

Division of Water Resources, PFAS

December 7, 2020

Department of Environmental Quality



Outline

PFAS Work at DWR

- Water Sciences Section
- Planning Section
- Ongoing Work at Chemours
- Water Quality Permitting
- Groundwater
- Overall Strategy
- Summary – Overview of Top 6 PFAS analytes



Water Sciences Section

Past, present, and future Survey studies

| Sample Site | Parameter | Sample Frequency | Matrix | Sample Type | Start Date | End Date |
|---|---------------------|------------------|------------------|-------------|---------------------------|--------------------------|
| Jordan Lake (5 locations) | 23 PFAS Analytes | 1x/month | Surface Water | Grab | Jan. 2018 to June 2020 | June 2018 Present |
| | | | | | May 2020 | Sept 2020 |
| PWS reservoir intakes in Neuse (10 sites) | 23 PFAS Analytes | 1x/month | Surface Water | Grab | May 2020 | Sept 2020 |
| PWS reservoir intakes in Yadkin-Pee Dee, Lumber, and Broad basins (25 sites) | 23 PFAS Analytes | 1x/month | Surface Water | Grab | May 2021 | Sept 2021 |

Samples collected starting in 2020 are analyzed in the DWR lab with improved detection levels than those sent to the EPA lab.

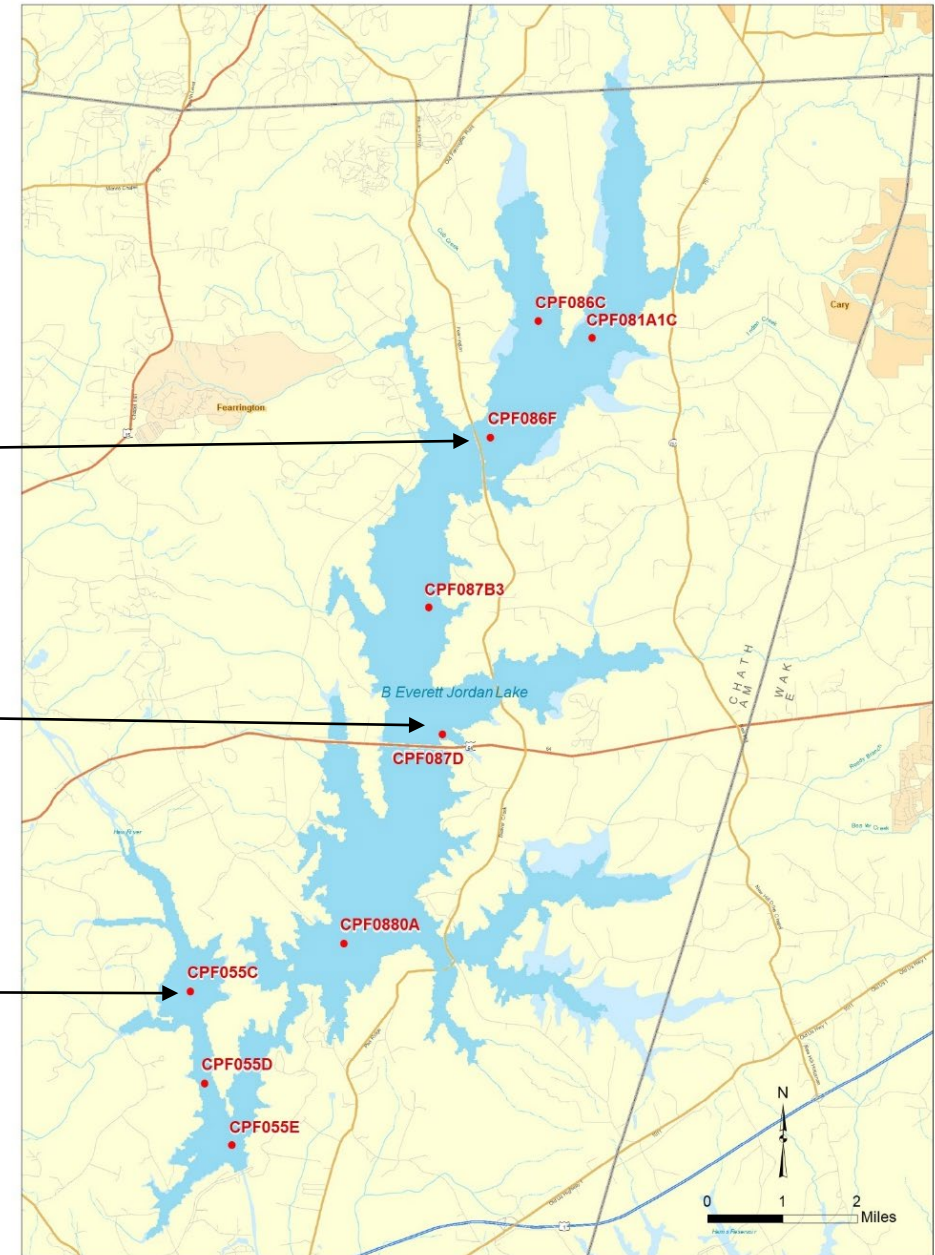
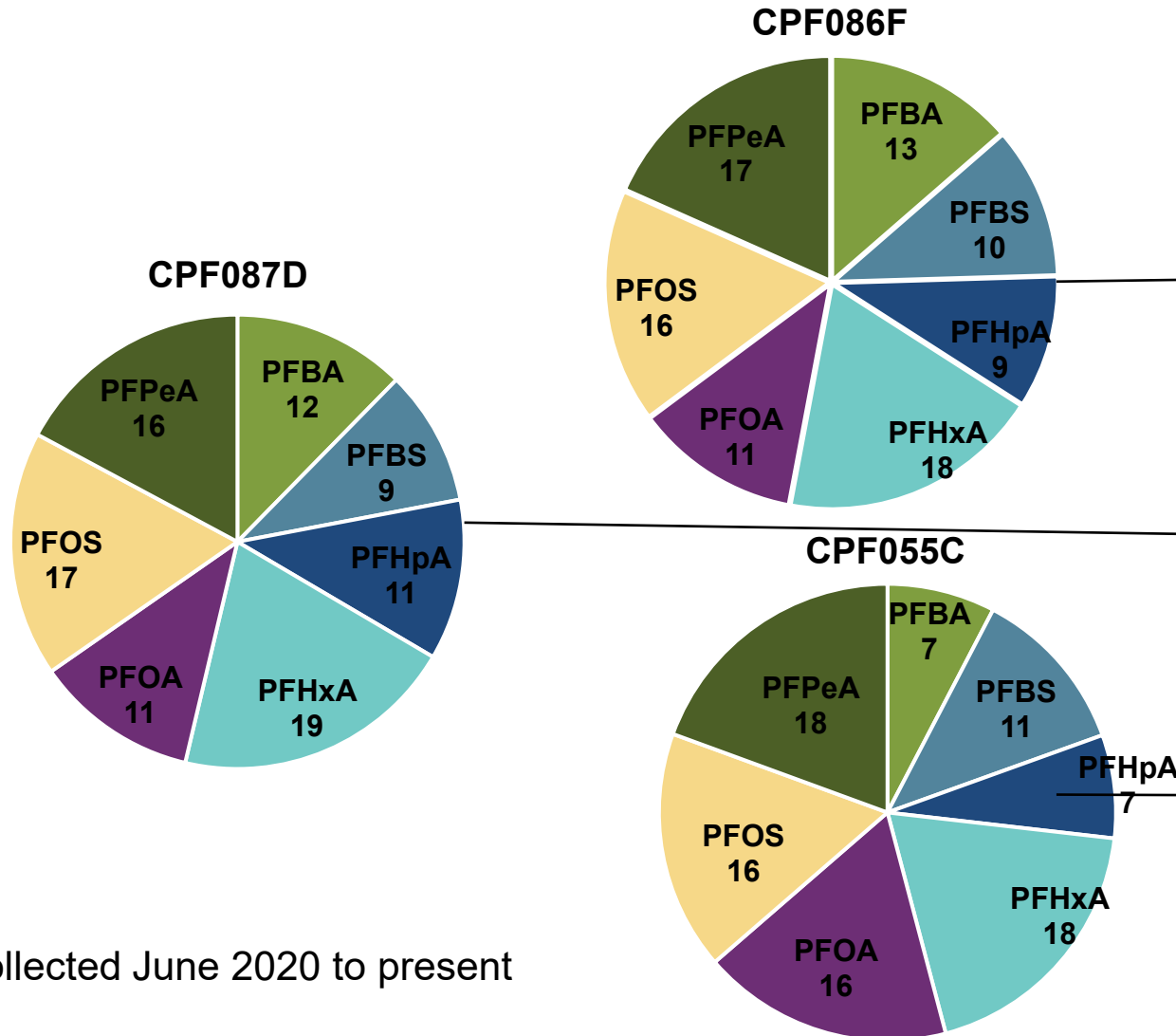
The next two slides show results from samples analyzed by DWR for Jordan Lake and the Neuse reservoir intakes.



Top 7 Analytes % Contribution to Detected PFAS Totals

Jordan Lake

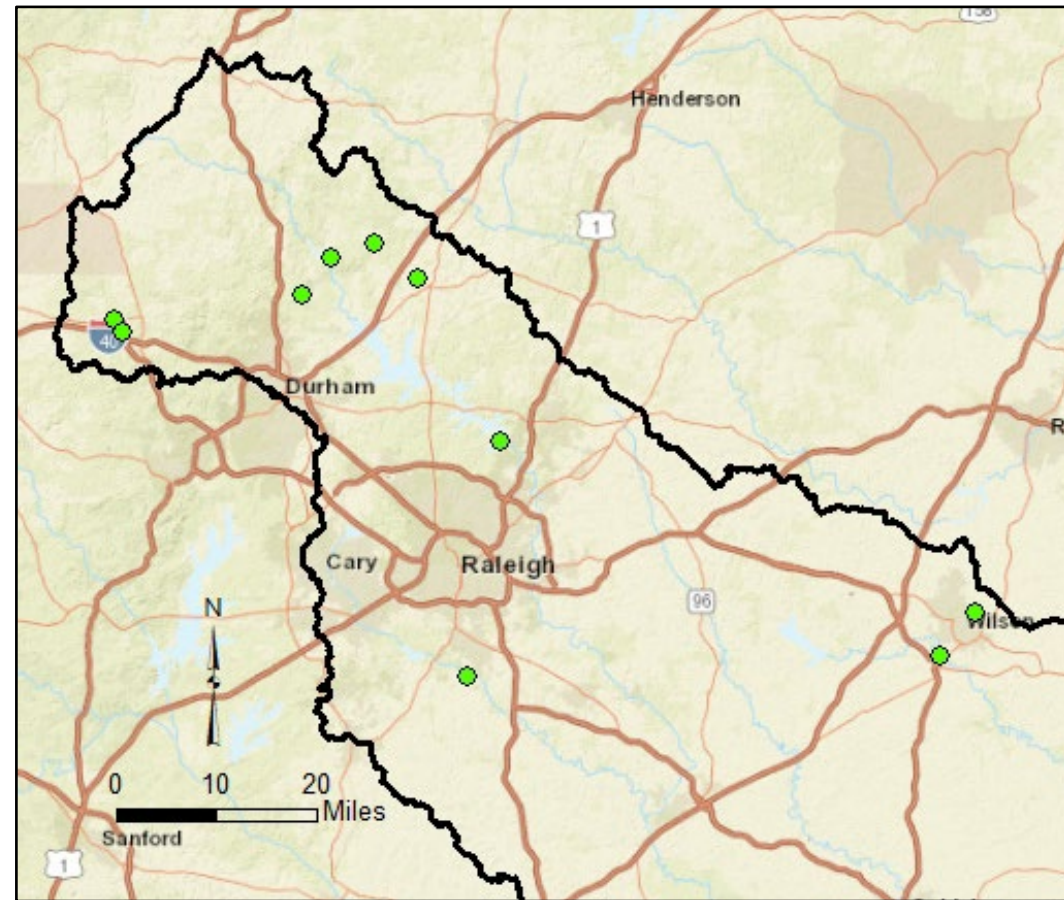
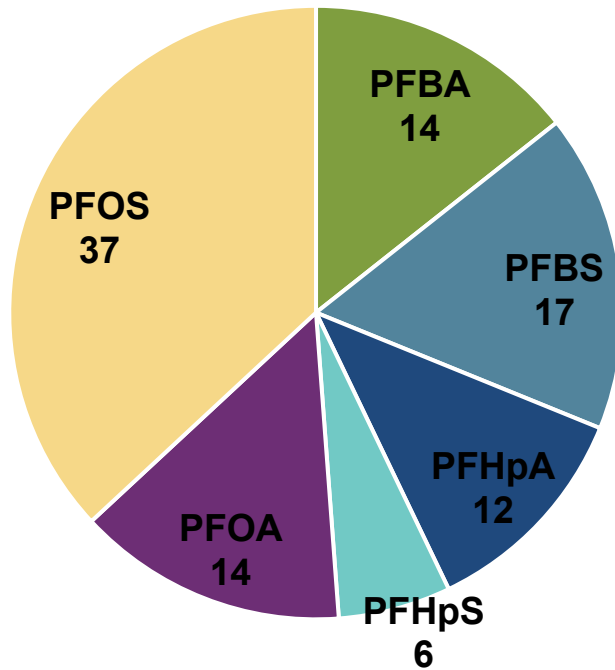
Approx. 90% of Total PFAS



Data collected June 2020 to present

Top 6 Analytes % Contribution to Detected PFAS Totals in Neuse Basin PWS Reservoirs

Approx. 87% of Total PFAS



Data collected May 2020 – Sept. 2020



Water Sciences Section

Intensive Survey Branch of the Water Sciences Section (WSS) conducted three different six-month screening efforts in 2018 to characterize the presence and concentration of 23 different PFAS compounds; 1,4-dioxane; and bromide in selected public water supply reservoirs. (*Contact: Eric Morris*)

1. Report released April 2019, **“Identification of Select Emerging Compounds in B. Everett Jordan Reservoir, Haw River Arm Watershed, and New Hope Creek Arm Watershed.”**
2. Report released April 2019, **“Identification of Select Emerging Compounds in Falls of the Neuse Reservoir and Surrounding Watershed.”**
3. Report released April 2019, **“Identification of Select Emerging Compounds in Public Water Supply Reservoirs in the Cape Fear, New and Watauga River Basins.”**

All studies can be accessed on DEQ’s Emerging Compounds webpage

EPA Athens lab used a different test method with PQLs of 40 ppt or higher, so the data is not suitable for comparisons to recent studies and analysis performed in the DWR lab.



Planning Section - Standards

| Substance | Resource | Current Concentration | Effective Date | Proposed Concentration | Reference |
|-----------------------------|---------------|-----------------------|----------------|--|---|
| PFOA/PFOS, GenX, other PFAS | Surface Water | None | N/A | None | N/A |
| PFOA | Groundwater | 2 ug/L (ppb) | 12/6/2006 | see PFOA+PFOS proposed concentration below | IMAC |
| PFOS | Groundwater | None | N/A | See PFOA+PFOS proposed concentration below | N/A |
| PFOA+PFOS | Groundwater | None | N/A | 70 ng/L (ppt) (sum total of both compounds if they co-occur) | Proposed gw standard 15A NCAC 02L .0202 Approved to go to public notice |

PFOA +/- or PFOS EPA Drinking Water Health Advisory 70 ng/L (ppt) 5/1/2016 US EPA review in process

<https://www.epa.gov/sites/production/files/2018-03/documents/dwtable2018.pdf>



Chemours – DHHS GenX Health Goal

As a result of the discharge of GenX (HFPO – DA) from Chemours:

NC DHHS Health Goal Established

| Substance | Resource | Current Concentration | Effective Date | Proposed Concentration | Reference |
|-----------|---------------|-----------------------|---|------------------------|--|
| GenX | Surface Water | 140 ng/L (ppt) | 7/1/2017 (not an adopted DWR Standard) | N/A | https://files.nc.gov/ncdhhs/documents/files/Appendix%20B%20GenX%20fact%20sheet.pdf https://epi.dph.ncdhhs.gov/oe/a_z/genx.html |

- Chemours stopped discharging process wastewater to Outfall 002 in Oct. 2017
- Chemours performed a PFAS NON-TARGETED ANALYSIS AND METHODS INTERIM REPORT on Process and Non-Process Wastewater and Stormwater-June 2020 (Paragraph 11 of CO)
- Chemours is installing remediation treatments to reduce PFAS loading to CF (Old Outfall 002 and Seeps)
- Chemours to separate stormwater from Non-Process Wastewater and treat SW in Manufacturing area.

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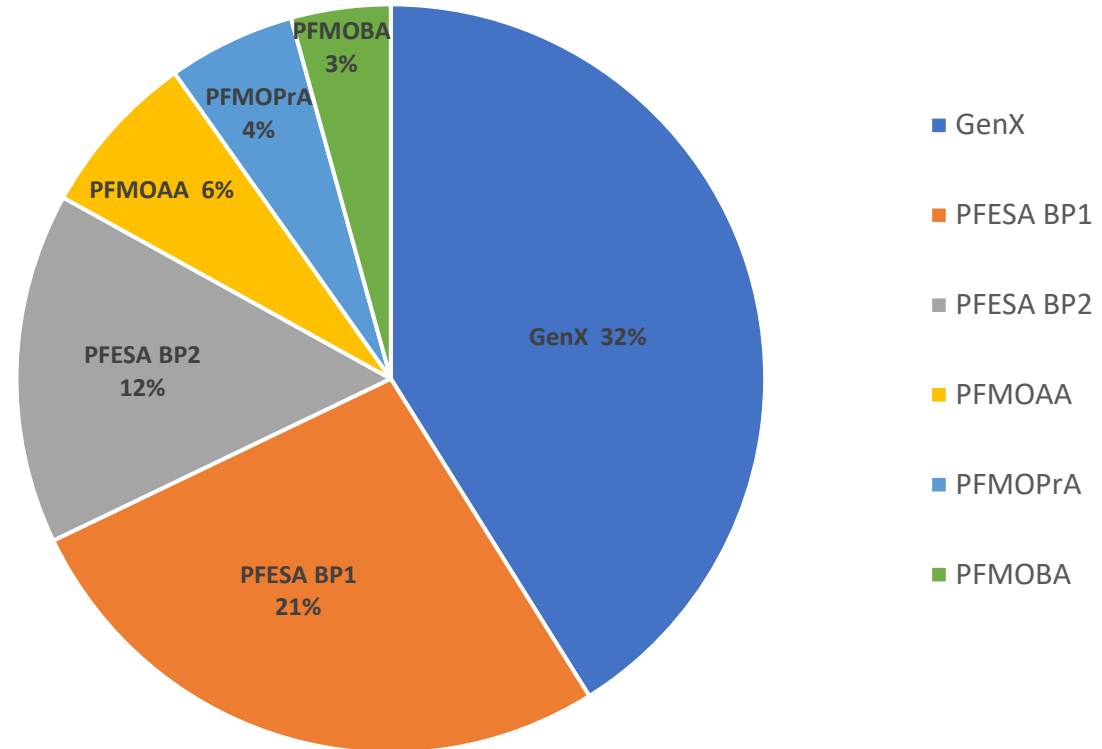


Chemours Outfall 002

DWR Data Collected 8/21 - 9/29/2020

| Analyte | DWR data (ng/L) | % of total detected PFAS |
|-----------|-----------------|--------------------------|
| GenX | 221 | 32% |
| PFESA BP1 | 144 | 21% |
| PFESA BP2 | 81.5 | 12% |
| PFMOAA | 38.5 | 6% |
| PFMOPrA | 29.6 | 4% |
| PFMOBA | 23.1 | 3% |
| PFPeA | 23.1 | 3% |
| PFO2HxA | 21.1 | 3% |
| PFOS | 15.9 | 2% |
| PFO3OA | 15.4 | 2% |
| PFHxA | 11.6 | 2% |
| PFO5DoA | 10.7 | 2% |
| PFO4DA | 10.5 | 2% |
| PFBA | 9.86 | 1% |
| PFOA | 9.36 | 1% |
| PFBS | 6.55 | 1% |
| PFHxS | 6.23 | 1% |
| PFHpA | 5.53 | 1% |

Top 6 Analytes (79%) of Total Detected PFAS - DWR Data



Groundwater Section



- Sampled 30 wells at 12 different locations (multiple aquifers in some locations) for PFAS compounds. Data is being reviewed; preliminary results indicate very low levels of PFAS in some of these samples.
- There are over 500 wells that are part of our state-wide groundwater network.
 - DWR goal is to sample all of these wells over the next 4-5; however this will depend on staffing and resources available to the division.



Water Quality Permitting

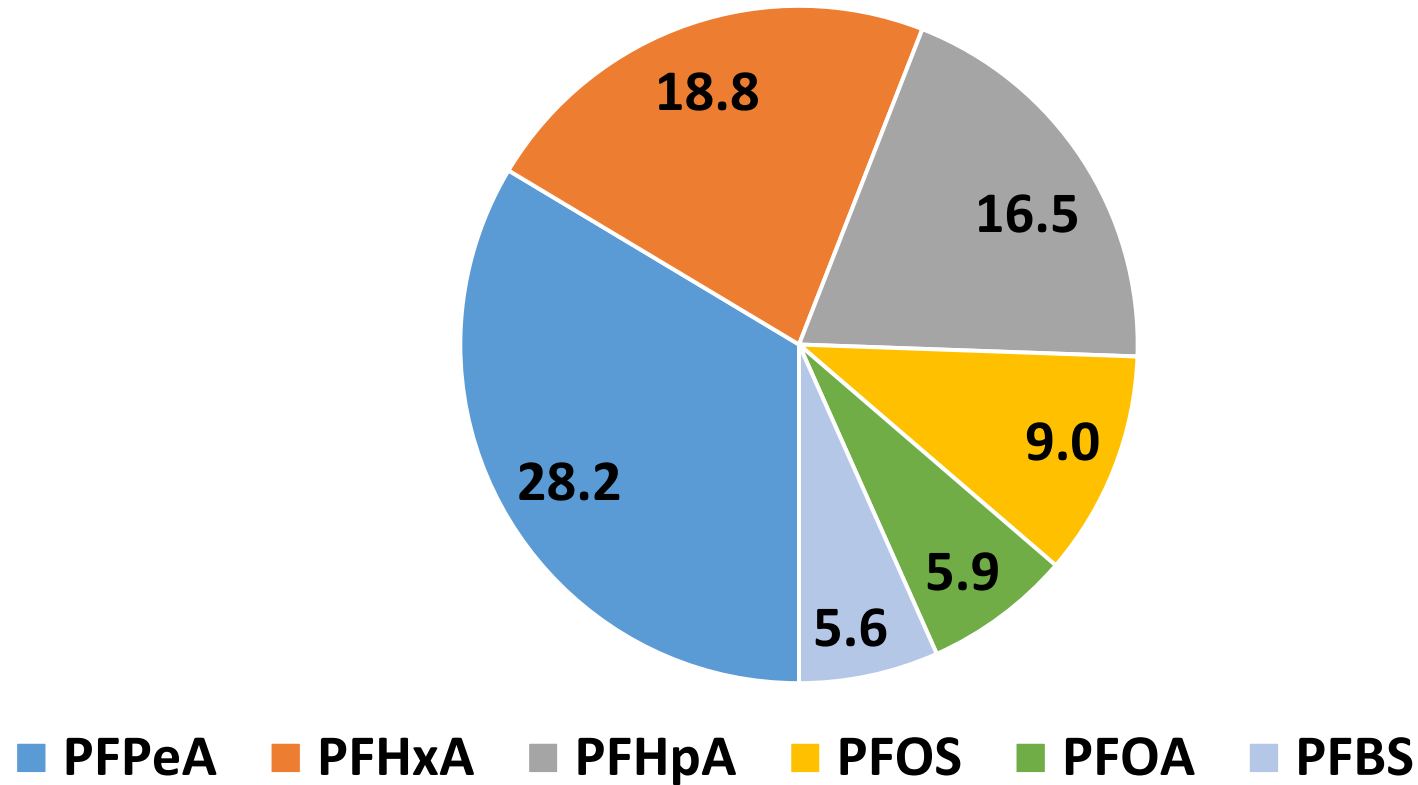


Cape Fear Basin - Emerging Compounds Investigation

- 2018, July: Initiated with Greensboro an Upper Piedmont Emerging Contaminants (UPEC) Workgroup
- 2019, May 21: Water Quality Permitting Emerging Compounds Workshop welcoming all POTWs but primarily POTWs with pretreatment programs in the Cape Fear River Basin
- 2019, Fall: Required 28 POTWs with a Pretreatment Program to perform influent screening on 1,4 dioxane and PFAS compounds
- 2020, Spring: Required 8 Industries with a direct discharge to state waters to perform PFAS effluent screening
 - Based on results – additional sampling of PFAS levels in discharge (effluent) is being performed at 2 POTWs and 2 Industry.
- 2020, Fall: Regional staff are performing effluent sampling at six 100% domestic municipal facilities discharging < 1 MGD, two samples will be taken at each to determine background levels of PFAS (sampling not completed yet, Covid-19 slowed study initiated in Jan. 2020).

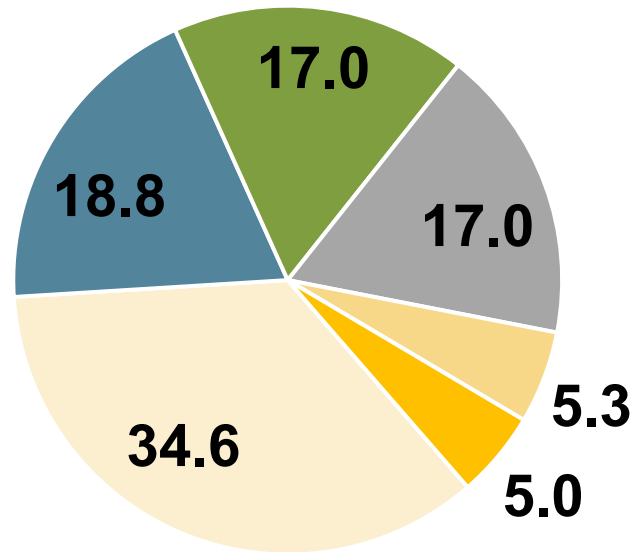
Evaluation of Influent PFAS data from 27 Municipalities in the Cape Fear River Basin

Municipal PFAS Top 6 Contributors (Sanford Omitted)



Evaluation of Effluent PFAS data from NC0024147

NC0024147 PFAS Top 6 Contributors



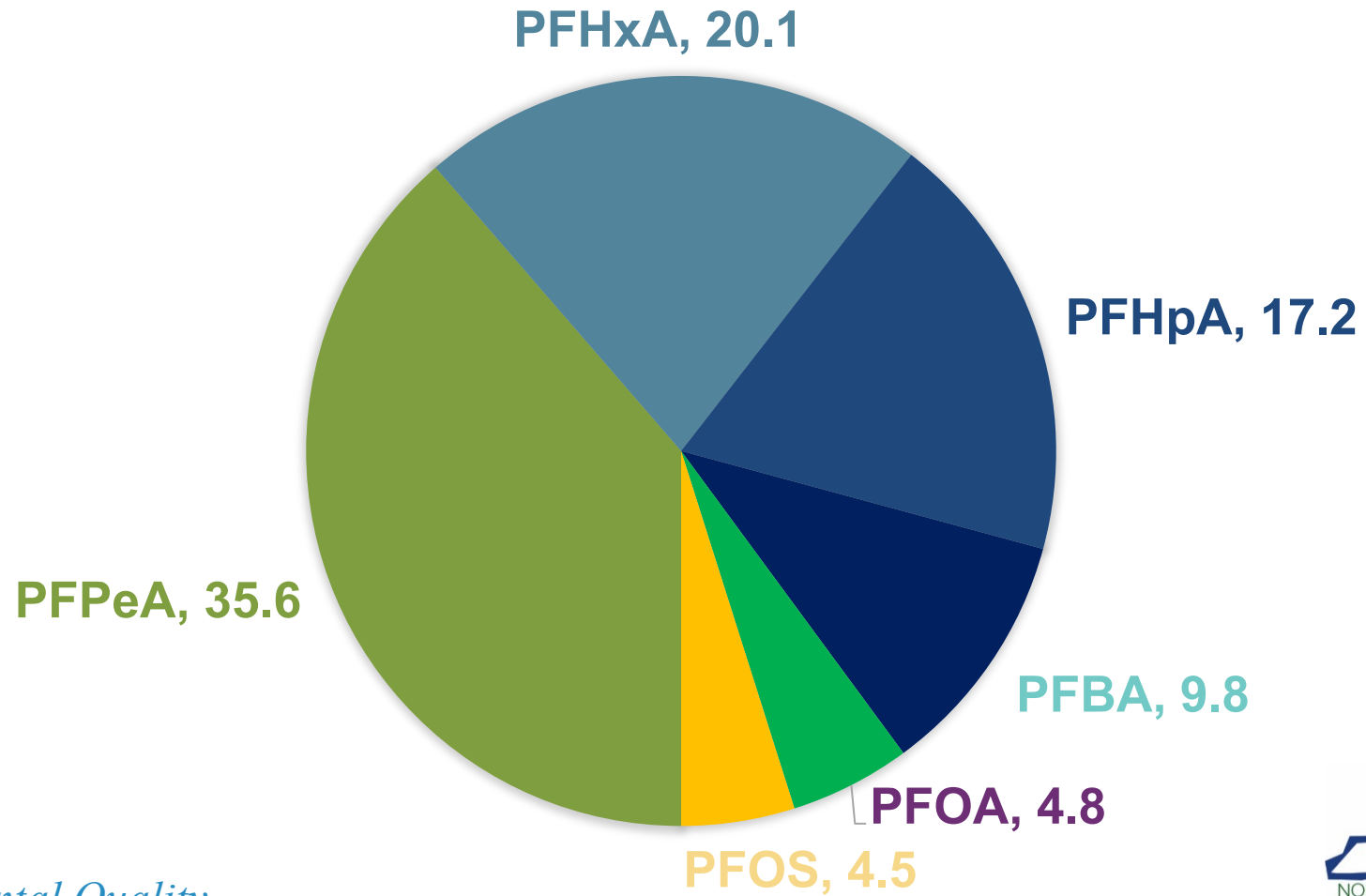
■ 6:2 FTS ■ PFHxA ■ PFPeA
■ PFHpA ■ PFOA ■ PFOS

Reason for Separation of NC0024147 from the Rest of the Municipal Facilities

- If NC0024147 data were to be bundled with the rest of the municipal data, 6:2 FTS would jump from comprising 0.1% of the total PFAS to comprising 3.3% of the total PFAS
- Including NC0024147 data in concluding which PFAS parameters were most prevalent would skew conclusions
- NC0024147 is seemingly the only facility with this much 6:2 FTS and should be examined separately

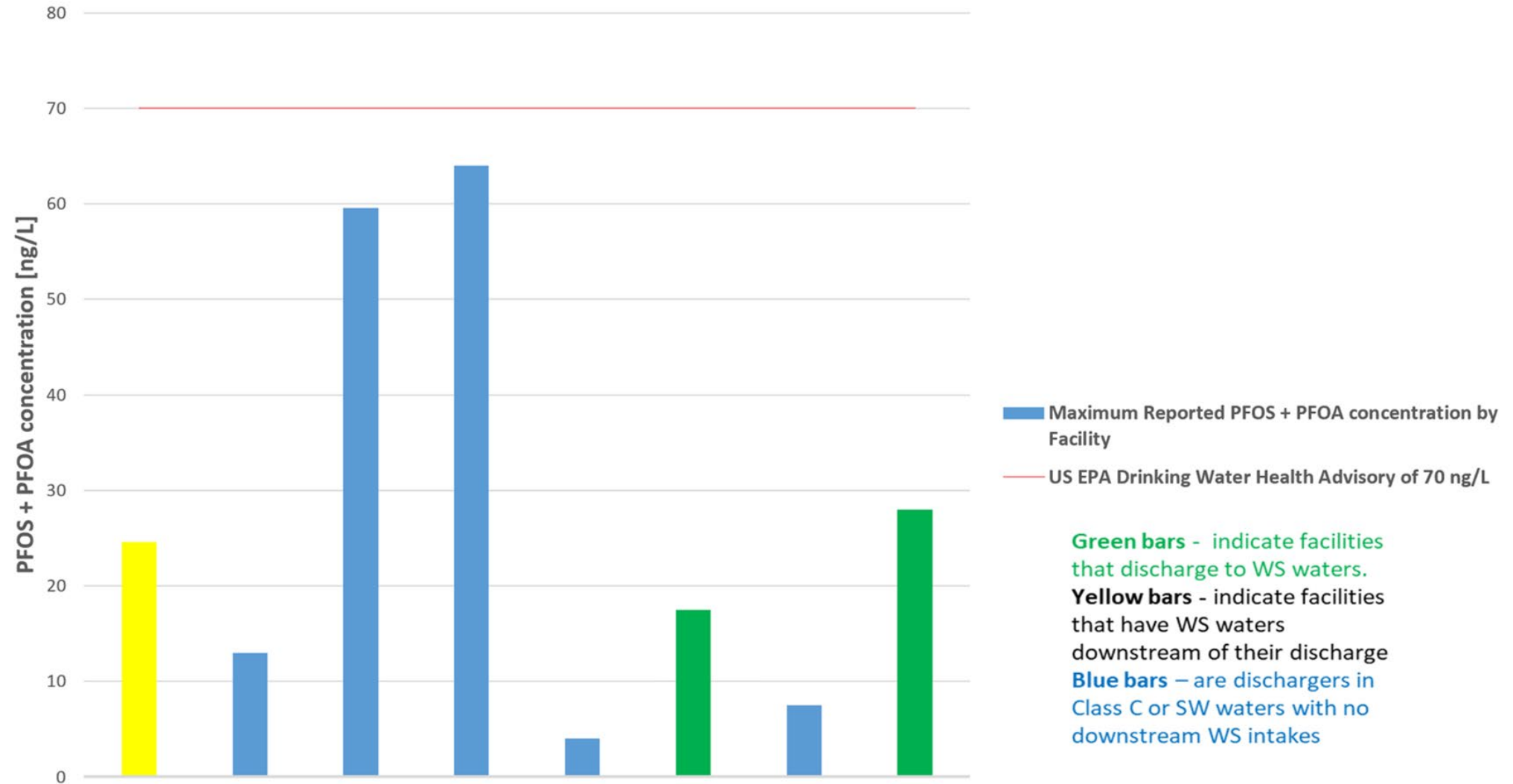
Evaluation of Effluent PFAS data from 8 Industrial Direct Dischargers in the Cape Fear

INDUSTRIAL PFAS TOP 8 CONTRIBUTORS





Maximum Reported PFOS + PFOA Concentration by Industrial Facility



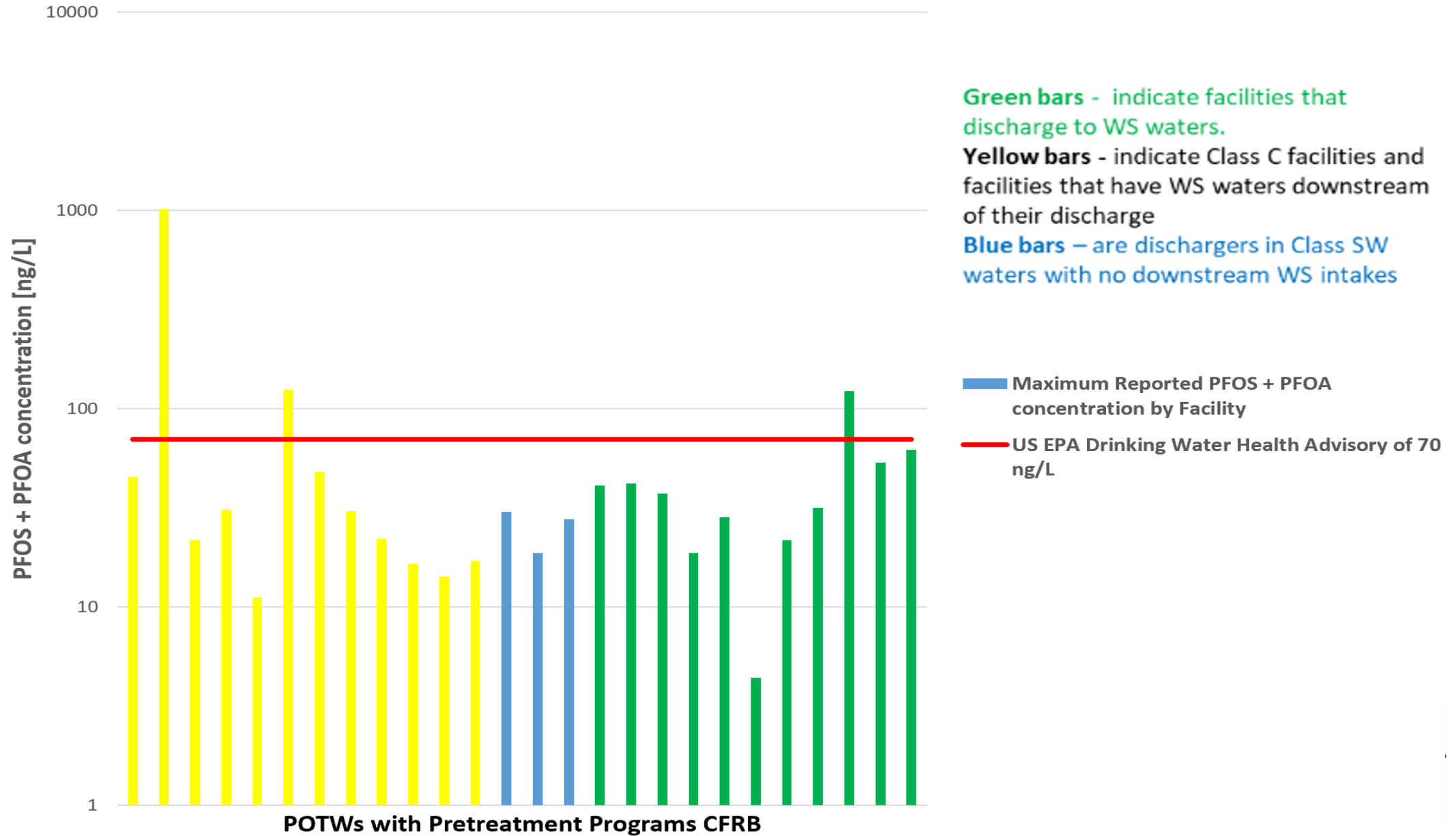
Industrial NPDES Permittees in the CFRB





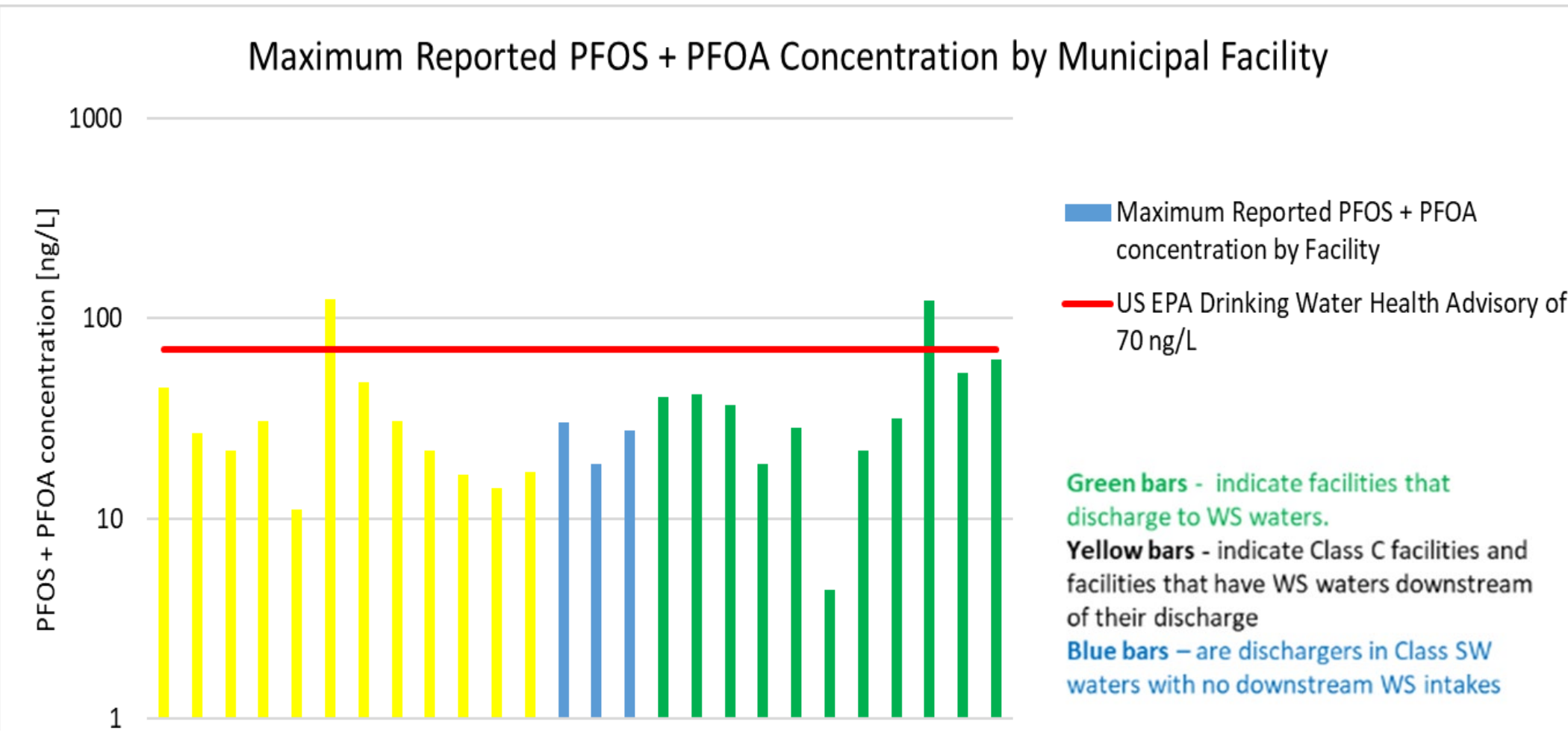
Influent Screening Results showing NC0024147 having the highest hit of PFOA+PFOS

Maximum Reported PFOS + PFOA Concentration by Municipal Facility





Comparison of Municipalities after 6 months of effluent sampling at NC0024147 (represented as 2nd yellow bar on graph).



Facilities with Pretreatment Programs in the CFRB



DWR and Emerging Compounds

OVERALL STRATEGY SUMMARY

Cape Fear River Basin

Focused on 1,4 Dioxane and PFAS

**Investigative & Ambient sampling in reservoirs,
groundwater wells, and PWS's**

Primary Goal to Protect Drinking Water Supplies

**Targeted Sampling of Municipalities and
Industries**

**Additional Monitoring of Identified Sources of
Concern**

**Collaborate with Municipalities to seek Source
Reductions**

**Use of Pretreatment Program Tools,
Corrective Action Plans in Permits, and
Enforcement Orders when necessary**

**Formalize an overall approach to source
identifications and source reductions and Restart
Process in another Basin**

Summary – Overview of PFAS analytes



Neuse PWS, Cape Fear River Basin's Jordan Lake, Municipalities, and Industries all depicted PFOS, PFOA, PFHpA as prevalent analytes. Excluding Neuse PWS sampling efforts, Cape Fear River Basin's Jordan Lake, Municipalities, and Industries also housed PFPeA and PFHxA at significant levels.

