line to Shell Point on Harkers Island, thence in a straight line across Back Sound to a point on Shackleford Banks near Banks Bay; to include Bogue Sound, Newport River, Back Sound, Middle Marshes, North River, The Straits, Whitehurst Creek, Sleepy Creek, Jarrett Bay, and all other creeks and tributaries within said boundaries.	07/25/14		Rainfall
07/29/14	E-1 returns to normal boundaries.		07/30/14	Sampling
08/02/14	**All those waters** between Intracoastal Waterway Beacon #65A near Salliers Bay, and a line beginning at the tip of Fort Macon on Bogue Banks across the Morehead City Channel to the southernmost tip of Radio Island, to include Salliers Bay, Freeman Creek, Bear Creek, Queens Creek, White Oak River, Bogue Sound, Tar Landing Bay and all other creeks and tributaries within said boundaries.	08/02/14		Rainfall
08/04/14	**E-1 closes (see above description)**	08/04/14		Rainfall
08/08/14	A portion of Bogue Sound returns to normal boundaries (beach side) **EXCEPT** All those waters from the Intracoastal Waterway to the mainland between Fl Beacon “45” near Cedar Point and the Morehead City permanent closure line near 16th Street.		08/09/14	Sampling
08/12/14	E1 returns to normal boundaries.		08/13/14	Sampling
08/19/14	**Bogue Sound** - All those waters from the Emerald Isle High Rise Bridge to the permanent prohibited area closure line at Fort Macon to include Tar Landing Bay, and all other tributaries within the described area.	08/19/14		Rainfall

Table 7: Conditional Closures

Proclamation Date	Closure Description	Closure Date	Opening Date	Comments
08/26/14	A portion of Bogue Sound (E-1) returns to normal boundaries **EXCEPT:** All those waters from the IWW to the mainland between IWW Beacon “27” and IWW Beacon “20”, to include all of Broad Creek and Gales Creek.		08/27/14	Sampling
09/03/14	A portion of Bogue Sound (between IWW #25 and #20 - Gales Creek area) returns to normal boundaries.		09/04/14	Sampling
09/13/14	**All those waters** in Bogue Sound from the IWW to the mainland between the Emerald Isle Bridge and the permanent closure line near 16th Street in Morehead City.	09/13/14		Rainfall
09/16/14	A portion of Bogue Sound returns to normal boundaries (IWW to mainland between Beacon "23" near Gales Creek to 16th Street in MHC) - keeps closed IWW to mainland between Emerald Isle High-rise Bridge to IWW Beacon "23", to include Deer Creek, Hunting Island Bay, Goose Creek, Sanders Creek, and Broad Creek.		09/17/14	Sampling
10/10/14	Broad Creek returns to normal boundaries.		10/11/14	Sampling
10/16/14	**All those waters** in Bogue sound from the IWW to the mainland between IWW Marker #27, near Broad Creek, and the permanent closure line near 16th Street in Morehead City.	10/16/14		Rainfall
10/22/14	Bogue Sound, Broad Creek, and Gales Creek returns to normal boundaries.		10/23/14	Sampling

Table 8: Conditional Sampling Results

	2010				2011						2012						
STATION	*8/26*	*9/14*	*9/20*	*10/7*	*1/20*	*1/27*	*1/31*	*8/31*	*10/24*	*10/27*	*6/1*	*6/4*	*8/30*	*9/10*	*9/12*	*9/13*	*10/31*
19A	22.0	70.0	1.7	13.0	21.0	46.0	4.5	13.0	70.0	2.0	1.7	1.7	13.0	17.0	17.0		7.8
1	1.7	11.0		6.8	4.5			1.7	1.7		**130.0**	1.7	1.7	2.0			2.0
6																14.0	
19			2.0														
3																	
5			1.7														

	2013							2014									
STATION	*2/14*	*10/10*	*10/14*	*10/15*	*10/16*	*10/22*	*12/2*	*3/10*	*3/20*	*3/24*	*5/19*	*5/21*	*6/30*	*7/9*	*7/28*	*8/11*	*8/21*
19A	1.7							46.0			23.0	1.7	79.0	2.0	6.1	11.0	13.0
1	17.0						4.5	7.8			4.5	1.7	4.0		1.7	1.7	11.0
6									21.0	13.0							
19		130.0	17.0	79.0	49.0	2.0											
3													2.0				
5																	

	2014										
STATION	*8/25*	*9/2*	*9/11*	*9/15*	*9/18*	*9/22*	*9/14*	*10/1*	*10/9*	*10/19*	*10/21*
19A	70.0	22.0		79.0	130.0	95.0	23.0	23.0	6.8	17.0	7.8
1	17.0	1.7	13.0	1.7						33.0	1.7
6											
19											
3											
5											

Table 9: Rainfall Totals

RAINFALL - 2010

E-2 Growing Area (Brandywine Bay Subdivision)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1						0.04		out of town				
2		0.50				0.06			0.74			
3								0.84		0.05	0.15	
4					0.20			0.80	6.0+		0.24	
5		gauge cracked									0.04	
6							out of town - 1.75"					
7												
8								0.08				
9	1.75							0.82				
10				1.8 - out of town								
11			out of town - total 1.2"			0.10						
12												
13												
14												
15		0.03										
16											0.42	
17							0.86					
18			0.64				0.52	0.30				
19					0.30							
20						0.26						
21	1.60			0.18			0.11	3.25				
22	0.05	0.80						0.40				
23		0.20	0.30			0.54		0.17				
24			out of town	0.16				0.58				
25	0.90				0.54					0.24		
26					0.40	0.38			3.75			
27				0.16			out of town		1.15			
28									0.80	0.12		
29									4.60			
30	1.05					0.80			4.70		0.78	
31												

RAINFALL - 2011

E-2 Growing Area (Brandywine Bay Subdivision)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1												
2												
3												
4												
5												0.10
6												0.04
7												
8												0.05
9												
10												0.03
11												
12			Note: Original Rain Gauge Stopped Monitoring In 2010. New Gauge Added 11/2011. Phone Contacts and Rain Gauges in D-4 and E-3 Used For Monitoring Bogue Sound Rainfall During The Interim Period									
13											*	
14												
15												
16											0.30	
17											0.25	
18											0.10	
19												
20												
21												
22												
23											0.25	
24											0.10	
25												
26												
27												
28											0.05	
29											0.15	
30											0.50	
31												0.04

Table 9: Rainfall Totals

RAINFALL - 2012

E-2 Growing Area (Brandywine Bay Subdivision)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				0.25				0.20		0.20		
2		0.18				0.10	1.40	0.35		0.50		
3									0.10	0.25		
4			1.75					0.15	0.25	0.05		
5		0.30	0.40			0.40			0.50		0.30	
6				1.00	1.20	0.07						
7		0.10		0.40			0.00	0.70	1.80		0.40	
8								1.25	0.20	0.05	0.05	0.30
9	0.25	0.06	out of town					0.30		0.05		
10	0.30				0.10			0.40				0.10
11		0.20					0.70	0.25				0.30
12	0.80						0.40	0.70				0.20
13						0.04		0.45			0.10	1.45
14							0.10				0.05	
15					out of town - total 2.4			0.30				
16								0.70			0.05	0.15
17	0.05	0.40						0.02				0.25
18	0.15								0.90			0.40
19	0.35	0.30						0.10	0.10		0.50	
20		0.48						1.00				
21	0.45		out of town (.8 total)				0.40	0.50				0.40
22	0.20			0.60			0.05	0.30				
23		0.13		0.70	0.08		0.40	0.20				
24		0.04				0.95	0.80	0.70				
25		0.46						0.60				0.10
26			0.20		0.20	0.10		0.05				
27	0.10			0.05								1.65
28	0.10	0.05		1.60				0.10		2.60	0.15	
29					0.05		0.60	0.25				0.35
30								0.05	0.45			0.65
31					2.85		0.55					

RAINFALL - 2013

E-2 Growing Area (Brandywine Bay Subdivision)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				0.05			1.05	0.33			0.10	
2	**0.30**			0.05	0.25		0.50	0.37	1.25		1.10	0.05
3							0.10					
4				1.90	0.05	0.65			0.85			0.03
5												0.50
6			0.15		0.10				0.30			
7	0.20				1.30	1.05					0.10	
8		3.40			0.05	0.10				0.90	0.20	0.20
9							2.50			1.55		0.05
10										0.20		
11						0.15						0.20
12	0.25	0.30	0.05									
13		0.46	1.00	1.30				0.50				
14		0.10						0.30				
15				0.10				0.20				2.00
16	0.20			0.60				0.50			0.30	
17		0.15						0.10	0.80			
18	0.50					1.80		0.40			0.10	
19			0.53					0.10		0.67		
20		0.20		1.80			0.10	0.90		0.05		
21								0.05				
22							0.15	0.05	0.70		0.01	
23		0.25			0.75					0.50		
24		0.40						0.10			0.03	away
25			0.30			0.30						
26	0.20	0.60					0.45		0.20			
27											2.70	
28						0.20	0.50				0.20	
29	0.10											
30				0.65		0.50	0.25	0.15				0.25
31	0.15											

Table 9: Rainfall Totals

RAINFALL - 2014

E-2 Growing Area (Brandywine Bay Subdivision)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1					0.40							
2	**0.10**	0.05						3.50				
3	0.75				0.10			1.25				
4							1.30	1.00		0.30		
5		0.20					out of town - cum total 0.9	0.40				
6	0.02	0.10	0.10			2.30		0.05	0.20			
7		0.05	2.10					0.05				
8			0.40	1.10				0.90	0.65			
9		0.35		0.10				0.05	2.00			
10						0.65						
11	0.10	0.05									0.40	
12	0.70	.9 thawed frozen precip						0.05		0.10	0.20	
13		1.00	0.10						2.25			
14	0.10					2.30						
15	0.50									1.00		
16		0.10		0.60	2.20		0.50			2.50		
17			0.75		0.60		1.45		0.15		0.30	
18			0.25								0.30	
19				0.50				4.75				
20				1.10								
21				0.10		1.25			0.95			
22	0.20	0.10					0.30	4.50				
23							0.10					
24					0.40			2.25	0.30		0.80	
25							4.40		0.60		0.10	
26			0.60	0.25					0.10		0.25	
27		0.10				0.01	0.33				0.50	
28					0.15	2.10						
29	Snow						0.20					
30			0.60	0.10			0.25		0.02	0.06		
31												

Table мл: Bacteriological Sampling Results

Station ID: 1

# Samples:	30	**Log Avg:**	0.4135
# > 43 MPN:	0	**Log Std Dev:**	0.2835
# > 260 MPN:	0	**Geomean:**	2.5909
Median:	1.7	**Estimated 90th:**	5

Date	Tidal Stage	Salinity	FC	Log FC
5/19/2010	1/4 FLD	34	1.7	0.2304
7/7/2010	3/4 EBB	37	1.7	0.2304
7/29/2010	1/4 FLD	36	1.7	0.2304
9/20/2010	1ST EBB	36	2.0	0.301
11/30/2010	3/4 EBB	32	2.0	0.301
1/13/2011	LAST EBB	34	4.5	0.6532
3/16/2011	1ST EBB	30	1.7	0.2304
4/27/2011	1/2 EBB	33	1.7	0.2304
5/12/2011	1ST EBB	34	6.8	0.8325
7/13/2011	3/4 FLD	36	1.7	0.2304
10/10/2011	LAST FLD	32	4.5	0.6532
11/22/2011	1/2 EBB	32	2.0	0.301
1/24/2012	LAST FLD	35	2.0	0.301
2/14/2012	1/4 FLD	32	4.5	0.6532
3/19/2012	1ST EBB	32	4.0	0.6021
4/25/2012	1/4 FLD	34	1.7	0.2304
5/15/2012	1/2 EBB	36	1.7	0.2304
12/17/2012	1/2 FLD	30	7.8	0.8921
2/5/2013	1/2 EBB	30	11.0	1.0414
5/6/2013	1/4 EBB	28	1.7	0.2304
6/4/2013	1/2 EBB	33	**17.0**	1.2304
8/6/2013	LAST FLD	35	1.7	0.2304
9/12/2013	3/4 EBB	34	2.0	0.301
11/12/2013	3/4 EBB	32	1.7	0.2304
2/4/2014	1ST FLD	28	4.5	0.6532
4/3/2014	1/4 FLD	26	1.7	0.2304
5/7/2014	LAST EBB	28	1.7	0.2304
5/19/2014	1/4 FLD	30	1.7	0.2304
6/19/2014	LAST EBB	32	1.7	0.2304
9/2/2014	1/2 EBB	25	1.7	0.2304

Station ID: 1A

# Samples:	19	**Log Avg:**	0.8359
# > 43 MPN:	2	**Log Std Dev:**	0.4919
# > 260 MPN:	0	**Geomean:**	6.8528
Median:	7.8	**Estimated 90th:**	29

Date	Tidal Stage	Salinity	FC	Log FC
11/22/2011	1/2 EBB	32	4.0	0.6021
1/24/2012	LAST FLD	32	7.8	0.8921
2/14/2012	1/4 FLD	34	1.7	0.2304
3/19/2012	1ST EBB	32	4.0	0.6021
4/25/2012	1/4 FLD	32	**49.0**	1.6902
5/15/2012	1/2 EBB	36	7.8	0.8921
12/17/2012	1/2 FLD	30	4.5	0.6532
2/5/2013	1/2 EBB	30	11.0	1.0414
5/6/2013	1/4 EBB	28	7.8	0.8921
6/4/2013	1/2 EBB	32	**79.0**	1.8976
8/6/2013	LAST FLD	35	1.7	0.2304
9/12/2013	3/4 EBB	32	7.8	0.8921
11/12/2013	3/4 EBB	32	2.0	0.301
2/4/2014	1ST FLD	28	2.0	0.301
4/3/2014	1/4 FLD	26	1.7	0.2304
5/7/2014	LAST EBB	25	7.8	0.8921
5/19/2014	1/4 FLD	28	**33.0**	1.5185
6/19/2014	LAST EBB	32	**17.0**	1.2304
9/2/2014	1/2 EBB	22	7.8	0.8921

Table мл: Bacteriological Sampling Results

Station ID: 2

# Samples:	30	**Log Avg:**	0.4446
# > 43 MPN:	0	**Log Std Dev:**	0.3538
# > 260 MPN:	0	**Geomean:**	2.7835
Median:	1.7	**Estimated 90th:**	7

Date	Tidal Stage	Salinity	FC	Log FC
5/19/2010	1/4 FLD	34	1.7	0.2304
7/7/2010	3/4 EBB	37	1.7	0.2304
7/29/2010	1/4 FLD	36	4.0	0.6021
9/20/2010	1ST EBB	34	4.5	0.6532
11/30/2010	3/4 EBB	32	6.1	0.7853
1/13/2011	LAST EBB	33	1.7	0.2304
3/16/2011	1ST EBB	30	1.8	0.2553
4/27/2011	1/2 EBB	33	1.7	0.2304
5/12/2011	1ST EBB	34	1.7	0.2304
7/13/2011	3/4 FLD	36	1.7	0.2304
10/10/2011	LAST FLD	32	1.7	0.2304
11/22/2011	1/2 EBB	32	13.0	1.1139
1/24/2012	LAST FLD	32	1.7	0.2304
2/14/2012	1/4 FLD	32	4.5	0.6532
3/19/2012	1ST EBB	34	1.7	0.2304
4/25/2012	1/4 FLD	35	2.0	0.301
5/15/2012	1/2 EBB	36	1.7	0.2304
12/17/2012	1/2 FLD	30	**23.0**	1.3617
2/5/2013	1/2 EBB	30	1.7	0.2304
5/6/2013	1/4 EBB	28	1.7	0.2304
6/4/2013	1/2 EBB	34	1.7	0.2304
8/6/2013	LAST FLD	35	1.7	0.2304
9/12/2013	3/4 EBB	32	1.7	0.2304
11/12/2013	3/4 EBB	32	2.0	0.301
2/4/2014	1ST FLD	30	4.5	0.6532
4/3/2014	1/4 FLD	27	1.7	0.2304
5/7/2014	LAST EBB	28	4.5	0.6532
5/19/2014	1/4 FLD	28	**33.0**	1.5185
6/19/2014	LAST EBB	32	3.7	0.5682
9/2/2014	1/2 EBB	26	1.7	0.2304

Station ID: 3

# Samples:	30	**Log Avg:**	0.3065
# > 43 MPN:	0	**Log Std Dev:**	0.1687
# > 260 MPN:	0	**Geomean:**	2.0256
Median:	1.7	**Estimated 90th:**	3

Date	Tidal Stage	Salinity	FC	Log FC
5/19/2010	1/4 FLD	34	2.0	0.301
7/7/2010	3/4 EBB	37	1.7	0.2304
7/29/2010	1/4 FLD	36	1.7	0.2304
9/20/2010	1ST EBB	34	2.0	0.301
11/30/2010	3/4 EBB	32	1.7	0.2304
1/13/2011	LAST EBB	32	1.7	0.2304
3/16/2011	1ST EBB	30	1.7	0.2304
4/27/2011	1/2 EBB	32	1.7	0.2304
5/12/2011	1ST EBB	34	2.0	0.301
7/13/2011	3/4 FLD	34	1.7	0.2304
10/10/2011	LAST FLD	32	4.5	0.6532
11/22/2011	1/2 EBB	32	1.7	0.2304
1/24/2012	LAST FLD	32	2.0	0.301
2/14/2012	1/4 FLD	34	1.7	0.2304
3/19/2012	1ST EBB	34	1.7	0.2304
4/25/2012	1/4 FLD	36	1.7	0.2304
5/15/2012	1/2 EBB	36	1.7	0.2304
12/17/2012	1/2 FLD	30	1.7	0.2304
2/5/2013	1/2 EBB	30	1.7	0.2304
5/6/2013	1/4 EBB	30	1.7	0.2304
6/4/2013	1/2 EBB	33	1.7	0.2304
8/6/2013	LAST FLD	34	1.7	0.2304
9/12/2013	3/4 EBB	26	2.0	0.301
11/12/2013	3/4 EBB	32	1.7	0.2304
2/4/2014	1ST FLD	28	7.8	0.8921
4/3/2014	1/4 FLD	28	1.7	0.2304
5/7/2014	LAST EBB	30	4.5	0.6532
5/19/2014	1/4 FLD	30	1.7	0.2304
6/19/2014	LAST EBB	34	4.5	0.6532
9/2/2014	1/2 EBB	26	1.7	0.2304

Table мл: Bacteriological Sampling Results

Station ID: 4

# Samples:	30	**Log Avg:**	0.7798
# > 43 MPN:	2	**Log Std Dev:**	0.5512
# > 260 MPN:	1	**Geomean:**	6.0227
Median:	4.5	**Estimated 90th:**	30

Date	Tidal Stage	Salinity	FC	Log FC
5/19/2010	1/4 FLD	34	13.0	1.1139
7/7/2010	3/4 EBB	37	4.5	0.6532
7/29/2010	1/4 FLD	36	1.7	0.2304
9/20/2010	1ST EBB	34	2.0	0.301
11/30/2010	3/4 EBB	32	7.8	0.8921
1/13/2011	LAST EBB	32	2.0	0.301
3/16/2011	1ST EBB	30	**350.0**	2.5441
4/27/2011	1/2 EBB	33	1.7	0.2304
5/12/2011	1ST EBB	34	**33.0**	1.5185
7/13/2011	3/4 FLD	34	13.0	1.1139
10/10/2011	LAST FLD	33	11.0	1.0414
11/22/2011	1/2 EBB	32	4.5	0.6532
1/24/2012	LAST FLD	34	4.0	0.6021
2/14/2012	1/4 FLD	34	1.7	0.2304
3/19/2012	1ST EBB	34	**49.0**	1.6902
4/25/2012	1/4 FLD	35	1.8	0.2553
5/15/2012	1/2 EBB	37	2.0	0.301
12/17/2012	1/2 FLD	30	9.3	0.9685
2/5/2013	1/2 EBB	30	2.0	0.301
5/6/2013	1/4 EBB	30	**22.0**	1.3424
6/4/2013	1/2 EBB	34	7.8	0.8921
8/6/2013	LAST FLD	35	7.8	0.8921
9/12/2013	3/4 EBB	34	**33.0**	1.5185
11/12/2013	3/4 EBB	32	1.7	0.2304
2/4/2014	1ST FLD	30	7.8	0.8921
4/3/2014	1/4 FLD	27	1.8	0.2553
5/7/2014	LAST EBB	28	4.5	0.6532
5/19/2014	1/4 FLD	30	4.5	0.6532
6/19/2014	LAST EBB	34	1.7	0.2304
9/2/2014	1/2 EBB	24	7.8	0.8921

Station ID: 5

# Samples:	30	**Log Avg:**	0.5232
# > 43 MPN:	1	**Log Std Dev:**	0.3830
# > 260 MPN:	0	**Geomean:**	3.3358
Median:	2	**Estimated 90th:**	10

Date	Tidal Stage	Salinity	FC	Log FC
5/19/2010	1/4 FLD	32	4.0	0.6021
7/7/2010	3/4 EBB	36	1.7	0.2304
7/29/2010	1/4 FLD	36	1.7	0.2304
9/20/2010	1ST EBB	34	1.7	0.2304
11/30/2010	3/4 EBB	32	13.0	1.1139
1/13/2011	LAST EBB	32	7.8	0.8921
3/16/2011	1ST EBB	30	11.0	1.0414
4/27/2011	1/2 EBB	32	1.7	0.2304
5/12/2011	1ST EBB	34	2.0	0.301
7/13/2011	3/4 FLD	36	2.0	0.301
10/10/2011	LAST FLD	32	1.8	0.2553
11/22/2011	1/2 EBB	32	2.0	0.301
1/24/2012	LAST FLD	34	2.0	0.301
2/14/2012	1/4 FLD	35	2.0	0.301
3/19/2012	1ST EBB	34	2.0	0.301
4/25/2012	1/4 FLD	36	1.7	0.2304
5/15/2012	1/2 EBB	36	2.0	0.301
12/17/2012	1/2 FLD	30	**17.0**	1.2304
2/5/2013	1/2 EBB	30	1.7	0.2304
5/6/2013	1/4 EBB	30	1.7	0.2304
6/4/2013	1/2 EBB	32	**49.0**	1.6902
8/6/2013	LAST FLD	34	1.7	0.2304
9/12/2013	3/4 EBB	34	4.5	0.6532
11/12/2013	3/4 EBB	32	2.0	0.301
2/4/2014	1ST FLD	28	4.5	0.6532
4/3/2014	1/4 FLD	28	1.7	0.2304
5/7/2014	LAST EBB	28	11.0	1.0414
5/19/2014	1/4 FLD	30	4.0	0.6021
6/19/2014	LAST EBB	33	4.5	0.6532
9/2/2014	1/2 EBB	23	6.1	0.7853

Table мл: Bacteriological Sampling Results

Station ID: 6

# Samples:	30	**Log Avg:**	0.9521
# > 43 MPN:	4	**Log Std Dev:**	0.5494
# > 260 MPN:	0	**Geomean:**	8.9553
Median:	7.8	**Estimated 90th:**	45

Date	Tidal Stage	Salinity	FC	Log FC
5/19/2010	1/4 FLD	32	**17.0**	1.2304
7/7/2010	3/4 EBB	36	2.0	0.301
7/29/2010	1/4 FLD	36	1.7	0.2304
9/20/2010	1ST EBB	34	6.8	0.8325
11/30/2010	3/4 EBB	32	**49.0**	1.6902
1/13/2011	LAST EBB	30	11.0	1.0414
3/16/2011	1ST EBB	30	1.7	0.2304
4/27/2011	1/2 EBB	33	13.0	1.1139
5/12/2011	1ST EBB	34	7.8	0.8921
7/13/2011	3/4 FLD	36	1.7	0.2304
10/10/2011	LAST FLD	33	**33.0**	1.5185
11/22/2011	1/2 EBB	32	2.0	0.301
1/24/2012	LAST FLD	35	11.0	1.0414
2/14/2012	1/4 FLD	35	12.0	1.0792
3/19/2012	1ST EBB	34	13.0	1.1139
4/25/2012	1/4 FLD	34	1.8	0.2553
5/15/2012	1/2 EBB	36	7.8	0.8921
12/17/2012	1/2 FLD	30	7.8	0.8921
2/5/2013	1/2 EBB	30	4.5	0.6532
5/6/2013	1/4 EBB	28	**23.0**	1.3617
6/4/2013	1/2 EBB	34	**240.0**	2.3802
8/6/2013	LAST FLD	34	2.0	0.301
9/12/2013	3/4 EBB	32	**22.0**	1.3424
11/12/2013	3/4 EBB	32	**33.0**	1.5185
2/4/2014	1ST FLD	32	7.8	0.8921
4/3/2014	1/4 FLD	28	4.5	0.6532
5/7/2014	LAST EBB	30	7.8	0.8921
5/19/2014	1/4 FLD	30	2.0	0.301
6/19/2014	LAST EBB	32	**49.0**	1.6902
9/2/2014	1/2 EBB	26	**49.0**	1.6902

Station ID: 9

# Samples:	30	**Log Avg:**	0.5617
# > 43 MPN:	1	**Log Std Dev:**	0.3691
# > 260 MPN:	0	**Geomean:**	3.6448
Median:	3	**Estimated 90th:**	10

Date	Tidal Stage	Salinity	FC	Log FC
5/19/2010	1/4 FLD	34	7.8	0.8921
7/7/2010	3/4 EBB	36	1.8	0.2553
7/29/2010	1/4 FLD	36	2.0	0.301
9/20/2010	1ST EBB	34	4.5	0.6532
11/30/2010	3/4 EBB	33	7.8	0.8921
1/13/2011	LAST EBB	31	1.7	0.2304
3/16/2011	1ST EBB	30	1.7	0.2304
4/27/2011	1/2 EBB	33	1.7	0.2304
5/12/2011	1ST EBB	34	4.5	0.6532
7/13/2011	3/4 FLD	34	2.0	0.301
10/10/2011	LAST FLD	33	6.8	0.8325
11/22/2011	1/2 EBB	32	6.8	0.8325
1/24/2012	LAST FLD	34	1.8	0.2553
2/14/2012	1/4 FLD	35	11.0	1.0414
3/19/2012	1ST EBB	34	1.7	0.2304
4/25/2012	1/4 FLD	35	4.5	0.6532
5/15/2012	1/2 EBB	37	1.7	0.2304
12/17/2012	1/2 FLD	30	13.0	1.1139
2/5/2013	1/2 EBB	30	2.0	0.301
5/6/2013	1/4 EBB	30	1.7	0.2304
6/4/2013	1/2 EBB	34	4.0	0.6021
8/6/2013	LAST FLD	35	1.7	0.2304
9/12/2013	3/4 EBB	34	11.0	1.0414
11/12/2013	3/4 EBB	32	2.0	0.301
2/4/2014	1ST FLD	30	**49.0**	1.6902
4/3/2014	1/4 FLD	29	1.7	0.2304
5/7/2014	LAST EBB	30	4.5	0.6532
5/19/2014	1/4 FLD	30	1.8	0.2553
6/19/2014	LAST EBB	34	6.8	0.8325
9/2/2014	1/2 EBB	26	4.5	0.6532

Table мл: Bacteriological Sampling Results

Station ID: 11

# Samples:	30	**Log Avg:**	0.2995
# > 43 MPN:	0	**Log Std Dev:**	0.1703
# > 260 MPN:	0	**Geomean:**	1.9929
Median:	1.7	**Estimated 90th:**	3

Date	Tidal Stage	Salinity	FC	Log FC
5/19/2010	1/4 FLD	36	1.7	0.2304
7/7/2010	3/4 EBB	37	1.7	0.2304
7/29/2010	1/4 FLD	37	1.7	0.2304
9/20/2010	1ST EBB	34	1.7	0.2304
11/30/2010	3/4 EBB	31	1.7	0.2304
1/13/2011	LAST EBB	32	7.8	0.8921
3/16/2011	1ST EBB	30	1.7	0.2304
4/27/2011	1/2 EBB	32	4.5	0.6532
5/12/2011	1ST EBB	34	2.0	0.301
7/13/2011	3/4 FLD	34	1.7	0.2304
10/10/2011	LAST FLD	34	2.0	0.301
11/22/2011	1/2 EBB	32	1.7	0.2304
1/24/2012	LAST FLD	35	4.5	0.6532
2/14/2012	1/4 FLD	35	1.7	0.2304
3/19/2012	1ST EBB	35	1.7	0.2304
4/25/2012	1/4 FLD	36	1.7	0.2304
5/15/2012	1/2 EBB	37	1.7	0.2304
12/17/2012	1/2 FLD	32	1.7	0.2304
2/5/2013	1/2 EBB	32	1.7	0.2304
5/6/2013	1/4 EBB	30	1.7	0.2304
6/4/2013	1/2 EBB	34	1.7	0.2304
8/6/2013	LAST FLD	34	1.7	0.2304
9/12/2013	3/4 EBB	36	1.7	0.2304
11/12/2013	3/4 EBB	32	1.7	0.2304
2/4/2014	1ST FLD	32	1.7	0.2304
4/3/2014	1/4 FLD	30	1.7	0.2304
5/7/2014	LAST EBB	28	1.7	0.2304
5/19/2014	1/4 FLD	30	1.7	0.2304
6/19/2014	LAST EBB	34	1.7	0.2304
9/2/2014	1/2 EBB	25	4.5	0.6532

Station ID: 12

# Samples:	30	**Log Avg:**	0.3511
# > 43 MPN:	0	**Log Std Dev:**	0.2311
# > 260 MPN:	0	**Geomean:**	2.2442
Median:	1.7	**Estimated 90th:**	4

Date	Tidal Stage	Salinity	FC	Log FC
5/19/2010	1/4 FLD	36	4.5	0.6532
7/7/2010	3/4 EBB	37	1.7	0.2304
7/29/2010	1/4 FLD	37	1.7	0.2304
9/20/2010	1ST EBB	34	1.7	0.2304
11/30/2010	3/4 EBB	32	1.7	0.2304
1/13/2011	LAST EBB	32	4.5	0.6532
3/16/2011	1ST EBB	28	2.0	0.301
4/27/2011	1/2 EBB	32	1.7	0.2304
5/12/2011	1ST EBB	34	1.7	0.2304
7/13/2011	3/4 FLD	34	1.7	0.2304
10/10/2011	LAST FLD	34	4.5	0.6532
11/22/2011	1/2 EBB	32	1.7	0.2304
1/24/2012	LAST FLD	35	7.8	0.8921
2/14/2012	1/4 FLD	35	1.7	0.2304
3/19/2012	1ST EBB	35	1.7	0.2304
4/25/2012	1/4 FLD	35	3.7	0.5682
5/15/2012	1/2 EBB	37	1.7	0.2304
12/17/2012	1/2 FLD	32	1.7	0.2304
2/5/2013	1/2 EBB	30	13.0	1.1139
5/6/2013	1/4 EBB	30	1.7	0.2304
6/4/2013	1/2 EBB	33	2.0	0.301
8/6/2013	LAST FLD	34	3.6	0.5563
9/12/2013	3/4 EBB	34	1.7	0.2304
11/12/2013	3/4 EBB	33	1.7	0.2304
2/4/2014	1ST FLD	32	1.7	0.2304
4/3/2014	1/4 FLD	30	1.7	0.2304
5/7/2014	LAST EBB	30	1.7	0.2304
5/19/2014	1/4 FLD	32	1.7	0.2304
6/19/2014	LAST EBB	34	1.7	0.2304
9/2/2014	1/2 EBB	25	1.7	0.2304

Table мл: Bacteriological Sampling Results

Station ID: 13

# Samples:	30	**Log Avg:**	0.2643
# > 43 MPN:	0	**Log Std Dev:**	0.1215
# > 260 MPN:	0	**Geomean:**	1.8377
Median:	1.7	**Estimated 90th:**	2

Date	Tidal Stage	Salinity	FC	Log FC
5/19/2010	1/4 FLD	34	2.0	0.301
7/7/2010	3/4 EBB	37	1.7	0.2304
7/29/2010	1/4 FLD	37	1.7	0.2304
9/20/2010	1ST EBB	34	2.0	0.301
11/30/2010	3/4 EBB	32	1.7	0.2304
1/13/2011	LAST EBB	32	7.8	0.8921
3/16/2011	1ST EBB	28	1.7	0.2304
4/27/2011	1/2 EBB	32	1.7	0.2304
5/12/2011	1ST EBB	34	1.7	0.2304
7/13/2011	3/4 FLD	36	1.7	0.2304
10/10/2011	LAST FLD	34	2.0	0.301
11/22/2011	1/2 EBB	32	1.7	0.2304
1/24/2012	LAST FLD	35	1.7	0.2304
2/14/2012	1/4 FLD	35	1.7	0.2304
3/19/2012	1ST EBB	35	1.7	0.2304
4/25/2012	1/4 FLD	36	1.7	0.2304
5/15/2012	1/2 EBB	37	1.7	0.2304
12/17/2012	1/2 FLD	30	1.7	0.2304
2/5/2013	1/2 EBB	32	2.0	0.301
5/6/2013	1/4 EBB	30	2.0	0.301
6/4/2013	1/2 EBB	33	1.7	0.2304
8/6/2013	LAST FLD	34	1.7	0.2304
9/12/2013	3/4 EBB	36	1.7	0.2304
11/12/2013	3/4 EBB	33	1.7	0.2304
2/4/2014	1ST FLD	32	1.7	0.2304
4/3/2014	1/4 FLD	28	1.7	0.2304
5/7/2014	LAST EBB	30	1.7	0.2304
5/19/2014	1/4 FLD	32	1.7	0.2304
6/19/2014	LAST EBB	34	1.7	0.2304
9/2/2014	1/2 EBB	24	1.7	0.2304

Station ID: 14

# Samples:	30	**Log Avg:**	0.3501
# > 43 MPN:	0	**Log Std Dev:**	0.2585
# > 260 MPN:	0	**Geomean:**	2.2394
Median:	1.7	**Estimated 90th:**	4

Date	Tidal Stage	Salinity	FC	Log FC
5/19/2010	1/4 FLD	36	4.5	0.6532
7/7/2010	3/4 EBB	37	1.7	0.2304
7/29/2010	1/4 FLD	37	1.7	0.2304
9/20/2010	1ST EBB	34	4.5	0.6532
11/30/2010	3/4 EBB	31	1.7	0.2304
1/13/2011	LAST EBB	31	6.8	0.8325
3/16/2011	1ST EBB	28	1.7	0.2304
4/27/2011	1/2 EBB	32	1.7	0.2304
5/12/2011	1ST EBB	34	4.5	0.6532
7/13/2011	3/4 FLD	36	1.7	0.2304
10/10/2011	LAST FLD	34	4.5	0.6532
11/22/2011	1/2 EBB	32	2.0	0.301
1/24/2012	LAST FLD	35	1.7	0.2304
2/14/2012	1/4 FLD	35	1.7	0.2304
3/19/2012	1ST EBB	35	1.7	0.2304
4/25/2012	1/4 FLD	35	1.7	0.2304
5/15/2012	1/2 EBB	37	1.8	0.2553
12/17/2012	1/2 FLD	30	1.7	0.2304
2/5/2013	1/2 EBB	32	1.7	0.2304
5/6/2013	1/4 EBB	30	1.7	0.2304
6/4/2013	1/2 EBB	32	1.7	0.2304
8/6/2013	LAST FLD	34	2.0	0.301
9/12/2013	3/4 EBB	35	1.7	0.2304
11/12/2013	3/4 EBB	33	1.7	0.2304
2/4/2014	1ST FLD	32	1.7	0.2304
4/3/2014	1/4 FLD	28	1.7	0.2304
5/7/2014	LAST EBB	30	1.7	0.2304
5/19/2014	1/4 FLD	30	1.7	0.2304
6/19/2014	LAST EBB	34	1.7	0.2304
9/2/2014	1/2 EBB	24	**23.0**	1.3617

Table ML: Bacteriological Sampling Results

Station ID: 18

# Samples:	30	**Log Avg:**	0.4701
# > 43 MPN:	1	**Log Std Dev:**	0.3715
# > 260 MPN:	0	**Geomean:**	2.9517
Median:	1.85	**Estimated 90th:**	8

Date	Tidal Stage	Salinity	FC	Log FC
5/19/2010	1/4 FLD	34	4.5	0.6532
7/7/2010	3/4 EBB	36	1.7	0.2304
7/29/2010	1/4 FLD	36	1.7	0.2304
9/20/2010	1ST EBB	34	7.8	0.8921
11/30/2010	3/4 EBB	32	4.5	0.6532
1/13/2011	LAST EBB	32	1.7	0.2304
3/16/2011	1ST EBB	30	7.8	0.8921
4/27/2011	1/2 EBB	33	1.7	0.2304
5/12/2011	1ST EBB	34	2.0	0.301
7/13/2011	3/4 FLD	36	1.7	0.2304
10/10/2011	LAST FLD	33	6.8	0.8325
11/22/2011	1/2 EBB	32	2.0	0.301
1/24/2012	LAST FLD	35	4.0	0.6021
2/14/2012	1/4 FLD	35	1.7	0.2304
3/19/2012	1ST EBB	34	1.7	0.2304
4/25/2012	1/4 FLD	35	4.5	0.6532
5/15/2012	1/2 EBB	37	1.7	0.2304
12/17/2012	1/2 FLD	32	11.0	1.0414
2/5/2013	1/2 EBB	30	**17.0**	1.2304
5/6/2013	1/4 EBB	30	2.0	0.301
6/4/2013	1/2 EBB	34	1.7	0.2304
8/6/2013	LAST FLD	34	1.7	0.2304
9/12/2013	3/4 EBB	34	1.7	0.2304
11/12/2013	3/4 EBB	32	1.7	0.2304
2/4/2014	1ST FLD	32	2.0	0.301
4/3/2014	1/4 FLD	29	1.7	0.2304
5/7/2014	LAST EBB	30	1.7	0.2304
5/19/2014	1/4 FLD	30	2.0	0.301
6/19/2014	LAST EBB	34	1.7	0.2304
9/2/2014	1/2 EBB	26	**49.0**	1.6902

Station ID: 19

# Samples:	30	**Log Avg:**	0.6096
# > 43 MPN:	0	**Log Std Dev:**	0.4404
# > 260 MPN:	0	**Geomean:**	4.0701
Median:	2	**Estimated 90th:**	14

Date	Tidal Stage	Salinity	FC	Log FC
5/19/2010	1/4 FLD	34	7.8	0.8921
7/7/2010	3/4 EBB	36	2.0	0.301
7/29/2010	1/4 FLD	36	1.7	0.2304
9/20/2010	1ST EBB	34	2.0	0.301
11/30/2010	3/4 EBB	32	7.8	0.8921
1/13/2011	LAST EBB	31	2.0	0.301
3/16/2011	1ST EBB	30	1.7	0.2304
4/27/2011	1/2 EBB	33	6.8	0.8325
5/12/2011	1ST EBB	34	**23.0**	1.3617
7/13/2011	3/4 FLD	36	1.7	0.2304
10/10/2011	LAST FLD	33	4.5	0.6532
11/22/2011	1/2 EBB	32	2.0	0.301
1/24/2012	LAST FLD	35	1.7	0.2304
2/14/2012	1/4 FLD	34	6.8	0.8325
3/19/2012	1ST EBB	30	1.7	0.2304
4/25/2012	1/4 FLD	34	1.8	0.2553
5/15/2012	1/2 EBB	36	1.7	0.2304
12/17/2012	1/2 FLD	32	13.0	1.1139
2/5/2013	1/2 EBB	30	2.0	0.301
5/6/2013	1/4 EBB	30	1.7	0.2304
6/4/2013	1/2 EBB	34	**33.0**	1.5185
8/6/2013	LAST FLD	34	1.7	0.2304
9/12/2013	3/4 EBB	32	7.8	0.8921
11/12/2013	3/4 EBB	32	**17.0**	1.2304
2/4/2014	1ST FLD	32	4.0	0.6021
4/3/2014	1/4 FLD	28	**17.0**	1.2304
5/7/2014	LAST EBB	30	1.7	0.2304
5/19/2014	1/4 FLD	30	4.5	0.6532
6/19/2014	LAST EBB	34	1.7	0.2304
9/2/2014	1/2 EBB	26	**33.0**	1.5185

Table мл: Bacteriological Sampling Results

Station ID: 19A

# Samples:	30	**Log Avg:**	0.7474
# > 43 MPN:	1	**Log Std Dev:**	0.4408
# > 260 MPN:	0	**Geomean:**	5.5903
Median:	5.65	**Estimated 90th:**	20

Date	Tidal Stage	Salinity	FC	Log FC
5/19/2010	1/4 FLD	32	13.0	1.1139
7/7/2010	3/4 EBB	36	11.0	1.0414
7/29/2010	1/4 FLD	36	1.7	0.2304
9/20/2010	1ST EBB	34	1.7	0.2304
11/30/2010	3/4 EBB	32	7.8	0.8921
1/13/2011	LAST EBB	30	11.0	1.0414
3/16/2011	1ST EBB	30	7.8	0.8921
4/27/2011	1/2 EBB	33	1.7	0.2304
5/12/2011	1ST EBB	34	**70.0**	1.8451
7/13/2011	3/4 FLD	34	4.5	0.6532
10/10/2011	LAST FLD	33	4.0	0.6021
11/22/2011	1/2 EBB	32	7.8	0.8921
1/24/2012	LAST FLD	35	4.5	0.6532
2/14/2012	1/4 FLD	35	2.0	0.301
3/19/2012	1ST EBB	34	13.0	1.1139
4/25/2012	1/4 FLD	34	1.8	0.2553
5/15/2012	1/2 EBB	36	1.8	0.2553
12/17/2012	1/2 FLD	32	**33.0**	1.5185
2/5/2013	1/2 EBB	30	2.0	0.301
5/6/2013	1/4 EBB	30	7.8	0.8921
6/4/2013	1/2 EBB	33	**22.0**	1.3424
8/6/2013	LAST FLD	34	1.7	0.2304
9/12/2013	3/4 EBB	32	4.0	0.6021
11/12/2013	3/4 EBB	32	7.8	0.8921
2/4/2014	1ST FLD	30	6.8	0.8325
4/3/2014	1/4 FLD	28	4.5	0.6532
5/7/2014	LAST EBB	28	1.7	0.2304
5/19/2014	1/4 FLD	30	2.0	0.301
6/19/2014	LAST EBB	34	11.0	1.0414
9/2/2014	1/2 EBB	26	**22.0**	1.3424

Table MM: Summary of Bacteriological Sampling Results

Summary of sampling data through 9/2/2014. Shaded cells indicate stations in waters closed to shellfish harvest.

Station ID:	# Samples:	Median:	Geomean:	Estimated 90th:
1	30	1.7	2.5909	5
1A	19	7.8	6.8528	29
2	30	1.7	2.7835	7
3	30	1.7	2.0256	3
4	30	4.5	6.0227	30
5	30	2	3.3358	10
6	30	7.8	8.9553	**45**
9	30	3	3.6448	10
11	30	1.7	1.9929	3
12	30	1.7	2.2442	4
13	30	1.7	1.8377	2
14	30	1.7	2.2394	4
18	30	1.85	2.9517	8
19	30	2	4.0701	14
19A	30	5.65	5.5903	20