



Division of Waste Management PFAS Overview

December 7, 2020

NC Department of Environmental Quality



DWM PFAS Overview

- Areas of Focus
- Current program data
- Developments and Next Steps

Areas of Focus in NC-PFAS

- Assess the environmental impact of PFAS compounds to the environment.
- Ensure current regulatory requirements are met and evaluate future needs.
- Address the needs of surrounding communities and serve as a conduit for the community and local partners to help them respond to concerns.
- Further the knowledge base of emerging compounds through collaboration with the DEQ / DHHS Science Advisory Board and the Environmental Management Commission.

PFAS Resources

- State Resources
 - Division of Water Resources (DEQ)
 - Division of Waste Management (DEQ)
 - Division of Air Quality (DEQ)
 - Department of Health and Human Services
 - PFAS Network
- Federal Resources
 - EPA
- Local Resources
 - County Health Departments
 - Boards of Commissioners



Regulatory Climate NC DEQ

- Coordinating with the Secretaries' Science Advisory Board and NC Environmental Management Commission- PFOA / PFOS
- Addressing impacts to groundwater, surface water, soil and air as information becomes available
- Focusing on risk communication
- Evaluating next steps- beyond PQL (practical quantitation limits) for groundwater- EMC approved combined standard of PFOA/PFOS for public comment at 70ng/L.

The screenshot shows a web browser window displaying the North Carolina Department of Environmental Quality (DEQ) website. The page title is "Health-Related Resources About GenX, PFOA and PFAS". The website header includes the DEQ logo, a search bar, and navigation links for Home, Permits & Rules, Outreach & Education, Energy & Climate, Conservation, News, and About. The main content area lists resources under "State" and "Federal" categories. A sidebar on the right contains a "GenX Investigation" menu with links to GenX Timeline, Frequently Asked Questions, GenX News Releases, Chemours Permit Information, Investigations and Enforcement Actions, GenX Sampling Sites, Health Related Resources (highlighted), Air Quality Sampling, Groundwater, Presentations Related to GenX, and Secretaries' Science Advisory Board. The Windows taskbar at the bottom shows the date and time as 1:00 PM on 1/7/2019.



PFAS Key Points

- Stakeholder and community engagement are key components.
- DEQ has helped to host numerous community information sessions around the state (Bladen County, Cumberland County, Greensboro, Atlantic, NC).
- Data needs are extensive and require collaboration from all parties.
- Resources are also a critical aspect in addressing emerging compounds.

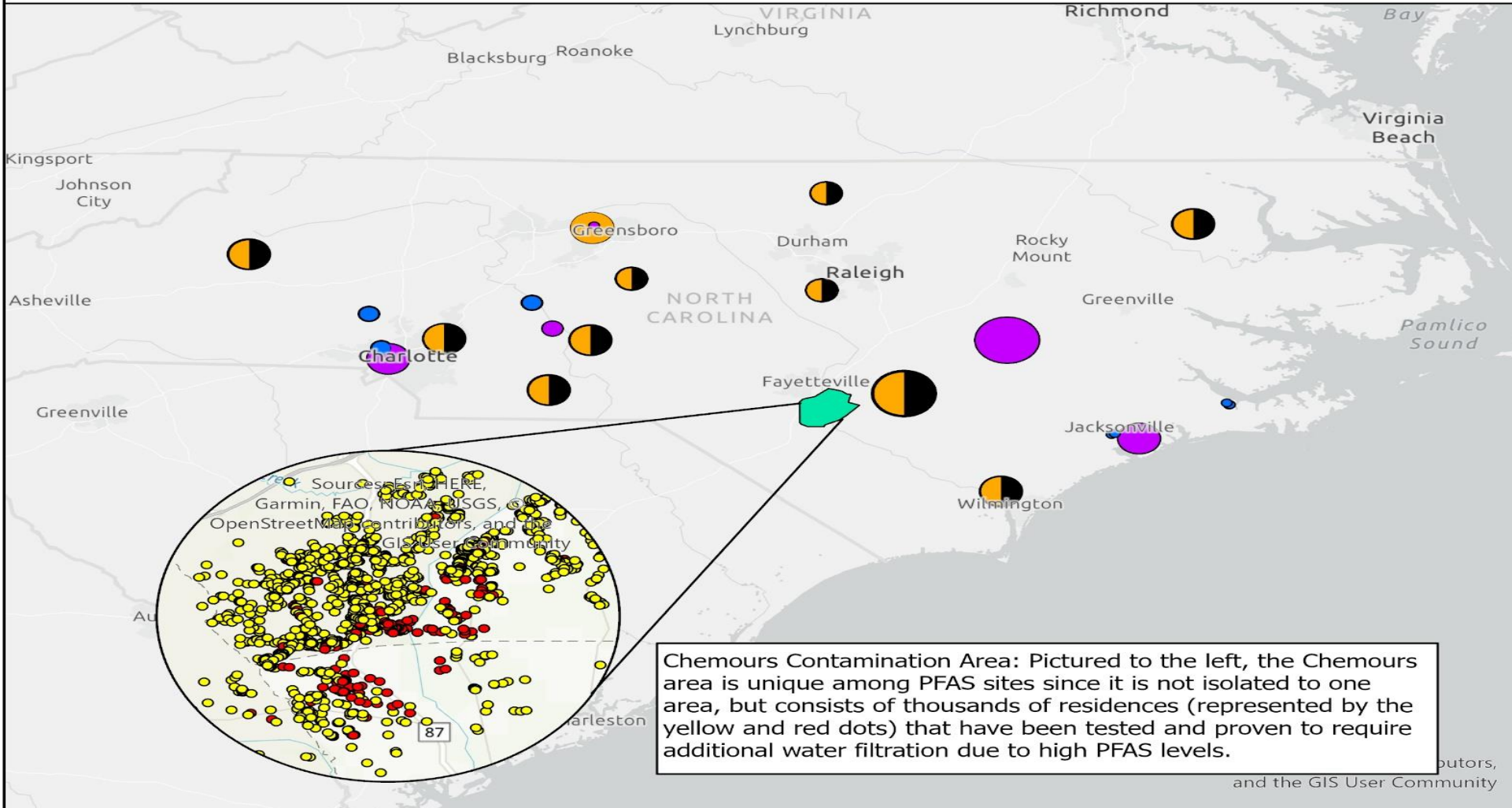


PFAS – Division of Waste Management Areas of Focus

- Hazardous Waste Program- RCRA facilities
- Solid Waste Program- Municipal Solid Waste landfills
- Superfund Program- Department of Defense / Homeland Security Sites
- Underground Storage Tank Program- Emergency Response / AFFF sites



NC DEQ Division of Waste Management PFAS Data by Concentration and PFAS Group



Legend

PFAS Contamination Level
 Total PFAS Concentration (Max) ppt

- ≤70
- ≤1,000
- ≤10,000
- ≤100,000
- >100,000

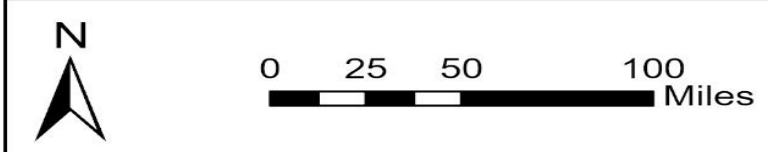
PFAS Group

- AFFF (Aqueous Film Forming Foam)
- Multiple Chemicals Found
- PFOA/PFOS
- Chemours Impacted Area
- ◐ Landfill Leachate
- Groundwater

Chemours Contamination Area: Pictured to the left, the Chemours area is unique among PFAS sites since it is not isolated to one area, but consists of thousands of residences (represented by the yellow and red dots) that have been tested and proven to require additional water filtration due to high PFAS levels.

Additional Information

- Concentration levels show the smallest group level as less than 70ppt (parts per trillion), since that is the Lifetime Health Advisory (LHA) level set by the EPA for PFOA/PFOS.
- The PFAS Group "Multiple Chemicals Found" means that at that location, compounds that fall in more than one of the PFAS groups, and/or may fall outside of the PFAS groups above, were identified at these sites.
- Some sites have additional surface water and soil PFAS detections, but only groundwater and landfill leachate has been accounted for on this map.



Map Creation Date: 12/02/2020
 Map Author: Elena Beckman
 Data Sources: North Carolina Department of Environmental Quality, ESRI

HW- RCRA Facilities

- The DWM RCRA program continues to evaluate its facility lists for sites that may have impacts from PFAS.
- Current areas of focus include sites where PFAS were produced and areas with known AFFF use.
- The program is starting to receive groundwater analytical data for PFAS on some of these sites.
- Compounds detected include: PFBS, PFBA, PFHxA, PFOA and PFOS



Onsite Groundwater Testing at Chemours



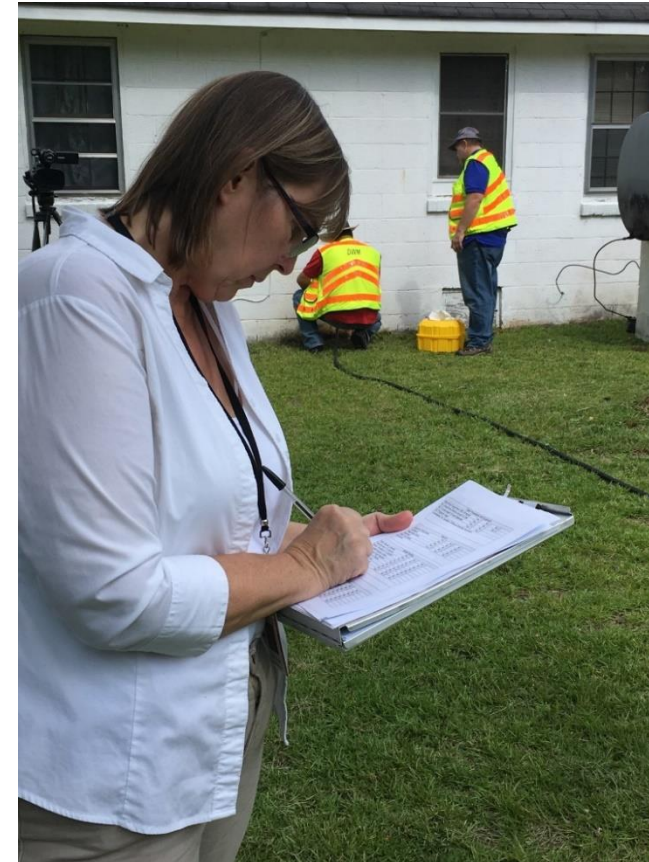
Primary compounds in groundwater:

- 1) PFMOAA
- 2) PSDA
- 3) HFPO-DA (Gen X)
- 4) PFO2HxA
- 5) PFO4DA

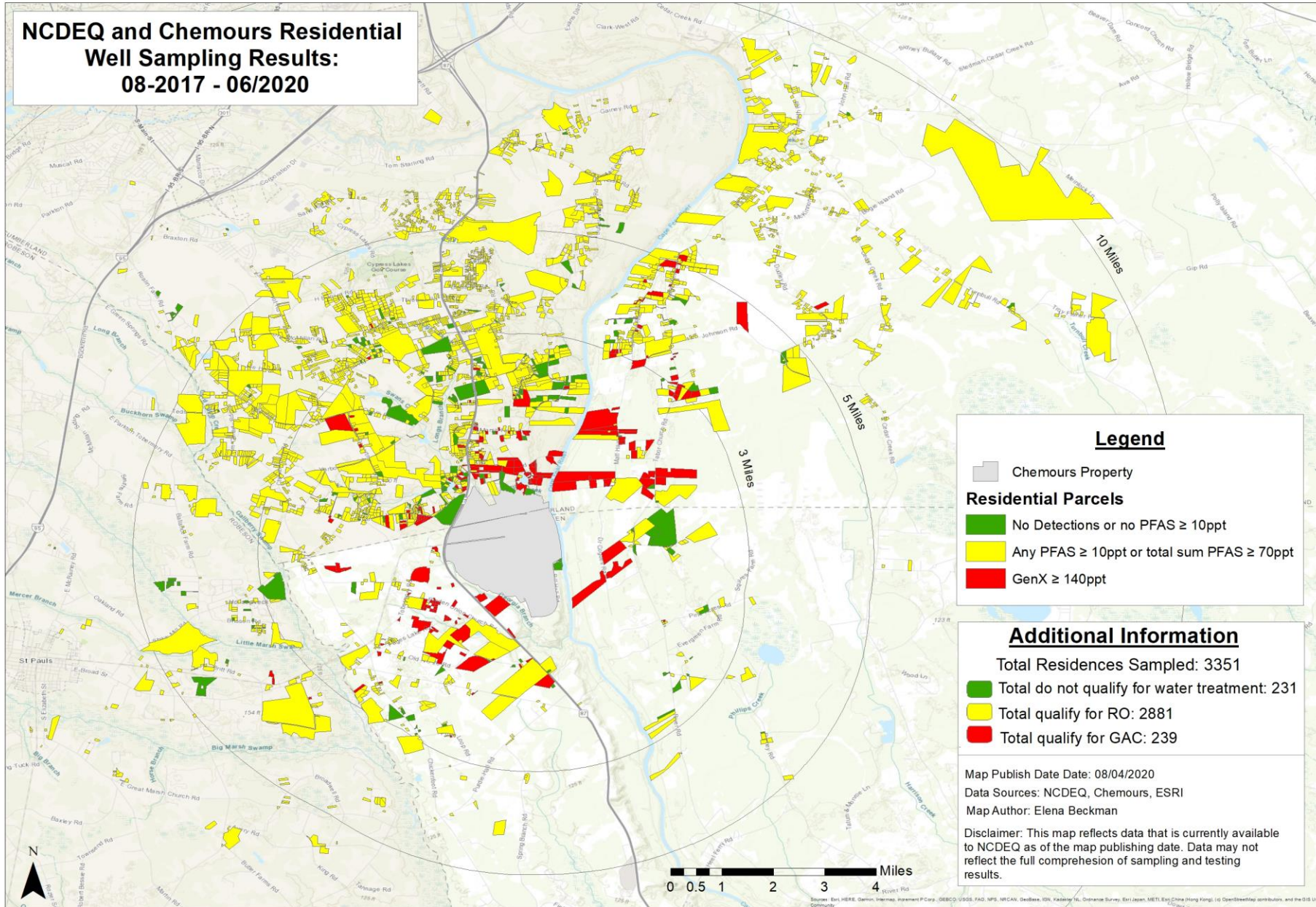


DEQ Offsite Groundwater Testing Around Chemours- Private Wells

- DWM continues to sample private wells around the Chemours plant
- DEQ is evaluating data abnormalities while also collecting performance data on filtration systems.
- DEQ has also collected surface water and soil data from around the plant.



**NCDEQ and Chemours Residential
Well Sampling Results:
08-2017 - 06/2020**



Primary compounds detected:

1. PFMOPra/PMPA (4032 Detections)
2. GenX (3962 Detections)
3. PFO2HxA (3332 Detections)
4. PFMOAA (2996 Detections)
5. PFESA BP2 (2467 Detections)



DEQ RO Filter Pilot Study

Results of under-sink Reverse Osmosis (RO) filter study

Pilot study goals:

- Are they effective at chemical removal?
- Assess high and low concentrations:
 - Low concentrations were eligible for RO (GenX=10-140ppt)
 - High concentrations were eligible for GAC (GenX>140ppt)

Basic study information

Four locations:

- 3 low concentration homes:
 - Avg. Total PFAS in untreated well water = 101-155 ppt
 - Up to 7 PFAS detected
- 1 high concentration home:
 - Avg. Total PFAS in untreated well water = 3,359 ppt
 - Up to 18 PFAS detected
- Analyzing for GenX and other PFAS

This RO system may perform differently from other RO systems available on the market.



Solid Waste- Landfill Leachate Data

- DEQ has collaborated with the waste industry within the Cape Fear River Basin to analyze leachate data from municipal solid waste landfills for PFAS and 1, 4 Dioxane.
- DEQ has sampled one MSW landfill for PFAS- New Hanover. This facility uses RO to treat its leachate.
- Primary PFAS detected in landfill leachate include:
PFBA, PFBS, PFHxS, PFHxA, PFHpA



DEQ- New Hanover County Landfill Sampling Event

- New Hanover County Landfill Sampling Event - City of Wilmington, mouth of Cape Fear
- Target analysis for 33 PFAS Compounds (in response to Cape Fear Public Utilities Authority sampling, Northside and Southside wastewater treatment plants)
- Two raw leachate samples were collected from raw leachate lagoon
- Two effluent water samples were collected subsequent to leachate treatment via the reverse osmosis system.
- All samples were analyzed for 33 Perfluorinated Chemicals (PFCs).
- Total PFC concentrations from the two raw leachate samples ranged from 12,231 parts per trillion (ppt) to 13,792 ppt.
- **No PFCs were detected** in the effluent water after raw leachate was treated by the reverse osmosis system.





New Hanover County Landfill Sampling Event

Post Reverse
Osmosis
System Sample



NC Collective Study

- In February 2019, DEQ met with landfill industry representatives to discuss the potential presence of PFAS in municipal solid waste landfill leachate and influence on leachate treatment/disposal practices.
- The landfill industry agreed to participate in a NC Collective Study.
 - Leachate samples were collected from four landfills in the Cape Fear River Basin and five landfills across the remainder of the State.
- The leachate sampling results indicated detectable concentrations of PFAS.
 - The daily mass of PFOS and PFOA discharged to public-owned treatment works (POTWs) was calculated using concentrations and estimated leachate volumes.
 - The calculated mean daily mass in MSWLF leachate was less than 0.001 lbs/day for PFOS or PFOA.



Landfill Leachate Data



	Min	Max	Mean
PFOS			
Concentration (ng/L)	82	402	199
Daily mass (lb/day)	0.00001	0.00014	0.00004
PFOA			
Concentration (ng/L)	108	3,690	1,005
Daily mass (lb/day)	0.00001	0.00098	0.00013



Collective Study Conclusions

- Between July and September 2019, NCDEQ required that POTWs in the Cape Fear River Basin with pretreatment programs collect influent samples for PFAS.
 - This included four POTWs that receive leachate from MSWLFs in the NC Collective Study.
- The POTW sampling results were obtained from the NCDEQ website and used in conjunction with permitted flow rates to calculate the daily mass in POTW influent.
- Based on comparison of the daily mass values for MSWLF leachate versus POTW influent, the estimated percent contribution of MSWLF leachate to overall POTW mass for the sites in the NC Collective Study ranged from 0.3% to 10.2% for PFOS and PFOA, with an average of 3.3%.
- For the POTWs that receive leachate from landfills in the NC Collective Study, NCDEQ concluded that the PFOS and PFOA concentrations for these POTWs would not cause levels at downstream public water supply intakes that exceed the respective EPA Drinking Water Health Advisory Levels.





*Work at
Superfund
Sites Across
NC*



Superfund Program PFAS data

- Work performed in conjunction with Department of Defense representatives.
- Primary compounds detected: PFOA, PFOS, PFHxS, PFHxA, PFBS, PFPeA
- Ongoing site investigations and assessments at several military installations.
- DEQ continues to coordinate with the military installations across NC to determine impacts from PFAS.





Aqueous Film Forming Foam (AFFF) Emergency Response Sites

- DWM has responded to several sites where AFFF has been used to suppress gasoline tanker fires.
- Focus is on receptors
- DEQ has coordinated with the PFAS Network on some tanker incidents.
- Primary PFAS detected include: 6:2 FTAB, 6:2 FTS, PFPeA, 6:2 PFS, PFHxA, PFOS, PFOA

PFAS Next Steps

- Continued coordination with all stakeholders- EPA, citizens, industry, environmental groups.
- Continue to evaluate areas of potential exposure to emerging compounds.
- Glean information from other countries (Netherlands) and states (Michigan, Vermont) who are addressing this same subject.
- Continued focus on risk communication for what is known and what is not known about emerging compounds.



Questions?

Michael E. Scott
N.C. Division of Waste Management
919-707-8246
Michael.Scott@ncdenr.gov

Department of Environmental Quality

