



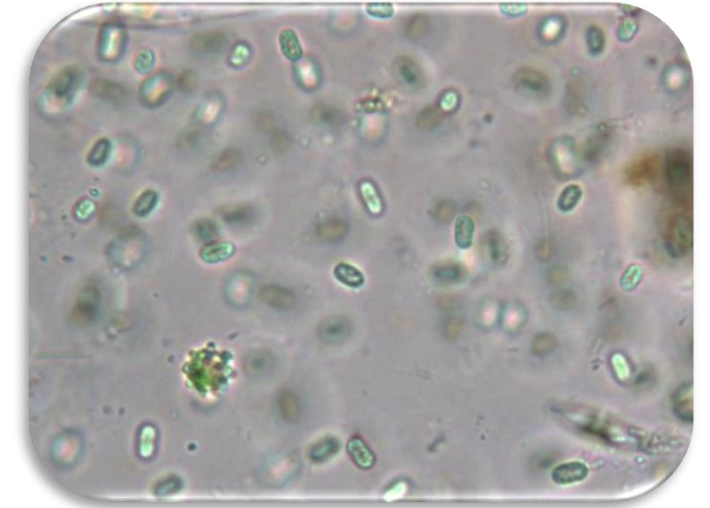
Lower Neuse Basin Association Nov, 1st , 2018

*Algal Bloom Assessment Program
Department of Environmental Quality
Division of Water Resources*



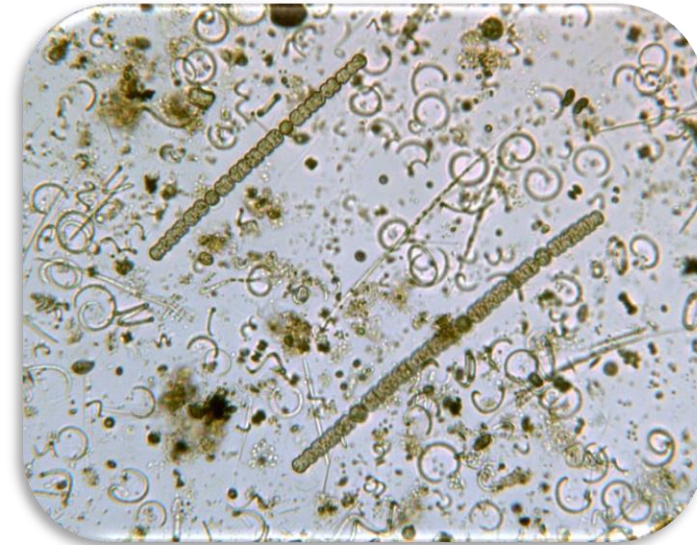
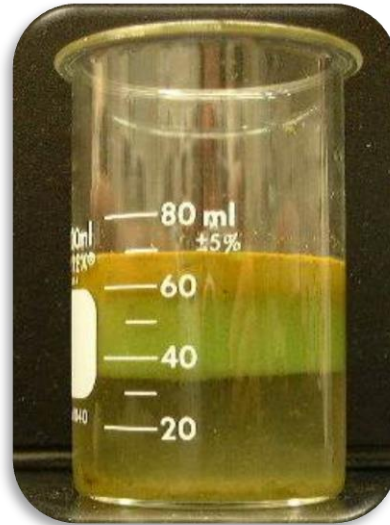
Algal Assessment Program

- Water Sciences Section, Ecosystems Branch
 - Three Phycologists (algal ecologists)
 - 50 years + combined experience
- Began 1980s
 - Clean Lakes Program, Chowan & Neuse Blooms, Red Tides
- Algae are:
 - Macroscopic or microscopic
 - Filamentous, periphytic or planktonic
 - Freshwater, estuarine or marine



Phytoplankton

- Focus: Phytoplankton
 - Algae in the water column
 - Blooms discolor water
 - Flecks, films and scums
- Analyses provide
 - Assemblage composition (identification)
 - Densities (cells and units/ml) & biovolumes



Past Algal Studies

- Basinwide & Ambient Monitoring Programs
 - Lakes, rivers and estuaries
 - 400-500 samples processed annually
- Special Studies
 - Nutrient Management Strategies
 - Jordan & Falls Lakes
 - Cape Fear River
 - Jordan Lake in-situ (SolarBees)
 - Nutrient Criteria Plan Development
 - High Rock Lake
 - Including Cyanotoxin assessments (NCSU)

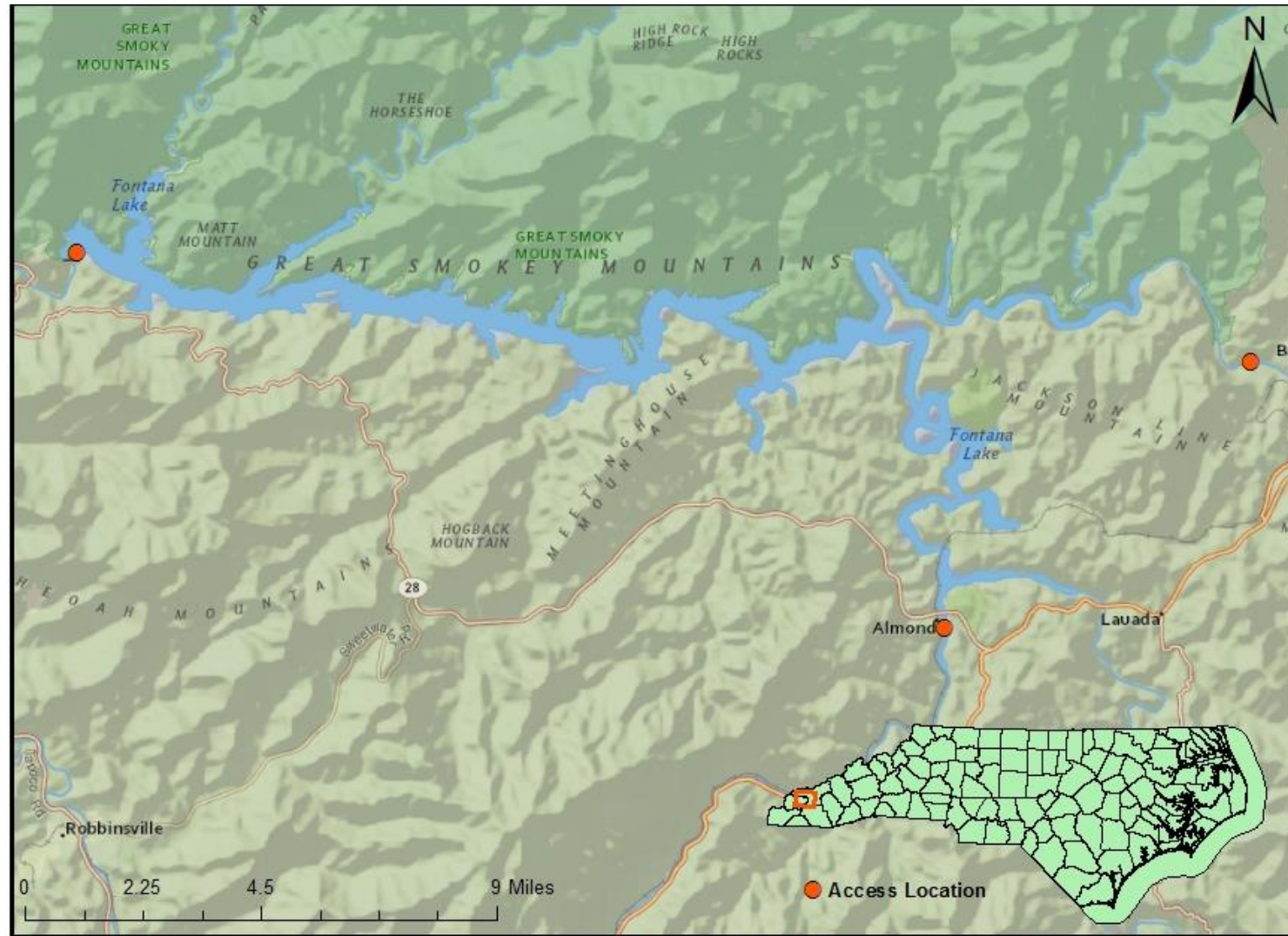


Harmful Algal Blooms (HABs)

- DWR defines HABS as:
 - Blooms of bluegreen algae that may produce toxins
 - Densities above 10,000 units/ml
- **PUBLIC HEALTH RISK = PUBLIC HEALTH DEPT.**
- Algal bloom investigations
 - Regional Offices
 - Estuarine Monitoring Team
- Episodic (1 to 7 days)
 - 31 in 2017
 - 20 considered pHABs
 - 34 so far 2018
 - 19 considered pHABs
 - 9 toxin detected
- Chronic (1 to 3 months, returning annually)
 - Fontana Lake 2015-2017
 - Chowan River/Albemarle Sound > 2015



Case Study: Fontana Lake 2015 -2017



Case Study: Fontana Lake 2015-2018

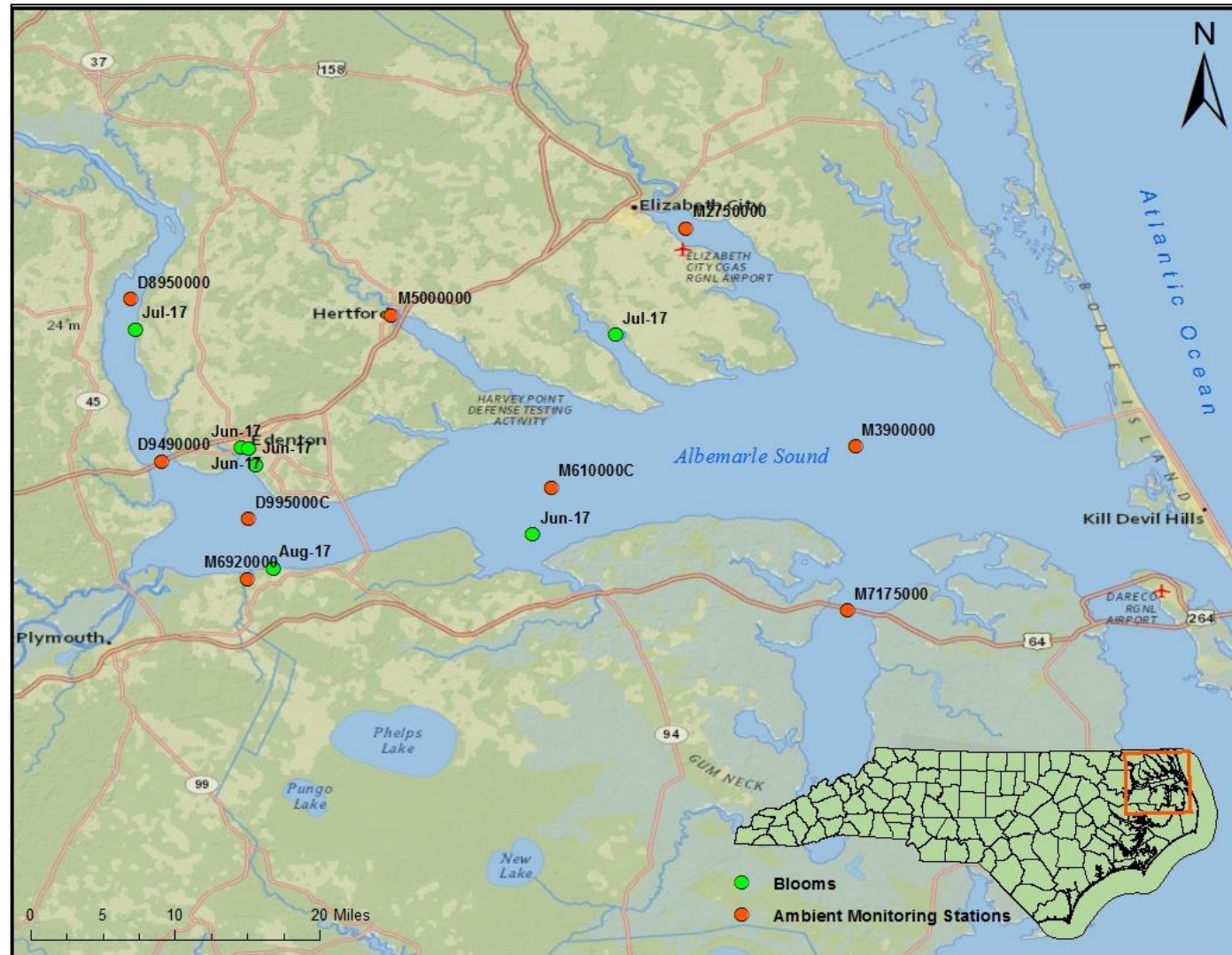
Bright green discolored water



Blueish white decomposing mess



Case Study: Chowan River/Albemarle Sound 2015-2018



Case Study: Chowan River/Albemarle Sound 2015-2017

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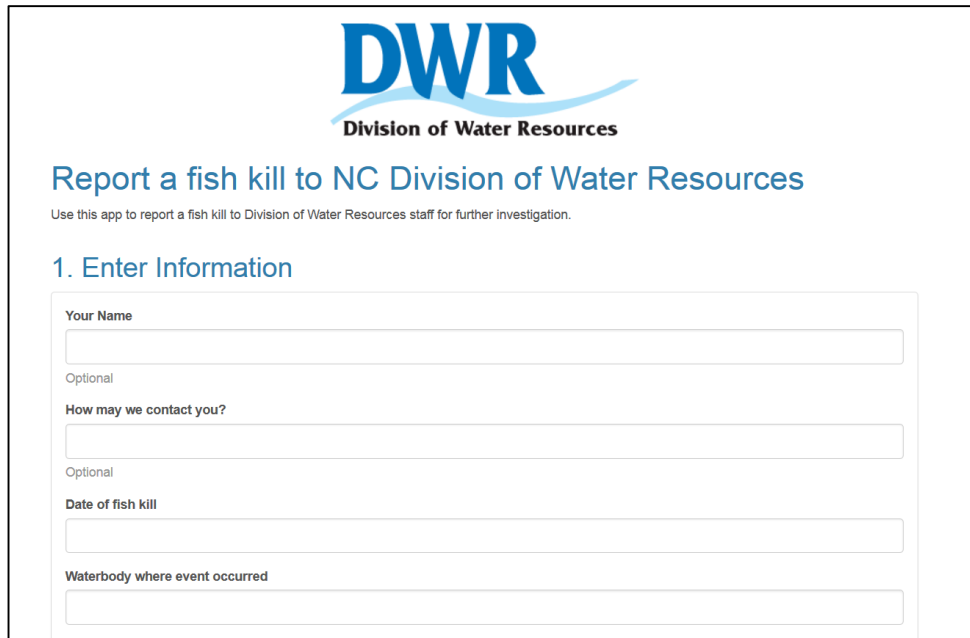
Cyanotoxin Testing Development

- Field Staff/Regional Office (2016)
 - Abraxis cyanotoxin test strips
 - Rapid assessment
 - Field or office use
 - Limited results (no verification procedures)
- Water Sciences Section Chemistry Laboratory (2017)
 - Abraxis Cyanotoxin Automated Assay System
 - ELISA instrument
 - Quality assurance and Quality Control procedures
- Special Studies (2018)
 - Draft cyanotoxin sampling procedures
 - Test strips vs ELISA
 - Basinwide Monitoring Program
 - Drinking water supplies
 - Emerging compounds (contaminants)
 - Comparison testing/Laboratory variance



Fish Kill and Bloom Reporting APP

- Developed as a Fish Kill reporting tool
- Reconfigured to include reporting algal blooms
- Downloaded to phone or via the [web](#)
- 46 fish kills where reported with this app in 2018
- 20 algal blooms were reported since spring 2018



DWR
Division of Water Resources

Report a fish kill to NC Division of Water Resources
Use this app to report a fish kill to Division of Water Resources staff for further investigation.

1. Enter Information

Your Name

Optional

How may we contact you?

Optional

Date of fish kill

Waterbody where event occurred

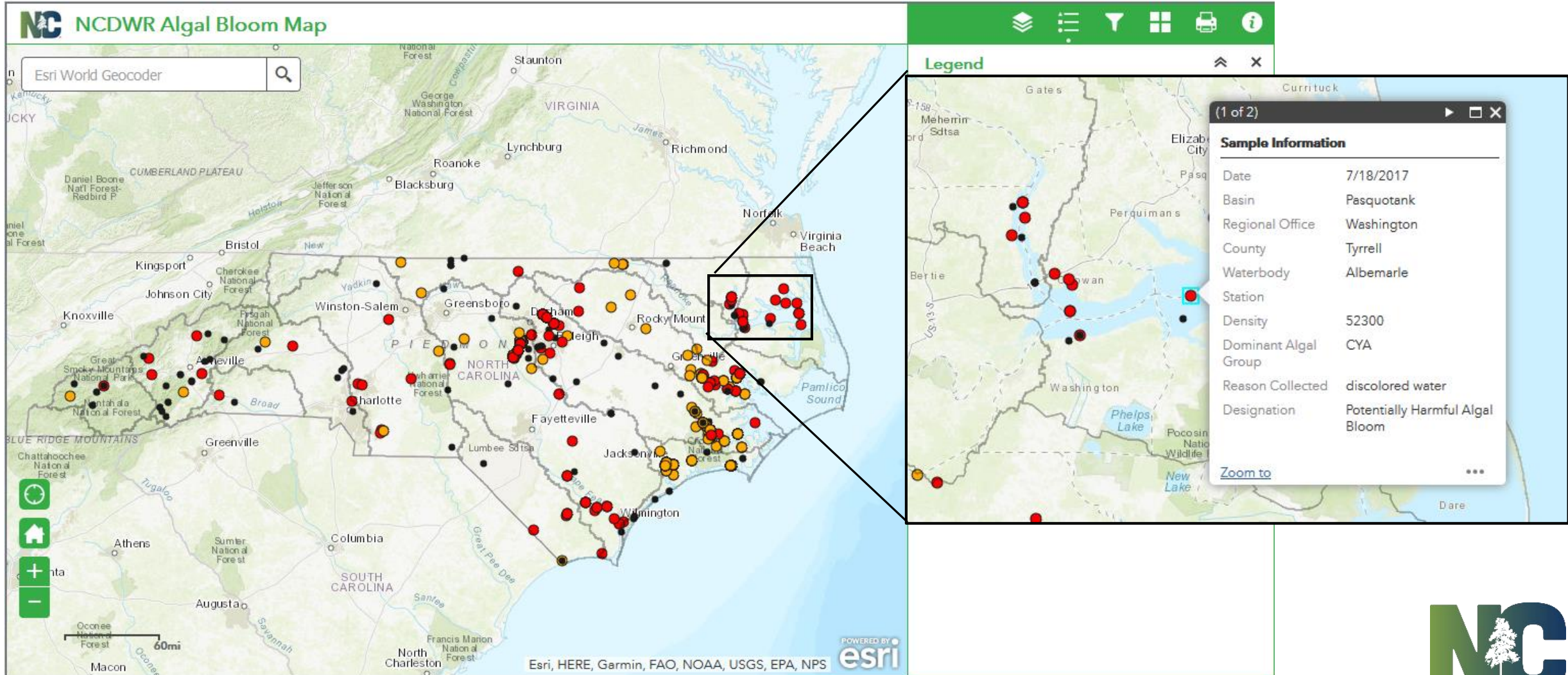


DWR App for Reporting Fish Kills and Algal Blooms

The Division of Water Resources often relies on citizens to report sightings of fish kills and algal blooms. Reporting these events in NC waters is now much simpler with the development of an online application that works on any device.

[Report a Fish Kill or Algal Bloom →](#)

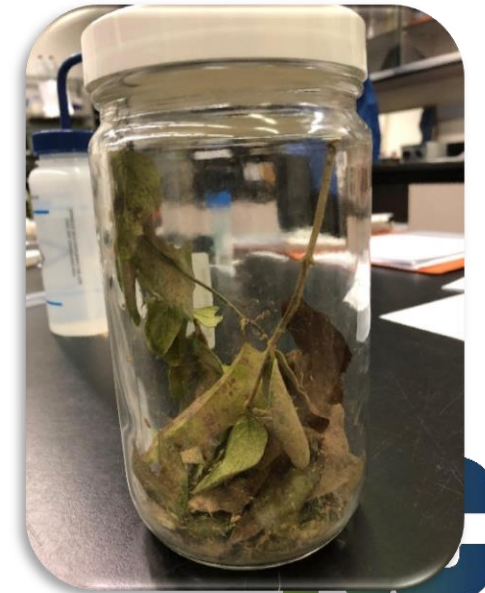
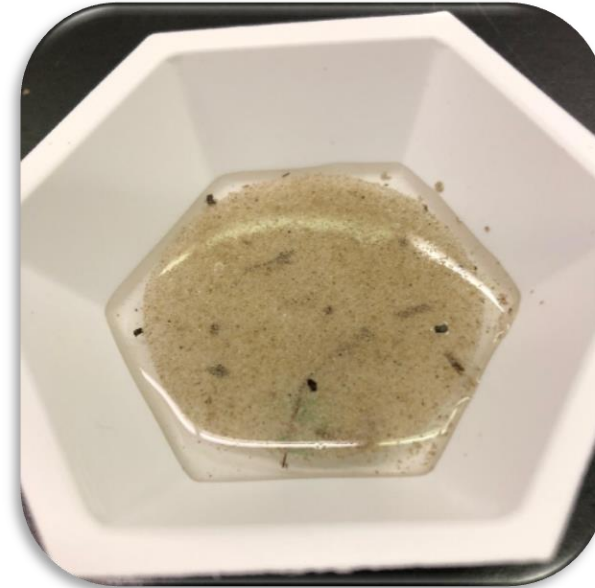
Algal Bloom Occurrence in North Carolina



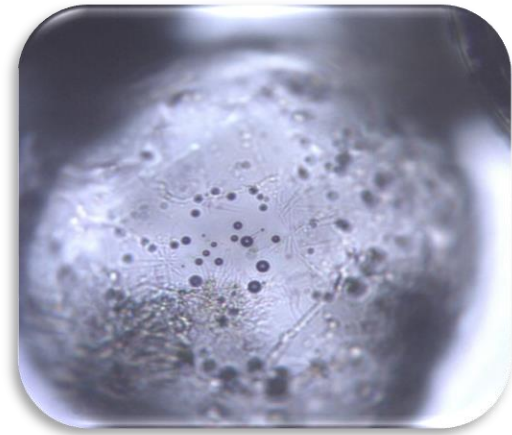
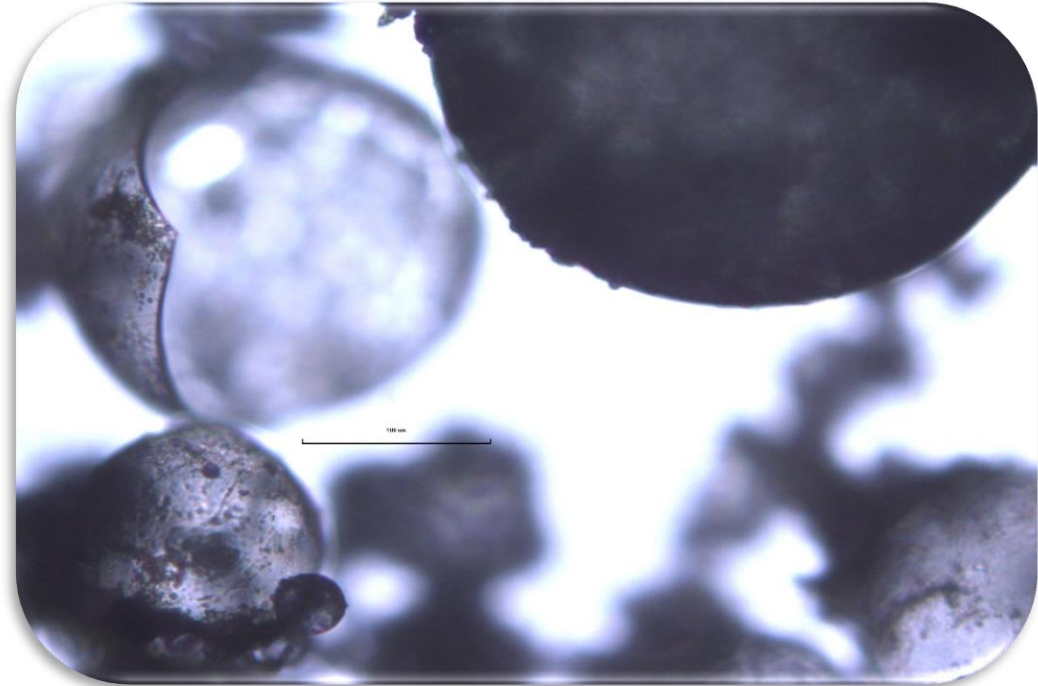
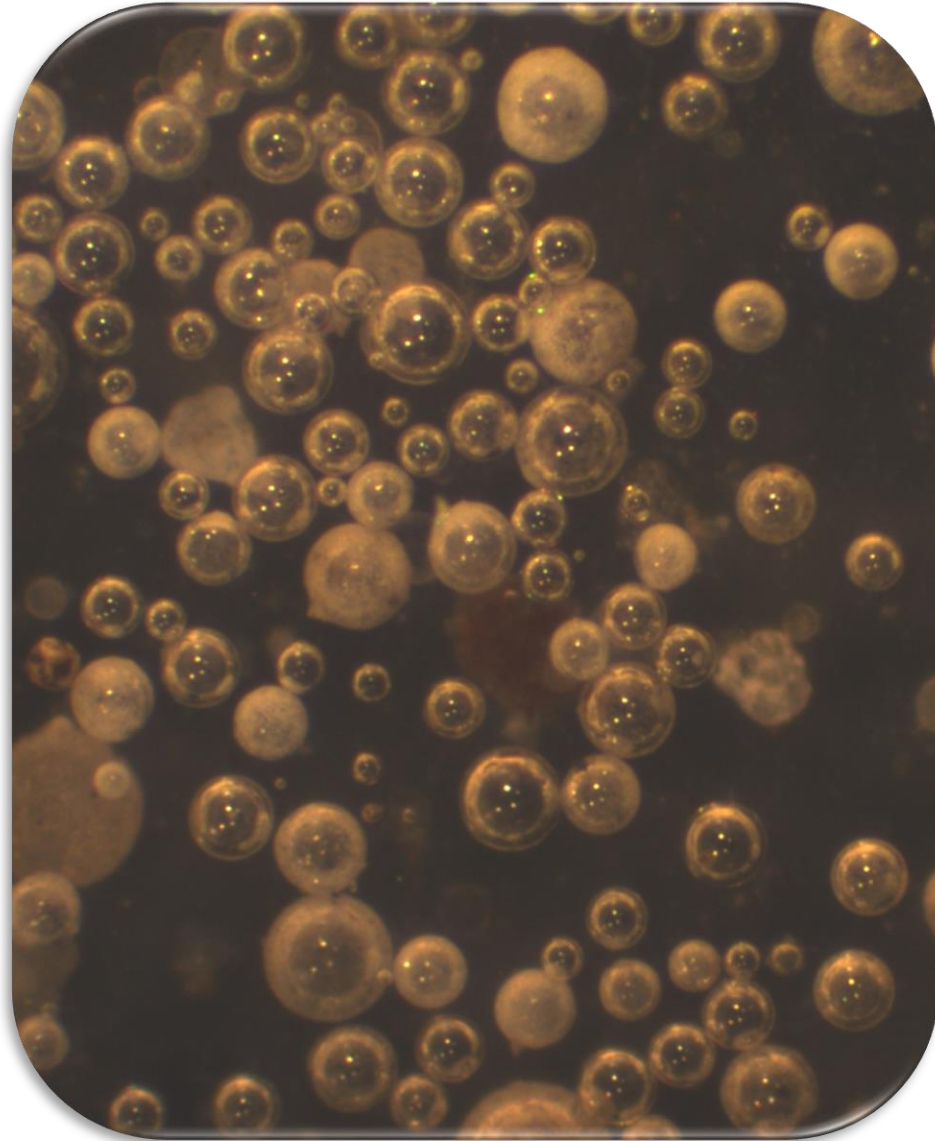
Coal Ash Investigations

“Cenospheres”

- Hollow, “glass” spheres (10-1000 μm) formed as by-product of coal combustion
- Lightweight, inert, largely made of silica and alumina.
- Are buoyant and are easily transported on surface of flowing waters.
- Can be used as an indicator for coal ash contamination (coal ash contains between 0.01-1% cenospheres)
- Can appear as white/tan/brown surface film or as sand deposited on debris and vegetation during high water
- May have an iron oxide coating that can contain heavy metals



Cenospheres Magnified



Contact Information

Water Sciences Section Chief
Cyndi Karoly cyndi.karoly@ncdenr.gov

Ecosystem Branch Supervisor:
Brian Wrenn brian.wrenn@ncdenr.gov

Algal Ecologists:

Mark Vander Borgh mark.vanderborgh@ncdenr.gov

Elizabeth Fensin elizabeth.fensin@ncdenr.gov

Leigh Stevenson leigh.stevenson@ncdenr.gov

