

## Interim Report from UNC Wilmington for the Environmental Review Commission

Pursuant to Section 20(a)(2) of Session Law 2017-209 (House Bill 56, effective October 4, 2017), the University of North Carolina at Wilmington (UNCW) received \$250,000, in mid-November, from the Contingency and Emergency Fund. Subsequently, UNCW has implemented efforts to collect sediments from the Cape Fear River to be used for the identification and quantification of GenX and to conduct studies of GenX biodegradation and bioaccumulation. This work is in addition to ongoing analysis of water samples by UNCW under contract with the Cape Fear Public Utility Authority (CFPUA) and to other related work, such as two meetings of experts hosted by UNCW in December.

UNCW presented preliminary work plans to the House Select Committee on North Carolina Water Quality ([available at this link](#)) and to the Senate Select Committee on North Carolina River Water Quality ([available at this link](#)). Session Law 2017-209 calls for a final report on the work by UNCW on or before April 1, 2018. Some of the work, especially on biodegradation and bioaccumulation, will continue past that date. The following interim report outlines the process for sediment sampling and related progress up to this point.

- Objective 1: Cape Fear Public Utility quantification and identification of perfluorinated alkyl substances in raw and finished drinking water

*Personnel Involved:* Four senior faculty, one graduate student and one undergraduate student

*Status:* Weekly sampling of raw and finished water has begun for the targeted quantification of GenX and other perfluorinated alkyl substances (PFAS). To date, there are seven sampling events beginning November 15, 2017 (table 1). In addition, non-targeted analysis for other unknown PFAS compounds in the same samples by high resolution mass spectrometry has tentatively identified additional compounds. The data generated so far will be used by the utility to investigate the effectiveness of different filter media at removing PFAS.

Ancillary to the initial contract work, biosolids have also been analyzed for GenX which was detected in one out of three samples. The data generated was used by CFPUA to warrant a further, more comprehensive analysis of biosolids by a contract laboratory. Lastly, samples have been taken weekly from the discharge of the water from Westbrook aquifer and storage recovery project for PFAS analysis.

- Objective 2: Develop and implement the analysis of sediments

*Personnel involved:* Four senior faculty (same personnel as Objective 1), one post-doctoral associate, one graduate student and one undergraduate student

*Status:* A transect along the Cape Fear River has been sampled starting above the Chemours Fayetteville Works Facility with sample stations at Lock and Dam 3, Lock and Dam 2, and Lock and Dam 1 (Figure 1). In addition, sediment has been collected in the lower Cape Fear River to examine long-range sedimentary transport and fate of GenX (figure 2). Sediments are currently being processed and preliminary results indicate that sediments collected from William O. Huske Dam have measureable levels of GenX (1.3 pg/g ).

- Objective 3: Conduct biodegradation studies in sediments

*Personnel Involved:* Four senior faculty (same personnel as Objective 1), one post-doctoral associate (same personnel as Objective 1), one graduate student and one undergraduate student

*Status:* Based upon results from Objective 1, sites will be chosen to collect sediments that will be used for biodegradation studies. Incubations will start by the middle of February 2018.

- Objective 4: Bioaccumulation in ecosystem

*Personnel Involved:* Three senior faculty, two graduate students, one undergraduate Honors student, and a middle school student

*Status:* Preliminary experiments have begun looking at growth, survival and filtration rates over various environmental concentrations. Initial experiments have focused on examining the impacts of GenX on juvenile oysters (10-20 mm length) to determine ranges that may result in any effect on the ecological responses of oysters. Results suggest that very high concentrations (between 10 and 100 ppb nominal concentrations) may decrease filtration in oysters. Tissues samples will be analyzed for bioaccumulation along with other sub-lethal responses in oysters in the next set of experiments.

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Figure 1: Sediment and river water sample locations along the middle Cape Fear River sampled September and November 2017. The black arrows indicated sample locations while the red arrow in the manufacturing facility.

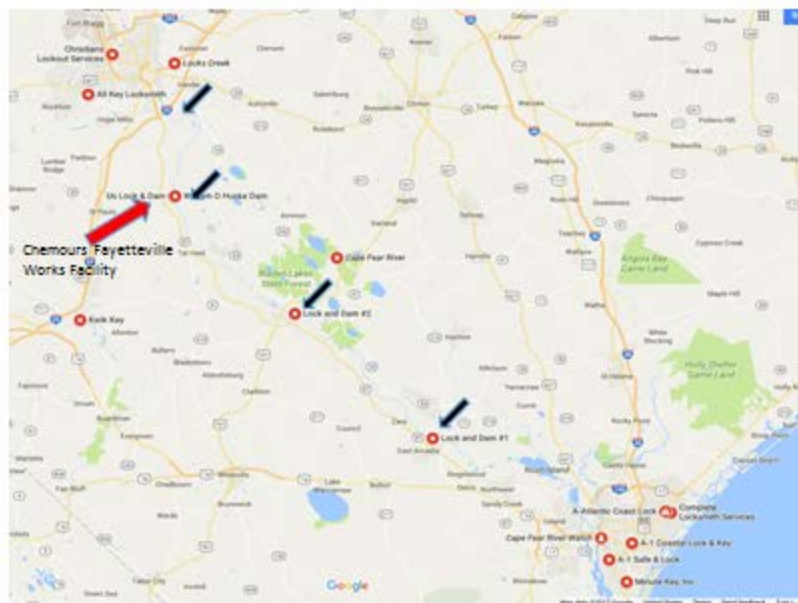


Figure 2: Sediment and river water sample locations along the lower Cape Fear River sampled September and November 2017. The black arrows indicated sample locations.

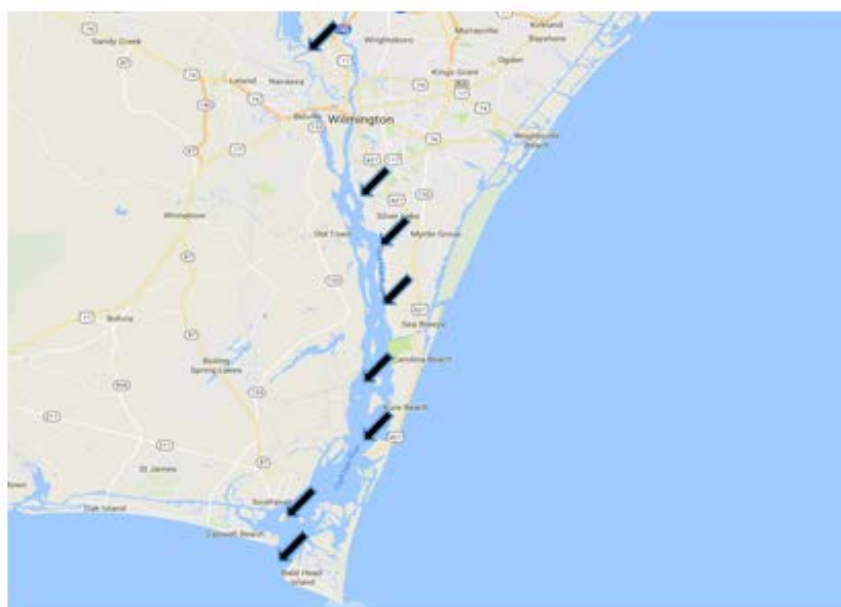


Table 1: Sample locations and dates for sediments and/or water samples

Location/Sample Type	Sample Dates
CFPUA Raw and Finished Water	Nov. 15, Nov. 22, Nov. 29, Dec. 6, Dec. 13, Dec. 21 and Dec. 28
CFPUA Biosolids	Sept. 19
Aquifer Storage and Recover (water only)	Sept. 21, Sept. 28, Oct. 4, Oct. 13, Oct. 19, Oct. 26, Nov. 1 and Nov. 7
Mid Cape Fear River (sediment and water)	September 19, 2017 and November 2, 2017
Lower Cape Fear River (sediment and water)	September 18, 2017 and October 23, 2017