Shellfish Sanitation and Recreational Water Quality Section

N.C. Division of Marine Fisheries

Department of Environmental Quality

N.C. Recreational Water Quality Program Mission

"To protect the public health by monitoring the quality of North Carolina's Coastal recreational waters and notifying the public when bacteriological standards for safe bodily contact are exceeded."

Recreational Water Quality Program

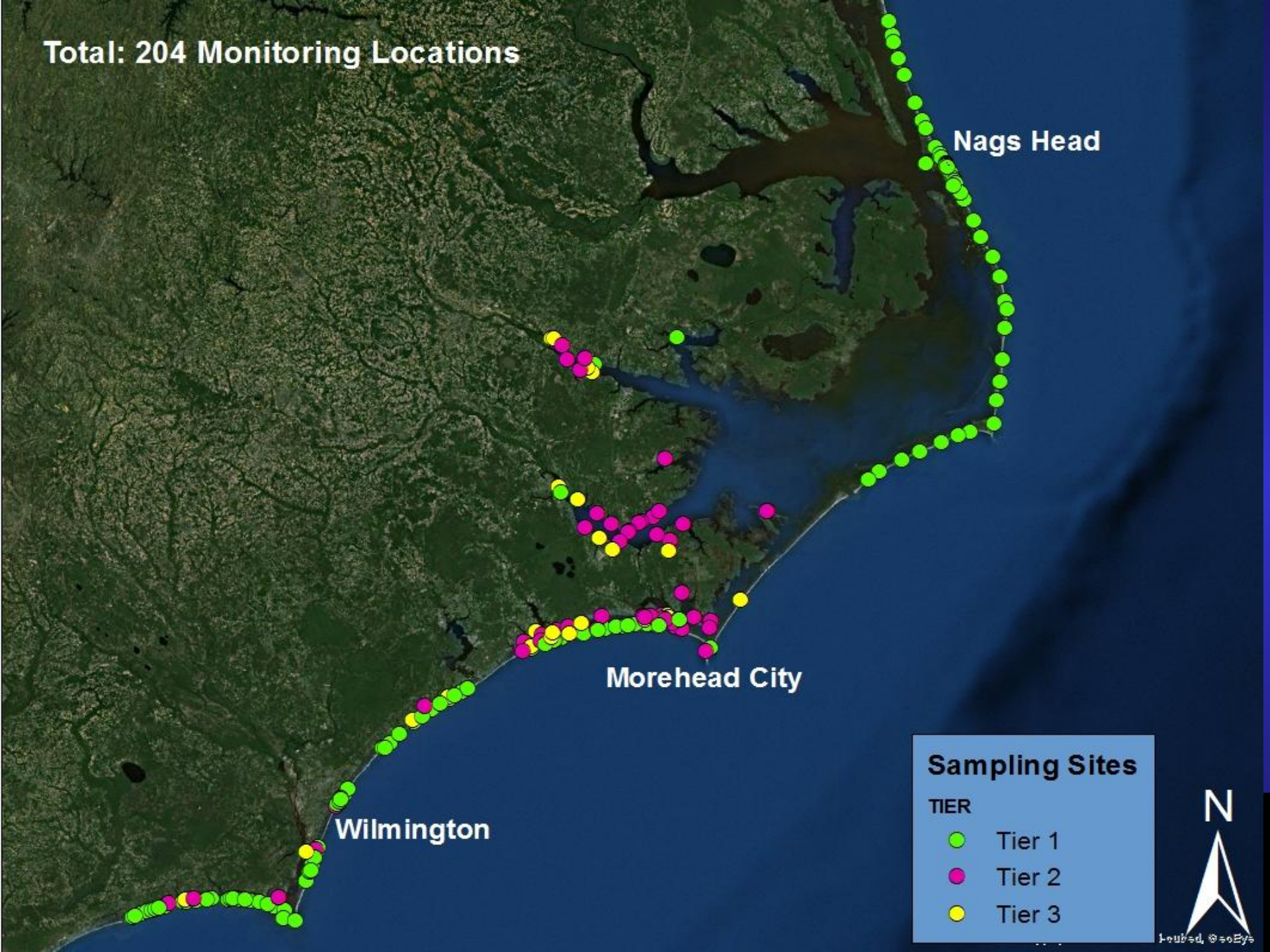
- Started in 1997 in response to public concern regarding coastal swimming waters.
- Became mandated by the E.P.A. in October 2000.
- Monitors coastal recreational waters including ocean beaches, sounds, bays and estuarine rivers.

Overview of N.C. RWQ Program

- 204 swimming sites monitored
- 3 regional labs / 4 boats for sampling sound-side waters
- 14 people directly involved in the RWQ program during the swimming season
- 3.75 FTE are funded by the BEACH grant
- $240,000? N.C. + $283,000 grant

Program Reductions

- Sequestration
- Nags Head SSRWQ Lab closed.
- Loss of three positions in Nags Head.
- Removed 36 monitoring sites in northern region from the program.
- Loss of one position in Morehead.


Total: 204 Monitoring Locations
Nags Head
Morehead City
Wilmington
Sampling Sites
TIER
Tier 1
Tier 2
Tier 3
N

Enterococci

- Bacteria - indicator of fecal contamination.
- Are found in the gut of all warm blooded animals.
- Do not cause illness but are associated with pathogenic organisms.

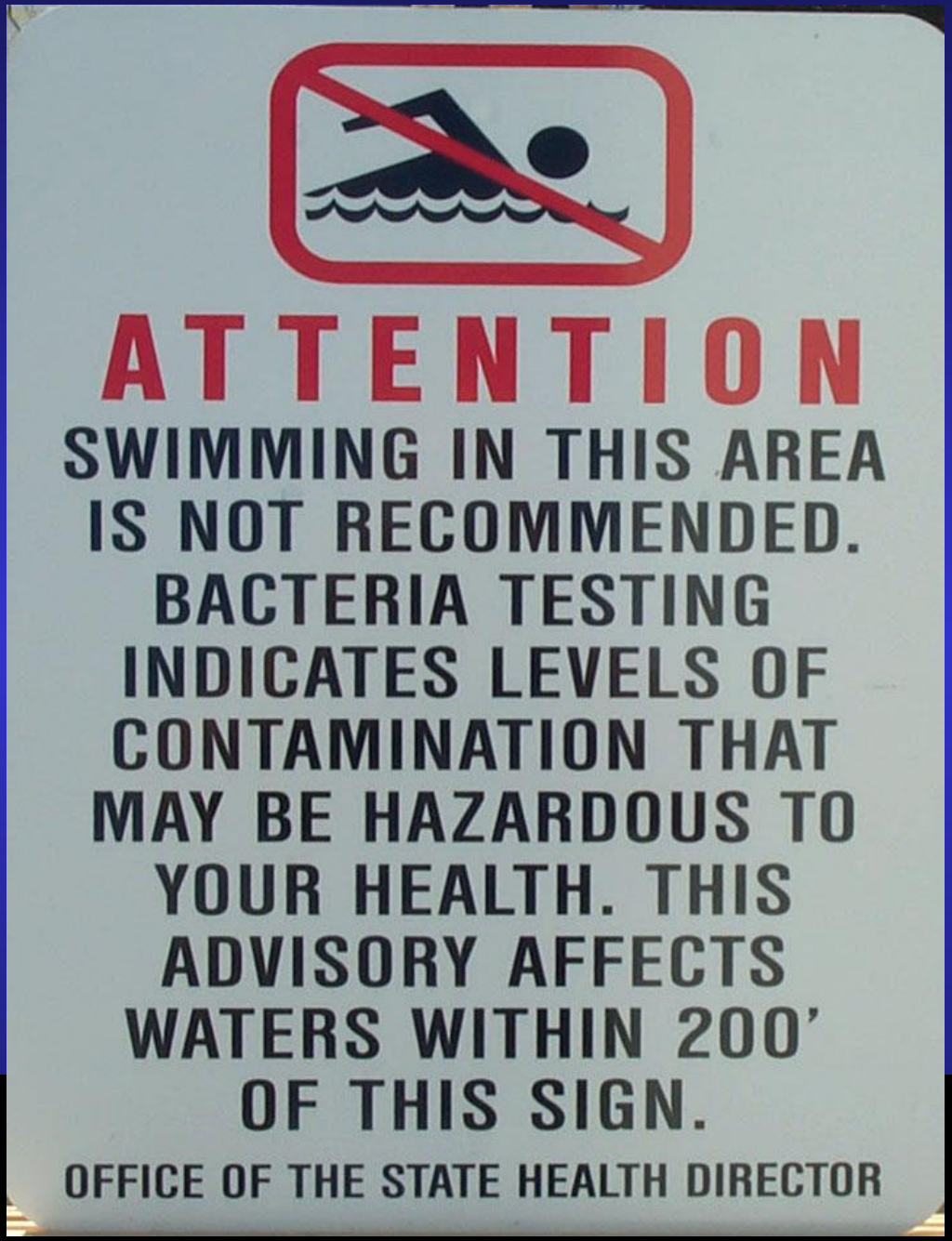

ATTENTION
SWIMMING IN THIS AREA IS NOT RECOMMENDED. BACTERIA TESTING INDICATES LEVELS OF CONTAMINATION THAT MAY BE HAZARDOUS TO YOUR HEALTH. THIS ADVISORY AFFECTS WATERS WITHIN 200' OF THIS SIGN.
OFFICE OF THE STATE HEALTH DIRECTOR

Table 1. Numbers of Viable Bacteria Found Per Gram of Feces of Adult Animals[8]
(Median values from 10 animals)

Animal	*E. coli*	*C. perfringens*	Enterococci	*Bacteriodes*	*Lactobacilli*
Cow	20,000	200	200,000	No Data	250
Horse	13,000	No Data	6,300,000	No Data	10,000,000
Pig	3,200,000	4,000	2,500,000	500,000	250,000,000
Sheep	3,200,000	20,000	1,300,000	No Data	7,900
Chicken	4,000,000	250	32,000,000	No Data	320,000,000
Dog	32,000,000	250,000,000	40,000,000	500,000,000	40,000
Cat	40,000,000	25,000,000	200,000,000	790,000,000	1,300,000,000
Human	5,000,000	1,600	160,000	5,000,000,000	630,000,000

Center for Watershed Protection

Table 7: Bacterial Densities in Warm-Blooded Animals Feces
(Sources: Pitt, 1998; Godfrey, 1992; Geldrich et al., 1962)

Waste stream	Fecal coliform *(Density/gm)*	Fecal streptococci	Unit discharge *(lbs/day)*
Human	1.3×10^7	3.0×10^6	0.35
Cats	7.9×10^6	2.7×10^7	0.15
Dogs	2.3×10^7	9.8×10^8	0.32
Rats	1.6×10^5	4.6×10^7	0.08
Cows	2.3×10^5	1.3×10^7	15.4
Ducks	3.3×10^7	5.4×10^7	0.15
Waterfowl	3.3×10^7	-	0.18 - 0.35

Center for Watershed Protection

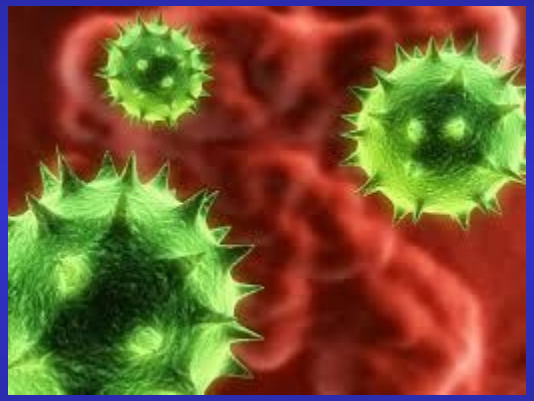
Waterborne Illness

Fecal Contamination

- Gastroenteritis – Bacteria, viruses, protozoa
- Flu-like symptoms
- Abdominal cramps, diarrhea, fever, nausea
- Ear, nose, throat, and skin infections

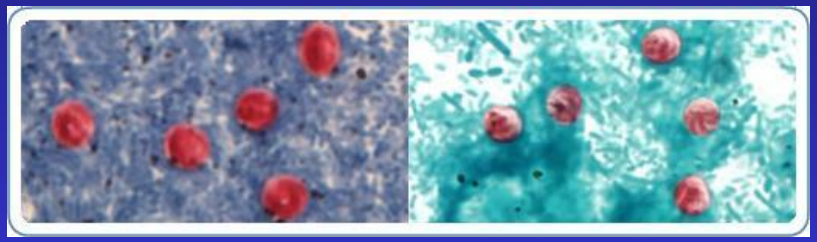
Viruses

- Norovirus
- Adenovirus
- Enterovirus
- Rotavirus
- Hepatitis A

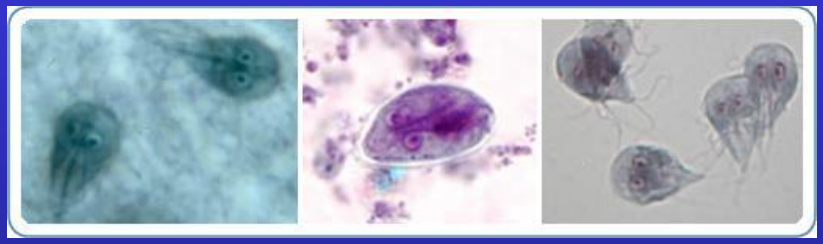


Protozoa

Cryptosporidia



Giardia



Bacteria

- Campylobacter
- Salmonella
- Pathogenic *E. coli*

Vibrio sp.

- Naturally occurring bacteria.
- Eating raw or under cooked shellfish.
- Wounds exposed to seawater.
- Septicemia - 50 % mortality rate for the immunocompromised.

Vibrio vulnificus

CONSUMER ADVISORY

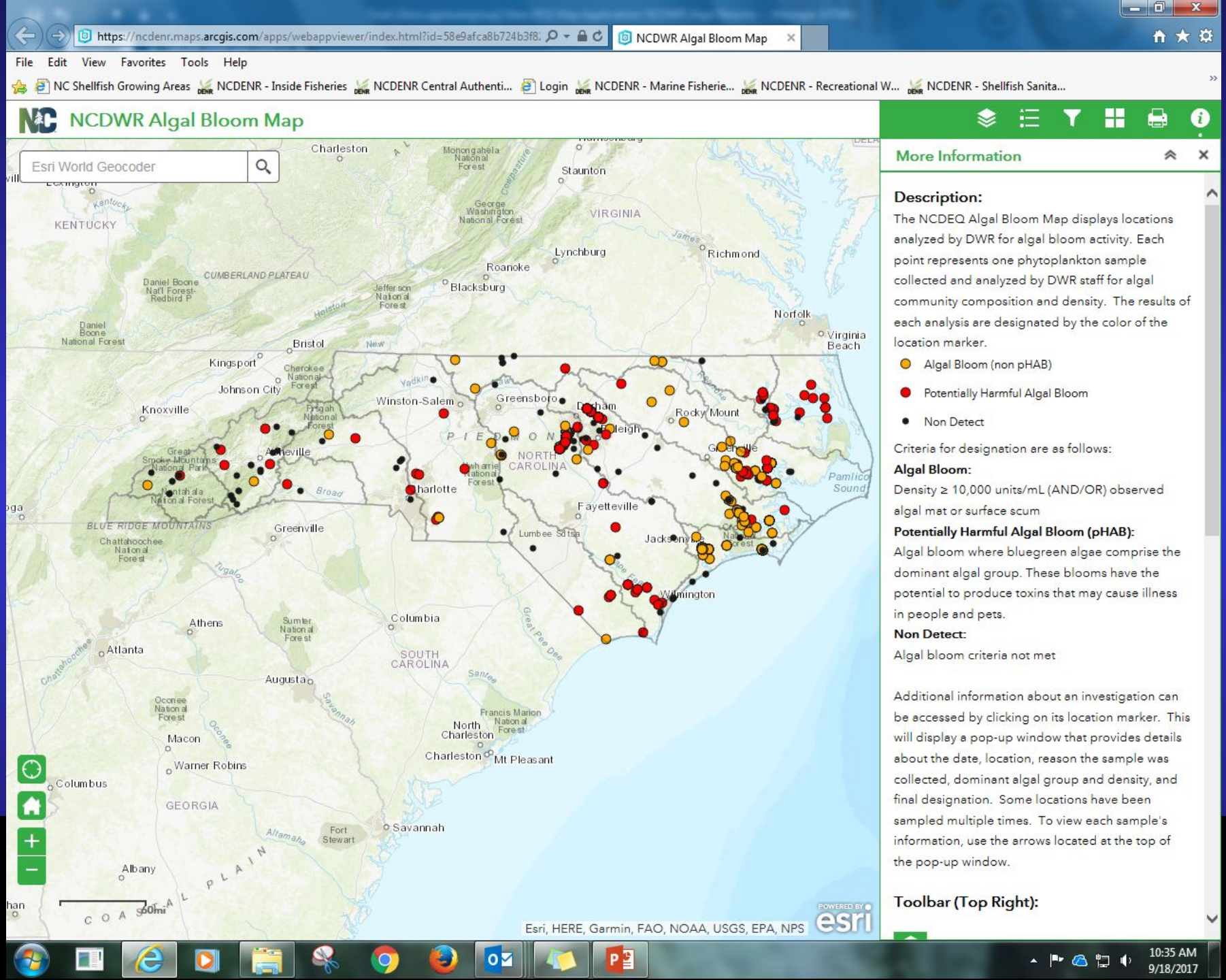
Eating raw *oysters, clams or mussels* may cause severe illness. People with the following conditions are at especially high risk: liver disease, alcoholism, diabetes, cancer, stomach or blood disorder, or weakened immune system. Ask your doctor if you are unsure of your risk. If you eat shellfish and become sick, see a doctor immediately.

N. C. Department of Environment and Natural Resources
Division of Environmental Health

DENR 4004
Environmental Health Services Section

Harmful Algal Blooms

- pHAB
- Monitored by DWR
- Toxins characterized by DHHS
- Cyanobacteria (Blue-green Algae)
- DHHS advises against wading or swimming in areas that may have a bloom
- Avoid swimming near fish kills


https://ncdenr.maps.arcgis.com/apps/webappviewer/index.html?id=58e9afca8b724b3f8
NCDWR Algal Bloom Map
File Edit View Favorites Tools Help
NC Shellfish Growing Areas
NCDENR - Inside Fisheries
NCDENR Central Authenti...
Login
NCDENR - Marine Fisherie...
NCDENR - Recreational W...
NCDENR - Shellfish Sanita...
NCDWR Algal Bloom Map
Esri World Geocoder
More Information
Description:
The NCDEQ Algal Bloom Map displays locations analyzed by DWR for algal bloom activity. Each point represents one phytoplankton sample collected and analyzed by DWR staff for algal community composition and density. The results of each analysis are designated by the color of the location marker.
Algal Bloom (non pHAB)
Potentially Harmful Algal Bloom
Non Detect
Criteria for designation are as follows:
Algal Bloom:
Density ≥ 10,000 units/mL (AND/OR) observed algal mat or surface scum
Potentially Harmful Algal Bloom (pHAB):
Algal bloom where bluegreen algae comprise the dominant algal group. These blooms have the potential to produce toxins that may cause illness in people and pets.
Non Detect:
Algal bloom criteria not met
Additional information about an investigation can be accessed by clicking on its location marker. This will display a pop-up window that provides details about the date, location, reason the sample was collected, dominant algal group and density, and final designation. Some locations have been sampled multiple times. To view each sample's information, use the arrows located at the top of the pop-up window.
Toolbar (Top Right):
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Charlotte
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Acknowlegements

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